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ABSTRACT

The manual focuses on the special needs of hearing impaired students who also have developmental disabilities. State of the art orientation and training materials for professionals are presented via 89 author contributed papers on nine topic areas (sample subtopics in parentheses): demographics (problems in identifying and defining multihandicapped hearing impaired students); assessment (integrating assessment and management, testing the difficult to test child, behavioral audiometry); communication (audiology, language and speech); instructional management (hearing impaired learning disabled students, curriculum development, behavior management, parent education); mental health issues (behavior and emotional problems of deaf children, family support programs); programmatic options (interagency services, residential programs, model programs for young deaf/emotionally disturbed children); personal preparation (computer assisted telecommunications); advocacy (vocational education and vocational rehabilitation, interagency coordination); and future needs (proceedings from a workshop on hearing impaired developmentally disabled children and adolescents). (CL)

HEARING IMPAIRED DEVELOPMENTALLY DISABLED CHILDREN AND ADOLESCENTS:

AN INTERDISCIPLINARY LOOK AT A SPECIAL POPULATION

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Participants, University Affiliated Facilities National Workshop on Hearing Impaired Developmentally Disabled Children and Adolescents

ASHA American Speech-Language-Hearing Association
10801 Rockville Pike • Rockville, Maryland 20852 • (301) 897-5700 (Voice or TTY)

May 12, 1982

Dear Colleague:

The American Speech-Language-Hearing Association (ASHA), in cooperation with Gallaudet College, is pleased to provide you with the enclosed Hearing Impaired Developmentally Disabled Children and Adolescents: An Interdisciplinary Look at a Special Population Workshop Manual prepared by Eileen Holzhauer, M.A., Project Manager, M. Kristin Hoff, Ph.D., and Evelyn Cherow, Project Director. The Manual was developed under Grant 90 DD 0005/01 to ASHA from the Administration on Developmental Disabilities (ADD), Department of Health and Human Services as a project of national significance for the purpose of improving services to children and adolescents with both hearing impairment and developmental disability. The thrust of this project is to update and disseminate materials developed under ADD Grant 54-P-71144/9-03 conducted by the University of Arizona and completed in 1979.

Interest in and concern for multihandicapped children have grown during the past few years. Programs for the hearing impaired in particular have been concerned because they have seen their populations changing to include more children identified as having disabilities in addition to hearing handicaps. These disabilities range in severity from mild behavior problems that inhibit learning to multiple organic and emotional involvements. We know that in and of itself, hearing loss is a complex and multifaceted handicap which not only disrupts the process of communication but also influences the pattern of educational, emotional, social and cognitive development. When one or more additional handicaps coexist with hearing loss, the ultimate effect is not simply additive in nature but rather synergistic due to the interaction of the handicaps.

The compiled materials herein address eight major topic areas impacting on the identification, education and rehabilitation of the hearing impaired developmentally disabled population: demographics, identification and assessment, communication, instructional management, mental health issues, programmatic options, personnel preparation, and advocacy. Additionally, as a result of futuring sessions conducted at the National Workshop for invited representatives of University Affiliated Facilities (UAF) (funded by the Administration on Developmental Disabilities), needs and trends for the target group in the 1980's will be identified in the areas of communication, mental health, and research; these will comprise the final section of this manual.

We hope that our workshops and Manual act as a catalyst to effect increased multidisciplinary efforts on behalf of the HIDD population. We believe that workshop replication and multiple usage of these materials will heighten professional sensitivity to the broad scope of issues and concerns of import to the hearing impaired developmentally disabled; therefore, improving accessibility and quality of services extant in these times of limited program expansion.

We are very appreciative of the assistance and support received from innumerable sources in the preparation of this Workshop Manual as well as in the planning for the national and regional training workshops. Thelma Lucas, Project Officer from the Administration on Developmental Disabilities, provided steadfast guidance in facilitating project planning and implementation. Boris Bogatz, Assistant Dean, School of Education and Human Services, Gallaudet College, offered considerable time, energy and ingenuity in coordinating efforts of all collegiate Departments in the production of the Manual and both National UAF and Mid-Atlantic Regional Workshops. Charlotte Hawkins-Shepard and the Gallaudet Research Institute extended expert content and editorial assistance. The Project Advisory Committee and National Workshop Faculty listed within furnished invaluable original articles, critiques, and references from which to select the included manual materials. Larry Stewart, former Project Director of the Arizona Model Demonstration Project (MDP) To Improve Services to HIDD, contributed his counsel in selecting and revising those MDP materials appropriate to the times and needs of children with hearing impairment and developmental disabilities.

We are pleased that ASHA has had the opportunity to provide the forum and materials to effect increased professional dialogue and resultant improved service delivery to these special children and young people. We dedicate our efforts to them.

Sincerely,

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HEARING IMPAIRED DEVELOPMENTALLY DISABLED CHILDREN AND ADOLESCENTS INDIVIDUALS WITH EXTRA SPECIAL NEEDS

The American Speech-Language-Hearing Association, in cooperation with Gallaudet College, is conducting a project to assist states to develop and improve services to children and adolescents with both hearing and developmental disability. This project is funded as a grant of national significance by the Administration on Developmental Disabilities.

Major Project Objectives:

To develop materials which describe the special needs of individuals developmentally disabled by highlighting the synergistic consequences of a hearing impairment for children who have concommitant developmental disabilities.

To compile state-of-the-art orientation and training materials to assist professionals to tailor their services to meet the assessment, communication, education, habilitation, and advocacy needs of developmentally disabled children who have a hearing impairment.

To encourage collaboration among university-affiliated facilities in their service, training, and research mission on behalf of this population by conducting a National Training Workshop.

To review and disseminate a competency-based specialization program for the preparation of teachers of hearing impaired multihandicapped children.

To provide professionals from all regions of the United States and from different disciplinary backgrounds the opportunity to meet at four Regional Workshops to learn more about service frameworks for HIDD children and adolescents.

To develop or identify an information exchange network which provides for the wide range of professionals who work with hearing impaired developmentally disabled children.

To establish a Resource Center for future inquiries to insure continuing dissemination of information concerning hearing impaired developmentally disabled children.

Major Training and Dissemination Activities:

A *National Workshop* for representatives from 36 university-affiliated facilities to be held May 12-14, 1982 at Gallaudet College, Washington, D.C.

Four Regional Workshops to be held:

June 18-19, 1982 at Gallaudet College, Washington, D.C.
July 9-10, 1982 at Gallaudet Extension Site, Kansas City, Missouri
July 29-30, 1982 at Eugene, Oregon
August 13-14, 1982 at Gallaudet Extension Center, Haverhill, Massachusetts

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DEMOGRAPHICS AND DESCRIPTION OF THE POPULATION

Interest in and concern for multihandicapped children has grown during the past few years. Programs for the hearing impaired in particular have been concerned as their populations have changed to include more children identified as having disabilities in addition to hearing handicaps. These disabilities range in severity from mild behavior problems that inhibit learning to multiple organic and emotional involvements.

> The multihandicapped constitute a large number of persons still left in institutions for the mentally retarded, or severely underserved in existing community programs. The hearing impaired person is quite frequently undiscovered as such, or poorly served due to lack of specialized staff or adequate curriculum. (Administration on Development Disabilities, 1981)

Surveys of educational programs serving the hearing impaired compiled by the Office of Demographic Studies at Gallaudet College for the Deaf show that the population of children with more than one additional handicapping condition has grown rapidly. In the years covered in the survey, 1968-1972, incidence figures indicate that this population has doubled--from approximately 8,900 in 1968, to approximately 16,400 in 1972. (Office of Demographic Studies, 1973).

Additional studies indicate that of 45,000 school aged children with hearing impairments, approximately 21% had one additional handicapping condition, and 11% had two or more additional handicapping conditions. These figures do not include those children with one or more handicapping conditions that are presently being served in educational programs other than for the hearing impaired.

Major portions of this introduction have been excerpted from the grant proposal for the HI-DD project. Authored by Evelyn Cherow, M.A., Charles Diggs, Ph.D., and Peggy Williams, Ph.D. for the American Speech-Language-Hearing Association.

> The great increase in recent years in the number of deaf children with additional handicaps is one of the most urgent problems confronting those concerned with deaf individuals. The numbers of such children have risen to more than 8,000 in 1968 (Rawlings and Gentile, 1970); up from 1,069 in 1954 and 3,050 in 1960 (Weir, 1963). The relative incidence of multiple disabilities among deaf children has also grown, and is unlikely to decline in the near future (Vernon, 1970). Problems and Programs in the Education of Multiply Disabled Deaf Children, (Power and Quigley, 1971).

In and of itself, hearing loss is a complex and multifaceted handicap which not only disrupts the process of communication but also has consequent effects on educational, emotional, social and psychological development. When one or more additional handicaps coexist with hearing loss, the ultimate effect is not simply additive in nature but rather synergistic due to the interaction of the handicaps. The effect of hearing loss in isolation, the compounding effect of other handicapping conditions which commonly present in the developmental disability population, current educational approaches for serving this population, and the issues concerning multidisciplinary service models are discussed in the various sections included in the training manual.

a. Hearing Loss

The auditory modality serves several functions for the human being including: 1) development and maintenance of oral communication; 2) monitoring of the individual's surroundings; 3) contribution to the educational and/or vocational processes; and 4) facilitation of successful social and emotional interaction of the individual with other persons. When the hearing sense is impaired, at any age, compensatory measures must be activated to some degree in each of the above areas.

As stated by Weir (1980):

> The primacy of the ear in speech and language acquisition is well illustrated by the simple observation that infants born into all the diverse language milieus of the world learn to speak and communicate in the language used in their environment. The normal-hearing child's exposure to the ongoing speech and language activity that surrounds him appears to be a sufficient trigger to initiate the complicated combination of cognitive and linguistic processes required to support speech and language. Witness to this is the fact that well before an age at which any formal instruction occurs in most cultures, children acquire essentially all the basic grammatical structures they will use as adults.
>
> Unfortunately, the situation is very different for the hearing-impaired child. Unless an early and ongoing strategy of explicit speech and language training is initiated, the hearing-impaired child will not acquire the speech and language skills of his hearing peers. Without amplification, a child with a severe hearing loss is just able to detect conversational speech spoken at a distance of one meter. There is simply not enough auditory information available in such a degraded signal to elicit appropriate responses from the infant.

Further, Weir points to the complicating effects of hearing loss on the young child's world;

> Hearing loss in an infant or young child is associated with a broad range of problems, including: (1) delay, or even an absence, of speech and language development; (2) deterioration or failure to develop healthy parent-child relationships due to a failure to obtain expected behavioral responses on the part of both parents and child; (3) psychological and social problems ranging from withdrawal from interpersonal relationships to hyperactivity or "acting out" behaviors; and (4) educational retardation or failure (Gregory, 1976).

Early identification of hearing loss has always been a perplexing issue due to the "hidden" aspect of the handicap.

b. Other Handicapping Conditions

A number of handicapping conditions are included in the developmental disability population. These conditions are enumerated and defined in Appendix A. The impact of two of these conditions which are often concomitant with hearing loss are discussed below.

- Mental Retardation

The presence of hearing loss alone reduces an individual's contact with physical and social worlds. When retardation is present, with its consequent reduction in cognitive functioning, the meaningfulness of even this limited contact is seriously questionable.

Hearing loss itself restricts the mentally retarded's input about the world so that functional abilities and cognitive skills are further depressed. Furthermore, input from sensory modalities other than audition cannot be utilized maximally due to reduced cognitive processes such as attention and memory. This, in turn, further impairs the full use of residual hearing. The end result is a debilitating cycle of functional impairment and social inadequacy.

The effects on the expressive area of language development best exemplifies the severe sequalae of concomitant hearing loss and mental retardation. According to Bever (1970), Schlesinger (1974), and others, language exists as a result of the human's mental capacities. Languages of the world are similar and have universal properties in common because persons everywhere have similar cognitive capacities; the mentally retarded are an exception.

As Sinclair-de Zwart (1973) indicates, from a Piagetian perspective, a child develops cognitive structures "composed of systems of action" from which more sophisticated cognitive structures emerge later. These systems of action are sensorimotor schemes in which the child can act upon objects and classify types of action so that the child, in his/her own cognitive schema, becomes distinct from the objects in the environment and can perform actions upon them. The system then allows for the mental representation of meanings, such as agent, action, object and the relationships among them (Sinclair, 1971).

These early cognitive structures form a universal base of meaning and contribute to the discovery that Linguistic utterances express these very meanings and relationsips. The mentally retarded child, reduced in cognitive areas such as perception, memory, selective attention, inferential reasoning, and conceptual understanding, finds development of the underlying representation of meaning difficult and consequently the development of language is affected.

The hearing impaired mentally retarded child is further deprived of the informal assistance in cognitive development provided by primary caregivers who organize the child's world to some extent via the language spoken to their children. Such organization is facilitated by the short, simple, and redundant utterances which are typically used in interaction between caregivers and children (Broen, 1972; Nelson, 1973; Newport, 1976; Phillips, 1973; Sacks, Brown, and Salerno, 1972; Snow, 1972). Use of such linguistic forms likewise assists the child in the development of the particular form of language which is utilized to express the underlying cognitive referent.

Certainly, sign language can have the same beneficial results as oral language in cognitive growth and development of a communication system. However, hearing parents typically are delayed in assisting their hearing impaired children develop this language symbol system.

The spiral of handicap continues because of the intimate relationship between language and the educational process. As Hall and Tomblin (1978)indicate, "there is a continuing limitation in educational achievement associated with the presence of a language impairment, with this limitation extending into adulthood." More specifically,

> . . .the pattern of performance on the Iowa Tests for the language-impaired children showed a definite and persistent limitation in achievement in the area of reading accompanied by equally persistent but less profound restrictions in other academic areas (Hall and Tomblin, 1978).

Likewise, limited language use alters the relationship between the handicapped and others within his social world. A sense of social isolation arises not only from the physical hearing loss as discussed earlier, but also from a tendency to avoid difficult situations like communication. Reduced knowledge of a language system exacerbates the lack of communication of thoughts and feelings which is often cited as the most common source of difficulties within families.

The ultimate picture of the hearing impaired mentally retarded child is one of considerable cognitive, sensory communicative, social, and emotional deficit. It is a profile which presents unique problems which cannot be attributed to retardation or to hearing loss in isolation but rather is attributed to their complex interaction.

- Cerebral Palsy

The neuromuscular abberations associated with cerebral palsy often limit the mobility of such individuals and affect skills of everyday life functioning such as bathing, grooming, dressing, toileting, walking, and communication. Such effects are only a small portion of the constellation of symptoms which the cerebral palsied individual may present. Associated disabilities commonly include:

- visual impairments (muscle imbalance, hyperopia, acuity deviations, etc.;
- auditory impairments;
- mental retardation;
- seizures;
- perceptual-motor dysfunction; and
- speech and language problems. (Cruickshank, 1976):

Much of the impact of mental retardation upon the child can be reiterated for the child with cerebral palsy. Even those individuals with cerebral palsy and normal intelligence may present slowed cognitive development due to their motoric disability alone. To repeat the viewpoint of Sinclair-de Zwart (1973), the child develops cognition via sensorimotor schemes which are based on his/her ability to interact and to move around within the environment. If motoric problems are severe, the child will be able to manipulate the environment with great difficulty at best, and cognitive development will be reduced. If visual or auditory problems are also present sensory input about the environment will also be reduced, and cognitive development will be even more delayed.

Also contributory to reduced language ability and consequently reduced educational success is the nature of the interaction between parent and child. The parent of the cerebral-palsied child may require special training to present the same degree of language stimulation which parents typically present to motorically intact infants in similar situations.

The addition of significant hearing loss to the above problems makes language learning quite an arduous task. Similar to the mentally retarded hearing impaired, the cerebral-palsied individual with impaired hearing must overcome a handicap of significant dimension.

Overview of Chapter One

In this introductory chapter, materials are included to address several objectives:

- To define this population of children and adolescents in terms of handicapping conditions, functional capabilities, and educational/medical and related service needs.
- To describe patterns of multiple handicaps in MHHI children and youth and to emphasize the synergistic consequences of deafness on other handicapping conditions.
- To describe certain changes in the demographic characteristics of the HIDD population over time.
- To present descriptions of major handicapping conditions and prenatal and post-natal causes of hearing impairment and concomitant disabilities (mental retardation, cerebral palsy, visual impairments, behavioral and emotional disorders, and autism).
- To overview types of services for the MHHI population and to describe current educational/residential placements for MHHI children and youth.

The initial materials in this section have been contributed by the National Academy of Gallaudet College; these materials summarize major national findings regarding the demographic characteristics of the hearing impaired population. It should be noted that these summaries reflect on characteristics of the entire hearing-impaired population, and provide some statistics which are helpful in placing the MHHI population in the context of the deaf community as a whole.

Indeed, defining this special population of children is problematic in itself. In his paper "Problems of Identification and Definition of Multihandicapped Hearing Impaired Students" (1982), Tom Jones of Gallaudet College provides a useful summation of some of the definitions of the MHHI population which appear in the literature, as well as a discussion of the educational implications of using the terminology "MHHI" to describe diverse groups of children.

Both Jones' paper and the definition used in the ODS studies and related literature views the child's handicapping condition(s) in terms of the <u>educational significance</u> of the impairment. This definition is most similar to the definition of handicapping condition in P.L. 94-142, which denotes a handicap both by type of condition and by the child's need for special education services. In contrast, the definition of developmental disability in P.L. 95-602, "is based solely on an individual's functional limitations and need for services, other than the diagnosis or nature of his or her disabling condition." (OHDS, Administration on Developmental Disabilities, May, 1981). Federal definitions of "handicapping condition," based on P.L. 94-142 and "developmental disability" (the P.L. 95-602 definition, as amended) are included in this section.

In reconciling these service-oriented definitons with other population definitions, it should be noted that the majority of children in the HI-DD population meet the basic eligibility requirements to receive services. However, each multihandicapped child may require a multiplicity of specialized services, not limited to special education services, over time. Moreover, the hearing impaired developmentally disabled child may be served in a variety of educational settings ranging from residential placements to supported classroom placements in the regular school setting. As an introduction to some of the demographic and service characteristics of the population, "Educational Significance of Hearing Loss at Three Levels of Severity" from the Office of Demographic Studies (ODS), Gallaudet College, is included here. Other materials from ODS are valuable resources for any professional working with the MHHI population.

Lastly, two selections overview the charcteristics of hearing impaired developmentally disabled children in terms of the etiology of handicapping conditions and the resulting patterns of disabilities.The first of these articles, "The Demographics of Deafness Resulting from Maternal Rubella" gives a general description of this subpopulation of hearing impaired children. The second selection, excerpted from materials prepared by the Demonstration Project at the University of Arizona, overviews the etiology and major characteristics of disabilities affecting HI-DD children and adolescents.

Further information about the demographic and service characteristics of this population can be found in other sections of the training manual--notably in Identification and Assessment; Instructional Management; and Programmatic Options. Further clarifications concerning Federal definitions under P.L. 94-142 and the Developmental Disabilities Act are covered in detail under Section VI, "Advocacy and Legal Issues."

The National Census of the Deaf Population (Schein and Delk, 1974) indicated a hearing impaired population of 13.4 million. Within this group 6.5 million had bilaterally severe hearing impairments and of this group 1.8 million were identified as deaf.

Ninety-five percent of deaf children of primary school age were either born deaf (90%) or were deafened before age 2 (5%).

The proportion of deaf persons in the population has remained relatively constant for the last one hundred years. However, the rubella epidemic of 1964-65 doubled the number of hearing-impaired children born during that period. This means twice the normal deaf adult population for the next 50 years or so.

General incidence figures suggest that the numbers of multiply handicapped deaf students are increasing rapidly. Present figures vary but estimates indicate that one-fourth to one-third of the deaf students in the U.S. could have an additional handicap.

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Prepared by: Office of Demographic Studies
Gallaudet College

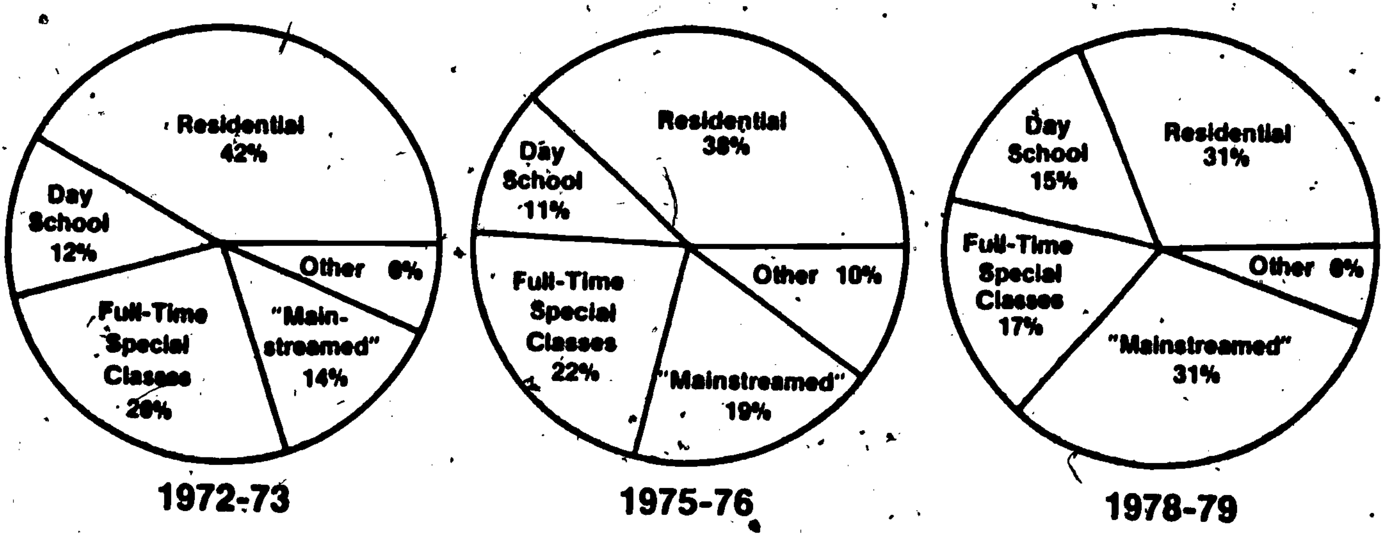
ESTIMATES OF THOSE WITH HEARING LOSSES

New England	Total General Population*	Hearing Impaired	Significant Bilateral Loss	Deaf	Prevocationally Deaf
Maine	1,091,000	65,000	28,000	7,500	2,000
New Hampshire	871,000	52,000	22,000	6,000	1,500
Vermont	487,000	29,000	12,500	3,500	1,000
Massachusetts	5,774,000	345,000	147,000	40,000	10,000
Rhode Island	935,000	56,000	24,000	6,500	1,500
Connecticut	3,099,000	185,000	79,000	21,500	5,500
Middle Atlantic					
New York	17,748,000	1,061,000	452,000	123,500	30,500
New Jersey	7,327,000	438,000	186,500	51,000	12,500
Pennsylvania	11,750,000	702,500	299,500	82,000	20,500
E.N. Central					
Ohio	10,749,000	705,500	362,000	103,500	26,000
Indiana	5,374,000	352,500	181,000	52,000	13,000
Illinois	11,243,000	738,000	379,000	108,500	27,000
Michigan	9,189,000	603,000	309,500	88,500	22,500
Wisconsin	4,679,000	307,000	157,500	45,000	11,500
W.N. Central					
Minnesota	4,008,000	263,000	135,000	38,500	9,500
Iowa	2,896,000	190,000	97,500	28,000	7,000
Missouri	4,860,000	319,000	164,000	47,000	12,000
North Dakota	652,000	43,000	22,000	6,500	1,500
South Dakota	680,000	45,500	23,500	6,500	1,500
Nebraska	1,565,000	102,500	52,500	15,000	4,000
Kansas	2,348,000	154,000	79,000	22,500	5,500
S. Atlantic					
Delaware	583,000	39,500	20,000	5,000	1,000
Maryland	4,143,000	282,000	141,000	37,000	8,000
D.C.	674,000	46,000	23,000	6,000	1,500
Virginia	5,148,000	350,500	175,500	46,000	10,000
West Virginia	1,860,000	126,500	63,500	16,500	3,500
North Carolina	5,577,000	379,500	190,000	50,000	11,000
South Carolina	2,918,000	198,500	99,500	26,000	5,500
Georgia	5,084,000	346,000	173,000	45,500	10,000
Florida	8,594,000	585,000	293,000	77,000	17,000
E.S. Central					
Kentucky	3,498,000	238,000	119,000	31,500	7,000
Tennessee	4,357,000	296,500	148,500	39,000	8,500
Alabama	3,742,000	254,500	127,500	33,500	7,500
Mississippi	2,404,000	163,500	82,000	21,500	4,500
W.S. Central					
Arkansas	2,186,000	149,000	74,500	19,500	4,500
Louisiana	3,966,000	270,000	135,000	35,500	7,500
Oklahoma	2,880,000	196,000	98,000	26,000	5,500
Texas	13,014,000	886,000	443,500	116,500	25,500
Mountain					
Montana	785,000	56,500	29,000	7,500	1,500
Idaho	878,000	63,000	32,000	8,000	1,500
Wyoming	424,000	30,500	15,500	4,000	1,000
Colorado	2,670,000	191,500	98,000	25,000	5,000
New Mexico	1,212,000	87,000	44,500	11,500	2,500
Arizona	2,354,000	169,000	86,500	22,000	4,500
Utah	1,307,000	93,500	48,000	12,000	2,500
Nevada	660,000	47,500	24,000	6,000	1,500
Pacific					
Washington	3,774,000	270,500	138,500	35,000	7,500
Oregon	2,444,000	175,000	89,500	23,000	4,500
California	22,294,000	1,598,500	817,500	207,500	43,000
Alaska	403,000	29,000	15,000	4,000	1,000
Hawaii	897,000	64,500	33,000	8,500	1,500

Hearing Impaired = any degree of hearing loss in one or both ears.
Significant Bilateral Loss = those hearing impaired who have substantial difficulty hearing in both ears.
Deaf = cannot hear and understand speech.
Prevocationally Deaf = those who became deaf prior to 19 years of age.

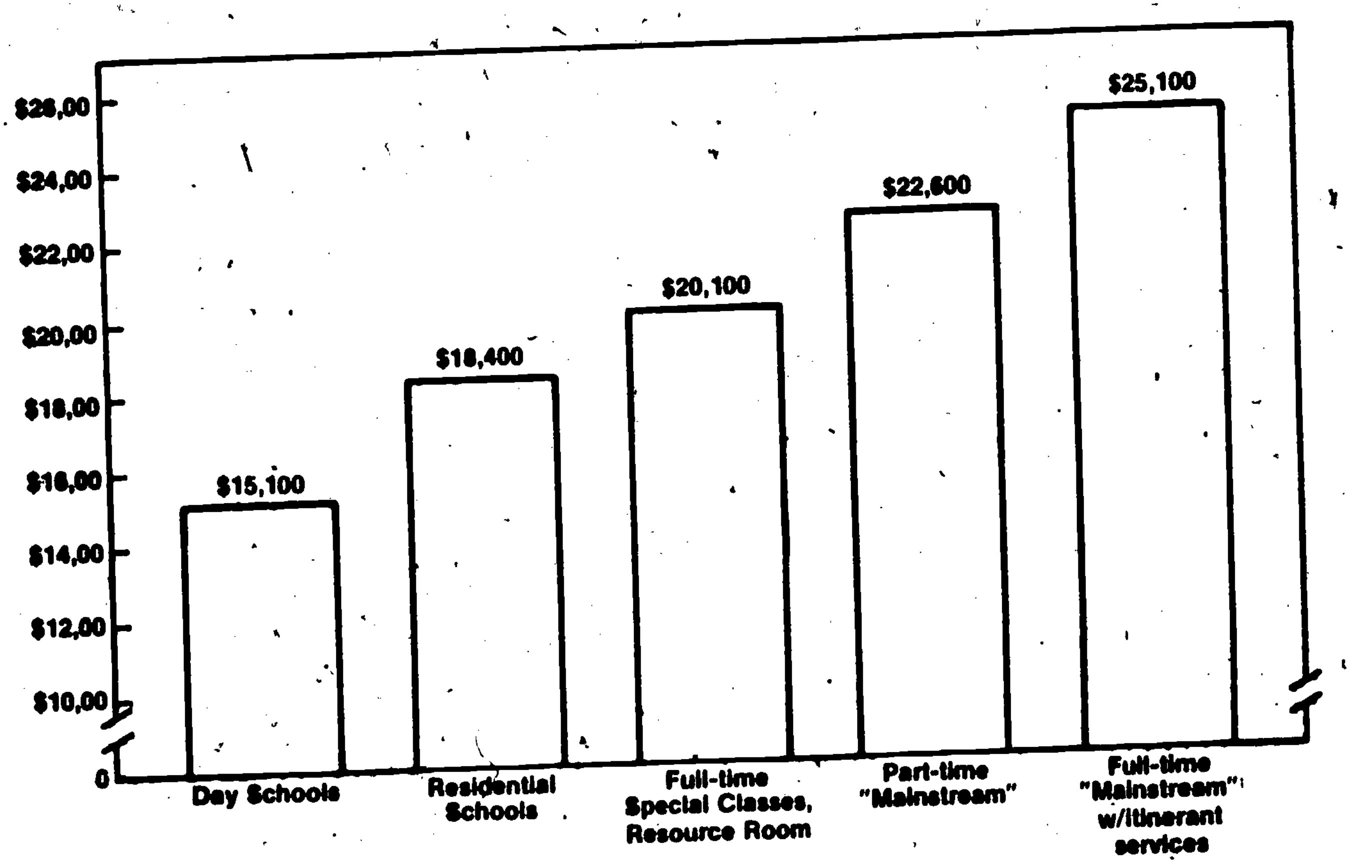
*U.S. Bureau of Census - July 1, 1978

Enrollments by Program Type



Hearing-impaired children attend a significant variety of types of educational experiences. The most striking changes are that the proportion of deaf children attending residential schools has dropped significantly while the proportion attending mainstream programs has increased. There are both advantages and disadvantages to this trend.

Family Income by Program Type



[Note: Data were collected in 1974, but have been presented here in 1980 equivalents using consumer price index adjustments: 1974 = 148, 1980 = 247.]

Mainstream or integrated educational settings are highly correlated with the highest levels of average family income. Schools for the deaf, whether day or residential, are associated with significantly lower family income and educational levels.

Parental Deafness

Two Deaf Parents	**2.3-3.1%**
One Deaf Parent	**2.3-5.8%**

Only 2.3 to 3.1% of deaf children have deaf parents. Deaf children of deaf parents perform significantly more successful on a wide variety of measures including linguistic competence, intelligence, and academic achievement. Research also indicates better social/emotional adjustment with fewer behavioral problems among deaf children who have two deaf parents than among deaf children who have one or no deaf parents.

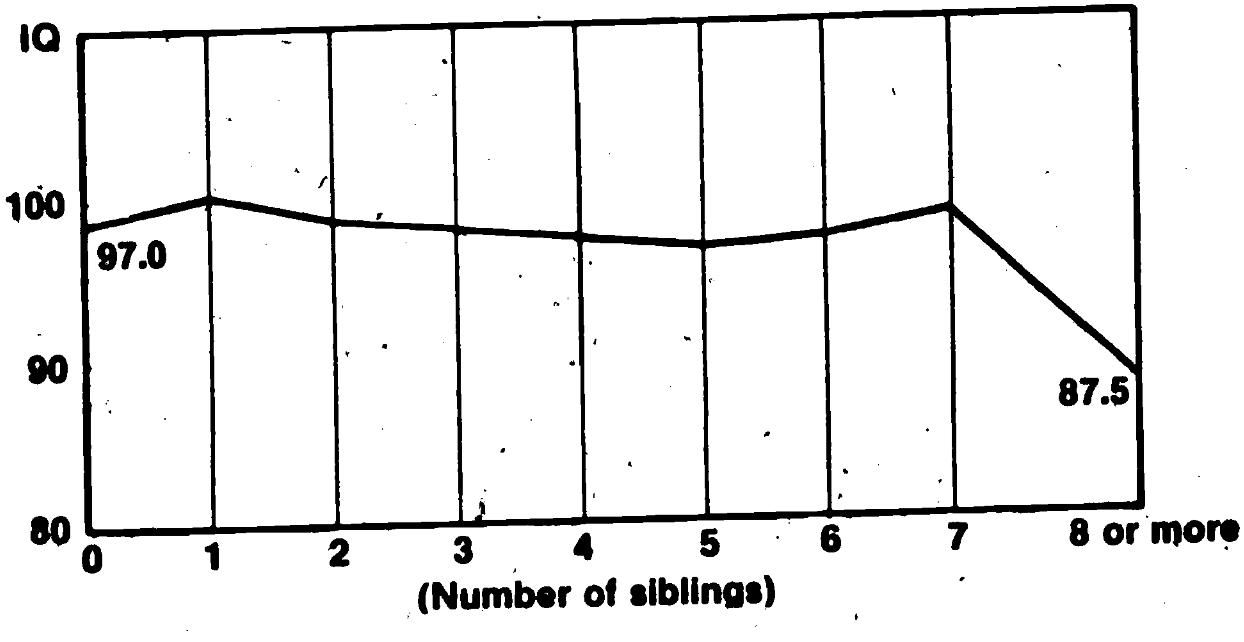
Rate of Emotional/Behavioral Problems

Two Deaf Parents	**5%**
None or One Deaf Parent	**9.2%**

Family Size

Number of Children	General Population	Women with at least 1 HI child
One	26%	8%
Two	32%	22%
Three	21%	26%
Four	11%	17%
Five or more	11%	28%
Mean number of children	2.1	3.2

Number of Siblings & Nonverbal IQ (1970-71)



Families with hearing-impaired children tend to be slightly larger than families in general. The nonverbal IQ score of school aged hearing-impaired children is highest when there is zero or one sibling; the average drops for each additional sibling.

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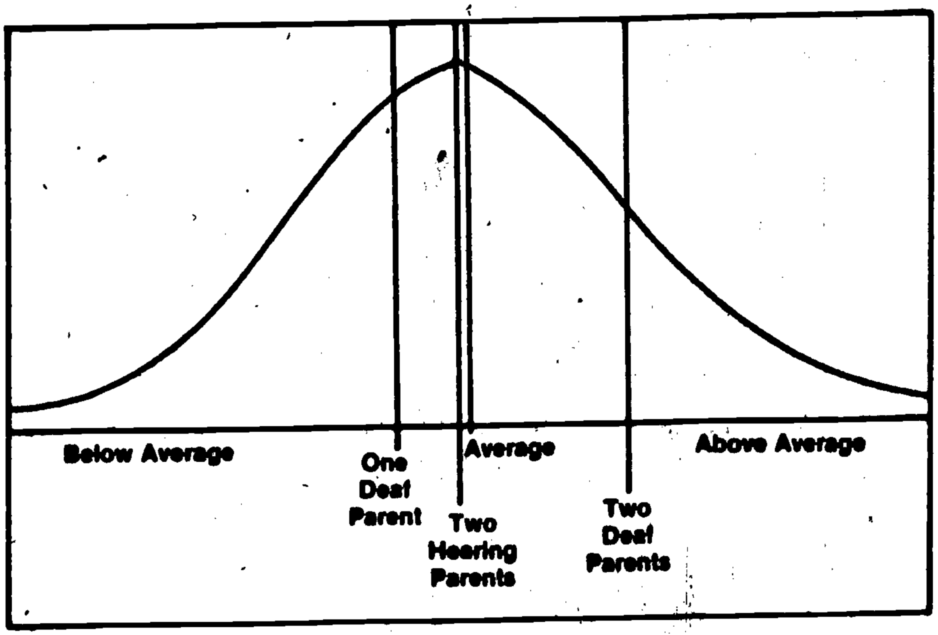
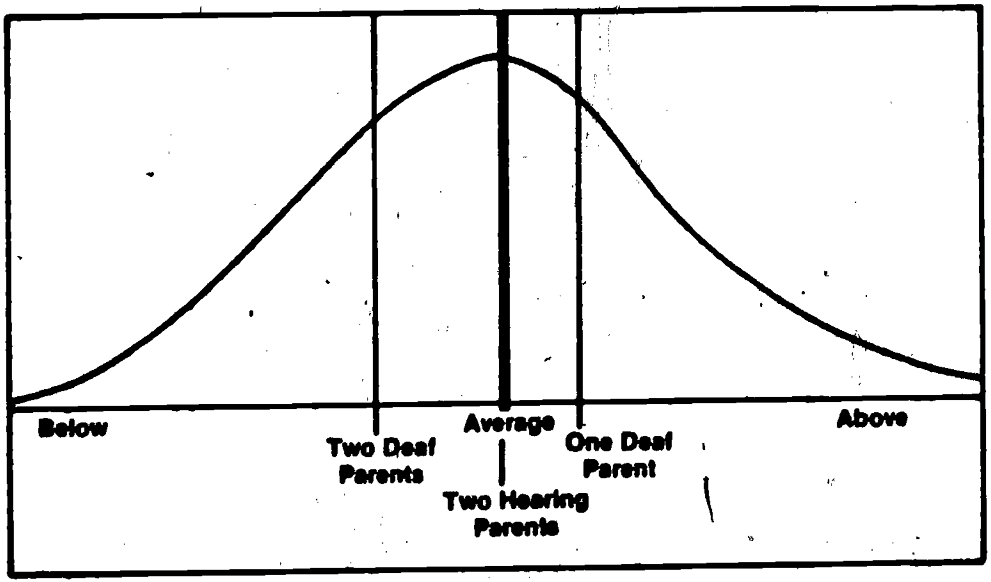
Sign Use



Speech Use



Children with two deaf parents are significantly above average in use of signs, and significantly below average in the use of oral speech. In contrast, children with one deaf and one hearing parent are much more like the group with two hearing parents, but are, if anything, even less manually oriented and more orally oriented than are the children with two hearing parents.

Correlation Data

Between parental use of speech and teacher use of speech	**.22**
Between parental use of signing and teacher use of signing	**.39**

Despite the importance of consistency in communication there tends to be very little agreement between parents and teachers on the communication style used with deaf children.

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Emotional/Behavioral Problems by Cause

Maternal Rubella (7,718)	11.1%
Perinatal Trauma (1,001)	10.7%
Prematurity (2,259)	10.5%
Complications of Pregnancy (1,415)	10.1%
High Fever (1,012)	9.9%
Trauma After Birth (403)	9.4%
Meningitis	8.0%
Otitis Media	7.4%
Rh Incompatibility	7.0%
Measles	6.6%
Heredity	6.2%
Mumps	4.8%

Since a wide variety of conditions and disorders can produce hearing loss in children or in adults, a collateral question is the extent to which the cause of the hearing loss has an impact on the likelihood of the child exhibiting emotional/behavioral problems. From the table above it is clear that the rate of emotional/behavioral problems associated with maternal rubella as a cause of deafness is more than double the rate associated with deafness resulting from mumps, for example. An examination of the causes associated with the highest rates of emotional/behavioral disturbances suggests strongly that, in at least a large proportion of the cases, the emotional/behavioral is a consequence of neurological damage to the organism and is, therefore, important background data.

Emotional Behavioral Problems

Associated with:

Brain Damage	26%
Perceptual-Motor	26%
Epilepsy	19%
Mental Retardation	17%
Severe Visual	15%
Heart Disorders	14%
Orthopedic Impairment	9%
Cerebral Palsy	8%
No AHC	5%

ASSOCIATIONS WITH OTHER HANDICAPPING CONDITIONS

The likelihood of an emotional/behavioral disturbance in a hearing impaired child is greatly increased if the child has other handicapping conditions in addition to the hearing loss. The table above shows that the rate of emotional/behavioral problems among deaf children with no additional handicapping conditions is 5%. At the other extreme, 26% of deaf children with secondary neurological handicaps are also reported to exhibit emotional or behavioral disturbances. Again, at least the first four handicapping conditions listed in the table appear clearly associated with neurological impairments in the organism. However, the table also shows increased likelihood of emotional/behavioral problems when such additional disorders as visual or heart problems are part of the picture. This would suggest at least two possibilities. On the one hand, the stress of living with these additional disabilities may give rise to problems of adjustment. As an alternative explanation, severe visual problems and heart disorders are particularly frequently associated with maternal rubella as a cause of deafness. In these cases, the emotional or behavioral disorder might also be viewed as evidence of neurological damage to the organism resulting from the presence of the virus during fetal development.

Percent of Programs Reporting Availability of Specified Support Staff

Program Type	Psychologist	Guidance Counselor	Vocational Rehabilitation Counseling
Residential Schools for the Deaf	62	63	34
Residential Schools for the Multiply Handicapped	77	15	26
Day Schools for the Deaf	40	16	4
Day Schools for the Multiply Handicapped	63	19	11
School Districts Offering Full-Time Classes Only	54	16	8
School Districts Offering Part-Time Classes and Services	48	21	8
Total All Programs	52	23	11

Given the nature and extent of emotional and behavioral problems of deaf children, one might suppose that substantial numbers of qualified personnel would be avilable in school programs to provide necessary services. The table above indicates that this is far from the case. Psychologists are available in only half of the school programs, guidance counselors in one out of four and vocational rehabilitation counselors in only one out of nine. These data, of course, say nothing about the experience or quality of these individuals, but reflect simply the availability. The table below reports the availability of genetic counseling services, sex education programs, and parent training programs in the various types of educational programs. Again, the situation is far from ideal.

Percent of Programs Reporting Availability of Specified Medical and Other Services

Program Type	Genetic Counseling	Sex Education	Parent Training Program
Residential Schools for the Deaf	16%	66%	61%
Residential Schools for the Multiply Handicapped	36%	50%	26%
Day Schools for the Deaf	16%	46%	72%
Day Schools for the Multiply Handicapped	33%	42%	67%
School Districts Offering Full-Time Classes Only	2%	40%	43%
School Districts Offering Part-Time Classes and Services	7%	39%	56%
Total All Programs	16%	46%	54%

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RECOMMENDED "MINIMUM STANDARD" COMPETENCIES REQUIRED FOR PSYCHOLOGICAL PRACTICE WITH A DEAF CLIENT

1. ABILITY TO USE THE FULL RANGE OF COMMUNICATIVE MODES, BOTH RECEPTIVE AND EXPRESSIVE USED BY DEAF PERSONS
2. KNOWLEDGE OF THE IMPLICATIONS OF THE VARIOUS DEGREES AND TYPES OF HEARING LOSS AND THEIR AMPLIFICATION POSSIBILITIES
3. KNOWLEDGE OF THE DEAF CULTURE, THE DEAF COMMUNITY AND DEAF PERSONS
4. KNOWLEDGE OF THE FULL RANGE OF POTENTIALS AND ABILITIES OF HEARING IMPAIRED PERSONS
5. KNOWLEDGE OF THE LANGUAGE, THINKING PATTERNS, AND CONCEPTS TO BE FOUND AMONG THE DEAF
6. KNOWLEDGE OF PSYCHOLOGICAL TECHNIQUES AND PSYCHOMETRICS APPROPRIATE FOR A GIVEN HEARING HEARING IMPAIRED CLIENT
7. SKILLS IN INTERPERSONAL RELATIONS IN WORKING WITH HEARING IMPAIRED PERSONS, THEIR FAMILIES, AND OTHER PROFESSIONALS
8. KNOWLEDGE OF LEARNING PATTERNS, EXCEPTIONALITIES AND EDUCATIONAL PRACTICES COMMON AMONG THE HEARING IMPAIRED
9. KNOWLEDGE OF INDIVIDUAL DIFFERENCES AMONG THE HEARING IMPAIRED
10. REALISTIC TIME-LINE IN WORK WITH THE HEARING IMPAIRED.

(Brauer, 1981)

PROBLEMS IN IDENTIFICATION AND DEFINITION OF MULTIHANDICAPPED HEARING IMPAIRED STUDENTS

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Multihandicapped hearing impaired (MHHI) students are an extremely heterogeneous group with complex educational needs. This heterogeneity coupled with inconsistent terminology and lack of understanding of their additional handicaps can impede identification and effective service delivery.

Identification of MHHI students often considers the educational significance of their handicaps accompanying deafness. Educational significance should be based on need rather than medical diagnosis or failure in established programs. Similarly, educational needs can provide a basis for classification of MHHI students when such classification would improve educational decision making.

This article has been submitted to Directions magazine for publication. It is included with permission of the author and Directions magazine.

Interest in education of hearing impaired students with additional handicaps has increased greatly in recent years. This increase is evidenced by a surge of articles and books concerned with this topic. Any attempt to plan service for MHHI students or to synthesize and generalize from the presently available literature, however, is hindered by a lack of common terminology and understanding of the characteristics and needs of the students involved. Indeed some people may use the same term to describe groups of students with almost no characteristics in common or may use different terms to describe groups with very similar characteristics! Some authors however, have consistently emphasized the need for standardized terminology to improve services for multihandicapped hearing impaired students (MHHI) (e.g., Dibenedetto, 1976; Flathouse, 1979, 1982; Griffing, 1981; Hardy & Bordley, 1973; Leenhouts, 1959; Lennan, 1979). Unfortunately, a variety of problems are evident both in the explicit definitions in use today and in the unwritten definitions implied by professional diagnosis, classification, and placement practices. The purpose of this article is to identify specific problems in identifying MHHI students and to make recommendations for resolving those problems.

Lack of Understanding of Accompanying Handicaps. If any agreement exists in identifying MHHI students, it is that they have a handicap accompanying hearing impairment. Professionals in the area of hearing impairment may have only a vague or limited understanding of the additional handicaps, however. Lennan (1979), for example, reported that educators of the deaf will give widely varying responses when asked to define additional handicapping conditions. Cohen (1980) and Flathouse (1979, 1982) suggested that lack of definition of the behavior or condition being identified confounds interpretation of incidence studies. Such a lack of understanding is unfortunate because specific criteria are available for definition and identification of several handicapping conditions and are supported and implemented by a large proportion of professionals, e.g., the American Association on Mental Deficiency Manual on Terminology and Classification in Mental Retardation (Grossman, 1977). Professionals in the MHHI area should have a clear understanding of a variety of handicaps and their effects on hearing impaired students.

Probably related to the lack of understanding of related handicaps is the practice of using the general term, multihandicapped, when a more precise term would be more appropriate and clear. For example, Arkell (1979) discussed "multiply involved deaf students" but reported that all of her subjects were functioning in the severely to profoundly mentally retarded range. Similarly, Mira & Hoffman (1973) in discussing "multihandicapped deaf-blind children" appeared to be using the adjective multihandicapped as a euphemism for mentally retarded. Reluctance to apply the term mentally retarded to MHHI students is understandable when one recognizes that much of the history of hearing impairment has been an effort to eradicate the notion that deafness is synonymous with mental retardation (Brannan, Sigelman, & Bensberg, 1975). Today, however, with a clearer understanding of what mental retardation is, correct use of the more precise label, hearing impaired severly mentally retarded, could result in a more appropriate program and more realistic expectations for a student.

Determination of Educational Significance. A pervasive theme in articles concerned with identification of MHHI students is that the handicaps accompanying hearing impairment should be "educationally significant" e.g., Griffing, 1981). Presently available literature shows two unsatisfactory approaches to determining educational signficance of accompanying handicaps: medical diagnosis, and failure to succeed in an established program.

Medical Diagnosis. Perhaps the least difficult procedure for establishing the educational significance of a handicap (whether it accompanies hearing impairment or not) is for it to be diagnosed and certified by a physician, a professional typically dissociated from the field of education. In this way, one author (although remarkably educationally oriented regarding other handicapping conditions) recommended that vision impairments be substantiated by an ophthalmologist (Lennan, 1974). Similarly, Hardy & Bordley (1973) and Vernon (1969) related educational considerations for MHHI students to medically diagnosed conditions and etiologies. While medical diagnostic information can be of great value in educational decision making, educators should avoid the fallacy of assuming equivalence between medical conditions and educational needs (Gordon, Appell & Cooper, 1982). For example, a hearing impaired child with a confirmed vision impairment may need only minor accomodations in the school setting or none at all. To call such a child MHHI would be very unnecessary and unjust. Conversely many educationally significant conditions cannot be evaluated properly by physicans at all, for example, the need for specific prevocational training or behavior management.

Stevens (1962) proposed a taxonomy for special education in which he recommended a clear distinction between the terms impairment, disability, and handicap. While impairment should refer to any defect in tissue and disability to loss of function, handicap should refer only to disorders which have relevance in school and the learning process. Such relevance may affect any of four factors: mobility; communication; self-concept; and social interaction. As defined by Stevens, handicaps require special education procedures. In the MHHI area, we should be careful that the children we label as MHHI truly have multiple handicaps not just an impairment or disability in addition to deafness. Thus, a student with Usher Syndrome should not be considered to be MHHI until either his retinitis pigmentosa progressed, or his psychological needs relative to his impending blindness developed to the point that special education procedures would be necessary.

Failure in Established Programs. In addition to medical diagnosis, a second unsatisfactory approach to determining the educationally significant handicaps accompanying deafness is the identification of children who fail in established programs. In some cases such an approach does not even clarify whether a second handicap exists. For example, Haag (1978) described a multihandicapped unit in a residental school which was designed for "deaf students who cannot function in a regular classroom (p. 475)." Even the Education for All Handicapped Children Act used failure to succeed in an established program as a criterion for classification as multihandicapped. Multihandicapped means concomitant impairments (such as mentally retarded-blind, mentally retarded-orthopedically impaired, etc.), the combination of which causes such severe educational problems that they cannot be accommodated in special education programs solely for one of the impairments."[P.L. 94-142, 1975, Sect. 121a.5(b)(5)].

Two related problems are obvious in using such a criterion to establish educational significance of handicaps accompanying deafness. First the criterion is exclusionary, that is, it tells us where the student cannot succeed but does not define a handicap or need. Ironically, it effectively restricts educational service options when expanded options may be what MHHI students need. Second, it places the burden of conformity on the student rather than on the program. This could allow hearing impaired students without accompanying handicaps to be "dumped" into MHHI classes when teachers consider that they have learning or behavior problems (Lennan, 1974). A failure-to-succeed criterion for MHHI student identification would reinforce teachers who are unwilling to individualize instruction or to adapt otherwise to the needs of individual students.

Appropriate Determination of Educational Significance. In order for a hearing impaired student to be classified as MHHI it is necessary to establish that the student has a second educationally significant handicap. We have shown that neither medical diagnosis nor failure in an established program is sufficient in itself to show that the student is multihandicapped. In determining that a student is multihandicapped, consideration should first be given to why that determination is being made.

As with any label, identification of students as MHHI should be avoided if it does not benefit them. The label may be beneficial if it enables appropriate expectations and educational services for the students (Kolstoe, 1972). To ensure that the MHHI label is beneficial it is necessary that educational diagnosis focus on need disability, and that a variety of service options are available where the needs may be met.

Assessment of Need. Assessment of the needs of students who may be MHHI is congruent with Lennan's (1974) injunction that we be more concerned with providing individual educational programs for MHHI students than with merely labeling and categorizing them. Griffing (1981) identified five factors for differentiating MHHI students. These could be considered as parameters of special education needs for MHHI students:

1. Instructional objectives. The MHHI student may need instruction in special curricular areas, for example, toilet training or orientation and mobility.

2. Environment of instruction. The MHHI student may need specially designed facilities or equipment.

3. Rate of instruction. The MHHI student may learn at an unusual rate or in an unusual sequence.

4. Methodology. The MHHI student may need special instructional procedures or materials, e.g., precision teaching.

5. Staffing. The MHHI student may require teachers with special competencies, ancillary services, or a low staff-student ratio. Assessment of educational need of MHHI students should focus on function and adaptability in a variety of settings (Flathouse, 1979; Haag, 1978) and several disciplines should be involved (Pronovost, Bates, Clasby Miller, Miller, & Thompson, 1976).

Service Options. Identification of MHHI students through assessment of special needs is meaningful only where a range of programs and expertise is available to meet the need which are identified (Connor, 1982). Variants within the need parameters presented by Griffing (1981) could be the basis for identifying placement options. In this way, Flathouse (1979) used staff-student ratios as one variable in defining a least restrictive environment for MHHI students. Similarly, Connor (1982) proposed that program goals be used as a parameter for educational placement options. Naiman (1979) and Pronovost et al. (1976) presented continua of specific placement options for MHHI students. They included self-contained classes for hearing, hearing impaired, and MHHI students; resource rooms; full, partial, and no integration; and the availability of supportive services. Not only do they show options for instructional environments but also options for objectives, instructional rate, methodology, and staff competencies.

Problem: Multiple Terminology. Communication about MHHI children is often confused because of the variety of cognomens which may be applied to this population. For example, the Federal definition of severely handicapped includes children " with two or more serious handicapping conditions such as ... the cerebral-palsied deaf" (U.S. Office of Education, 1978, p. 449), children who obviously have multiple handicaps. The Federal definition of multihandicapped, however, excludes deaf-blind children (P.L. 94-142) probably because of a separate funding pattern. Also Federally funded through still another pattern are children who are called hearing impaired/developmentally disabled (i.e., having mental retardation, cerebral palsy, epilepsy or autism in addition to hearing impairment) (Stewart, 1978).

What is ironic is that these terms, severly handicapped, multihandicapped (MHHI), deaf-blind, and hearing impaired/ developmentally disabled, may be used to denote children with very similar characteristics and educational needs. Yet, each of the terms has been related to the development of a corpus of knowledge and professional practice which is almost separate from each of the others. Professionals who identify with one network find it difficult to access and benefit from the findings of the others. Services to deaf-blind children in this country, for example, have been in place since 1969 and a tremendous amount of information on educational assessment and programming for these children has been generated (Tweedie & Baud, 1981), but teachers of the severely handicapped, or even the MHHI, often do not realize the applicability of that information to their work.

Heterogeneity and Classification. Anyone who considers the educational needs of MHHI students cannot avoid being impressed with this heterogeneity, the wide range of learning characteristics and educational needs such students have (Connor, 1982; Wolf & Anderson, 1969). This is perhaps the most difficult problem in any endeavor concerned with these students, whether it be teacher preparation, identification, or educational decision making. The diversity of characteristics of MHHI students creates great difficulty in using valid generalizations for educational decision making. In order to overcome the problem of heterogeneity and to aid in placement and decision making in MHHI programs, several authors have preposed classification schemes for hearing impaired children with additional handicaps. Others (e.g., Lennan, 1974) have warned against preoccupation with classifications. Griffing (1981), however, showed that definition and classification of MHHI students would assist policymakers and educational decision makers in providing appropriate services for this population.

Perhaps the most common way of classifying MHHI students is in terms of their additional handicaps (e.g., Craig & Craig, 1981; Cruickshank, 1969; Stewart, 1978; and Wolf & Anderson, 1969). The Federal definitions, cited earlier also foster this approach. Thus, MHHI students would be subdivided into the deaf mentally retarded, deaf-blind, deaf cerebral palsied, etc.

While an additional handicap approach may be useful in reporting incidence data (and even this is questionable), it leaves much to be desired from an educational service delivery perspective. One problem is that such an approach separates children whose educational needs are truly very similar, e.g., many deaf-blind and deaf mentally retarded students. Connor (1982) pointed out the fallacy of program planning based on disability categories. Secondly, classification by secondary handicaps fosters the fragmentation of professional knowledge and practice discussed above as a consequence of multiple terminology.

Finally, classification by secondary handicaps encourages a related problem, the issue of "primary" disability. In planning services for MHHI students one may be tempted to ask whether mental retardation (or cerebral palsy or whatever) affects the child's functioning more significantly than hearing impairment. Should the child be called mentally retarded deaf or deaf mentally retarded? Blind-deaf or deaf-blind? This question is moot. Multiple disabilities interact with each other in such a way that their relative effects cannot be separated (Flathouse, 1979; Griffing, 1981; Moores, 1978). According to Dibenedetto (1978), "presently there is no theoretical or philosophical basis for assigning priority to one handicap over the other" (p. 166).

Other Variables In Classification. Several authors have proposed MHHI classification systems based on variables other than additional handicaps. These systems are summarized in Table 1. The additional variables which are considered included medical needs, inappropriate education, placement and degree of educaitonal need.

The difficulties in using medical diagnosis to detemine educational significance of impairments accompanying deafness are discussed above. Power & Quigley (1971) included medically remediable impairments (e.g., epilepsy) in their taxonomy but emphasized that these conditions do not require special education services. Similar impairments seem to comprise Griffing's (1981) mildly MHHI category which he defines as deaf children having "additional handicapping conditions that are corrected, ameliorated, or which otherwise do not impede receiving instruction in the conventional curriculum and edcuational setting" (p.5). In either case labeling the children as MHHI for educational purposes does not seem to have any value or benefit.

Griffing (1981) identified a subgroup "whose basic needs are for medical care on a 24-hour basis" (p. 6). This group and his group needing care in a personal care facility are probably synonymous with Lennan's group requiring continual custodial care. While a large proportion of MHHI students are "hospitalized" in institutions for the mentally retarded (Brannan et al., 1975) which may operate according to a medical model, it is questionable that a significant number of them are sick and require continuing medical care (Wolfensberger, 1976). Similarly, the concept that significant numbers of MHHI children are more appropriately placed in personal care or custodial care facilities is questionable. Current legislation, litigation, and a growing body of research has established that even the lowest functioning students can benefit from educational programs (Sontag, Certo, & Button, 1979). A taxonomy for MHHI students with total medical personal, or custodial care category can only result in excluding students from beneficial special education services. Inclusion of such a category is not supportable.

Moores (1978) postulated that a major category of MHHI students is the group whose handicaps are caused not by a disability within the student but by inappropriate educational experiences. This group may be similar to Bond's (1979) group whose difficulties may be due to exogenous factors such as late diagnosis or problems in the home. In these cases, the accompanying handicaps appear to be artificial. The value must be questioned of labeling these students as MHHI, especially if the label serves to limit service options for the students and reinforce inappropriate educational methodology. If the cause of the problem is the educational environment and not a problem within the student, it would seem to make more sense to improve the environment and prevent the creation of artificially MHHI students. Using an inappropriate educational history as a basis for classification as MHHI appears to have the same fallacies, discussed above, as using failure in an established program as a basis for determining the educational significance of additional disabilities.

As with determination of educational significance of additional handicaps, a valid taxonomy for MHHI students must consider educational need. The identification of placements where the students will benefit most is a step in that direction (e.g., Lennan, 1974). Griffing (1981) went a step further and identified three subgroups of MHHI students based on need for modifications in instructional objectives, environment, rate, methodology or staff. The distinction between the educationally remediable and educationally adjustable subgroup of Power & Quigley (1971) is similar. The additional handicaps of the former group can be "removed" by special education, therapy, etc., but the latter group requires an adaptation of the program to accommodate their disabilities.

Summary. MHHI students are a very heterogeneous group with widely varying needs and characteristics. This has caused difficulty in defining, identifying, and serving them and has led to efforts to subdivide them for educational purposes. Identification of students as MHHI should be accomplished only in the context of a continuum of programs available to meet their unique needs. Students identified as MHHI should be those who have educationally significant handicaps in addition to hearing impairment. Professionals in the MHHI area should have a clear understanding of the effects of these handicaps. Educational significance should be understood in terms of special education need parameters, such as unusual instructional objectives, environment, rate, methodology and staff, rather than medical diagnosis, categories of handicaps, or failure in an established program. Special educational need parameters can also provide a basis for classification of MHHI students where classification will benefit them through improved educational decision making. Finally, professionals concerned with MHHI students should not fail to take advantage of the resources available from related networks including those concerned with severely handicapped, deaf-blind, and developmentally disabled students.

Table 1

Classification Systems for MHHI Students

Source				
Bond, 1979	Griffing, 1981	Lennan, 1974	Power & Quigley, 1971	Moores, 1978
			Medically Remediable	Caused by inappropriate education
No Obvious significant handicaps	Mildly MHHI Educational Needs			
			Educationally remediable	
Additional handicap due to exogenous factors	Moderately MHHI Educational Needs	Benefit from Special Class Placement		
			Educationally Adjustable	
Severe additional handicap	Severely MHHI Educational Needs	Benefit from Special Program Placement		
	Personal Care Needs	Requiring continuing custodial care		
	Medical Care Needs			

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Current Definition of Developmental Disabilities, under P.L. 95-602.

The current definition of developmental disabilities, as contained in Public Law 95-602, the "Developmental Disabilities Assistance and Bill of Rights Act", Section 102(7), is:

> "(7) The term 'developmental disability' means a severe, chronic disability of a person which—
>
> (A) is attributable to a mental or physical impairment or combination of mental and physical impairments;
>
> (B) is manifested before the person attains the age twenty-two;
>
> (C) is likely to continue indefinitely;
>
> (D) results in substantial functional limitations in three or more of the following areas of major life activity: (i) self-care, (ii) receptive and expressive language, (iii) learning, (iv) mobility, (v) self-direction, (vi) capacity for independent living, and (vii) economic sufficiency; and
>
> (E) reflects the person's need for a combination and sequence of special interdisciplinary, or generic care, treatment, or other services which are of life-long or extended duration and are individually planned and coordinated."

The definition of developmental disability contained in Public Law 95-602, sometimes referred to as the new definition of developmental disability, is based solely on an individual's functional limitations and need for services, rather than the diagnosis or nature of his or her disabling condition.

Reasons for the Change in the Definition of Developmental Disabilities

The philosophy underlying the Developmental Disabilities Program is unique in its broad ecumenical approach to advocacy and planning for a target population with various disabilities and needs. Since the inception of the Developmental Disabilities Services and Facilities Construction Act of 1970, the Developmental Disabilities Program has attempted to bring together a variety of agencies traditionally serving disabled persons to develop a coordinated and comprehensive service delivery system for its target population.

Because of the unique broad-based approach to the program, it is not surprising that ambiguity has existed about the program's target population. The question of which groups of disabled persons fall under the term "developmentally disabled" and which groups do not qualify has been raised by various agencies, programs, and consumers.

The bases for the changes reflected in P. L. 95-602 are, as determined by the National Task Force on the Definition of Developmental Disabilities who conducted the independent study mandated in P.L. 94-103 :

- The need to focus scarce resources on that segment of the disabled population most in need of services;
- Developmentally disabled persons will require a combination and sequence of special interdisciplinary or generic care, treatment or other services which are of lifelong or extended duration and are individually planned and coordinated;
- The target population of developmentally disabled individuals is substantially and chronically disabled;
- Service agencies' traditional approaches are not oriented toward meeting the unique needs of this population so that the following combination is required:
    - Comprehensive planning;
    - Improved leverage on existing monies;
    - Increased access to existing services;
    - Interdisciplinary services in a variety of service delivery modes;
    - Advocacy to ensure the above; and
    - Coordination of services at the delivery point to ensure that needs are met.

- Concern that individuals with conditions or disabilities other than the four listed in P. L. 94-103 might share the limitations and service needs of the four named conditions and because of the definition be denied services.

The purpose of the functional definition was to emphasize the complexity, pervasiveness, and substantialty of the disabling conditions to be addressed by the Developmental Disabilities Program by focusing on the individual's functional limitations and the resulting need for comprehensive services. Thus, the definition of developmental disabilities changed from one which was categorically based to one which is functionally based.

Excerpted from SPECIAL REPORT ON THE IMPACT OF THE CHANGE IN THE DEFINITION OF DEVELOPMENTAL DISABILITIES. (Office of Human Development Services, Administration on Developmental Disabilities: May, 1981)

Eligibility Criteria under P.L. 94-142

Handicapped Children

Eligibility under P.L. 94-142 is determined under the following definition:

> Handicapped children means those children evaluated...as being mentally retarded, hard of hearing, deaf, speech impaired, visually handicapped, seriously emotionally disturbed, orthopedically impaired, other health impaired, deaf-blind, multihandicapped, or as having specificlearning disabilities, who because of those impairments need special education and related services.

This definition is extended to the school age population of handicapped individuals ages 3-21. The term "handicapped children" includes the handicapped individuals ages 18-21.

Two criteria determine if a child is "handicapped" for purposes of P.L. 94-142:

1. An impairment listed under P.L. 94-142 definition of handicapped children.

2. A need for special education and related services because of the impairment.

Definitions are drawn from the Regulations for P.L. 94-142 (Education for All Handicapped Children Act) Further interpretations are found in the Advocacy Section of this training manual.

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Educational Significance of Hearing Loss at Three Levels of Severity

Michael A. Karchmer, Michael N. Milone, Jr., and Steve Wolk

National Survey data from over 10 years are analyzed to determine specific relationships between degree of hearing loss and a variety of factors affecting hearing impaired students. Three categories of hearing loss are singled out for comparison, and differences are discussed relative to educational placement, student characteristics, achievement test performance, and communication skills.

For more than 10 years the Office of Demographic Studies (ODS), through its Annual Survey of Hearing Impaired Children and Youth, has collected information on the characteristics of hearing impaired students enrolled in special education programs in the United States. In that time, the factor that has shown itself to play the most pivotal role in a student's personal and educational adjustment has been the student's degree of hearing loss. Degree of hearing loss is a major consideration in determining educational placement, and it also influences such factors as the extent to which a student is judged to speak intelligibly, the particular communication methods the student is likely to use, and whether he or she will use a hearing aid. Moreover, the severity of hearing loss is significantly related to other important variables: to the cause of hearing loss, to the student's sex, and to the presence of additional handicaps.

The purpose of this paper is to describe these relationships between degree of hearing loss and other important student characteristics in some detail; in doing so, we hope to draw a portrait of hearing impaired students with differing hearing abilities.

Part of the information reported in this paper comes from the Annual Survey of Hearing Impaired Children and Youth for the 1977-78 school year. This survey includes information obtained on 54,080 students in almost 700 special education programs throughout the country. The sample represents approximately 80 percent of the total population estimated to be enrolled in special education programs for the hearing impaired in the United States. The remainder of the data comes from an ODS special survey of a national sample of teachers of 997 hearing impaired students. This survey elicited information on a wide range of topics not generally included in the Annual Survey. Details of the data collection procedures can be found in Karchmer and Kirwin (1977).

In the Annual Survey, hearing level is defined as a student's unaided average pure-tone threshold in the better ear (BEA) at 500, 1000, and 2000 Hz expressed in dB ISO. Audiological test results sufficient to compute a BEA were provided for 77 percent of the 54,080 students reported on the 1977-78 Annual Survey. For purposes of this paper the hearing levels were converted into six categories of hearing loss: within normal limits (less than 27 dB), mild (27-40 dB), moderate (41-55 dB), moderately severe (56-70 dB), severe (71-90 dB), and profound (91 dB or greater). Where incomplete or no audiological test information was available, schools were requested to estimate the student's hearing loss using the above categories. Such estimates were given for about 17 percent of the students. Since there are only extremely small differences in the distributions from these two sources of information—the computed BEA and the school estimate—the figures for both are combined in this paper.

Table 1 shows the distribution of levels of hearing loss (measured or estimated) for hearing impaired students in special education as reported in the 1977-78 Annual Survey. No audiological information was provided by the schools for 2,818 students, slightly more than 5 percent of the total; this report, therefore, concentrates on the 51,262 students for whom hearing loss information was provided in the 1977-78 Annual Survey.

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Table 1. Frequency and percent distributions of hearing loss for students in the 1977–78 Annual Survey of Hearing Impaired Children and Youth

	Frequency (N)	Percent (%)
Total number of students in Annual Survey	54,080	100.0
Number of students for whom audiological data were not reported or incomplete	2,818	5.2
Total known data (Better ear average)	51,262	100.0
Normal (less than 27 dB)	2,250	4.4
Mild (27–40 dB)	2,743	5.4
Moderate (41–55 dB)	4,536	8.8
Moderately severe (56–70 dB)	6,640	13.0
Severe (71–90 dB)	12,666	24.7
Profound (91 dB or greater)	22,427	43.7

For these students, the largest category of hearing loss, by far, is profound; 43.7 percent of the hearing impaired students in the Annual Survey have hearing levels of 91 dB or greater. This actually represents a modest decrease from previous findings. For example, 46.8 percent of the students in the 1973-74 Annual Survey were reported to have profound losses. The decrease in the size of the profound loss group may reflect the exit from special education of students born in 1958 whose deafness resulted from the rubella epidemic that year. (Maternal rubella is associated with greater severity of hearing impairment; see Table 3.) Two other factors may also account for the decrease in the proportion of students with profound losses. First, under the influence of recent legislation such as P.L. 94-142, more students with relatively mild losses are being provided with special education services than before. Second, the range of coverage of the Annual Survey has broadened gradually over the past decade to include more and more programs serving mildly impaired students.

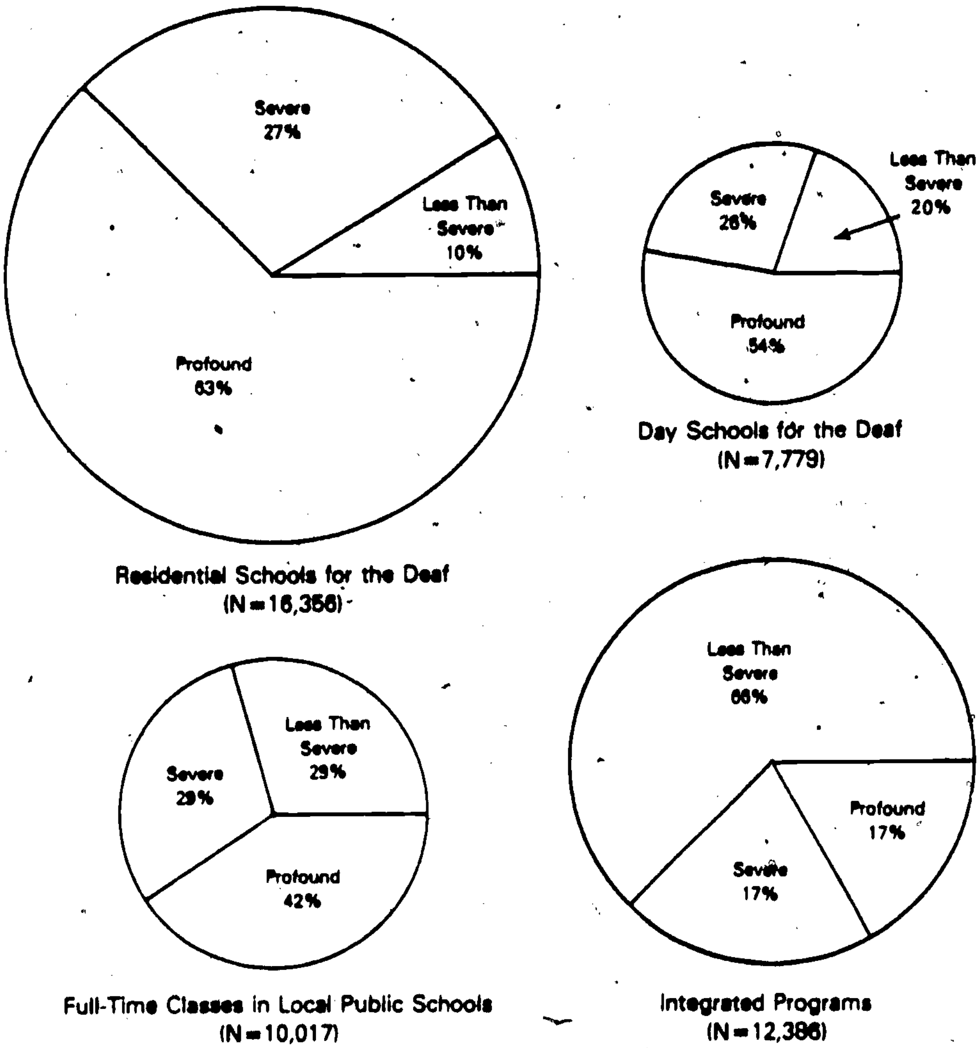
For the remainder of this report, in the interest of clarity of analysis, the students with a BEA of 70 dB or less are grouped into a single category. Thus, our focus will be to compare three categories of hearing impaired students: the group with less than severe hearing loss (≤70 dB), the group with severe loss (71-90 dB), and the group of students who are profoundly deaf (91 or greater dB). This division is not at all arbitrary. Jensema, Karchmer, and Trybus (1978) observed that hearing impaired children with BEA hearing levels in the normal, mild, moderate, and moderately severe categories were nearly identical in a wide variety of characteristics including sex, age, race, and speech intelligibility, so that for present purposes they can be treated reasonably as a single group. Jensema, Karchmer, and Trybus further showed that this combined group had significantly different characteristics from the severe and profound loss groups. This three-way clustering is, therefore, empirically a sound procedure.

HEARING LEVEL AND EDUCATIONAL PLACEMENT

Perhaps the most striking concomitant of hearing loss is the student's educational placement. Simply put, the various kinds of special educational programs tend to enroll students of different average hearing levels. This is not a new finding, and has been discussed previously by Rawlings (1973), Jensema (1974), and Karchmer and Trybus (1977).

Figure 1 shows distributions of hearing loss for students within four types of special education settings. On one hand, students at residential schools for the deaf tend to have the greatest degrees of impairment. Almost two-thirds are profoundly deaf, and 90 percent have hearing levels exceeding 70 dB. At the other

Figure 1
Distribution of Hearing Loss by Type of Program
(Annual Survey of Hearing Impaired Children and Youth, 1977-78)



Residential Schools for the Deaf
(N=16,356)

Day Schools for the Deaf
(N=7,779)

Full-Time Classes in Local Public Schools
(N=10,017)

Integrated Programs
(N=12,386)

extreme, only 17 percent of students in integrated or "mainstream" programs (i.e., itinerant programs, resource rooms, or other part-time special education classes) are profoundly impaired; approximately two-thirds have better ear averages in the less-than-severe range of impairment.

It is interesting to note that the distribution of hearing loss within the various programs has stayed relatively stable over the past five years. Table 2 shows the distribution of the hearing losses of students in four types of special education settings for the 1972-73 and 1977-78 Annual Surveys.

About 61 percent of residential school students surveyed in 1972-73 (for whom audiological information was supplied) were reported to have hearing levels exceeding 90 dB; five years later the corresponding percentage was 63 percent. In 1972-73, only about 15 percent of the students in resource rooms, itinerant programs, or part-time special education classroom setting were profoundly deaf; in 1977-78 the percentage was 17. These five-year com-

Table 2. Percent distributions of hearing loss for students in four types of education programs: 1972–73 vs. 1977–78 Annual Survey of Hearing Impaired Children and Youth*

	Program Type							
	Residential Schools for the Deaf		Day Schools for the Deaf		Full-time Special Education		Integrated Programs	
Degree of Loss (BEA)	1972–73	1977–78	1972–73	1977–78	1972–73	1977–78	1972–73	1977–78
Less than Severe (≤70 dB)	12.2	9.9	19.0	19.6	30.4	29.3	64.7	65.8
Severe (71–90 dB)	27.1	26.7	28.7	26.4	30.0	28.7	20.1	17.5
Profound (>90 dB)	60.7	63.4	52.3	54.0	39.6	42.0	15.2	16.6
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Percent of Annual Survey in each program type	41.5	32.0	11.5	15.2	25.9	19.6	14.0	24.2
Number reported in each program type	17,037	16,356	4,740	7,779	10,620	10,017	5,739	12,386

*Percentages do not include students for whom audiological information was not reported.

parisons are particularly telling for students in integrated education settings. Although it is evident that there has been growth in the number and size of "mainstream" programs across the country in the last five years, the students served by such programs continue to be predominantly hard of hearing students (less-than-severe losses), with only small proportions of severely or profoundly deaf children being served in such settings.

OTHER VARIABLES RELATED TO EXTENT OF LOSS

Etiology

The severity of a child's hearing impairment depends, of course, on what caused the loss in the first place. Table 3 illustrates that some reported causes of hearing loss give rise to greater degrees of impairment than other causes. Hearing impairments reported to be a result of maternal rubella, hereditary factors, and meningitis are particularly associated with profound loss. For these causes, 50 percent or more of the students had a hearing level that exceeded 90 dB. On the other hand, the "after birth" causes, with the notable exception of meningitis, tend to be associated with milder impairments. When the probable cause of a hearing loss was mumps, infections, trauma after birth, or otitis media, it generally resulted in a hearing level in the severe or less-than-severe range. (See Gentile and Rambin, 1973, for a more extensive discussion of the causes of hearing loss.)

Age

Figure 2 shows the relative distribution of hearing loss for six separate age ranges. Two patterns are evident. First, students with profound losses make up the largest share of the special education population at each age group. Second, from age 6 years onward, the relative proportion of profoundly deaf students increases with age. Students with less-than-severe losses are represented in their greatest proportion during the 6 through 11 year old range. For those ages, over 35 percent of the Annual Survey sample has a less-than-severe loss.

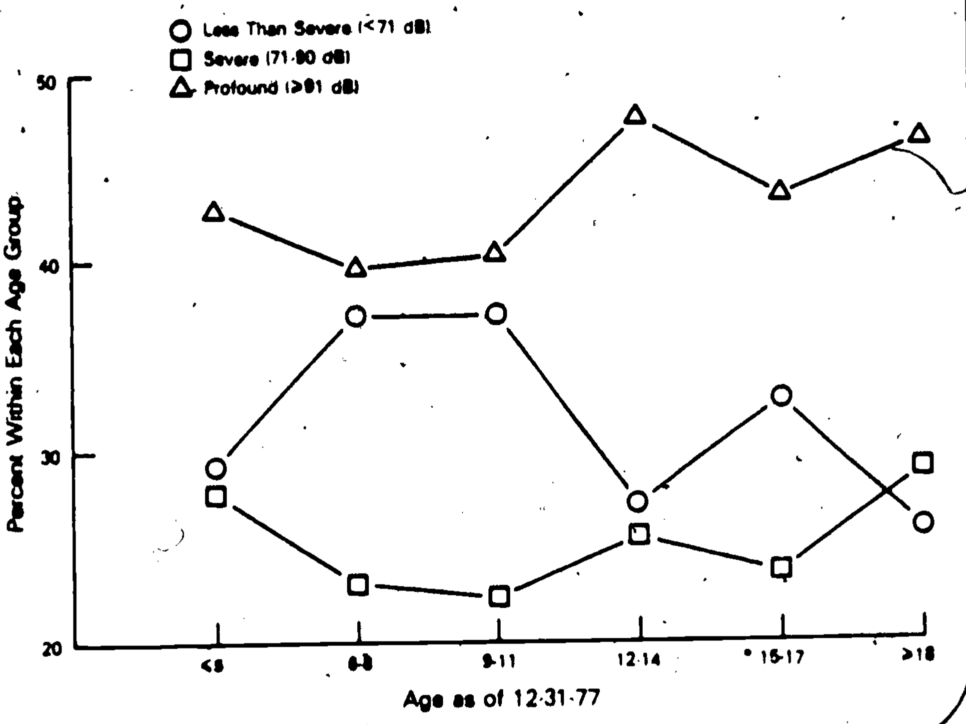
While it is possible that there is actual deterioration of hearing abilities with increasing

Table 3. Percent distributions of hearing loss for various probable causes of hearing impairment*

	Reported Cause													
	At Birth or Congenital						After Birth							
Degree of Hearing Loss (BEA)	Maternal Rubella	Pregnancy Complications	Heredity	Trauma at Birth	Prematurity	Rh Incompatibility	Mumps	Measles	Meningitis	High Fever	Infection	Otitis Media	Trauma after Birth	Cause Cannot Be Determined
Less than Severe (≤70 dB)	15.7	31.7	27.4	31.9	31.5	29.2	44.7	29.5	17.6	32.6	57.9	76.5	41.1	30.7
Severe (71–90 dB)	30.7	25.6	22.8	29.0	29.7	29.8	17.8	28.4	21.2	24.7	17.9	10.5	22.9	24.4
Profound (≥91 dB)	53.7	42.7	49.7	39.0	38.9	41.0	37.4	42.1	61.2	42.7	24.3	13.0	36.1	44.8
Total number and percent of Annual Survey sample reporting cause	8,966 (17.5)	1,440 (2.8)	4,597 (9.0)	1,109 (2.2)	1,952 (3.8)	1,036 (2.0)	219 (0.4)	662 (1.3)	3,205 (6.3)	1,409 (2.7)	1,125 (2.2)	944 (1.8)	137 (0.3)	13,974 (25.8)

*In some cases, more than one cause was reported for a student.

Figure 2
Distributions of Hearing Loss by Age for Hearing Impaired Students in Special Education, 1977-78



age, we are more inclined, given our present data and level of analysis, to attribute these age differences to one certain and one possible factor. Maternal rubella, as has been noted, is associated with greater severity of hearing loss, and the proportion of hearing losses due to rubella varies widely by age group. Children born in the rubella epidemic of 1964-65, included here in the 12-14 age group (age as of 12/31/77), clearly show a pattern of more serious hearing impairments. It is also possible to infer from the data that students with less-than-severe losses enter special education later, and leave it earlier, than children with more serious impairments. This enrollment pattern, along with the variation in causes, may explain some of the age group to age group variation in hearing levels. We do not at present have data to support a hypothesis of actual deterioration of hearing abilities with increasing age in the 0–21 range.

Sex

About 54 percent of the hearing impaired students reported in the 1977–78 Annual Survey are male. However, this percentage varies somewhat by degree of hearing loss, as shown in Table 4. Males are found in greatest proportion (56 percent) in the less-than-severe category. This declines slightly to about 55 percent in the severe loss group, and reaches its low point of 53 percent in the profound loss children. To some extent, this reflects the finding that maternal rubella causes a hearing loss in at least as many females as males, thus increasing the relative proportion of females in the profound loss group (Karchmer & Kirwin, 1977). Even when students whose deafness was caused by rubella are removed from the analysis, however, the same basic trend (i.e., decrease in percentage of males with increasing hearing loss) obtains.

Ethnic Background

There does not appear to be a strong relationship between degree of hearing loss and a student's ethnic origin (Ries, Bateman, & Schildroth, 1975). The 1977–78 Annual Survey data (Table 5) show that the relative distribu-

Table 4. Sex by degree of hearing loss, 1977–78*

Degree of Hearing Loss (BEA)	Sex: Male N	Male (%)	Female N	Female (%)
Less than Severe (≤70 dB)	9,008	(56.0)	7,076	(44.0)
Severe (71–90 dB)	6,907	(54.7)	5,711	(45.3)
Profound (≥91 dB)	11,754	(52.6)	10,600	(47.4)
Total number and percent in each sex category	27,669	(54.2)	23,387	(45.8)

*Excluded from this table are 3,024 students for whom audiological information or sex was not reported.

tions of hearing loss for white, black, and Hispanic students are all very similar.

Additional Handicapping Conditions

Of the students enrolled in special education programs, a higher percentage of those students with one or more handicaps were more likely to be less-than-severely impaired than students without additional handicaps. (Table 6). Very possibly, students with lesser hearing loss, and without at least one additional handicap, were fully mainstreamed with no supportive services, and thus were not reported to the Survey.

Table 7 shows the distribution of hearing loss for specific handicapping conditions. From this table, it seems evident that there is a relationship between severity of hearing loss and specific handicaps. This relationship, however, is not direct, and may be mediated by certain conditions, such as rubella, which cause both hearing impairment and other disabilities. For further discussion, the reader is referred to Gentile and McCarthy (1973).

ACHIEVEMENT TEST PERFORMANCE

We turn our attention now to a brief examination of how a student's hearing level relates to academic achievement as measured by a standardized achievement test. For this purpose we draw on data collected as part of the

Table 5. Frequency and percent distributions of hearing loss by ethnic background, 1977–78*

Degree of Hearing Loss (BEA)	Ethnic Background: White N	White (%)	Black N	Black (%)	Hispanic N	Hispanic (%)	Other N	Other (%)
Less than Severe (≤70 dB)	10,948	(31.7)	2,494	(29.7)	1,368	(31.7)	379	(31.0)
Severe (71–90 dB)	8,417	(24.4)	2,158	(25.7)	1,071	(24.8)	283	(23.2)
Profound (≥91 dB)	15,122	(43.8)	3,735	(44.5)	1,877	(43.5)	560	(45.8)
Total number and percent of Annual Survey sample for each ethnic group	34,487	(71.2)	8,387	(17.3)	4,316	(8.9)	1,222	(2.5)

*Excluded from this table are 5,668 students for whom audiological or ethnic information was not reported.

Table 6. Distribution, in special education programs, of additional handicapping conditions by hearing loss, 1977–78*

Degree of Hearing Loss (BEA)	Total Additional Handicaps None Reported N	 (%)	 One or More N	 (%)
Less than Severe (≤70 dB)	11,084	(30.2)	5,085	(35.1)
Severe (71–90 dB)	9,154	(24.9)	3,512	(24.2)
Profound (≥91 dB)	16,521	(44.9)	5,906	(40.7)
Total number and percent of Annual Survey sample in each handicap category	36,759	(71.7)	14,503	(28.3)

*Excluded from this table are 2,818 students for whom audiological information was not reported.

national achievement test standardization program conducted by the ODS in Spring, 1974. At that time, the Special Edition for hearing impaired students of the Stanford Achievement Test (SAT-HI) was administered to a national sample of almost 7,000 hearing impaired students for the purpose of developing academic norms. This national project is described in detail by Trybus and Karchmer (1977).

When the median achievement scores for the 1974 standardization sample are plotted by age for each of the three hearing loss categories, very clear patterns emerge. For reading comprehension (Figure 3) it is evident that the median scores of students with less-than-severe losses are superior at each age level to the scores of the students with more significant hearing impairments. This advantage is, on the average, between one-half and one grade equivalent. The group with severe losses has a slight advantage over the profoundly deaf group through age 12; beyond this age, the dis-

Table 7. Percent distributions of hearing loss for specific handicapping conditions*

Degree of Hearing Loss (BEA)	Handicapping Conditions Visual Impairment	 Brain Damage	 Epilepsy	 Orthopedic	 Cerebral Palsy	 Heart Disorder	 Mental Retardation	 Emotional/ Behavioral Problem	 Specific Learning Disability
Less than Severe (≤70 dB)	33.1	36.2	32.3	32.7	28.9	26.4	42.8	28.3	54.2
Severe (71–90 dB)	26.9	25.8	20.8	25.5	31.0	28.6	22.4	24.5	20.3
Profound (≥91 dB)	40.0	38.0	46.9	41.8	40.1	45.0	34.8	47.1	25.5
Total number and percent of Annual Survey sample with each handicapping condition	3,789 (7.4)	1,333 (2.6)	461 (0.9)	966 (1.9)	1,460 (2.9)	1,313 (2.6)	4,008 (7.8)	3,421 (6.7)	801 (1.6)

*In some cases, more than one additional handicapping condition was reported for a student.

tributions of scores for these two groups overlap.

As Figure 3 indicates, hearing level makes much less difference on mathematics computation than on reading comprehension. The median scores of the less-than-severe group are only slightly elevated above the scores of the other two groups, and this difference holds only for students 15 and younger. The "severe" and "profound" groups are remarkably similar, and are distinguishable only at ages 10 and 11.

Communication Factors

The final section of this report examines three factors relevant to the communication abilities of hearing impaired children: the extent of their hearing aid usage, the degree to which their speech is judged to be intelligible, and the methods by which they communicate. Each of these topics has been dealt with at length in separate monographs from the Office of Demographic Studies (Karchmer & Kirwin, 1977; Jensema, Karchmer, & Trybus, 1978; Jensema & Trybus, 1978). The findings reported in these monographs are discussed here only as they relate to a student's hearing status.

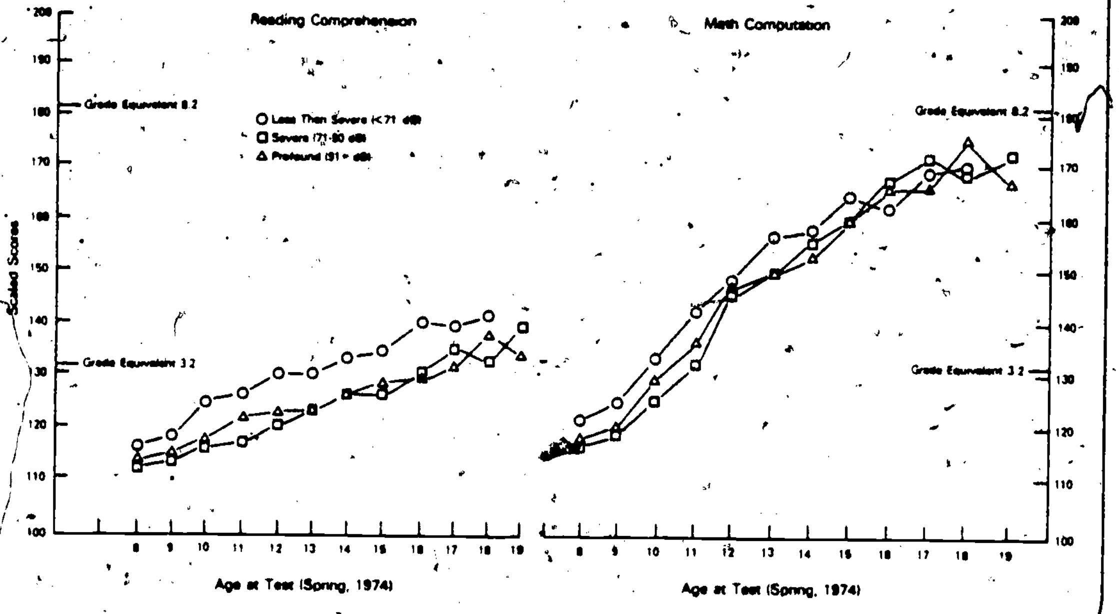
The data to be discussed are drawn from a 1974 study done in conjunction with the National Achievement Test Standardization Program described in the previous section. In this study, classroom teachers provided educationally relevant information on a random sample of 997 hearing impaired students from across the United States.

Hearing Aid Usage

Karchmer and Kirwin (1977) found that over 80 percent of all hearing impaired students in the national sample used some sort of amplification device. However, hearing aid use varied systematically as a function of hearing level. Consistent hearing aid use was highest among students having moderate or severe losses (41–90 dB), with almost 90 percent of these students using aids. Non-wearers were found in greatest proportion among those students with hearing levels at either extreme of the distribution. Of the students with profound losses, 22.7 percent did not use hearing aids. Included within this group, no doubt, was a large number of individuals with little or no measureable residual hearing and therefore minimally able to benefit from amplification.

Figure 3

Median Performance by Hearing Impaired Students on the SAT-HI for Reading Comprehension and Math Computation as a Function of Age for Three Hearing Loss Groups



Note. Insufficient data to show scores for 19-year-old students with less than severe losses.

The students with only slight impairment (up to 40 dB) were the least likely to wear a hearing aid; nearly 60 percent of this group were non-wearers. It might be noted that hearing aid usage is one of the few characteristics that differentiates among students within the 0–70 dB hearing loss range.

Speech Intelligibility

The ability of a hearing impaired student to speak in a manner intelligible to an average person influences later functioning in society at large. The development of this ability is one of the goals of special education for the hearing impaired. By far the best statistical predictor of a hearing impaired student's rated speech intelligibility is hearing level [Table 8(a)]. Jensema, Karchmer, and Trybus (1978) found that the rated speech intelligibility of students in their sample was uniformly high when hearing loss was less-than-severe; 86 percent of these students were rated by their teachers as speaking intelligibly or very intelligibly. There appeared to be an abrupt drop in intelligibility ratings for students with hearing levels beyond 70 dB; in the "profound" category, less than one-quarter of the students were rated as having intelligible speech.

Table 8(b) presents a complementary picture to the data summarized in Table 8(a). Again, although it is apparent that speech intelligibility is very much a function of degree of hearing loss, one important qualification bears noting. Of the students whose speech is rated as intelligible or very intelligible, 26.3 percent were profoundly hearing impaired. Although this figure suggests a very positive speech potential for slightly more than one-quarter of profound loss students, it should be interpreted cautiously. Age at onset of hearing loss was not considered in the analysis; its influence on the relationship between speech intelligibility and hearing loss is quite probable.

Communication Patterns

The hearing impaired student population is a heterogeneous one, with the communication methods used by particular students in their classroom and homes being equally diverse. Nonetheless, it is clear that degree of hearing loss is a strong influence on the communication methods used by a student. Jensema and Trybus (1978) reported a trend for less speech use and more sign use as the child's hearing level moves away from normal in the direction of less and less useable hearing. There appeared to be a particularly pronounced alteration in communication patterns at 70 dB. When the hearing level was at 70 dB or less, the emphasis was on speech, with relatively little

Table 8(a). Distribution of rated speech intelligibility for categories of hearing loss

Degree of Hearing Loss	Speech Intelligibility Rating[a] Very Intelligible or Intelligible N	(%)	Barely Intelligible N	(%)	Not Intelligible N	(%)	Would Not Speak N	(%)	Total N	(%)
Less than Severe (≤70 dB)	168	(86.1)	18	(9.2)	6	(3.1)	3	(1.5)	195	(100.0)
Severe (71–90 dB)	144	(55.0)	53	(20.2)	35	(13.3)	30	(11.5)	262	(100.0)
Profound (≥91 dB)	111	(23.2)	135	(28.2)	149	(31.1)	84	(17.5)	479	(100.0)
Total number and percent in each intelligibility category	423	(45.2)	206	(22.0)	190	(20.3)	117	(12.5)	936[b]	(100.0)

[a] See Jensema, Karchmer, and Trybus (1978) for scale definitions.

[b] Percentages do not include students for whom audiological or speech intelligibility information was not reported.

Table 8(b). Three categories of hearing loss distributed by rated speech intelligibility, Spring 1974

	Degree of Hearing Loss							
	Less than Severe (≤70 dB)		Severe (71–90 dB)		Profound (≥91 dB)		All Categories	
Rated Speech Intelligibility[a]	N	%	N	%	N	%	N	%
Very intelligible or intelligible	168	(39.7)	144	(34.0)	111	(26.3)	423	(100.0)
Barely intelligible	18	(8.7)	53	(25.7)	135	(65.5)	206	(100.0)
Not intelligible	6	(3.2)	35	(18.4)	149	(78.4)	190	(100.0)
Would not speak	3	(2.6)	30	(25.6)	84	(71.8)	117	(100.0)
Total number and percent in each category of hearing loss	195	(20.8)	262	(28.0)	479	(51.2)	936[b]	(100.0)

[a] See Jensema, Karchmer, and Trybus (1978) for scale definitions.

[b] Not included are 61 students for whom audiological or speech information were not reported.

use of signs. As hearing levels declined beyond 70 dB, there was a noticeable shift in emphasis away from speech and toward a greater reliance on signs.

Figure 4 provides further analysis of the same data used by Jensema and Trybus (1978). Roughly 90 percent of the hearing impaired students in the sample fall into three categories: those who used speech without signing, those who signed without speaking, and those who used some combination of the two modes. Figure 4 shows that the degree of hearing loss is strongly related to the child's communication style. Over 60 percent of the students with less-than-severe hearing losses were reported to use speech as their sole means of communication; virtually none of this group used signs without speech. At the other end of the spectrum, profoundly deaf students were highly unlikely to use only speech; more than 80 percent used signs either alone or in combination with speech.

It is worth noting that these findings do not address themselves to the quality of use of the respective methods. It is only a description of the national situation as reported at the time of the study five years ago, and not a statement of how things would or should be in the future.

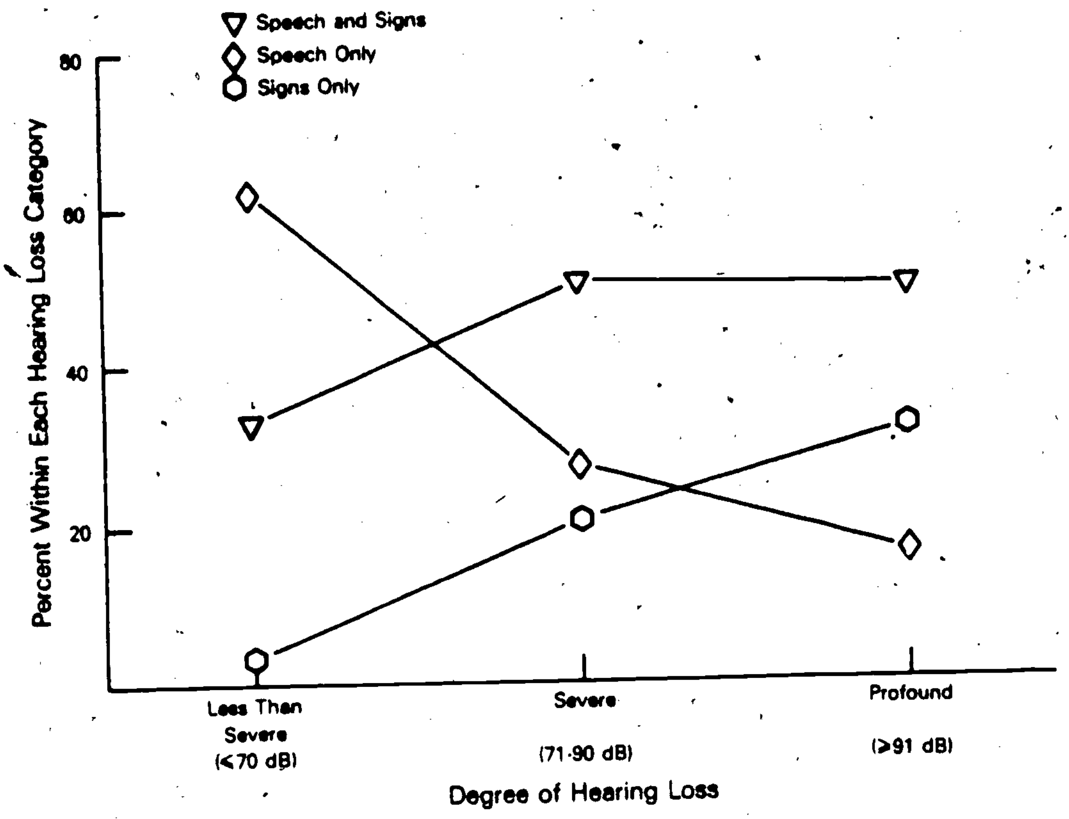
SUMMARY

In this paper, we have discussed a number of important demographic and educational characteristics of hearing impaired children as they relate to level of hearing loss. For clarity of presentation, each variable of interest was examined separately as it related to degree of hearing loss. However, it must be recognized that most of the variables themselves are interrelated. Accordingly, further multivariate analysis of the data is now being done, and will be the subject of a future publication.

Still, it is possible to construct meaningful profiles of students based on degree of hearing loss. The clearest differences emerge when profoundly deaf students are contrasted with students whose losses are less-than-severe. By way of summary, then, let us consider these two groups of students.

The largest proportion of students with less-than-severe hearing losses is enrolled in integrated ("mainstream") settings, and the majority of students in these settings has less-than-severe hearing losses. Comparatively few attend residential or day schools for the deaf. These students tend to be found most frequently in special education in the 6 through 11 year old range.

Figure 4
Student to Teacher Communication Methods by Degree of Hearing Loss (Spring, 1974)



Students with a less-than-severe loss rely primarily on speech when communicating with parents and teachers, and their speech is rated as intelligible to the average listener. With respect to reading achievement, less-than-severely impaired students tend to score one-half to one grade level higher than their age-mates with more severe losses. Interestingly enough, students with additional handicaps, if they are reported in special education programs, are more likely to be less-than-severely impaired than children without additional handicaps.

The profoundly deaf students, by contrast, are more likely to attend a residential or day school for the deaf, rather than an integrated program. The former programs are generally associated with a fuller range of services (Rawlings & Trybus, 1978).

Although children with profound losses perform on the average below their less-than-severely impaired age-mates on tests of reading comprehension, the differences between these two groups on math computation are not as large. In terms of communication, students with a profound loss are unlikely to use speech as their sole mode of communication, depending heavily on manual communication, and as would be expected, their speech tends to be less intelligible than that of students with less-than-severe losses.

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The Demographics of Deafness Resulting From Maternal Rubella

Raymond J. Trybus, Ph.D., Michael A. Karchmer, Ph. D., Philip P. Kerstetter, and Wanda Hicks

This paper reviews data on the size and major characteristics of the population of rubella-deafened children, with emphasis on those born during 1963-65. Three sets of data are presented; first, from the national studies of the Annual Survey of Hearing Impaired Children and Youth; second, from a current study of Gallaudet College students; and third, from a continuing study of students at the Model Secondary School for the Deaf. The focus is on the impact that this large group of deaf youngsters will have on postsecondary educational institutions and rehabilitation agencies during the decade of the 1980's.

INTRODUCTION

The purpose of this paper is to describe the size and some of the characteristics of children in the United States whose hearing is significantly impaired as a result of maternal rubella, and who therefore are enrolled in some form of special education program for hearing-impaired children. While these data were collected from special education programs, since that is where these children are presently being served, the focus will be on the impact soon to be felt by postsecondary education programs and vocational rehabilitation services as these children complete their secondary education.

The data presented here derive from three sources. The national data were developed by the Office of Demographic Studies at Gallaudet College, through its Annual Survey of Hearing Impaired Children and Youth. Information on Gallaudet students was developed through a study conducted at the college during the summer of 1980; similarly, the information on students at Gallaudet's Model Secondary School for the Deaf was collected as part of a study being conducted in the fall of 1980.

Through the Annual Survey of Hearing Impaired Children and Youth, Gallaudet researchers contact all schools and school systems in the U.S. known to be offering special education services to hearing-impaired children (at upwards of 2,000 locations) and ask them to submit a variety of information on each of their students. This data file is updated and augmented yearly, and the information presented here is based on data collected during the 1978-79 school year. Participation in the Annual Survey is voluntary, and a participation rate of approximately 80% has been maintained for most of the 12 years of operation of the Annual Survey.

The figures presented here are actual counts of data reported by schools to the Annual Survey; to produce an estimate of the *total* U.S. picture, the Annual Survey counts should be increased by approximately one-fourth. Thus, if the Annual Survey yields a count of 8,000 children in some category (based on an 80% participation rate), this figure should be increased by one-fourth, or 2,000, to yield an *estimate* of the probable total number of children in the given category in the U.S., or 10,000 in this example. This, of course, applies only to actual *numbers* of children. Rates, percentages, and relationships among variables are the best available results as stated.

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DEMOGRAPHICS

Size of Rubella "Bulge"

Figure 1 shows the numbers of hearing-impaired children according to year of birth and reported cause of the hearing loss. For the nonepidemic years, the number of children in the Survey varies slightly by year, but remains in the vicinity of 3,000, with the percentage of hearing loss reported as due to maternal rubella ranging from 6% to 16% and averaging 9.6%. The number of children born in 1964 and 1965, however, is much higher, being more than double the usual number for the 2-year period. At the same time, the proportion of reported maternal rubella increased to 41% and 34% in 1964 and 1965, respectively. Note, however, that the number of children born in 1964–65 for whom rubella was *not* reported as a cause also increased significantly. This strongly implies that many of these children also incurred hearing loss as a result of undiagnosed maternal rubella. With this in mind, and considering the survey participation rate, a good estimate is that there are more than 8,000 rubella-deafened children born in 1964–65 who are in special education programs for the hearing impaired, *in addition to* the 7,500 children who would be expected in any normal 2-year period. This is the central fact we must face in the immediate future. Remember also that these figures apply only to children in special education programs for the hearing impaired. Post-rubella children in programs for the deaf-blind or for severely and profoundly multiply handicapped are not included in these figures and must be considered as well.[1]

Sex Distribution

The sex distribution for both rubella and non-rubella deafened children is shown in Table 1 for the nation, for the National Technical Institute for the Deaf (see Stuckless' following article), and for both the high school and the college students at Gallaudet. Nationally, rubella seems to be an exceptionally egalitarian cause of hearing loss for the two sexes, while other causes produce a 55% to 45% preponderance of males over females. The Gallaudet programs generally serve a slightly higher proportion of females, while NTID students are more heavily male for both rubella and other groups.

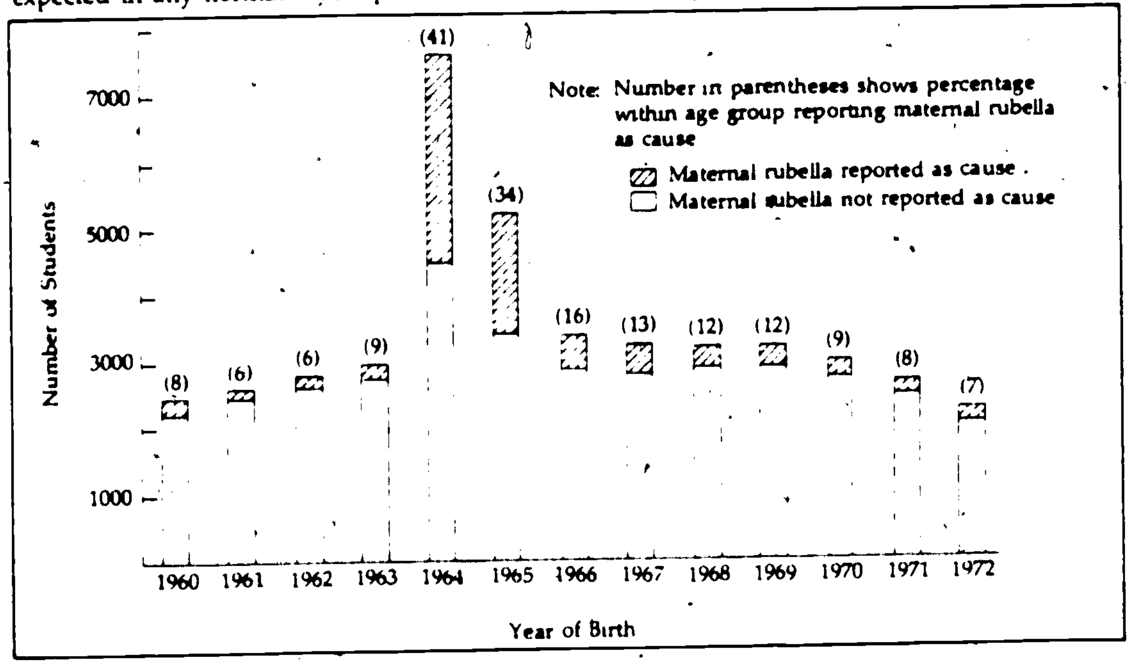

Figure 1. Hearing-impaired students in special education reported to the Annual Survey of Hearing Impaired Children and Youth, 1978-79, by year of birth and according to whether maternal rubella was reported as the cause of hearing loss (only students 6-18 shown).

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[1] *Editor's note: See the Lockett and Rudolph article for numbers of youngsters with maternal rubella in programs for the deaf-blind. Unfortunately, no national data are available on numbers of other severely multiply handicapped deaf children with maternal rubella. Some are known to be in programs for severely emotionally disturbed or mentally retarded children*

Table 1. Sex Distribution by Reported Cause.

	United States		NTID		Gallaudet			
					High School		College	
	Rubella	Other	Rubella	Other	Rubella	Other	Rubella	Other
Male	50%	55%	58%	62%	47%	54%	43%	46%
Female	50%	45%	42%	38%	53%	46%	57%	54%

Table 2. Percent Distribution by Month of Birth According to the Reported Cause of Hearing Loss.

	Rubella % of total	Rubella not-reported % of total
January	13	9
February	6	7
March	3	7
April	2	7
May	2	8
June	2	7
July	4	8
August	6	8
September	10	9
October	15	10
November	19	10
December	18	10
TOTAL	100	100
	N = 8,708(a)	N = 44,101(b)

(a) Month of birth not reported for 40 rubella students.
(b) Month of birth not reported for 457 nonrubella students

Month of Birth

As Table 2 shows, rubella births occur on a cyclical basis during the year, with 75% of births occurring between September and January and almost 40% in November and December. Augustin, Marron, and Stuckless (1979) have reported a similar percentage distribution among 112 students with maternal rubella at NTID. By contrast, an even distribution throughout the year would result in 42% of births occurring in September through January and 17% falling in November and December. This pattern reflects the great prevalence of the disease itself in the winter and early spring months.

Additional Handicapping Conditions

One of the most important considerations for planning purposes is the presence or absence of additional handicapping conditions beyond the hearing loss. Table 3 shows that 25% of children who are hearing impaired as a result of causes other than rubella have one or more additional handicapping conditions. This figure increases to 37% for rubella-deafened children, or half again as much. The proportions of rubella-deafened children with more than one additional handicapping condition is about twice that for other hearing-impaired children.

Table 3. Number of Additional Handicapping Conditions According to Cause of Hearing Loss.

Number of additional handicaps	Rubella		Rubella not reported	
	N	%	N	%
None[a]	5,489	63	33,237	75
One	1,883	22	7,754	17
Two	830	9	2,238	5
Three or more	546	6	1,329	3
TOTAL	8,748	100	44,558	100

[a] Or all information on handicaps left blank.

The specific conditions involved in this situation are listed in Table 4. Severe visual problems occur three times as frequently in the rubella group, while heart disorders are eight times as common. Stuckless in the following article reports similar findings among rubella and non-rubella students at NTID. The rate of emotional/behavioral problems is half again as large in the rubella group as in others, and smaller differences are in evidence for several of the other conditions. Since the schools are asked to report only those conditions which have a discernible impact on the educational process, the likelihood is that the rates of conditions subject to medical diagnosis would be higher than the figures presented here. Also, many schools are reluctant to report conditions such as emotional/behavioral problems, further suggesting that these figures are, if anything, minimal estimates of the actual situation.

Severity of Hearing Loss

Another major consideration in the planning of services is the severity of the individual's hearing loss. The available audiological data presented in Table 5 show that rubella-deafened children have more severe hearing losses as a group. This information must be viewed in the light of comments by Vernon and Hicks (1980) and others, which suggest that rubella-deafened children may have more functional use of residual hearing than these severity levels, obtained by averaging the pure tone hearing levels in the better ear at 500, 1000, and 2000 Hz, would imply. In the following article, Stuckless reports slightly better hearing in the speech range among rubella than non-rubella students at NTID, and significantly better auditory discrimination and speech intelligibility among rubella students

Type of School Program

Where are the rubella children now? Table 6 shows the types of programs now serving rubella-deafened children. As might be expected from the extent of additional handicapping conditions and the greater severity of hearing loss, a somewhat greater proportion attend special schools and classes, and a smaller proportion attend integrated or mainstream programs than is the case for children with deafness resulting from other causes.

Table 4. Prevalence of Additional Handicapping Conditions by Cause of Hearing Loss.

Handicapping condition[a]	Rubella	Rubella not reported
	(Percentage of 8,478)	(Percentage of 44,558)
Uncorrected visual problems and legal blindness	15	5
Brain damage	4	2
Epilepsy	1	1
Orthopedic	2	2
Cerebral palsy	4	3
Heart disorder	8	1
Other health impaired	3	4
Mental retardation	8	8
Emotional/behavioral	9	6
Specific learning disability (includes perceptual/motor disorder)	6	5
Other additional handicaps	2	2

[a] Handicap categories are not mutually exclusive in that more than one handicap may be reported for a student.

Table 5. Severity of Hearing Loss by Cause.

	Rubella	Rubella not reported
	%	%
Less-than-severe (<70 dB ISO)	15	35
Severe (71-90 dB ISO)	30	24
Profound (91 or more dB ISO)	55	41
TOTAL	100 N = 8,458[a]	100 N = 41,786[b]

[a] Audiological information not available for 290 rubella students.

[b] Audiological information not available for 2,772 nonrubella students.

Table 6. Kinds of Special Education Programs Attended by Rubella Students.

Program type	Percentage distribution of deaf students: Rubella reported as cause	Percentage distribution of deaf students: Rubella not reported as cause
Residential school for the deaf	38	30
Day school for the deaf	17	15
Full-time special education classes in regular schools	19	17
Full-time programs for the multiply handicapped	7	5
Part-time special education programs and services	18	34
TOTAL	100 N = 8,375[a]	100 N = 44,385[b]

[a] Program unknown for 13 rubella students.
[b] Program unknown for 173 nonrubella students.

SAMPLE PROJECTION

To illustrate the potential impact of this group of students on a program, Figure 2 presents current enrollment data and projections for Gallaudet College. The figures for the academic years 1975–76 through 1980–81 represent actual enrollments, which are in the 1,000–1,250 range. Beginning with the academic year 1981–82, the figures represent projections and tentative plans. The figures which peak at about 2,000 in 1984–85 and return to a 1,250 level in 1989–90 represent our best estimates of what Gallaudet enrollments would look like, all other things being equal (i.e., no change in programs, admission policy, etc). Because of the enormous difficulties in trying to manage such rapid program growth and decline, we have prepared another set of figures which represent our tentative targets for enrollments during these years. Our approach will be to try to flatten the peak through such means as early and delayed admissions, then to limit the population decline in the post-rubella years by instituting a variety of new curricula and programs in the latter half of the 1980's. This provides for a somewhat more manageable situation if we succeed in meeting these targets.

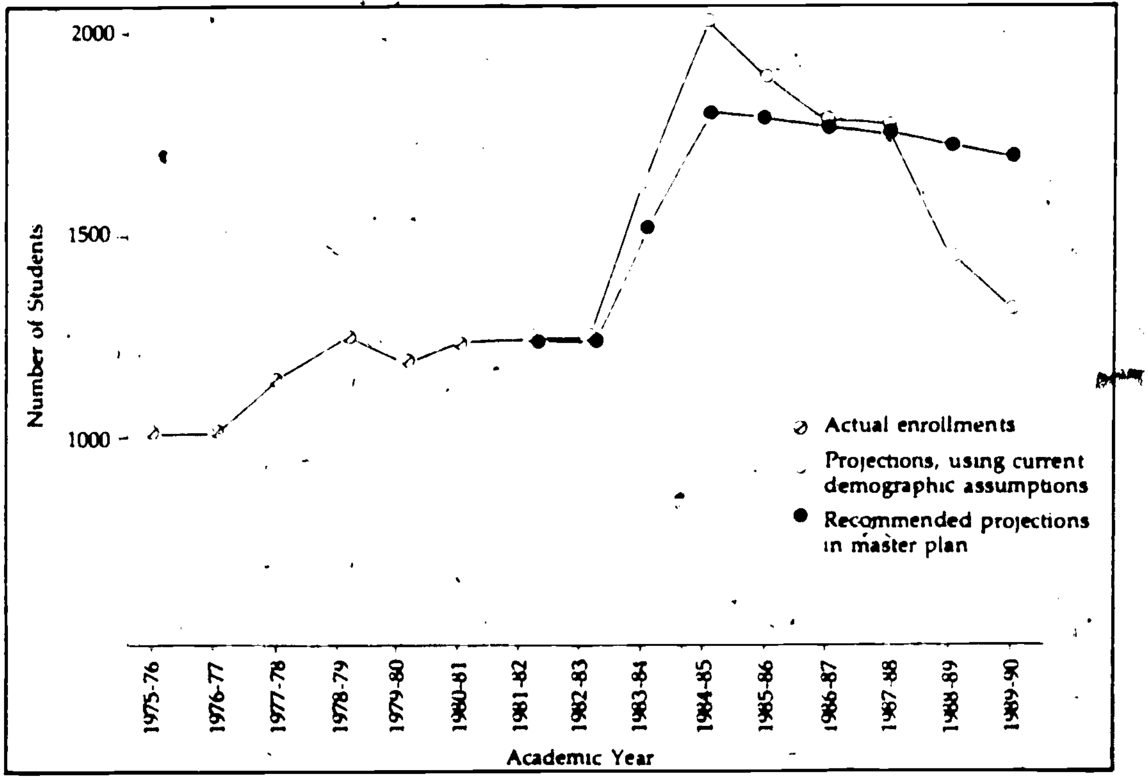

Figure 2. Gallaudet College undergraduate head count: Actual enrollment and projections.

Table 7. Type of Secondary Program Last Attended.

Type of program	NTID Rubella	NTID Other causes	Gallaudet Rubella	Gallaudet Other causes
School for the deaf	45%	53%	69%	78%
Regular high school	55%	47%	31%	22%

Gallaudet planning has just begun, and modifications in these targets are sure to occur as time goes on. The point is that every service delivery institution will need to develop some reasonable estimate of the probable impact of the rubella group, then develop targets and strategies for managing the resulting growth and subsequent decline in a rational and effective manner. Not to do this is to insure chaos and to reduce our own effectiveness in responding to the challenge of serving these youngsters who, though they share common characteristics, are after all individual human beings with names and faces.

DATA ON GALLAUDET COLLEGE STUDENTS

The next set of information is derived from a study of 583 students who were accepted and enrolled at Gallaudet College between 1977 and the present, and who had been born between 1957 and 1959, during the rubella epidemic which occurred during those years (an epidemic of lesser proportions than that of 1963–65 with which we are concerned here). This study looked first at the schools from which these students came, and compared the data with similar figures from NTID. Although the national data presented earlier showed that a relatively smaller percentage of rubella students are enrolled in mainstream programs, the reverse is true here. Although a minority of both Gallaudet and NTID students came from mainstream programs, the proportion who came from such programs is higher at both institutions for the rubella students than for the others (Table 7). It is also clear that Gallaudet students, regardless of cause of deafness, came predominantly from special schools for the deaf, while the NTID students are almost evenly drawn from the two types of programs.

Another important consideration for planning and enrollment projections is the age at which students enter college. This will of course vary to some extent from institution to institution. The data for Gallaudet College are presented in Table 8 for students with various causes of hearing loss. It is clear that age 19 is the most frequent age at admission, with age 20 being next most frequent. This pattern holds for rubella and for most other causes, with the exception of students with hereditary losses, who tend to enter somewhat later. The possible reasons for this are not known at present. What is of most significance here is that the rubella group does not show a greatly different pattern from that of most other students.

Table 8. Age at Entry to Gallaudet by Cause of Hearing Loss.

Age at entry	Percentage Rubella	Heredity[a]	Other specified causes[b]	Cause unknown	Total
19 years	41	32	39	49	43
20 years	33	38	35	36	36
21 years	15	23	17	11	15
22 years	11	7	10	4	7

Rubella, however, does make a significant difference when it comes to additional handicapping conditions. As Figure 3 shows, Gallaudet rubella students, like the national population of elementary and secondary age children, exhibit a higher rate of such conditions. The most common additional handicapping conditions for the rubella group are blindness or other severe visual impairments, while cerebral palsy and orthopedic handicaps are the most common such conditions for other groups. Gallaudet has found it necessary to establish a program called Student Specialized Services to insure that adequate academic support services are provided to these students, who have met the same admission requirements as other students and who proceed through the same curriculum completely integrated with other Gallaudet students.

DATA ON MODEL SECONDARY SCHOOL FOR THE DEAF STUDENTS

Another study is currently under way to examine the characteristics of rubella and other

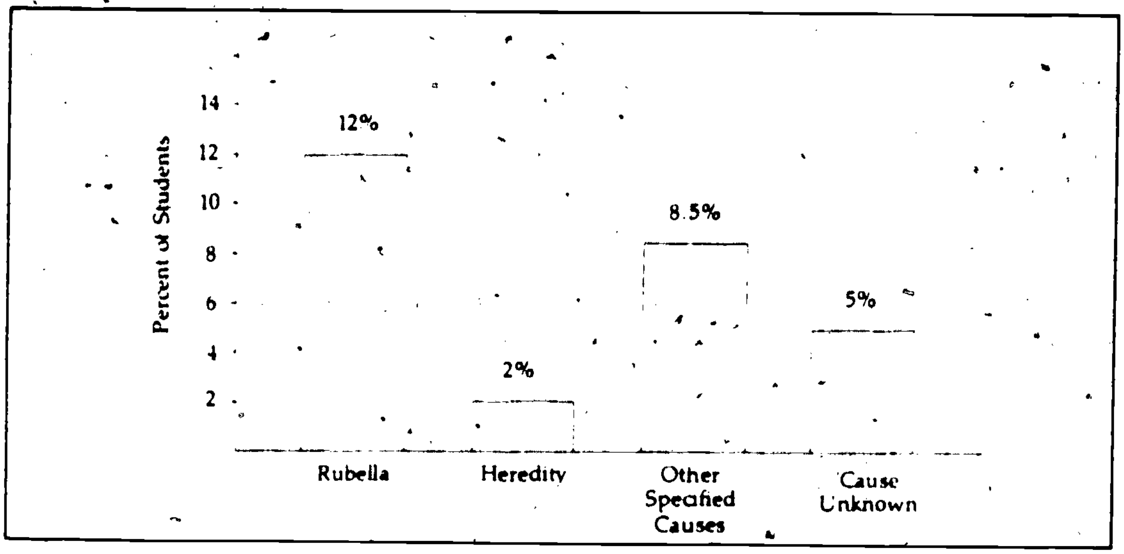

Figure 3. Prevalence of additional handicapping conditions among Gallaudet students by cause of hearing loss.

students now enrolled at Gallaudet's Model Secondary School for the Deaf (MSSD). The study is ongoing and the data presented here are only preliminary results. One part of the study examines the critical question of the academic ability of rubella students. Table 9 shows the median scaled score for rubella and other students on the reading comprehension and the mathematics computation subtests of the Stanford Achievement Test, Special Edition for Hearing Impaired Children. As is apparent, the rubella students are a single point below the others in math computation, and 8 points below the others in reading comprehension. This latter difference may reflect, in part, the more severe hearing losses and the greater prevalence of additional handicapping conditions. At the same time, these differences are not overwhelming. National data collected by the Office of Demographic Studies in 1974 (Jensema, 1975) showed no significant difference between rubella students and deaf students in general in their school achievement, although more recent data to be published shortly by the Office of Demographic Studies reflects a pattern similar to that found at MSSD, with rubella students lagging slightly behind the others.

A final set of data relates to the emotional/behavioral problems exhibited by rubella and other deaf students. Table 10 shows the proportion of students involved in an incident (fighting, property damage, alcohol or drug abuse, etc.) reported to the principal or other school authorities. Rubella students were much *less* likely to be involved in a reported incident, although the number of incidents per student was higher (for those with one or more reportable incidents) in the rubella group. Likewise, a greater proportion of the incidents reported for

Table 9. Median Achievement Scores for MSSD Students by Cause of Hearing Loss.

Achievement area	Rubella	Other causes
Reading comprehension (median)	138	146
Math computation (median)	166	167

Table 10. Reportable Behavior Incidents at MSSD by Cause of Hearing Loss.

Item	Rubella[a]	Other causes[b]
Percent with one or more reportable incidents	40%	99%
Average number of incidents per person for those with one or more incidents	2.7	2.2
Percent of incidents involving violence	42%	31%

[a] 111 rubella students.
[b] 91 students deaf from other causes.

rubella students involved some form of violence than was true for the other students. Thus, while problems were present, they were not necessarily significantly worse among rubella students.

CONCLUSIONS AND IMPLICATIONS

It is clear that rehabilitation, mental health, postsecondary education, and other human service programs will face an enormous increase in demands for service in the years just ahead, as a result of the 1963–65 rubella epidemic having produced more than double the usual number of deaf children during those years. This will require careful planning and major—but temporary—increases in the need for funds, facilities, and personnel. Such increases will not be easy to obtain under the current difficult economic conditions. It seems to us essential that we not oversell the need and overbuild staffs and facilities, since the numbers of deaf children born per year will return to normal levels after most of the victims of the 1963–65 epidemic move through the system. Fewer professional workers and physical facilities will be needed when services to this rubella group are completed

At the same time, these rubella-deafened young people have a greater number and severity of secondary and tertiary handicapping conditions than do other groups of deaf youngsters. Consequently, rehabilitation services will be more difficult and will need to be provided for longer periods of time. For some, these services will be necessary over a full lifetime. The rate of case closures and rehabilitation successes will inevitably decline, but the cost and duration of service will inevitably increase These factors must be taken into account in staff and budget preparation. Some revisions in "accountability formulae" will be necessary where personnel are evaluated on the basis of case closures and successful rehabilitations per year. This will be even more true for the deaf-blind and other severely and profoundly multiply-handicapped children who were not included in the data reported in this paper.

All service programs will need to pay greater attention to the need for medical support, especially for the visual problems, heart disorders, and increased risks of diabetes which accompany rubella-caused deafness.

In a general way, this problem was brought to the attention of the profession, in terms of implications for rehabilitation services, at least as far back as 1974 (Trybus & Murphy, 1974). The general must now give way to the specific as we prepare to deliver quality service to these many individuals, and in so doing, maintain our right to serve.

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SPECIFIC CHARACTERISTICS

Developmental Disabilities

The characteristics of developmentally disabled persons are well defined in the HEW publication, *What are Developmental Disabilities?* (1976), as reported by T. Cerva in an unpublished paper (1977). The following excerpts are quoted from that source.

1. *Autism*

A. *Description.* Autism refers to severe disorders of communication and behavior which begin in early childhood. The word is from the Greek, autos, which means "self," reflecting the stage children go through when they are withdrawn into themselves and do not show interest in others. Autistic children include those afflicted with infantile autism (Kanner's syndrome), childhood psychosis, childhood schizophrenia, or other conditions characterized by severe deficits in language (such as profound aphasia), behavior, and by the inability to relate to others.

B. *Causes.* The causes of primary childhood autism are not known. Autism is found throughout the world, in every social class, with a uniform clinical picture. Many autistic children have abnormal or borderline brain wave patterns, and a small proportion develop seizures. Evidence suggests that autism is like some of the inborn disorders of metabolism.

C. *Effects.* There is a lack of contact with reality. The universal symptom is the child's inability to relate to other persons in a normal way. This becomes more apparent as the child grows older. "Autistic aloneness" is characterized by staring at space, nonresponses to sounds, and a total lack of interest in other persons. Other common characteristics include failure to use speech effectively, rocking or other repetitive behavior, tantrums, difficulties in toilet training, problems in feeding, and absence of social awareness. Autistic children can show normal skill in some isolated areas of functioning, such as mathematics and music performance.

2. *Cerebral Palsy*

A. *Description:* 'Cerebral' refers to brain, 'palsy' to lack of control over muscles. It is not a single disorder but a group of dysfunctions having a variety of symptoms. All are brain centered and all affect muscular control as well as sensory functions. There are three main types: The spastic persons move stiffly and with difficulty. The athetoid has involuntary and uncontrolled movements. The ataxic has a disturbed sense of balance and depth perception.

B. *Causes:* Poor maternal nutrition and health before and during pregnancy can affect the brain development of the baby. Any damage to brain tissue can cause cerebral palsy, whether the result of defective development, disease or an injury occurring any time in life. A chief cause is insufficient amount of oxygen reaching the fetal or newborn brain. Other causes might be premature birth, Rh or A-B-O blood type incompatibility between parents, or infection of the mother with German measles or other virus diseases in early pregnancy, and viruses attacking the newborn's central nervous system.

C. *Effects:* There is difficulty in muscular control and coordination. Sometimes cerebral palsy shows itself only by slight awkwardness of gait or hand movement. More often there are other complications, such as seizures; the inability to see, hear, speak, or learn as other people do; or psychological and behavioral problems. Cerebral palsy is not always associated with mental retardation. Any combination of physical and mental states is possible.

3. *Epilepsy*

a. *Description.* The term epilepsy (or 'the epilepsies') applies to a number of disorders of the nervous system, centered in the brain. While the term comes from the Greek word meaning 'to be seized,' epilepsy is a symptom of a disorder of the central nervous system. It is characterized by sudden seizures—muscle convulsions and a partial or total loss of consciousness—due to abnormal electrical discharges of brain cells.

b. *Causes.* There is no precise answer as to why brain cells discharge abnormally. Epilepsy can result from defects in the brain; brain injury before, during or after birth; head wounds; chemical imbalance; poor nutrition; childhood fevers; some infectious diseases; brain tumors; and some poisons.

c. *Effects:* Seizures of one kind or another are the primary characteristic of all forms of epilepsy. The three major types are: Grand mal seizures last a minute or more and can occur one or more times daily, weekly, monthly, or annually. The victim loses consciousness and has convulsions. Afterward he is confused or drowsy and might sleep for several hours. Petit mal, most common in children, lasts from 5 to 20 seconds and can occur many times an hour. It can be accompanied by staring or twitching of the eyelids and momentary lapse of consciousness. The patient is seldom aware he has had a seizure. Psychomotor seizures can occur at any age. They have the most complex pattern of behavior, including activities such as chewing and lip-smacking, staring and confusion, abdominal pains and headaches, changes in color perception, spots before eyes, ringing ears, dizziness, fear, anger, and, following the seizure, sleep. The seizure might last from a minute to several hours. After the attack, the person is unable to remember what happened. It is important to know that epilepsy usually does not affect a person's intelligence.

4. *Mental Retardation*

A. *Description:* Persons who are mentally retarded are limited in their ability to learn and are generally socially immature. Some are further handicapped by emotional and physical disabilities. There are significant sub-average intellectual functioning and defects in adaptive behavior. Mental retardation is a condition, not a disease, manifested during the developmental period.

B. *Causes:* About 80% of retardation has socio-environmental causes, not biomedical causes. Among the latter causes of mental retardation are: genetic and chemical abnormalities, poor maternal nutrition and malnutrition in infancy, damage to the central nervous system, toxic agents (such as lead), viruses, or brain injury early in life. Premature infants are especially vulnerable, as are children born to women over 35.

C. *Effects:* Retardation has been divided into four levels: mild, moderate, severe, and profound. Mildly retarded persons differ from nonretarded people in rate and degree of intellectual functioning and are usually not identified as retarded until they enter school. As adults they are often absorbed into the competitive labor market. Moderately retarded persons are usually identified before they reach school age. They, too, may become productive members of the community through appropriate education. Severely and profoundly retarded persons can learn to care for their basic needs and can adapt to normal patterns of life.

Mentally retarded persons are found among every race, religion, and nationality, as well as every educational, social, and economic background. However, there is a greater likelihood of socio-economically caused mental retardation in lower socio-economic classes.

Hearing Impairment

Although Schein and Delk (1971) used a simple, but nevertheless effective, for their purposes, definition for hearing impairment (i.e. "all signficant deviations from normal, including deafness"), they recognize, as do other works in the area of deafness, that no single definition can meet the needs of the varied disciplines that work with hearing handicapped persons. The definition offered by Healey (1975) appears t[illegible] a workable one, and is offered below:

a. Description: Hearing impairment is a generic term indicating any loss of hearing from mild to profound as indicated otologically, audiometrically, and functionally. The term generally includes the subclassifications of deaf and hard of hearing.

Four basic factors are normally considered when defining hearing impairment. These are: site of lesion (the type of hearing loss: sensorineural, conductive, or central) etiology (cause of hearing loss: heredity, disease, trauma); age at onset (effect on language and speech development); and, degree of hearing impairment (audiometric and behavioral) (Healey, 1975, p. 7).

B. Causes: The causes of hearing impairment are many and varied, as is the case with the developmental disabilities. Etiologic factors include heredity; Rh factor incompatibility in the parents; pregnancy complications; infection of the mother with German measles or other virus diseases in early pregnancy; prematurity; otitis media, meningitis, mumps, measles, and other diseases; high fever; infection; and trauma after birth.

C. *Effects:* As suggested in A above, the effects of hearing loss are mediated by etiology, site of lesion, age at onset, and degree of hearing impairment. Additionally, the extent and kind of remedial action taken (e.g., medical treatment, auditory amplification, surgery, communication skills training, special education) immediately following the onset of hearing loss have a profound impact on the outcomes of such loss. Generally, the earlier the age at onset and the greater the degree of loss, the more serious will be the effects in such areas as language, speech, social development, and general knowledge.

Hearing Impairment and Developmental Disabilities

The combined disabilities of hearing impairment and one or more of the developmental disabilities constitute a set of conditions that has received relatively little attention in the professional literature up to the present time. However, by combining and modifying the preceding definitions and using these as a base, we now offer the following definition:

A. *Description:* The hearing-impaired/developmentally disabled are those persons who have a hearing impairment in combination with a disability which had its onset prior to the age of 18 years and is attributable to mental retardation, cerebral palsy, epilepsy, autism, or any other condition of a person found to be closely related to mental retardation and which is a substantial handicap that can be expected to continue indefinitely.

B. *Causes:* The causes of hearing impairment and developmental disabilities are usually similar to those listed for the preceding single category developmental disabilities and for hearing loss.

C. *Effects:* The effects of this multiple disability, again, are comparable to those previously listed for single category disabilities. However, rather than resulting in an additive effect (e.g., the handicaps of hearing loss plus the handicaps of a developmental disability), the effect is one of multiplication (hearing loss plus developmental disability plus the combination). An example[illegible]uld be a ing-impaired, mentally retarded person who must deal not only with the ndicaps of a loss of hearing and the handicaps of mental retardation, but also the eciprocating flow of limitations in both areas. Such a person would have a more difficult time learning because of hearing loss, and this further diminishment of *use* of auditory input would increase retardation, and the increased retardation would further impair one's ability to use residual hearing, and so on in a devastating downward spiral.

Again, the impact of hearing impairment among the developmentally disabled is determined by the etiology, age at onset, site of lesion, degree of hearing impairment, extent and nature of early intervention strategies, and accompanying disabilities.

Population Prevalence Estimates

At the present time, there are reliable prevalence estimates for the hearing-impaired population (Schein & Delk, 1971), and these will be reported later in this section. However, as Cerva (1977) notes, it is not certain how many people in the United States have developmental disabilities as defined by the Disabled Assistance and Bill of Rights Act of 1975 (P.L. 94-103). Gross estimates differ due to variations in definitions, validity of identification and reporting procedures, and sampling methods.

1. *Developmental Disabilities*

It has been estimated that approximately 3 to 6% of the U.S. population, or between 6 to 12.6 million people, have one or more of the developmental disabilities. The following section presents prevalence estimates for four basic categories of the developmental disabilities.

A. *Autism*. Recent estimates of the prevalence of autism in the general population range from 4.3 per 10,000 (Brask, 1970) to 4.8 per 10,000 (Traffers, 1970; Wing, et. al., 1976). Applying the higher rate to the January, 1977, population of the United States yields a current prevalence figure of 102,960 persons.

Discussing this prevalence rate, Cerva (1977, p. 13) comments:

> Autism is described almost totally as a childhood disability. Most researchers use the term as connoting childhood autism although many children with autism reach adulthood with the same symptoms. These adults are likely to be labeled mentally retarded or mentally ill. This procedure by definition insures that the prevalence rate for autism is highest among children. There is also a historical problem here. Most of the work on autism has occurred in the last 25 years so that the oldest cohort of individuals who were correctly labeled autistic in childhood is now only 30 or 40 years old.

B. Cerebral Palsy. According to a pamphlet distributed by the United Cerebral Palsy Association (1977) 750,000 children and adults in the U.S. have cerebral palsy, and more than 250,000 of them are under 21 years of age. Cerva (1977) quotes these figures, adding that this translates into a rate of .36% (.0036).

C. *Epilepsy*. Estimates of the prevalence of epilepsy in the U.S. population range from less than 1% to 5%. Basing its estimate upon nine studies, the Epilepsy Foundation of America (1975) states that epilepsy has a prevalence rate of 2% in the U.S. Applying this rate to the 1977 U.S. population suggests that there are currently 4,290,000 children and adults with epilepsy.

D. *Mental Retardation*. The American Association on Mental Deficiency has estimated that the prevalence rate for mental retardation is 3%. According to this estimate, then, the January, 1977 U.S. population of 214,500,000 included 6,435,000 mentally retarded persons.

E. *All Developmental Disabilities*. Combining the above population prevalence estimates for autism, cerebral palsy, epilepsy, and mental retardation results in an over-all prevalence rate of 5.4% or a current total of 11,596,000 children and adults. However, many persons have more than one developmental disability, and consequently such persons are counted more than once in the preceding estimates. Cerva (1977) attempts to correct for such overlapping estimates by reducing the combined population prevalence rate to an even 5% for all developmental disabilities. This reduction, then, results in a current estimate of 10,725,000 for the developmentally disabled population in the U.S.

2. *Hearing Impairment*

The prevalence of hearing impairment in the U.S. has recently been studied extensively by the National Association of the Deaf and the Department of Health, Education, and Welfare's Rehabilitation Services Administration (Schein & Delk, 1971). In this nationwide census of deaf people, the investigators reported the following information.

A. *All Hearing Impairments*. Concerning the prevalence and prevalence rates for hearing impairments in the civilian noninstitutionalized population, Schein and Delk (1971) reported 13,362,842 children and adults in the U.S. with some degree of hearing impairment. This represents a prevalence rate of 6,603 per 100,000, or 6.6%.

B. *Significant Bilateral Hearing Impairment.* This category encompasses hearing loss in both ears, with the individual having some difficulty hearing and understanding speech through the better ear (Schein & Delk 1971, p. 133). In this category the investigators reported there were 6,548,842 persons of all ages, or a prevalence rate of 3,236 per 100,000. This represents 3.2% of the total population.

C. *Deafness*. In the deafness category ("inability to hear and understand speech") Schein & Delk (1971) reported a prevalence of 1,767,046 persons of all ages. This is a rate of 873 deaf persons per 100,000 population, or .873%.

Prevocational Deafness. Schein and Delk (1971) used the classification "prevocational deafness" to refer to all ages at onset of deafness up to 19 years. In this subgroup they reported 410,522 deaf persons, for a prevalence rate of 203 per 100,000 (.203%).

b. *Prelingual Deafness.* This category was used by the investigators to include all deaf persons who became deaf prior to three years of age. A prevalence of 201,626 persons as found in this category, which represents a prevalence rate of 100 per 100,000, or .1%.

In applying the 1971 prevalence rate to the 1977 U.S. population estimate of 214,500,000, the following prevalences should obtain (assuming 1971 rates remain valid for 1977):

Category	Prevalence Rate	1977 Population Estimate
All hearing impairment	6.6%	14,157,000
Significant bilateral	3.2%	6,864,000
Deafness	.873	1,869,580
Prevocational	.203	435,435
Prelingual	.1	214,500

3. *Hearing Impaired/Developmentally Disabled*

There apparently have been no reported studies of the prevalence of hearing impairment in combination with the four developmental disabilities in the U.S. population. Even when hearing impairment and one of the developmental disabilities are considered, most related studies have been restricted in methodology. The problem seems to be essentially one of diagnosis and sampling. The hearing impaired/developmentally disabled (HIDD) population represents an especially hard-to-diagnose group. Superimposed on the communication problems inherent in developmental disabilities are the communication problems related to loss of hearing. Symptoms overlap among these classifications, and many developmentally disabled persons fail to respond to sophisticated audiometric assessment procedures. While evoked response audiometry represents a breakthrough in testing nonresponsive persons, the methodology currently is not readily available for widespread use due to manpower scarcity. The following information is presented with these limitations in mind.

A. *Hearing Impaired/Autistic.* There is currently very little information available concerning this population due to two problems. Differentiating autism per se from other diagnostic classifications presents one problem. Another problem is that autistic persons exhibit severe communication deficits that can be differentiated the problems caused by hearing loss only by sophisticated audiometric

procedures. These difficulties have up to now precluded reliable studies of the prevalence of HIA. However, if we assume that the prevalence rate of hearing impairment among the U.S. populations is similar for autistic persons, then we may expect 6.6% (Schein & Delk, 1971) of autistic persons who comprise 4.8 per 10,000 of the 1977 U.S. population of 214,500,000, to be hearing impaired.

(.066)	X	$\frac{4.8}{10,000}$	X	(214,500,000)	=	6,795
Hearing Loss Rate		Autism Rate		U.S. Population (1977)		HIA Persons

Thus, of the estimated 102,960 autistic persons in the U.S., 6,795 may be hearing impaired.

B. *Hearing Impaired/Cerebral Palsied.* Although the United Cerebral Palsy Association (1977) notes that cerebral palsy often is accompanied by hearing and/or speech problems, there is little information on the prevalence of hearing impairment among persons with cerebral palsy.

In the Schein and Delk (1971) national census of the deaf, .9% of the respondents reported having cerebral palsy. As will be seen below, this rate is more than double the prevalence rate for cerebral palsy among the hearing population (.36%).

The etiologies of cerebral palsy are often causative factors of hearing loss, and on this basis we may reasonably estimate that the prevalence of hearing loss is higher among the cerebral palsied than among the general population. The following estimate, then, should be viewed as a significantly low one.

(.066)	X	(.0036)	X	(214,500,000)	=	50,965
Hearing Loss Rate		C.P. Rate		U.S. Population (1977)		HCP Persons

According to the above extrapolation, then, there were at least 50,965 hearing-impaired cerebral palsied persons in the U.S. in January, 1977.

C. *Hearing-Impaired/Epileptic Persons.* Hearing impairment among persons who are epileptic has not been studied to an appreciable extent due to the fact that the epileptic population itself has not been adequately studied in terms of numbers and other characteristics. In the absence of more definite information, then, the prevalence rate for hearing impairment among the general population may be [illegible]ied to the epileptic population.

(.066)	X	(.02)	X	(214,500,000)	=	283,140
Hearing Loss Rate		Epilepsy Rate		U.S. Population		HIE Persons

Thus, among this country's 4,290,000 persons with some form of epilepsy, at least 283,140 have some degree of hearing loss. Since some of the etiologies of epilepsy also cause hearing loss, we may consider 283,140 to represent an underestimation.

D. *Hearing-Impaired/Mentally Retarded Persons.* Hearing impairment among mentally retarded persons has been the subject of several recent studies which will be reported in this section. However, the limitations of each study are such that drawing conclusions from them regarding national prevalence rates appears to be questionable for the reason to be given.

According to Schein and Delk (1971, p. 123), 1.6% of the respondents surveyed in a national census of the deaf reported also having mental retardation. Although an excellent study, the Schein and Delk (1971) results were based upon a census of noninstitutionalized citizens. Accordingly, the results are not applicable in considering the total HIMR population since so many of this population are in institutions

According to a report of the National Association of Superintendents of Public Residential Facilities for the Mentally Retarded (Scheerenberger, 1976, p. 14), 2,806 or 2.8% of the 100,283 residents of public residential facilities for the mentally retarded were reported as deaf and 1,600 (1.6%) were reported as blind and deaf. However, the 237 public residential facilities reporting for the 1975-1976 year classified 74% of their residents as severely to profoundly retarded. In view of the difficulty inherest in audiological assessment of the severely and profoundly retarded, the validity of these reported data is questionable. For example, it was reported in 1961 that a mail survey indicated that the prevalence of hearing loss among the institutionalized retarded ranged from 0% to 50%. Rittmanic (1971), on the basis of a review of 27 surveys, also reported variation in reported prevalence of hearing loss, which ranged from 8% to 56%. Brannan, Sigelman, and Bensberg (1975) surveyed 212 state facilities for the mentally retarded, with 158 of these facilities returning more or less complete survey forms. Of these 158, 111 provided estimates of the hard-of-hearing and the deaf mentally retarded populations. There were 98,034 residents in these 111 institutions. Among these residents, 9,343 (9.53%) were reported as hearing impaired, or deaf, 7,100 (7.24%) were classified as hard of hearing, and, 2,243 (2.29%) were classified as deaf. However, estimates varied from institution to institution, with such estimates ranging from 0.21% to 15.4% for hard of hearing residents and 0% to 12.17% for deaf residents.

Although the Brannan et. al. (1975) study represents one of the better studies in the field, the authors conclude:

However, the validity of these incidence figures was jeopardized by varying definitions of hearing impairment, approximate census figures, and incomplete survey data.

Healey (1975) notes the wide range of prevalence estimates for the HIMR population, and suggests that a 10% rate may obtain. It is clear that previous studies have failed to result in a reliable prevalence rate estimate for the HIMR population. Considering the available data, two tentative rates may be considered pending further findings:

1. Applying the 10% rate suggested by Healey (1975, p. 1) to the 1977 U.S. population of mentally retarded persons yields a current prevalence of 643,500 (6,435,000 x .10).

2. Applying the 6.6% prevalence rate for hearing impairment (Schein & Delk, 1971) to the 1977 U.S. population of mentally retarded persons (6,435,000) results in a current prevalence of 424,611 HIMR persons.

In view of the fact that many of the causes of mental retardation also lead to hearing impairment, it is probable that the first estimate above (643,500) is closer to the true prevalence of hearing impairment and mental retardation.

E. *The HIDD Population.* The hearing-impaired/developmentally disabled population, according to the tentative estimates that have been derived from the above calculations, is composed of the following numbers:

Hearing Impaired/Autistic	6,795
Hearing Impaired/Cerebral Palsied	50,965
Hearing Impaired/Epileptic	283,140
Hearing Impaired/Mentally Retarded	643,000
Hearing Impaired/Developmentally Disabled	983,900

Since many HIDD persons have more than one developmental disability, the estimate of 983,900 should be corrected downward. How much downward correction is appropriate cannot now be determined.

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Identification and Assessment

The interdisciplinary team is charged with the responsibility of assessment of the child's functioning and potential in a number of areas or domains including: medical, audiological, sign language assessment, psychological and psychoeducational, communication, gross and fine motor, and neurological. Each specialist assessing the needs of the hearing impaired developmentally disabled child is faced with the difficult task of interpreting assessment results in several domains and synthesizing these results with his/her own findings.

In order to prepare the professional to interact within the interdisciplinary team setting, articles and chapters have been selected to address: selection of appropriate instruments and/or techniques; adaptation of the content and administration of assessment instruments; interpretation of performance results; and use of results for instructional planning and modification of the child's instructional environment. Articles in this section specifically cover the following areas of assessment: audiological; psychoeducational; motor; communication; and neurological.

The initial articles in this chapter discuss general principles of assessment for hearing-impaired developmentally disabled children. O. T. Kenworthy's article on "The Integration of Assessment and Management Processes" provides a conceptualization of the administrative structure of the interdisciplinary team structure as operative for the assessment of the multihandicapped hearing impaired child. Edna Levine's chapter on "The Examination of Children and Youth" discusses the specific adaptation of assessment techniques for deaf children, including the multihandicapped deaf child. Levine's chapter covers some general principles in the assessment of deaf children, with a strong focus on the selection and adaptation of tests for psychoeducational assessment purposes.

A series of selections are presented with reference to the audiological assessment of the mutihandicapped child. The chapter by Patrick Cox and Patricia Edelin provides an introduction to the issues involved in audiological assessment of the developmentally disabled child. In addition, excerpts from Hearing in Children (Jerry Northern and Marion P. Downs), provide additional comments on testing the difficult-to-test child. Excerpts selected from Evaluation of the Hard of Hearing Child (Mark Ross) provides further explanation of the interpretation of audiological findings.

Two articles by Lyle Lloyd represent his knowledgeable perspective on the assessment of hearing impaired retarded children. "The Assessment of Auditory Abilities" and "Behavioral Audiometry Viewed as an Operant Procedure" are included here.

A commentary on the domain of motor functioning is provided in excepts from Robert Johnston's chapter on motor function in normal and cerebral palsied children. This chapter introduces some of the general formulations which guide the assessment of motor functioning in the young child and which provide a basis for a rehabilitative program for the physically impaired child. Further considerations in evaluating the motor functioning of the hearing impaired, physically handicapped child are covered in a unique selection by Shane & Wilbur which outlines procedures for predicting the appropriateness of sign language as a communication technique.

The final selection in this chapter is drawn from the physician's training course developed by Frankenburg et. al. Bernstein's chapter on "Neurological Evaluation" summarizes assessment considerations and the types of neurological disorders which are characteristically seen in children within the HI-DD population.

While there is a wealth of material on the assessment of specific handicapping conditions, e.g., mental retardation, only a limited number of selections apply specifically to the evaluation of the hearing impaired child who has concomitant development disabilities. The materials included in this section have been selected to represent a spectrum of assessment domains within the interdisciplinary team.

Other materials related to the assessment area are found in the chapters Communication, Instructional Management, Mental Health Issues.

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Integration of Assessment and Management Processes

Audiology as an Educational Program

O. T. Kenworthy

The literature is replete with references, written for clinicians, detailing sensory assessment procedures for both handicapped and nonhandicapped school-age persons (e.g., Bricker & Bricker, 1969; Fulton & Lloyd, 1975; Fulton et al., 1975; Gerber & Mencher, 1978; Greenberg et al., 1978; Harford et al., 1978; Jerger, 1973; Katz, 1972; Kenworthy, 1978a, 1978b, 1978c; Moore, Thompson, & Thompson, 1975; Moore, Wilson, & Thompson, 1977; Rose, 1966; Wilson, 1978; Wilson et al., 1976b). It is apparent from the number of such references that we are developing an understanding of how to establish the sensory status of any individual. It has been this author's observation, however, that although audition is critical to the educational management of both handicapped and nonhandicapped students, auditory status is frequently overlooked or misinterpreted during the formulation and implementation of individualized education programs.

Although the reasons behind this problem are numerous and complex, we may approximate resolution by focusing upon two aspects, the interaction of which appears critical to the issue. First, administrative support for a comprehensive, integrated, multidisciplinary model of educational management, such as that alluded to by Gruenewald, Schroeder, and Yoder (Chapter 10), seems crucial. Second, a lack of understanding and support for audiology in the schools may be partially attributable to clinicians' patterns of service delivery (Garstecki, 1978). Consequently, this chapter is addressed to both clinicians and administrators. Administrators are provided information concerning the components of comprehensive audiologic service delivery and how those components may functionally have an impact upon and interface with the educational process. For clinicians, suggestions are provided for redefining their functions in a manner that will more effectively interact with the educational process/program. Addressing these two aspects of the problem may facilitate the dialogue and unity of purpose that is currently lacking, and yet is critical to effective service delivery (Knezevich, 1975).

This chapter includes two basic sections. The first section is an overview of administrative and programmatic concerns relative to development and implementation of audiologic services in the educational setting. The second deals more specifically with a redefinition of audiologic assessment procedures in a manner consistent with the foregoing administrative framework. Although these two areas are presented independently, it is hoped that the reader will recognize them as integrated and inseparable aspects of a comprehensive plan of service delivery that is designed to be part of an overall program of educational management.

Rationale

Why this preoccupation with educational management in a chapter related to assessment of severely handicapped persons? The answer to this question has apparently evaded clinicians and administrators for some time. It is the lack of an answer to this question that seems to account, in part, for why more effective and comprehensive services have not been developed for severely handicapped persons in the past (Healey, 1975). The advent of state and federal mandates concerning education in the least restrictive environment has focused our efforts toward considering educational outcomes for severely handicapped persons. Consequently, educators have made significant gains in developing curricular strategies to integrate severely handicapped persons into society (Brown et al., 1978; Gruenewald et al., Chapter 10). In the interest of both humanitarian and cost/benefit considerations, the educational setting has subsequently emerged as the primary management environment for handicapped persons. Thus, to address the service needs of handicapped persons adequately, we should mesh service delivery with the person's educational plan. It is no longer appropriate to assume that the type of assessment information supplied or techniques utilized in a custodial care situation are sufficient. Therefore, discussion of audiologic assessment of severely handicapped persons is linked with delivery of audiologic services within an educational setting. The following discussion has been structured accordingly.

PROGRAM/ADMINISTRATIVE CONCERNS

Incorporating Audiology into the Educational Setting

POPULATION NEEDS AND THE M-TEAM PHILOSOPHY

The influx of students with exceptional educational needs (EEN) into the educational environment has resulted in some constructive decisions relative to educational management. One major development has been the implementation of a multidisciplinary team (M-Team) approach to evaluation. It seems only logical that more than a single input is necessary for appropriate education of any kind. This is particularly apparent when we confound the process with the added complexities of any handicapping condition. As technology and expertise continues to grow, this principle should assume a fundamental role in defining quality education.

There are few conditions under which the M-Team philosophy is more applicable than when hearing impairment is a concern. Any person who suffers a significant hearing impairment necessarily endures the sensory deprivation of diminished hearing sensitivity, as well as the commensurate effects of disrupted communication. These handicapping effects can be minimized, but this is dependent upon early identification and intensive, broad-based management of the client (Bess, 1977; Gerber & Mencher, 1978, Jaffe, 1977; Kemker et al., 1979; Northern & Downs, 1974; Ross & Giolas, 1978). As Flathouse (Chapter 1) points out, no single discipline is sufficiently trained to meet the needs of the hearing impaired person, particularly when other handicaps are also present. Hearing impairment itself and the processes necessary to identify, assess, and manage it are much too complex. Given these circumstances, one might expect an M-Team approach would be the method of choice relative to management of school-age, hearing impaired persons. Furthermore, one might expect that the teacher of hearing impaired students, the speech/language clinician, *and* the audiologist would all be integral members of that team.

In addition, one might consider the following observations relative to severely handicapped individuals:

1. The higher incidence of middle ear dysfunction (Brooks, 1978; Bruns et al., 1978; Fulton & Lamb, 1972; Keith, Murphy & Martin, 1976; Kenworthy, in preparation; Lamb & Norris, 1970; Rubin, in press)
2. The increased sophistication required to identify hearing impairment (Fulton et al., 1975; Gerber & Mencher, 1978; Kenworthy, in preparation; Wilson, 1978)
3. The increased need for appropriate interpretation of complex audiologic data, such as acoustic-immittance measurements, visual-reinforcement audiometry (VRA) and electroencephalic audiometry (EEA) results (Fulton & Lloyd, 1975; Gerber & Mencher, 1978; Hecox, personal communication; Northern, 1978; Weber, Spaulding, & Fletcher, 1980; Wilson, 1978)

Given these observations, one might appropriately conclude that an audiologist should and would participate in the M-Team process for any severely handicapped person.

AUDIOLOGY, THE M-TEAM, AND HEARING IMPAIRMENT

Yet, two disturbing trends have emerged relative to application of audiologic services within the educational setting. First, there appear to be inadequate provisions made for delivery of these services, despite the encouragement provided by Public Law 94-142. For example, "the actual number of certified audiologists providing services in the schools appear(s) to be less than anticipated. . ." (Garstecki, 1978, p. 290; see also, ASHA, 1979; Ross, 1979b; Ventry, 1965). Furthermore, the frequency distribution of audiologists in the schools, across states, shows no consistent per capita ratio (ASHA, 1979). Only 13 states provide certification standards for persons performing audiologic duties within an educational setting (ASHA, 1979). Second, where services are being provided, the majority of the service delivery is focused upon pure tone and site-of-lesion testing rather than upon communication, habilitation, and/or interaction with the educational process (Garstecki, 1978; Kenworthy, in preparation). It appears that, despite our previous observations concerning the needs of hearing impaired and severely handicapped persons, audiology is not an integral part of the educational process. In part, this may be attributable to educational administrators' lack of understanding of the integrated M-Team process presented here. Unfortunately, though, it also seems linked to the functions audiologists have pursued in the educational setting. In observing these functions, it seems quite possible that educational administrators have developed a restricted view of both audiologists and hearing impairment.

Audiology has a history of affiliation with the medical model. Hence, the training of audiologists has traditionally focused upon hearing impairment as a primarily medical problem. As a result, pure tone and site-of-lesion testing is emphasized in the audiologist's training. Since nonmedical work settings have not previously represented a viable work placement for the audiologist, there has been little emphasis upon the influences that the work setting might exert upon service delivery. It is easy to see, then, how this training bias might account for the fact that audiologists in the educational setting continue to focus upon identification and sensory assessment (Garstecki, 1978). It seems equally easy to recognize, however, that such a pattern of service delivery might lead educational administrators to conclude that hearing impairment is only a medical problem and audiologists are a clinical, allied health profession. As the management emphasis for handicapped persons shifts away from custodial care and toward educational outcomes, it seems encumbent upon audiologists, educational administrators, and training institutions to dispel this viewpoint.

The impression of "the audiologist as audiogram" is no longer sufficient if the audiologist is to maintain a functional role in the overall management process. How and what we assess must coincide with the demands of the educational model. This entails broadening our concept of hearing impairment to include both health/medical considerations and academic/communicative considerations. The training provided to students in audiology, as well as to other professionals and the public, must expand the concept of hearing impairment in a similar manner (ASHA, in press; Jeffers et al., 1972; Kenworthy, in preparation; O'Neill, 1980). Educational administrators, as program developers, must also recognize this concept of hearing impairment as both a health and educational concern. In addition, they must provide the type of administrative process—planning, allocation, stimulation, coordination, and evaluation (AASA, 1955)—that actualizes the concept as a service delivery plan. In deference to our previous observations concerning the service needs of hearing impaired and severely handicapped students, it seems reasonable to include audiologic services as an integral part of that plan.

PRINCIPLES OF OPERATION

Our success in implementing this type of service delivery will, however, be dependent upon certain environmental conditions. To implement such a change requires either that a facilitative environment exists or that we manipulate the environment to be more facilitative. In that regard, we can increase the likelihood of success by establishing consensus, within the educational setting, relative to certain preconditions that should exist. These underlying assumptions, or *principles of operation*, provide the type of operative framework within which our plan of audiologic service delivery will function most effectively. Without a firm commitment to these principles at both the administrative and service delivery levels, the substance and effectiveness of audiologic services, as defined here, will be seriously undermined (see Table 1).

It should first be recognized that audition is critical to the learning process. In fact, as our identification techniques continually improve, we have begun to investigate the detrimental effects of even minimal auditory dysfunction upon communication and learning (Holm & Kunze, 1969; Katz, 1978; Katz & Illmer, 1972; Kessler, 1978, as cited in Ross, 1979a; Ling et al., 1969; Menyuk, 1969; Needleman, 1977). Without this recognition, there will be little interest in establishing a comprehensive plan for management of auditory dysfunction. Assuming such recognition and motivation exists, however, there are some less self-evident principles that are equally critical.

There should be a commitment to an integrated, multidisciplinary team approach to educational management. Furthermore, the professional roles and responsibilities within each team should be based upon an analysis of professional competencies and demonstrated skills, rather than pre-judged professional biases, or assumptions based on title. It should not be assumed, for example, that because a person's certificated title is "speech and hearing clinician," "teacher of the hearing impaired," or "hearing clinician" that such a person is necessarily qualified to provide aural rehabilitation therapy

Table 1. Principles of operation

1. Recognition of audition as critical to learning
2. Interest in developing a comprehensive plan for management of auditory dysfunction
3. Commitment to an integrated, multidisciplinary team (M-Team) approach to educational management
4. Definition of roles and responsibilities within the M-Team based upon demonstrated competencies rather than professional title
5. Placement and management of students based upon learner profile rather than diagnostic label
6. Commitment to systematic, data-based decision making
7. Commitment to continuous assessment of both the program and individual plan of management
8. Avoidance of duplication of services both within the educational setting and within the community
9. Focus upon prevention rather than crisis intervention

(e.g., speechreading, auditory training, etc.) or appropriate interpretation of audiologic data. Rather, services should be provided by persons who *demonstrate the competencies* identified as integral to service delivery (Garstecki et al., 1980). Similarly, student placement and management should be based upon consideration of the student's learning profile and the type of instruction that will maximize the student's performance. It should not be assumed, for example, that presence of hearing impairment dictates the need for services from a teacher of the hearing impaired nor that presence of retardation dictates the services of a teacher of the mentally retarded. Instead, we should document the student's strengths and weaknesses, inventory the demands of the student's learning environments, and implement the instructional plan that provides the inputs that most effectively minimize the discrepancy between student performance and desired outcome (Gruenewald et al., Chapter 10).

This type of educational management relies heavily upon systematic, data-based decisions, and it demands documentation of and accountability for instructional-management decisions. Accordingly, the intervention process should be under continuous scrutiny and the assessment process should be an ongoing and integral part of intervention (see Figure 1). The assessment process and procedures should be the source of information for developing, adapting, or modifying the student's instructional program or management plan. Each professional, therefore, needs an understanding of the overriding plan, if the assessment is to be appropriately structured.

Yet, no professional possesses sufficient expertise to single-handedly formulate or implement an appropriate, individualized instructional plan. Hence, development of a suitable context within which to evaluate students' needs requires continuous interaction amongst a variety of professionals. It is for these reasons that the multidisciplinary approach is crucial to both assessment and intervention.

Finally, as enrollments decline, while costs accelerate, we are faced with seriously diminished resources (see Flathouse, Chapter 1). It is critical, therefore, to avoid duplication of services either within the educational setting or within the community. It also becomes increasingly important to provide cost-effective service delivery. This means focusing upon prevention, rather than crisis intervention, and upon delegating responsibility for service delivery to that person whose training and experience meets the competencies demanded by the job. Consequently, the need for identifying the components of a comprehensive service delivery plan and the competencies necessary to

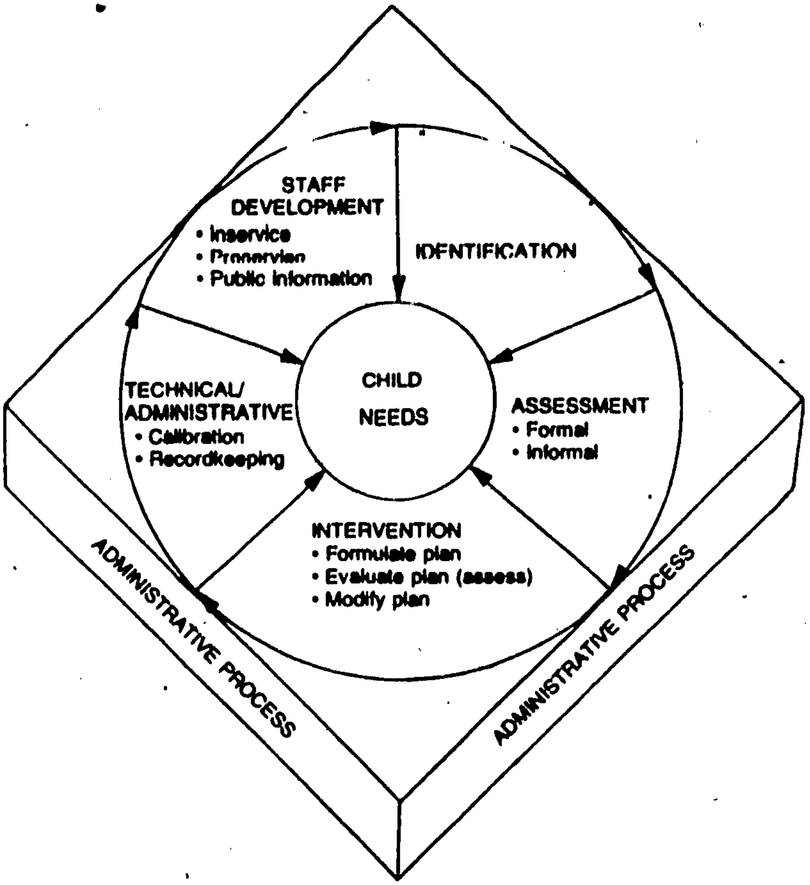

Figure 1. An integrated model for audiologic service delivery in the educational setting.

effect that plan becomes critical (ASHA, 1980; Garstecki et al., 1980; Jeffers et al., 1972; Kenworthy, 1977; Kenworthy et al., 1979; O'Neill, 1980).

SERVICE COMPONENTS AND IMPLEMENTATION

Structurally, we may reduce comprehensive service delivery to the six basic components illustrated in Figure 1: administrative process, identification, assessment, intervention, staff development/public information, and technical/administrative activities performed by staff. In addition, the general formats for organization and delivery may be incorporated into as few as four general models (ASHA, in press; Kenworthy, 1977). Also, the competencies required to provide services within the educational setting, regardless of the model employed, may be specified by a relatively small number of tasks (ASHA, in press; Kenworthy et al., 1979). Yet, the number of programs that have succeeded in full-scale implementation of services in the educational setting is disturbingly small. It would appear that, although the structures are rather simple, the implementation process has somehow fallen short.

In analyzing the implementation of these structures, two distinct problems present themselves. First, there has been a tendency to prioritize the components noted. Second, there has been a trend toward emphasizing services for which capital equipment outlays are greatest, i.e., identification and assessment (Garstecki, 1978). While this may seem a logical strategy from a cost-effectiveness viewpoint, it leads to the limitations on the audiologist's role and impact discussed previously. In addition, it makes service delivery contingent upon large capital expenditures. Both clinicians and administrators might, therefore, wish to consider program-model options that reduce capital expenditures and put equal emphasis upon services that have a direct impact on learning (ASHA, 1980; Kenworthy, 1977). Amplification monitoring and staff development are just two examples of service areas offering potential in this regard (Kenworthy, in preparation).

It is a well-documented trend, for example, that 40% to 60% of the personal hearing aids in an educational setting are malfunctioning at any time (Coleman, 1972; Gaeth & Lounsbury, 1966; Kemker et al., 1979; Kenworthy, in preparation; Northern et al., 1972; Zink, 1972). Data on group amplification systems (e.g., FM auditory trainers) are no more favorable (Freeman & Sinclaire, 1979; Freeman, Sinclaire, & Riggs, 1980; Hoverston, 1979; Kenworthy, in preparation). In addition, such group amplification systems often represent the largest single capital equipment expenditure in a program for hearing impaired individuals. In Madison Metropolitan School District, for example, such systems represent $20,000 in initial expenditures with a depreciation factor of $4,000 per year (straight-line depreciation over a 5-year period) and maintenance costs ranging from $1,500 to $2,500 annually. The limited data available suggest that an amplification monitoring program designed, implemented, and coordinated by an audiologist can significantly reduce such malfunctions (Hanners & Sitton, 1974; Kemker et al., 1979; Kenworthy, in preparation). Data presented by Garstecki (1978) suggest, however, that few audiologists working in the educational setting devote any consistent block of time to amplification monitoring. Yet, the literature suggests that this ought to be a daily activity (Bess, 1977; Chial, 1977; Hanners & Sitton, 1974; Kemker et al., 1979). This trend exists despite notation in the Federal Register (August 23, 1977) that it is the responsibility of the educational system to ensure that amplification worn by hearing impaired students is functioning appropriately.

Staff development and inservice training is another area requiring considerable attention and no capital equipment. Schwarz and Schwartz (1979), for example, found that 63% of regular education teachers claimed to have contact with hearing impaired students, and 72% of those teachers claimed a need for more information about hearing loss and amplification. Similarly, Kenworthy (1979) presented a list of common audiologic terms to 29 special educators (teachers of the hearing impaired and speech/hearing clinicians). These terms included such items as *speech reception threshold, pure tone average, speech frequencies, visual reinforcement audiometry, sound-pressure level,* and *inverse square law.* Results indicated a mean score of 23% correctly identified, with a range of scores from 4% to 46% correct. In addition, 17 of the persons surveyed participated in an inservice course that focused upon principles represented by these vocabulary items. Afterward, all 17 participants stated they had learned "several valuable ideas" and 88% (15 of 17) indicated these ideas were "directly related to classroom instruction."

Clearly, these data on amplification monitoring and staff development indicate a need for full-range service delivery rather than concentration upon identification and assessment. In addition, these data support the principle that effective audiologic service delivery need not be linked to large expenditures for capital equipment (Kenworthy, in preparation).

ADMINISTRATIVE PROCESS AND ORGANIZATION

To some degree, our failure to develop effective services may also be related to a perceived dichotomy between administrators and clinicians or teachers. (This author has come to label this faculty-lounge phenomenon as the "We/They Syndrome.") Administrative structure and process is still often packaged and perceived as it was presented in the post-Industrial Revolution models of Fayol (1949) and Gulick and Urwick (1937). Unfortunately, these models present a clear dichotomy between administrative and staff levels. Their emphasis is nomothetic, with the needs of the organization superceding the needs of the individual. In deemphasizing the idiographic (personal) dimension, however, these models reduce overall effectiveness in favor of organizational efficiency. The advent of social systems theory, however, has presented us with the alternative of a transactional approach to administrative technique; we may develop a system with a better interplay between the idiographic and nomothetic dimensions and, hence, a better balance between efficiency and effectiveness.

There are numerous models available for effecting more transactional administrative process and organization. PDMR (Jones & Healey, 1973), PERT, PPBS/MBO (Knezevich, 1975; Spillane & Levenson, 1978), and PASCE (AASA, 1955) are but a few examples. It is beyond the scope of this chapter to discuss the advantages and disadvantages of each model. In examining these models, however, they do present a common set of characteristics that will facilitate full-range service delivery as it is defined here. In that regard, this author would suggest the following sequence for program development and implementation:

1. Identify the problem or need and its components
2. Identify and collect the resources that address the need
3. Outline the discrepancy between need demands and resources available
4. Construct an organizational framework for alleviating the discrepancy
5. Implement the organizational framework as a program
6. Evaluate the effectiveness of the program in meeting the need
7. Identify problems/needs resulting from implementation

The distinct similarity to the scientific model, and hence the clinical model, is fully intended. The reason being that it is crucial to the success of a service delivery plan/program to develop a fusion between the administrative and service delivery levels. It is important to recognize that the processes that define good administrators are the same processes that define a good clinician or teacher. Conversely, the processes that define a good teacher or clinician are the same as those that produce an effective administrator. Effectiveness in problem identification, hypothesis testing, and decision making are critical to the success of the individual and the combined efforts of teacher/clinician and administrator (see section below, "How to Assess"). Once teachers and clinicians structure their data base and program/plan evaluations to meet this sequence, they will have a mutual framework within which they may discuss effective service delivery with administrators. Similarly, administrators should remove the mystique from the administrative process and subscribe to the type of program development, implementation, and evaluation that coincides with clinical activity. The clinical data base will then become more responsive to administrative demands relative to cost effectiveness and other factors. This is best facilitated, however, when both the administrator and clinician/teacher are involved in management at the administrative (program) level *and* at the service delivery (plan) level (see Figure 2).

The problem still remains that the clinician must appropriately define service delivery to coincide with these principles of operation and administrative structures and processes. How we assess, what we assess, and our program evaluation must coincide with administrative demands resulting from the foregoing model. We have briefly addressed the program evaluation process above. Let us now direct our attention to the data collection process, or how and what to assess.

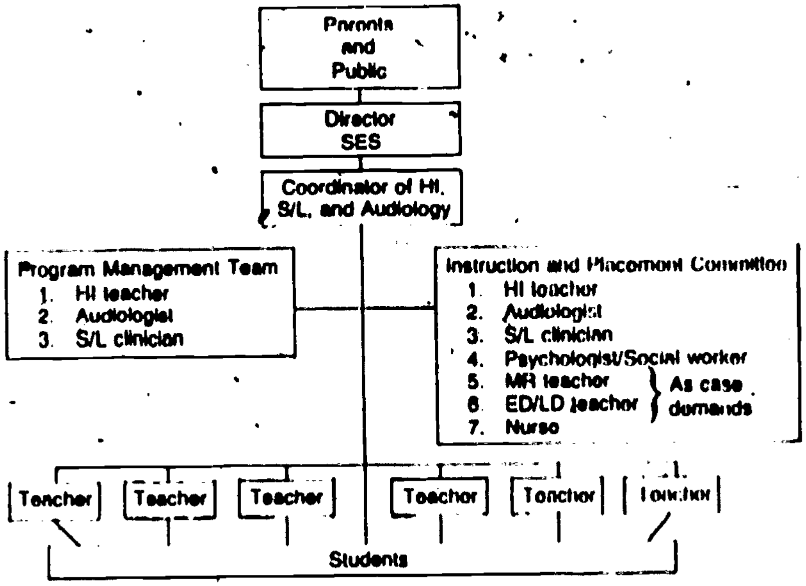

Figure 2 Proposed hearing impaired program organizational chart. (SES, specialized educational services; HI, hearing impaired; S/L, speech and language; MR, mental retardation; ED/LD, emotional disturbance/learning disabilities.)

PLAN/SERVICE DELIVERY CONCERNS

Audiologic Assessment in the Educational Setting

HOW TO ASSESS

As mentioned previously, the effectiveness of clinicians is largely determined by their skills in problem identification, hypothesis testing, and decision making. These three activities should guide clinicians' actions as they progress through the sequence of steps (Figure 3) related to the clinical and administrative process. To provide some common understanding from which to expand our notion of clinical process, let us define these three activities as they relate to the clinical method previously specified.

Problem identification is the process of recognizing alternatives for what to teach or assess and formulating a plan for intervention or evaluation. It involves establishing goals, objectives, and strategies for evaluation or intervention. Decision making is the process by which we prioritize or arrange our objectives and strategies based on an appropriate rationale. It allows us to

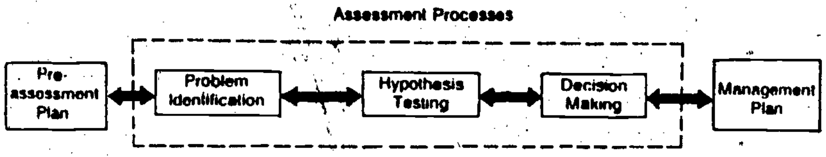

Figure 3. How to assess: the sequence of steps related to the clinical and administrative process.

select those outcomes, procedures, or pieces of information that are most salient to effective evaluation and management of the client. Hypothesis testing means establishing the questions to test and the appropriate rejection regions for the null hypothesis (Marascuilo, 1971). When applied in a clinical context, it provides information concerning whether we have resolved the discrepancy between the expected outcome and the measured outcome.

CLINICAL PROCESS: A CASE PROFILE

An example of this process, and some suggested modifications, may help to further clarify these terms. Consider a case where we wish to determine the auditory status of a 5-year-old, language-disordered child with a history of ear infections. We first recognize that he often asks people to repeat things and that he does not appear responsive to environmental sounds. We also observe that he is extremely active and maintains only brief periods of contact with any single toy. While observing him at play, we find that he emits some two-word, and occasional three-word, utterances. We suspect that a loss of hearing sensitivity with concomitant middle ear involvement is likely. We are, however, also concerned about the effects of his attending behavior upon his communicative performance and test performance. Up to this point, *problem identification* has noted three areas of investigation: hearing sensitivity, middle ear status, and attending behavior. We employ *decision making* to determine that we will assess hearing sensitivity before applying acoustic-immittance measures. The underlying assumption is that assessing hearing sensitivity involves less intrusive procedures. Later in the session, when rapport is established, we will assess middle ear status. We further recognize that the validity and reliability of our hearing sensitivity measures begin with establishment of an appropriate attending set.

We bring the child in for testing and he sits down at the table and waits for our cue. We begin by teaching him to place an object (e.g., block or ring) near his ear in anticipation of a stimulus presentation. As the stimulus is presented, we require the child to place the object in/on a receptacle. Forty-five minutes later, we emerge from the test suite with an incomplete pure tone audiogram and some uncertainty about whether the results obtained are reliable or valid. We approach our faithful acoustic-immittance equipment and find that our young client is not as impressed by it as we are and he refuses to be tested. As we leave the waiting room, we indicate to the mother the importance of taking the child for a medical examination ". . . just to be sure there is nothing medically wrong with his ears. . . ." As we head back to write our report, we are considering, once again, how to structure our report to compensate for our lack of data.

Any of us who can honestly claim this has *never* happened to them, in clinic, is either a sorcerer or the court jester. It will happen to anyone, even the best clinicians. What is different, however, is that a clinician who appropriately engages in decision making and hypothesis testing will not have to be concerned with how to best describe what has happened. The data collected will dictate that description and will lend credibility to the description.

Where did we go wrong in the foregoing session? First, consider that the child did come in and sit down, as we desired. Yet, we proceeded to teach him an attending set involving placement of an object by his ear. Effective decision making should cause us to ask, "Why?" "Very simple," we say, "it was necessary to establish that the child is reliable." Certainly, that is a desirable, if not required, outcome. Except, reliability and validity are measured in terms of the child's response to stimuli, in this case, auditory stimuli. If we instructed the child to "Pick up the block" and then systematically controlled intensity, signal spectrum, etc., and if we kept data relative to hits, misses, false positives, and correct rejections, we would have a measure of reliability *and*, after appropriate hypothesis testing, a valid estimate of the child's hearing sensitivity. "But," we claim, "it is necessary for the child to attend properly." That is very true, but effective decision making, as defined herein, would dictate that the attending behaviors required be consistent with an educational plan for the child. When in the history of his education, outside an audiometric suite, will he be asked to hold an object by his ear to signal appropriate attending set? This practice may be criticized from the point of task analysis or task complexity alone (Kenworthy, 1978c). That is, we are requiring an additional, unrelated and complex motor response pattern. Nevertheless, for our purposes, it is most inappropriate for its failure to answer the foregoing question concerning interface with future academic/communicative demands.

Our assessment process has failed back at the problem identification level, as well. From the beginning, we failed to specify some extrinsic and intrinsic variables and how they would affect our outcomes (Kenworthy, 1978a; see Figure 4). For example, we failed to recognize the extrinsic variable of developmental level and how it might influence learning rate, stimulus input, response demands, and so on. We also failed to specify whether we were bound to achieving the desired outcome in some limited time frame. Had we considered these factors, we could have specified a learning rate required to meet the outcome. Then, during the course of our assessment, we could have analyzed our conditioning data to determine whether we were achieving that learning rate. If not, the process of decision making would have directed us to some alternative strategies specified during our *preevaluation*, problem iden-

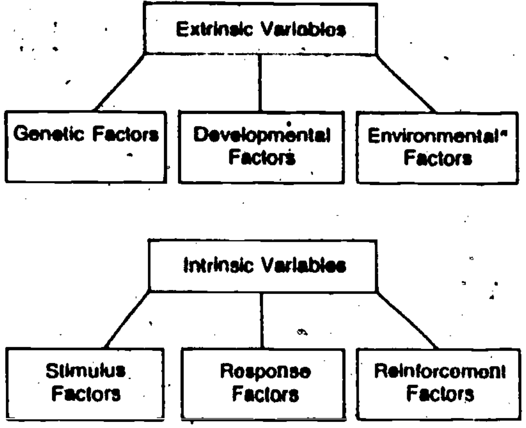

Figure 4. Variables influencing audiologic assessment. (*This category includes considerations relative to both the test environment and the client's environmental interactions and constraints.)

tification planning session. Had we determined that we had *only* one session to see this child we might have predetermined that we would spend a set time interval on conditioning. Failure to meet criterion in that period would have resulted in employing alternative strategies, such as visual reinforcement audiometry (VRA) and electroencephalic audiometry (EEA). This would have allowed us to stay within a reasonable time span for assessing hearing sensitivity and probably facilitated the child's cooperation with further testing such as acoustic-immittance (Wilson, 1978, personal communication).

Finally, the question of reliability and validity should not present a concern. Reliability is extracted from a comparison of the child's response to stimulus and control (silent) intervals (Kenworthy, 1978b; Moore et al., 1977). Validity is established by setting an acceptable Type I error rate before we begin testing. Then we simply compare our data to the critical value (Z-distribution) and clearly state whether the child did not demonstrate normal hearing (Hays, 1973; Marascuilo, 1971). (We assume a null hypothesis, "The client has normal hearing," since the consequences of a Type II error in this case would be less critical. That is, it is less damaging to say the child has a hearing loss and be wrong than to predict normal hearing and be wrong.) This, of course, presumes an adequate standard of comparison. Unfortunately, there are limited normative data available when assessing the auditory status of infants and other difficult-to-test populations (Fulton & Lamb, 1972; Northern & Downs, 1974; Wilson, Moore, & Thompson, 1976a).

Although this example represents one of the simpler clinical contexts within which audiologists operate, it demonstrates some fundamental clinical principles. These clinical principles (similar to the previously noted administrative principles of operation) are critical to the effectiveness of our assessment, regardless of the complexity of the behavior we are analyzing. First, we should clearly detail the variables affecting our outcome, specifying those we

will measure as dependent variables and those that we will allow to influence the outcome as our independent variables (Kenworthy, 1978a; Rosenblum, 1978). We also should devise a sampling or measurement technique appropriate to the array of variables presented (Sackett, 1978) and establish, *before* the session, the alternative strategies or manipulations of input variables we will employ. In addition, the criteria for acceptable performance should be clearly specified, so the data we gather will provide us sufficient decision-making power. The formulation of our hypothesis, as well as our data collection and interpretation, must be clearly related to the communicative and academic demands the child faces on a daily basis (see also, Gruenewald et al., Chapter 10). This principle applies throughout the assessment and intervention procedure as it is defined here. It is this principle of integrating assessment with educational management that differentiates this approach from a traditional clinical approach.

ANALYTIC VS. INTEGRATED APPROACH

Audiology has traditionally pursued analysis and control in its assessment procedure and has achieved some admirable results. Nevertheless, we should also recognize that it is possible and desirable to consider responses to auditory stimuli (or any other observable behavior) in a more interactive context with equal interest in controlling and specifying variables (Sackett, 1978). Consider, for example, how often we write on our reports that a child "requires preferential seating." Placed in the educational context, this means at least two basic operations are necessary relative to input to the child. We need to alter both environmental variables (e.g., distance from the speaker) and teaching style (e.g., appropriate use of visual cues) to accommodate this child. As Ross (1979a), Schwarz and Schwartz (1979), and Schultz, Kenworthy, Schwarz, and Hoekenga (1980) have specified, there are myriad factors involved and several alterations in teaching style available that will facilitate the child's comprehension. Selecting among those alternatives can be best accomplished by observation of the child within the learning environments. Predicting the impact of even a minimal hearing loss solely on the basis of audiometric data plus manipulation of some acoustic principles (e.g., the inverse square law) is insufficient.

Yet audiologists have traditionally tended to assume that the functional impact of a given hearing loss is directly reflected by the clinical results obtained. For example, persons with "a slight hearing loss and normal speech discrimination in quiet" are assumed to have little or no listening difficulties (Davis & Silverman, 1978). We tend to take for granted that such will be the case for a school-age client who falls within that category. This involves, however, at least three dangerous assumptions:

1. That all school learning environments are similar in content, construct, and expectations;

2. That the effects of slight hearing losses are not a function of developmental level, language ability, and so on;
3. That the interactive effects between hearing loss, learning environments, and the communicators within the environments are accounted for within the clinical measurement of auditory function.

It is this last assumption that seems to produce the most oversight in our clinical management.

One of the bases for pure tone audiometric testing has been the principle of Fourier analysis (Rose, 1966). That is, we assume that any complex signal may be expressed as the sum of a series of pure tones. This type of analytic approach has established a trend, however, that has moved us toward removing the client as an active participant in the assessment process. This appears especially true when we deal with pediatric or other difficult-to-test populations (Hecox, personal communication; Wilson, 1978). For establishing pure sensory status, this may represent an expedient alternative and, in some cases, the only alternative. At the very least, it offers a powerful addition to the assessment battery. It is not sufficient, however, to utilize a single assessment measure (Hecox, personal communication; Jerger, 1973; Weber et al., 1980). More importantly, it is erroneous to assume that establishing sensory status sufficiently defines the auditory status of a child. When we were satisfied with linear (specific skills) models of speech perception (Liberman et al., 1967) and communication (Kirk, McCarthy, & Kirk, 1968), that may have been true. When we were concerned with custodial care and medical treatment, it may have been sufficient. There are, however, few data to support a linear model of communication or speech perception any longer (Bloom & Lahey, 1978; Davis, 1978; Hammill & Larsen, 1974). In addition, our management concerns have extended to include educational outcomes. It is necessary, therefore, to interpret our data relative to an interactive model of communication applied in a broader context (Bloom & Lahey, 1978). This principle should influence not only how we assess but what we assess, as well.

WHAT TO ASSESS

The clinician interested in implementing this model of service delivery must perform assessment on two levels: plan-centered and program-centered (see Figure 5). As indicated in the preceding section, this process involves application of problem identification, decision making, and hypothesis testing to structure our data collection and analysis. If structured appropriately, these two evaluative procedures should complement one another, rather than represent separate and distinct tasks. Obviously, the degree to which we may provide adequate program-centered evaluation (i.e., analysis of overall service delivery) will be directly reflected in the adequacy of our child-centered analysis. Similarly, the quality of our child-centered service delivery will be a direct reflection of how well we have documented program needs through program-centered evaluation.

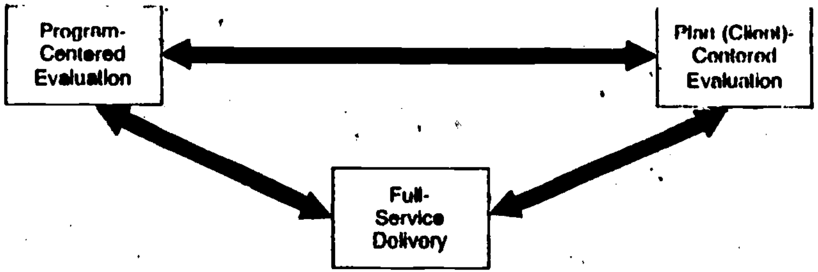

Figure 5. What to assess.

Program Evaluation

By now, we should have a fair notion of the content of our program evaluation (see Figure 6). In the preceding section on administrative and program concerns, we outlined the components of service delivery (see Figure 1). These components and their subcomponents serve as the standard of reference for our analysis. We should, in addition, identify the populations to be served and the resources available, specifying what level of service may be provided with the given resources. In essence, this involves prioritizing the populations to be served, rather than prioritizing the services themselves. Effective programming, as defined in this chapter, assumes the provision of some level of service under each component area, rather than focusing resources and time allotment in one or two service areas. That is, all persons who are identified as high priority cases should receive a full range of comprehensive services, even if this means leaving other cases unserved. Prioritization of populations to receive services should be cooperatively arranged with the program administrator. Decisions relative to what level of service a given child *should* receive ought to be based upon what the child's learning profile demands (e.g., Chapman & Miller, 1980). Program evaluation then, involves the task of documenting what *should* be delivered versus what is *actually* delivered based on resources available. It is this discrepancy that program evaluation should address and document. In addition, it should be concerned with documenting quality of service relative to client progress. These data are extracted from a careful analysis of both individual and group data gathered at the client level.

Plan (Client)-Centered Evaluation

Under these circumstances, client-centered assessment assumes an extended purpose. It supplies information relative to the specific learner and it also provides a valuable feeder mechanism for evaluating effectiveness of and/or need for services. While this need not significantly alter what assessment data

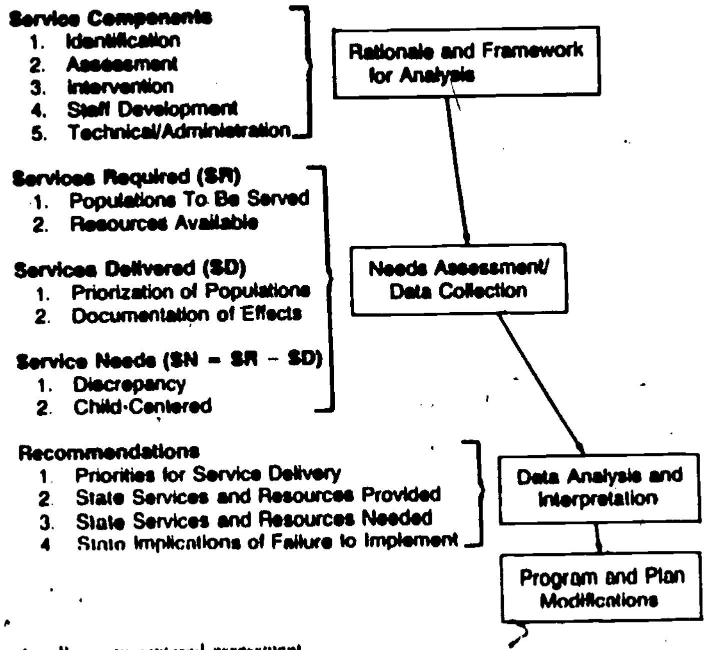

Figure 6. Program-centered assessment.

are gathered, it does have implications relative to data analysis and interpretation. In the case of client-centered data, we are afforded the option of comparing those data against normative standards (Hays, 1973; Marascuilo, 1971) or against individual performance in an *N* of one design (Kratochwill, 1978; Sackett, 1978). In consideration of the performance characteristics of the handicapped student, *N* of one design and criterion-referenced measures have assumed renewed popularity. When we perform program evaluation, however, we often deal with group data that can mask or eliminate trends noted at the individual level, unless recording of the group data is carefully formatted to reflect those trends.

For example, reporting group means and number of client contacts is a customary procedure. Although that procedure adequately quantifies service delivery, it does not represent adequate program or plan evaluation. Data concerning the range and variance of performance, as well as an analysis of factors contributing to the variability should be included. Furthermore, we provide better indices of the *quality* of service delivery when we supply criterion-referenced information in addition to typical measures of central tendency. Contrast the impression imposed by data reported in the two following statements:

1. Currently, students in the . . . program demonstrate an average delay in speech/language production skills of 2.2 years.

2. In the past year, students in the program have demonstrated an average increase in speech/language production skills of 3 months with a range of 0–6 months gained and a modal increase of 4 months. An analysis of gain versus time in therapy revealed a strongly positive association ($r = 0.80$).

In the first case, we are struck with the impression that the students are delayed in spite of receiving intervention. In the second case, however, we are afforded some information that suggests the value of our intervention procedure. Combine the two statements and we have a good case for increasing service delivery. The data that allow the more definitive second statement are only available at the individual (plan) level. The point is that we need to make these data available to administrators and to highlight the efficacy of such data in both the plan and program evaluation processes.

What behaviors are of concern to us, then, as we assess the individual child (see Figure 7)? In a general sense, we should concern ourselves with specifying learner attributes, paradigmatic variables, environmental attributes, and interactions between each of these categories. In essence, our goal is to detail how auditory status will interact with each of these other categories to affect the cues and prompts provided within each learning environment or subenvironment (Falvey et al., 1978; Grueneweld et al., Chapter 10).

Within the category of learner attributes, sensory status becomes an immediate focus of concern. These are the audiometric data that have characterized the output of the audiologist in the clinical setting. What should be of particular interest to audiologists in the educational setting, however, is the impact of any sensory deficit upon communicative and academic function. We should be interested in establishing the child's operative level, relative to auditory stimuli, in addition to the degree and type of sensory impairment (see

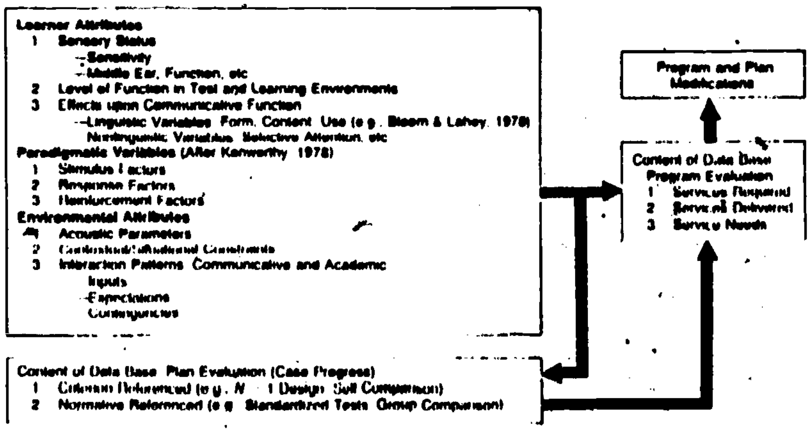

Figure 7. Child centered assessment.

Table 2. Child-centered assessment (level of function, development of auditory skills, reception)*

	Attention/Memory	Meaning
Stimulation		
Detection		
Awareness/Recognition		
Localization/Orientation		
Discrimination		
Identification		
Comprehension		

From Daniel and Kenworthy (1978); adapted from Ling (1976) and Pollock (1974).

*This should not be considered as much a hierarchy of skill development as a continuum. Because we are dealing with an integrated model of speech perception, acoustic cues are only a part of the information utilized for signal processing. Therefore, the receiver's operative level may vary as a function of his ability to compensate for the degraded signal through the use of contextual, situational, and other linguistic variables (Blesser, 1972; Bloom & Lahey, 1978; Davis, 1978, Pisoni, 1977)

Table 2). Both the test environment and the learning environments provide us with complementary pieces of information in that regard. The test environment allows us to manipulate various paradigmatic variables systematically (Kenworthy, 1978a). From this we may then generate hypotheses relative to appropriate cues and prompts to employ within the learning environments (Falvey et al., 1978). That is, it allows us to predict that, if the learning environment presents certain characteristics, we must alter our input to compensate for those characteristics.

AN INTEGRATED, ECOLOGICAL APPROACH: A CASE PROFILE

For example, a learning disabled student with a history of middle ear infections was referred for "suspected hearing loss." His hearing sensitivity and understanding for speech (in quiet) were found to be within normal limits. The parents indicated no concerns relative to hearing, but the teachers and employer complained that the student had become inattentive and was not following directions adequately. Upon reevaluation, the student was found to demonstrate significantly poorer speech discrimination when a competing message was introduced at signal-to-noise ratios as favorable as +12 dB. Further testing also indicated only slight improvement when visual cues were added, but significant improvement in speech discrimination scores when familiarization of materials or contextual information (e.g., topic) was provided. An inventory of the student's learning environments indicated continuous background noise in both the school and work settings. All classrooms operated simultaneous small-group sessions. The school was also arranged on an "open-concept" basis with minimal acoustic isolation of classrooms. The work-setting was an automotive tune-up center where car engines were running constantly. The school and work settings also provided multiple visual distractions that hampered the student's concentration. It was therefore recommended that both teachers and the employer:

1. Establish and maintain visual contact during conversations with the student.
2. Reduce visual distractions within the environment to maximize attention to and benefit from visual cues.
3. Provide clear indication of the topic of conversation.
4. Provide written feedback relative to the topic, such as key words in the directions.
5. Verify comprehension through questioning during the course of the conversation.
6. Move to a quiet environment, if necessary.

All of the above recommendations were carefully explained to the teachers, employer, and the student, and were supported by examples. In addition, periodic observations were made in each learning environment and feedback provided to the teachers and employer. Following 6 weeks of observation, improvement was noted by all participants. After 12 weeks, observation was reduced to once per semester, or as requested by any of the participants. This final level of contact was maintained to ensure follow-up of middle ear status and to ensure long-term advocacy for the student's needs.

What this case illustrates is the manner in which assessment procedures assume a clearly different pattern when we are concerned with communicative and academic outcomes. What is represented is an example of the integration of learner attributes, paradigmatic variables, and environmental attributes into a comprehensive diagnostic picture and effective intervention plan. The necessity for inventory of both test environment performance and learning environment demands is presented as an expanded alternative to the traditional clinical model of audiologic assessment. As we consider full implementation of "free and appropriate education" for all students, this approach to audiologic assessment procedures should be considered as a valuable complement to the educational process and a legitimate alternative to traditional clinical assessment. Achievement of such a model of service delivery will, however, require alteration in our administrative, clinical, and training methods. Only through a cooperative effort between administrators, clinicians, and training institutions will we realize the upgrading of service delivery that such a model provides.

SUMMARY

This chapter, written for both clinicians and administrators, is intended to redirect each groups's thinking about *program/administrative concerns* and *plan/service delivery concerns*. This is considered critical to facilitating the unity of purpose necessary for implementing an integrated, comprehensive model of service delivery. Such a model of service delivery is viewed as the most expedient route to upgrading service delivery.

The model of service delivery presented incorporates components of *identification, assessment, intervention, staff development, and technical/administrative activities*. Each of these components is seen as integral to effective, comprehensive service delivery. It is therefore suggested that prioritization of the populations to be served rather than prioritization of service components may be a more productive approach to service delivery, given that resources are limited. It is also noted that the model of service delivery presented will be most effective:

1. When the administrative framework adheres to certain *principles of operation* (see Table 1)
2. When the clinician's pattern of service delivery includes the full range of components listed (see Figure 1)

In this regard, it may also be necessary for administrators, clinicians, and training institutions to adopt a broader definition of auditory dysfunction. This definition should include both *medical/health considerations* and *academic/communicative considerations*.

To facilitate implementation of this model, administrative process is defined in terms of the scientific/clinical method. This is done to highlight the similarities between effective administrative method and effective clinical method. Program organization is also presented in a way that involves the administrator and the clinician/teacher as a team at both the program (administrative) level and plan (service delivery) level, the goal being to blend these two levels of operation.

Similarly, clinical method (how and what to assess) is redefined in a manner consistent with the foregoing administrative method. Once again the focus is upon the similarities between what constitutes an effective administrator and an effective clinician or teacher. Clinical process is analyzed relative to *problem identification, hypothesis testing, and decision making*. Clinical content (what to assess) is subsequently analyzed from the standpoint of *program evaluation* and *plan evaluation*. Suggestions are then provided to assist the clinician in structuring data collection to provide a functional data base for both of these levels. Emphasis is also placed upon viewing auditory dysfunction in a broad context. Hence, consideration of both test environment and learning environment performance is stressed. Two brief case studies are presented to clarify these points in terms of clinical outcomes and to exemplify an integrated, ecological approach.

Finally, upgrading service delivery in this manner is viewed as heavily reliant upon a cooperative, team effort. In that regard, altering present service delivery patterns accordingly is seen as the responsibility of administrators, clinicians, and training institutions alike.

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12 Examination of Children and Youth

THE PERIOD from childhood through youth covers an extensive range both chronologically and developmentally. Chronologically, it spans the school-age years from preschool through adolescence. Developmentally, it encompasses a broad sequence of continuous change that gradually transforms the child-that-was into the adult-to-be.

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The patterns and processes of change that characterize the transformation are masterfully described in the classic writings of Gesell and his co-authors and in the seminal contributions of Piaget, among others. The details are well beyond the scope of this chapter. The focus here is simply on how an examiner fares in the psychological examination of children and youth who are deaf.

Case History

The history of a deaf child begins with its infancy biography and gradually moves into the broadened behavioral sphere that growing up entails. For psychologists to deaf children, a comprehensive history serves the particular purpose of filling information gaps resulting from testing difficulties, interview problems, and observation limitations.

Data of special importance in a case history concern what Muller (1969) calls "the tasks of childhood." For younger children, these include: (1) the growth of self-awareness; (2) the attainment of physiological stability; (3) the formation of simple concepts related to physical and social reality; (4) the appearance of conscience; (5) the learning of social communication and beginning scholastic skills; and (6) acquiring the concepts necessary to everyday life, including appropriate sexual roles. For youth they include: (1) ognition of limitations; (2) achievement of emotional independence; choice of a career; and (4) the formation of a personal philosophy.

History items related to Muller's tests are included in Appendix F, the history inventory. The following areas are of special importance in the histories of deaf school-agers.

1. *Developmental History*

Diagnostic leads to later learning and behavior difficulties can be picked up in the developmental history. For younger children, in particular, such early alerts may provide guides to appropriate interventions at a time when they will do the most good.

2. *Health History*

Coping with the many pressures and problems of deafness requires considerable physical stamina on the part of a child. Chronic illness in a school-ager means the loss of valuable learning-time that can seldom be made up; physical debility robs a child of the energies needed to master the intricate learnings that lie ahead; and, not infrequently, chronic physical invalidism induces an attitude of psychological invalidism as well. Health history is therefore a continuing consideration in habilitation as well as in rehabilitation, and current health information is an important part of history data.

3. *Vision*

Vision is a deaf person's major avenue for information from the outside, hence plays a critical role in learning. Given the many documented reports of visual problems among the deaf, including Usher's syndrome (Vernon, 1969), it is of utmost importance that a psychological examiner know the visual status of a deaf school-ager. This would include not only ophthalmological reports but also information concerning visual perception, visual-motor coordination, and visual memory. Visual problems in learning to read must be identified early, so that remedial steps can be taken and this particular reading block overcome where possible.

4. *Auditory History*

Information concerning the auditory status and history of a school-age child and the auditory status of the child's parents provides an examiner with psychologically important insights. As discussed earlier, the psychological impact of deafness may vary considerably with: (a) age of onset; (b) amount and type of hearing loss; (c) amount and type of usable language preceding deafness; (d) travails leading to diagnosis; (e) age at confirmed diagnosis; (f) family attitudes; and (g) the nature, benefits, and child's acceptance of remedial interventions such as the hearing aid, visual languages, and school placement.

Briefly summarized: The more language the child had preceding deafness and/or the greater the amount of residual hearing, the higher the expectations for linguistic progress. The more disruptive the traumatic impact of acquired deafness, the greater the possibility of serious psychological disturbance. The more frustrating and lengthy the diagnostic search has been, the more likely the presence of family tensions and disturbances in the child's developmental environment. The more helpful the remedial interventions and the sooner they are applied, the better the outlook for adjustment to deafness and for progress in school.

5. *Educational Experiences*

For a deaf child who is cut off from much of the informal, out-of-school learnings acquired by nondeaf children in the course of daily experiences, school represents the principal milieu for developing the skills and attitudes essential for the incorporation and application of knowledge. Among the special considerations in a deaf child's school and learning experiences are the following.

Initial exposures. Whatever the education option a parent initially chooses, permanent negative attitudes to learning may develop even at this beginning stage owing to such factors as: (1) prematurely applied tutorial pressures either by parent or teacher; (2) the forcing of formal instruction before the child is physiologically or emotionally ready; (3) emotional trauma resulting from a child's being sent away from home to board with a tutor or to a residential school; (4) the risks of parent-tutors becoming more tutorial, judgmental, and critical than loving; (5) operating beyond a child's limits of physical endurance; (6) inappropriate school placement; and (7) incompetent teaching.

Equally dangerous is neglect of a child's learning and exploratory "hungers," whether through overprotection, ignorance, or indifference. Such neglect may result in transforming a potentially good learner into a lazy one who may never do full justice to his own potentials. The older the child becomes and the more deeply ingrained the listless learning attitudes, the more difficult they are to correct.

School placement. As previously discussed, deaf pupils attend different kinds of schools and programs, ranging from regular hearing schools to residential special schools. When a school's educational philosophy and the needs of the child are mismatched, the pupil suffers the consequences both scholastically and emotionally. Therefore psychological examiners need to turn to school-placement history to detect whether the school's philosophy coincides with the pupil's best interests, paying special attention to such matters as: (1) whether the methods of instruction and communication are appropriate to a pupil's auditory status, learning abilities, mental capacity, and special learning problems; (2) whether there is adequate provision for a pupil's psychosocial developmental needs; (3) whether there is provision for the treatment of emotional and learning problems; and (4) whether teacher competence is sufficient for dealing with deaf children in general, and the child being examined in particular.

Length of time in school. Serious and permanent scholastic retardations can result from too late a start and too few years in school. Although preschool and infant programs are increasing, there are still numbers of deaf children throughout the country who for one reason or other do not begin school until 8, 10, or more years of age. Such children seldom make up for the delay in beginning school. And there are numerous pupils who leave school before completing the course of study. The less formal education a deaf pupil has had, the more likely the prospect of serious handicaps, and the more difficult they are to alleviate.

Scholastic attainments. Because prelinguistic deafness retards the development of verbal language, it slows the pace of all learning based on verbal-language mastery. To make up for the lag, deaf pupils customarily require an appreciably longer period of schooling than the nondeaf. Even so, the average prelinguistically deaf pupil is about 4 years behind the hearing in scholastic attainment. Where this 4-year retardation extends to 6 and more years, the examiner is alerted to the presence of additional retarding agents such as emotional disturbance, mental incapacity, inadequate instructional practices, special learning disabilities, and language-learning disorders associated with brain damage. Differential diagnostic search is called for.

It must be emphasized that this traditionally accepted 4-year retardation in scholastic attainment should not be viewed as a permanent scholastic "norm" for deaf pupils. It is more likely a "norm" of deficiency in educational management. With improved educational standards, better teaching, a more realistic curriculum, and more appropriate communicative strategies, there is every likelihood that this retardation can be considerably reduced if not eliminated.

6. *Family Aspirations and Attitudes*

When a deaf child enters the school years, family aspirations begin to evolve and gradually crystallize into plans and goals for the future. A good lead to level of aspiration is history information concerning the educational, occupational, and socioeconomic status of the family. As a rule, the higher the family levels, the higher the aspirations; and the higher the aspirations, the greater the expectations for the child's scholastic success. Both aspirations and expectations can be quite inconsistent with the realities of deaf education or the child's abilities. In many instances, families are not fully informed of these realities by the schools, or if informed feel that their child is bound to prove an exception to the rule. But whatever the situation, when the child does not live up to family hopes, the consequences are registered in his adjustive environment. Where he was once the center of family attention and anticipation, he is now regarded as a lost cause. Not infrequently, emotional problems among deaf school-agers are rooted in such situations. It is therefore essential for a psychological examiner to know whether a child's acceptance by his family is contingent upon attaining the family's aspirations; whether he can attain them; and the extent to which a family will accept modified goals without rejecting the child.

7 *Psychosocial Attitudes and Adjustments*

With the deaf as with the hearing, the pattern of adult adaptability is fashioned to a considerable extent by the way in which the child was prepared to meet new experiences. When a child is deaf, explanations of the meaning of unfamiliar events are seriously hampered by the problem of communication; and, as a result, many deaf children feel themselves thrown into new experiences rather than prepared for them. Those children whose experiences have happily generated self-confidence and trust in others are able to maintain exploratory drive and emotional equilibrium. But to an insecure child, even everyday events may loom as threats to which he reacts with anxiety, apathy, resistance, and the like. Such a child would rather do without and remain safely protected by a familiar environment than venture out into the unknown. Many of the rigid, inflexible deaf adults of today are nothing more than the frightened, insecure children of the past.

Life is especially hard on a child who becomes deaf during the formative childhood years. Not capable of fully understanding what has happened, the child tends to feel that his parents are somehow responsible for not having prevented it from happening. The parents, on the other hand, in their anxiety to apply the full battery of habilitative compensations, are apt to overlook the critical necessity of reestablishing themselves as symbols of security in the child's new and frighteningly silent world. In such instances, it is not unusual for a child's panic and anger at not hearing to center on the parents for seemingly being more interested in hearing aids and deafness than in the child and his or her emotional needs. Such children often experience disruptive feelings of rejection. Rejection is not generally the case at all; it is simply the child's interpretation of the parents' excessive concern with habilitative aids. Unless special pains are taken to correct this impression, the child's feelings of hostility may become a fixed attitude toward the hearing world.

Another important determinant of social initiative and fraternization with the hearing is the nature of a deaf child's recreational experiences. Many suffer denigrating or at best patronizing treatment at the hands of their hearing peers, and find recreational satisfactions only with the deaf. Some are not permitted by their parents to associate with other deaf children and are in consequence forced to "play" with reluctant hearing children or else go off by themselves; others are recreationally immobilized by strenuous parental overprotection. The ones who fare best are those who are encouraged to develop a wide range of recreational interests with both deaf and hearing peers. They fare best as children, and later as adults.

8. *"Preparation-for-life" Knowledge*

Traditionally, school age is considered the time when a child is scheduled to be "prepared for life." Referring again to Muller's tasks of childhood (1969), it is a period for acquiring the concepts necessary for everyday living and for the appropriate sex role; a period for achieving emotional independence, choosing a career, and developing a personal philosophy. Considering the obstacles deafness can raise toward accomplishing these crucial tasks, it is essential that a psychological examiner make a special effort to find out how far along the road to independent living a deaf school-ager is for his or her years, and which life areas are in special need of remedial attention.. Particularly important is information about a school-ager's sex knowledge and experiences, in view of Kallmann's statement that "sexual delinquency and immaturity, lack of preparation for a successful marriage and a stable family life, and the more extreme forms of deviant sex behavior are by no means less common among the deaf" (1963, p. 245). There are plenty of psychological inventories for such life-adjustment areas as social maturity, values and attitudes, sex knowledge, occupational preferences. Psychological test catalogues and the Buros publications are major reference sources. The trouble in applying the devices to a deaf clientele is that most of the measures are highly verbal and can be extremely difficult to adapt to deaf school-agers both linguistically and conceptually. They can, however, serve as interview guides for examiners who are highly skilled in work with the deaf.

Preparation-for-life information is of value not only in the examination of a particular individual, its importance extends into the whole area of preventive mental health measures for the deaf. To quote Kallmann again, "If we sincerely desire to promote prevention and cure of these delinquency patterns, we shall have to learn to look at them as *deviations* from a normal maturational process that is determined not only by man's biological nature, but also by the family, school, and psychological atmosphere in which he develops" (1965, p. 245, italics added).

9. *Focus of Behavior Data*

An examiner customarily looks to history data for descriptions of a subject's reported behavior and behavior deviations before conducting his own inquiry. However, a special point must be made concerning the focus of behaviors generally recorded in a case history. This is customarily on the behaving individual. Rarely is there any information about the *elicitor* of the reported behavior, whether teacher, classmate, houseparent, or whoever, or about the situation that evoked or provoked the behavior. But behavior does not take place in a vacuum, nor is it a "normable" constant from person to person or situation to situation. Therefore, in order to evaluate the *relevance* of undesirable behavior and judge whether it was warranted, the focus of the report needs to be broadened to include the behavior of the eliciting figures vis-à-vis the child, the nature of the behavior-evoking situation, and whether certain behaviors are consistently evoked by certain figures. Such history information is particularly important where wide swings and inconsistencies in behavior are reported. The "blame" may lie not so much with the child as with the behavior-evoking figure or situation.

10. *Current Communication Patterns*

In preparation for meeting a school-ager, the examiner needs to know the child's current preferred modes of and expertise in expressive and receptive communication. While these may be inferred from school history, progress or changes may have taken place in the course of time. Current abilities and preferences need to be described to inform the examiner of which modes to use in interpersonal exchange, what to expect in mutual comprehension, and what alternate approaches or supports may be required.

Psychological Testing

In turning from the infancy to the school-age level, psychologists move from the chronological range of least difference between the deaf and the hearing to that in which differences become increasingly pronounced; from the flexibility characterizing infant evaluation to the rigid rules governing the use of standardized tests; and from the selection of developmental schedules that are equally applicable to deaf and hearing babies to sharp limitations in tests designed and standardized for deaf school-agers.

As a result of this combination of circumstances, most of the tests used with the deaf are measures standardized on nondeaf populations. As previously noted, some support the practice on the grounds that the deaf live in the same world as the hearing and therefore should be tested with the same measures; while others protest the unfairness of testing deaf children with measures and norms based on "hearing" experiences and performance. And finally, there are the "compromisers" who feel a satisfactory solution to the problem is to attach deaf norms to hearing-standardized tests, without realizing that despite deaf norms the tests and test items may still be structurally unsuited to a deaf population.

Psychologists caught in this test-bind are faced with complex problems of test selection. The problem of standardized versus unstandardized is joined by numbers of variations in test format. For example, there are verbal tests which require the use of verbal language for both administration and response. Some deaf persons can take such tests successfully, but most cannot. There are nonverbal tests which use verbal language for directions but not response; nonlanguage tests in which no verbal language is required for either directions or response, performance or manipulative types of tests which can be administered and responded to nonverbally; and there are paper-and-pencil tests in which test items are written, printed, or drawn, and response is made in writing of some kind. Further, there are group tests that can be given simultaneously to upward of 20 subjects and individual tests that are administered to one subject at a time. There are also other kinds of variations among psychological tests that raise provoking questions of choice.

All in all, in attempting to achieve fair test practices with deaf subjects, a conscientious examiner often finds that more time must be spent in searching for appropriate measures than in actual testing. The sections that follow offer guidelines for dealing with this difficult situation.

General Testing Guides

The main focus of this section is on mental and personality testing, since it is in these important examination areas that the testing of deaf subjects poses its most inhibiting problems.

Selecting the Instruments

The "standardization" halo. In selecting psychological tests for deaf subjects, examiners are prone to assume that once a psychological instrument claims to be standardized, it bears a seal of excellence and so warrants consideration for use with deaf individuals. This is of course not so. There are well-standardized tests, poorly standardized ones, and some for which the term "standardized" is simply window-dressing. Whatever modifications need to be made to adapt a test to a deaf subject, the least that can be asked is that the test be well constructed. A good indication of a test's soundness can be found in its standardization details, which are described in the manuals of all responsible tests.

Screening the tests. Once the standardization details of promising tests have been reviewed, a matching process is conducted involving the fit (a) between the content and concepts of test items and a subject's age, experiences, scholastic standing, and concept level; (b) between a test's directions for administration and a subject's ability to comprehend them as they stand; (c) between the manner in which response to test items is to be made (oral, written, manipulative, etc.) and a subject's abilities along these lines; (d) between the demands of unstructured tests, such as projective techniques, and a subject's ability to meet them; and (e) between a subject's ability to take a test after suitable modifications have been made and the feasibility of making modifications without harm to the test. Relevant details about a subject's contributions to these matches are found in the case history, which should be reviewed before test selection. References to test resources and descriptions of tests can be found in psychological test catalogues and in the Buros *Mental Measurement Yearbooks* and other Buros publications and reviews.

Adapting the tests. Where modifications in promising tests are required for deaf subjects, they need to be carefully worked out beforehand, and objective modifications need to be prepared for three eventualities—simplified verbal language, signs, and pantomime—the form to be used depending upon which is most comprehensible to a particular individual. Where such modifications in language are so worked out, it is entirely possible to maintain the intent and objectivity of the original test. The most risky and difficult modifications involve simplifying concepts expressed in test items and questions that are beyond the experiences or grasp of a subject. An example taken from the WISC is: "Why is it generally better to give money to an organized charity than to a street beggar?" (Wechsler, 1949, p. 63). Although items on the WISC Verbal Scale can be tried experimentally with deaf children, this example shows why the Performance Scale of the WISC is preferred for I.Q. purposes. Before using modified tests with deaf subjects, it has been my practice to take the tests myself, with a colleague acting as examiner, in order to assess the conceptual and communicative modifications, their objectivity, and comprehensibility. Whatever improvements seem called for are made, and then the test is tried out with sample deaf subjects with an eye to further improvement, and rechecked with other samples after these improvements have been made.

Pretest Preparations

The test environment. Test rooms should be neutrally cheerful and simply but comfortably furnished. Nothing should suggest a doctor's office, nor should the examiner wear a lab coat. Even with older deaf children, these may arouse unhappy memories of early diagnostic experiences, and inhibit performance. With very young children newly emerging from diagnostic travails, reminders of doctors commonly arouse fear. Room furnishings should include chairs and tables for testing young and older children. For times when parents must be present during testing, a good supply of popular magazines should be available for browsing. Test materials should be neatly arranged, convenient to hand for the examiner but not distractingly visible to the subject; and closed cupboards or files should contain other potentially distracting materials such as office supplies, other tests, and toys. The examiner must keep in mind that deaf children are visual beings; hence visible distractions should be reduced to a minimum. This includes the surface of the test table, which should be free of all materials (test manuals, stop watches, etc.) except those involved in a test task. Stop watches can be particularly distracting to young children and anxiety-provoking to older ones. I have found it convenient to hang the stop watch around my neck on a string that is long enough to center the watch below the tabletop. The child knows it is there, of course, but the watch loses its impact by being less visible and at the same time leaves the examiner's hands free to attend to other matters.

Examiner preparation. Over and above technical competence and the special competencies required of examiners to the deaf, examiners of very young children need to be familiar with the basic facts of child development. Such children are not simplified adults. There are still developmental changes taking place before experiential stability is reached; and children of different developmental levels and experiences may perceive the same test task in quite different ways. Along these lines, research suggests that children even see pictures differently from adults, and that children who have had little experience with pictures perform relatively poorly on tasks involving pictorial representations (Gibson and Olum, 1960, p. 361).

It is highly important, therefore, that examiners of young deaf children be able to see test items through the eyes and experiences of the child. For example, does a given manipulative task fit the child's previous experiences with manipulative play materials or is this a first exposure? "First exposure" children may be seriously penalized in test performance as compared with experienced children of the same age and mental level. Child-examiners must also be able to perceive and interpret minute behavioral clues, and adapt their own behaviors and procedures to what the clues reveal. All these efforts serve to establish empathetic insights and rapport in order to evoke best performance from the child and sound interpretations from the examiner.

Finally, at whatever chronological level is being tested, examiners must enter the test situation fully familiar with the tests and fully skilled in the dextrous manipulation of test materials. Nothing is more boring to a subject of any age, especially a deaf subject, than to have to sit and wait while the examiner is reading up on test instructions, scribbling notes, or fumbling about with test materials. This is the surest way to blunt interest and dull response. Examiners must keep pace with a subject's performance.

Preparing the subject. No subject, even if previously tested, should be plunged into a psychological test without some introductory explanation by a responsible person. With very young children who are not yet test-wise, preparation is smoothly handled where the child is already attending a school in which the examiner is a staff member and makes routine classroom rounds for observation purposes. In such situations, most young children enjoy a break in class routines and happily accompany this familiar, nonthreatening figure to the room where special games are played.

When both examiner and situation are entirely unfamiliar to a young child, special care must be taken on a first encounter not to overpower the child with enthusiastic greetings, especially a timid or mistrustful child. Presumably the intake history which the examiner has read beforehand describes the communicative patterns used by the child, and a smiling "Hello" is addressed to the child in its accustomed communicative mode; or if this is unknown, simply a warm and friendly spoken "Hello." Also, some nontest toys are temptingly displayed to capture the child's interest and convey the message that this is a play situation. If the child shows signs of anxiety unless the mother is present, then she is permitted to stay, but seated off to one side of and slightly behind the child so the child can see her out of the corner of an eye without having to get up and look around to make sure she is still there.

Preschoolers and young school-agers are led into formal testing by way of a brief preliminary period of play with the examiner, using nontest toys. Formal testing begins when the child is ready for more games. In the event a child refuses to respond to these overtures, testing is not forced. The child is smilingly dismissed with a cheerful "Good-bye," and arrangements are made for a return visit which is usually successful. Exceptions to this procedure are certain children with bizarre behaviors who cannot be "prepared" in the usual ways but who can nevertheless be tested, albeit through unorthodox approaches, as illustrated in later discussion.

With older deaf children, who are already test-wise in most instances, preparation can simply take the form of a friendly greeting and an explanation in the subject's preferred communicative mode that the test procedure is a way of finding out about a person's interests and goals as a means of helping to plan for the future and manage current problems. When questions are asked by the subject, they should be answered by the examiner as sincerely but as briefly as possible, since the test session must not be permitted to turn into an interview unless it becomes obvious that the subject's needs so require. In this case, testing is rescheduled for another time.

Influencing Variables

Although many potential variables in testing are controlled through standardization and pretest preparation, examiners must be prepared for others that are still likely to arise, such as test anxiety, motivation, physical or emotional condition at the time of testing, misleading directions, and the subject's previous exposures to the same test. Where such variables threaten test performance, testing should be postponed and special precautions taken to control the offending variables before subsequent testing.

Examiners, too, can be offending variables. Being human, they have personal preferences and competencies which do not necessarily fit every subject, hence influence test performance. It would be too much, for example, to expect every examiner to be equally competent at all chronological levels, with all types of subjects, and all types of tests. Many have their favored pool of tests from which they are unfortunately loath to depart even for a special situation or subject. Most have age-range preferences. And numbers of examiners frankly admit an inability to work with certain types of disablements and certain kinds of subjects. Children are sensitive to such examiner dispositions, and deaf children especially so. Examiners therefore need to face up to their own preferences and limitations and, when they feel ill at ease or out of their depth, to take whatever corrective measures are possible in their particular situation lest they too become a confounding variable.

A Note on Cited Tests

The sampling of tests mentioned in the next sections includes some that are often used by examiners of deaf subjects, some seldom used, and some that warrant further trial. The lists serve an informative rather than a "recommendation" function. Recommendations on the basis of tests alone are almost impossible to make because of the many cautions and criteria involved in conscientious test selection, adaptation, and administration. Whether a test is "good" or not for a deaf subject depends largely on how well these criteria have been established and observed. Even a good test can become a poor instrument when badly matched to a given subject, or poorly adapted, or poorly administered.

Further, in the course of time, test revisions appear. While the changes made are seldom radical, they nevertheless require buying new materials. Where the unrevised version of a test is doing a satisfactory job, examiners must decide for themselves whether this expense is warranted. However, when a test not previously used needs to be ordered, it is wise to consult current test catalogues to see if a revision has been made and what the improvements are in the revised form.

To avoid confusion, the tests cited in the following sections are unrevised versions unless otherwise noted. Examiners may refer to current psychological test catalogues and to the latest Buros *Mental Measurements Yearbook* for detailed test information. To keep abreast of changes in the test market, the reader should ask to be placed on the mailing lists of major test publishers and distributors for their annual catalogues and other announcements.

Finally, Appendices I and J provide publisher and distributor information for easy access to test manuals and materials of those tests and developmental scales cited in the sections on psychological testing.

Mental Testing

Of central importance during the school years are a deaf child's learning potentials. Judgments in this area are often difficult to make, especially when a child's behavior is immature, scholastic attainment is retarded, environmental interplay is limited, and communications are equally so. Therefore, a large share of responsibility falls on mental test information in estimating learning ability.

Mental Tests Used with Deaf School-agers

Table 12.1 rank-lists mental tests used with deaf subjects (preschool through adolescence) as reported by two or more respondents in a survey of psychological practices with the deaf (Levine, 1974). In addition to the hearing-standardized tests cited in Table 12.1, there are several tests standardized on the deaf, namely: the Nebraska Test of Learning Aptitude for Young Deaf Children (Hiskey, 1941); the Ontario School Ability Examination (Amoss, 1936); the Non-Verbal Intelligence Tests for Deaf and Hearing Subjects (Snijders and Snijders-Oomen, 1959); and the Smith Nonverbal Scale, now titled the Smith-Johnson Nonverbal Performance Scale (Smith and Johnson, 1978). Almost half of the respondents reported that their particular test-selections were determined by the triad of ease of administration, ease of scoring, and recommendation by other testers. Advantages and disadvantages were expressed about most of the tests in use, including the popular Wechsler scales.

Descriptive Digests of Selected Mental Tests

The alphabetical listing that follows is an illustrative sampling of tests reported in table 12.1, and annotated by age and test items. All are capable of administration in pantomime or signs.

1. *Chicago Nonverbal Examination.* A paper-and-pencil test for ages 8 years through adult. Tasks include: digit symbol; genus discrimination; block counting in stacked constructions; part/whole discrimination; figure matching; part/whole pictorial relationships; event sequence; progression sequence; pictorial absurdities; pictorial part-to-whole relationships.
2. *Goodenough-Harris Drawing Test.* A paper-and-pencil "one-item" test which is a revision and extension of the Goodenough Draw-a-Man test for ages 3–15 years; involves drawing a man and a woman.
3. *Leiter International Performance Scale.* A performance-type test for ages 2–18 years. Tasks are categorized as: concretistics—matching of specific relationships; symbolic transformation—judging relationships be-

Table 12.1 Mental Tests in Rank Order (*n* =166 Respondents)

	Special School			*Regular School*				*Other Agency*				
Name of Test	*Residential*	*Day*	*Total*	*Special Class*	*Partially Integrated*	*Totally Integrated*	*Total*	*Diagnostic Unit*	*Speech & Hearing Center*	*Rehabilitation Setting*	*Total*	*Grand Total*
Wechsler Intelligence Scale for Children (WISC) Performance	32	25	57	47	9	6	62	6	3	1	10	129
Leiter Intelligence Tests	21	19	40	34	5	3	42	7	3	2	12	94
Wechsler Adult Intelligence Scale (WAIS) Performance	31	10	41	18	6	3	27	6	3	2	11	79
Hiskey-Nebraska Learning Aptitude Test	15	10	25	14	7	3	24	1	2	1	4	53
Goodenough-Harris	14	11	25	6	1	1	8	0	2	0	2	35
Wechsler Preschool/Primary Scale of Intelligence (WPPSI) Performance	10	7	17	7	2	0	9	6	2	0	8	34
Arthur Adaptation Leiter	12	5	17	10	1	0	11	1	1	0	2	30
Columbia Mental Maturity Scale (CMMS)	6	1	7	14	1	2	17	0	0	1	1	25
Merrill-Palmer Scale of Mental Tests	8	5	13	5	1	2	8	0	2	0	2	23
Ravens Progressive Matrices	7	5	12	3	1	1	5	0	0	2	2	19
Ontario School Ability Examination	3	6	9	4	0	0	4	0	0	0	0	13
Stanford-Binet Intelligence	3	4	7	2	3	0	5	0	0	0	0	12
Cattell Intelligence Tests	0	5	5	0	1	0	1	1	1	1	3	9
Chicago Nonverbal Exam.	6	0	6	1	0	0	1	0	0	0	0	7
Wechsler-Bellevue Intelligence Scale II	0	1	1	3	0	0	3	0	0	0	0	4
Snijders-Oomen Nonverbal Intelligence Test	0	1	1	1	1	1	0	2	0	0	0	3
Pintner-Paterson Scale	2	1	3	0	0	0	0	0	0	0	0	3
Denver Developmental	0	3	3	0	0	0	0	0	0	0	0	3
Preschool Attainment (Doll)	1	0	1	1	0	0	1	0	0	0	0	2
Smith Nonverbal Scale	1	0	1	1	0	0	1	0	0	0	0	2
Revised Beta	1	0	1	0	0	0	0	0	0	1	1	2
Calif. Mental Maturity	2	0	2	0	0	0	0	0	0	0	0	2
Porteus Mazes	1	0	1	0	0	0	0	1	0	0	1	2

SOURCE: Drawn from Levine (1974).

tween two events; quantitative discriminations; spatial imagery; genus matching; progression discriminations; immediate recall; speed.

Arthur Adaptation of the Leiter International Performance Scale is a restandardization of the scale on children aged 3–8 years, using portions of the scale appropriate to this age range.

4. *Merrill-Palmer Scale of Mental Tests* (Language Scale omitted). A performance scale for ages 2–5 years. Tasks include such items as: crossing feet; standing on one foot; throwing a ball; paper folding; drawing up a string; cutting with scissors; matching colors; closing fist and moving thumb; copying a circle, a cross, a star; buttons and buttonholes; pyramid buildings; various formboards.

5. *Hiskey-Nebraska Test of Learning Aptitude for Young Deaf Children*. A performance scale standardized on hearing-impaired children for ages 4–10 years. Tasks include: memory for colored objects; bead stringing patterns; pictorial associations; block building; memory for digits; drawing completions; pictorial completions; pictorial identifications; paper folding; visual attention span; puzzle blocks; and pictorial analogies.

6. *Snijders and Snijders-Oomen Nonverbal Intelligence Tests for Deaf and Hearing Subjects*. A performance scale standardized on deaf children for ages 3–15 years. Tasks are grouped according to: form; combination; abstraction; and memory; and include mosaic designs, block design, copying, drawing completion, puzzles, halved pictures, corresponding pictures, picture completion, series continuation, picture analogies, figure analogies, sorting shapes, sorting cards, picture memory, knox cube.

7. *Porteus Mazes*. A "single-item" type of paper-and-pencil test in which mazes of increasing difficulty (Vineland revision, Porteus Maze Extension, and Porteus Maze Supplement) are arranged for ages 3 years through adult.

8. *Raven Progressive Matrices*. A design fill-in test for ages 5 years through adult. The task involves selecting a particular piece, from several exposed pieces, that will complete a given design or "matrix" from which the part had been removed. Design themes are: continuous patterns; analogies between pairs of figures; progressive alteration of patterns; permutations of figures; and resolution of figures into constituent parts. Colored Progressive Matrices sets were constructed in 1947 for children between 5 and 11 years.

9. *Wechsler Preschool and Primary Scale of Intelligence (WPPSI), Performance portion*. Standardized on nondeaf children aged 4–6 years. Test items include: animal house (a color matching/memory task); picture completions; mazes; geometric designs; block designs.

10. *Wechsler Intelligence Scale for Children (WISC), Performance portion*. Standardized on nondeaf children aged 5–15 years. Test items include: digit symbol; picture completions; block designs; picture arrangements; and object assemblies.

11. *Wechsler Adult Intelligence Scale (WAIS), Performance portion*. Standardized on the nondeaf aged 16 years and over. Test items include: digit symbol; picture completions; block designs; picture arrangements; object assemblies.

Testing Guides and Practices

An underlying imperative in all psychological practice is mutually comprehensible communication between psychologist and subject. The following guides rest on an examiner's ability to engage in such communication with deaf subjects.

1. An important determinant of a subject's test performance lies in his or her clear understanding of test directions. Otherwise poor test performance may be due as much to a misunderstanding of directions as to mental inability. It is therefore essential that an examiner check understanding carefully before proceeding with a test item. In this connection, it is interesting to observe the various ways in which deaf children approach manipulative test items. Some charge right in as soon as the test material is displayed, without waiting for directions. These are generally the test-wise children. Others have difficulty even with suitably adapted directions. In such instances, examiners can devise a few simple practice items if the test lacks sample tasks. It is important, however, that the practice items do not serve as guides to answers. But it is even more important that a subject fully understand what he is expected to do.

2. Testing should be managed so that the subject leaves with a feeling that this has been an interesting, nonjudgmental experience which he would not mind repeating at some future time, as most likely will be the case. Toward this end, testing begins with a task that is within the range of a subject's abilities (as indicated in history information), yet not so simple as to be insulting. Testing should also end on a note of accomplishment, even if a nontest item must be used to achieve this.

3. Where possible, test items should be presented in line with a subject's interests and abilities. Items that have less appeal should be carefully interspersed among those that are more appealing; simpler items among those presenting difficulties. In testing deaf subjects, especially with hearing-standardized tests, it is more judicious to elicit best performance in this way than to rigidly adhere to a prescribed sequence in the face of a subject's resistance or distress.

4. Examiners should guard against taking advantage of a child's wish to please by urging him on beyond the limits of tolerance. When a child is pushed too far, test performance is determined more by adversely influencing variables outside the test frame than by the test itself. Testing should be discontinued when it is apparent that the subject can no longer put forth his best efforts.

5. An examiner's behavior and facial expression should be under wise control when testing deaf subjects. Children, in particular, look to an examiner's face for evidence of appraisal and are extraordinarily sensitive to even minute clues—a raised eyebrow, a slight frown, the twitch of a lip. The examiner's expression should at all times be pleasantly encouraging and nonjudgmental. Also to be avoided is extravagant praise for a good response, because when no praise is forthcoming for a poor one, the child feels let down and discouraged. Instead, the child should be made to feel that it is the effort that counts. Failure is acknowledged by "That was a hard one, but you *tried!* Now let's try another one." Success is quietly enjoyed by both. As the child comes to perceive this nonjudgmental attitude, he will cease to fasten his attention on the examiner's face, and will concentrate instead on the tasks before him and on his own critical faculties.

6. In testing deaf (as well as hearing) children, examiners should not be so eager to record test responses that other equally revelatory behaviors are ignored. These are reviewed later, in the section on Observation.

7. With deviant and disturbed children, unusual flexibility and patience are required to adapt test procedures to the subject's motor compulsions, psychological obsessions, and easy distractibility. Orthodox procedures are replaced by those demanded by the child's behavior and preferences. If, for example, the child insists on sitting on the examiner's lap, testing is conducted in this way. If the child prefers the floor or some other testing locale, then testing is conducted there. Two of my deviant subjects, aged 6 and 7 years, exhibited an autistic pattern that has been likened to a visual agnosia for humans. In one instance, I sat on the floor, completely immobile, for about half an hour, trying to simulate a piece of furniture before the child approached and permitted sporadic contact. However, no test contact could be established, and testing had to be abandoned. In the other case, a supply of balloons had to be on hand and the child's father had to hover over the child with a demanding expression on his face before the child would perform; and then he would do so only if permitted a break between test items to blow up and play with the balloons. Testing was completed in this case, with an above-average I.Q. In neither instance did the child seem aware of the examiner as a person. Other types of deviant behaviors and obsessions demand relevant adaptations. Completing any test-item under such conditions leaves an examiner possibly exhausted but with a real sense of accomplishment.

8. When an examiner requires the assistance of an interpreter, that person should be carefully selected and coached. Details are reviewed in a later section on Interview.

9. To carry out these practices with deaf subjects, I find that test administration is best conducted individually even though the test used is a group test.

Hearing-standardized Mental Tests and the Deaf: Problems and Management

A glance at table 12.1 shows that the intelligence tests most favored for deaf children and youth are performance and nonverbal types of tests, most of which have been standardized on nondeaf populations. Over and above the "fairness" of using hearing-standardized mental tests with deaf subjects, there are other issues worthy of deliberation. A number are briefly summarized here.

Performance scales. There is a general assumption among examiners that the "fairness" issue of using hearing-standardized tests with the deaf is eliminated by using performance or nonverbal types of mental tests. This is a mistaken notion. Even the culture-fair, paper-and-pencil types of mental tests rest on cultural backgrounds and experiential variables, and so do performance tests. For example, Wechsler (1944) found that a test as seemingly culture-fair as Digit-Symbol could not be used with illiterates because they lack experience in the use of pencil and paper. Noted earlier was the poor performance on pictorial tests on the part of children with little or no exposure to pictures. The same principle of background and cultural experiences applies to all tests including performance scales, and may account for the frequent comments from users of the culturally loaded Wechsler children's performance scales that the tests underrate deaf children. Therefore, in using hearing-standardized performance tests as first-tests with very young deaf children, examiners must keep in mind the possibility that they are testing the child's preparatory experiences as much as, or possibly more than, mental ability. In consequence, first I.Q.'s should be regarded as tentative findings subject to verification by later testing.

Another point brought out by the Wechsler performance scales is the practice of using portions of a full scale for arriving at a definitive I.Q. The Wechsler performance scale I.Q.'s are the most widespread example of the practice with deaf subjects. But as Wechsler himself remarked, when an abbreviated form of the Full Scale must be used, "the simplest and safest procedure is to use the Verbal part of the examination alone, and rate the subject on the basis of the I.Q.'s furnished for this part of the scale" (Wechsler, 1944, p. 145). Since this recommendation is not feasible in testing deaf children (or adults), an alternative recommendation is to use a battery of tests and not rely on a single portion of a hearing-standardized full scale as the sole index of mental ability.

Test instructions. Another problem in using hearing-standardized performance scales with deaf children is the lack of standardized directions for deaf subjects. This means that each examiner of a deaf child is free to devise his own. The varying strategies used can lead to considerable variations in response on tests given to the same child at different times by different examiners, as well as to difficulties in securing comparable data from child to child. Steven Ray (1978) sought to counteract these problems by developing a manual of test directions for the administration to deaf children of the revised Wechsler Intelligence Scale for Children (WISC-R).

Assessing validity. The question that haunts all examiners of the deaf is whether hearing-standardized mental tests measure with deaf subjects what they purport to measure with the hearing. One source of information is concurrent validity. This is commonly assessed by estimating the correspondence between a test's scores and those of a dependable established test. And here examiners of the deaf find themselves faced with a further problem: Which of the mental tests used with the deaf can be considered a "dependable established test"? For lack of a definitive answer, the following outside criteria are used as common-sense concurrent validity guides by those who "know" prelinguistically deaf children.

1. An arithmetic achievement level of 4th to 5th grade in older school-agers suggests above-average mental capacity.
2. A reading achievement level of 4th to 5th grade in older school-agers suggests at least average mental capacity.
3. Fairly fluent verbal expressive language suggests better than average mental capacity.
4. A prelinguistically deaf school-ager who is able to compete successfully with hearing peers in full mainstream programs demonstrates at least above-average and generally superior mental capacity.
5. Exceptional altertness on the part of a school-ager or preschooler in grasping thoughts, ideas, and directions, and in creative projects suggests at least above-average mental capacity.
6. Recognized leadership in recreational and other pursuits suggests above-average mental capacity.

These and other real-life criteria can help in assessing the validity for a deaf subject of hearing-standardized mental test scores. Where marked divergence between criteria and scores is found in favor of real-life performance, the fault generally lies with the test or in the manner of testing, and further inquiry is in order. It must be emphasized that the converse of these concurrent validity guides cannot be assumed to indicate mental deficits. There are many deaf children who do not measure up to these outside criteria despite average or better mental endowment. It is the examiner's responsibility to identify the retarding factors.

Interpreting test results. Interpreting scores earned on mental tests requires a clear understanding by the examiner of which *mental behaviors* the test constructor believes to be elicited by which *test items*. Also required is knowledge of the consonance between a subject's experiential background and that of the standardization group of the particular test, and the test-manifested expression of deviations between the two. In the case of deaf subjects, these factors are essential components of the interpreting process.

Test items indicate which components of intelligence are being probed. For example, in the Wechsler Preschool and Primary Scale of Intelligence (WPPSI), the Animal House test item is considered by the test constructor to be essentially a measure of a subject's learning ability involving memory, attention span, goal awareness, and the ability to concentrate (Wechsler, 1963, p. 11); while the Geometric Design task is a measure primarily of perceptual and visual-motor organization (1963, p. 11). At the adult level, Wechsler (1944) considers the Similarities test item to be a measure of logical thinking; Picture Arrangement, a measure of ability to comprehend and size up a total situation; Picture Completion, a measure of ability to differentiate essential from nonessential; and Block Design, a measure of synthetic and analytic abilities. Other mental behaviors evoked by test items include: reasoning; ability to see relationships and make associations; abstractive ability; judgment; learning ability; mental alertness; and comprehension. The kinds of test items commonly used by test constructors to evoke mental response are: analogies; memory for various verbal or nonverbal items; missing parts; symbol matching; similarities and differences; copying directly and from memory; arithmetic problems and reasoning; vocabulary; sentence completion; and problem solving. *It cannot be emphasized strongly enough that interpreting test results is not made by quoting test scores but by evaluating the mental behaviors for which the particular test items and scores stand.*

Where test manuals are not clear about which types of mental activity the various test items are intended to evoke (as is often the case), the examiner must take the time to think this out, possibly with the help of one or another of the many publications on test interpretation which are appearing in the test market. When these publications are used as aids, there is no objection to their use; but when they are used blindly in cookbook fashion, the examiner simply blunts his own professional sensitivities.

Finally, in using hearing-standardized tests with deaf subjects, it is imperative not only that test items be matched to the subject for purposes of examination but that test responses be matched to the subject's background of experiences for purposes of interpretation. The greater the experiential gap between a subject's background and that of the test's standardization group, the greater the likelihood of seemingly off-beat responses which may in actuality be quite in line with the subject's background and experiential viewpoint. It is of course not possible to arrive at exact quantitative estimates of the difference from "hearing" expectations that deafness may impose on test responses. It takes considerable experience even to arrive at a good guesstimate. But after years of psychological practice, perceptive examiners of deaf subjects are able to come up with remarkably astute estimates and interpretations of a deaf subject's mental resources that are often closer to the mark than the test scores themselves.

Special considerations in test selection. In selecting a mental test for a deaf subject of any age, the aim is for as broad a sampling of mental behaviors as possible, and this requires a correspondingly broad variety of test items. It is a rare hearing-standardized test that meets this requirement when used with deaf children. One-item type tests when used alone certainly do not, neither do portions of tests; and even generously itemized hearing-standardized tests become considerably less so when items are omitted that do not "fit" deaf subjects.

One way of getting broader mental coverage is to take advantage of the fact that several mental tests are available that have been standardized on deaf school-agers. Examiners can use these tests or items drawn from them to greater advantage than has been the case thus far. Of special merit is the Snijders–Snijders-Oomen *Non-verbal Intelligence Tests for Deaf and Hearing Subjects*, which covers an age span of 3–15 years and has separate norms for deaf and for hearing populations. There are also the *Hiskey-Nebraska Test of Learning Aptitude for Young Deaf Children* for a narrower chronological range, and the *Smith-Johnson Non-Verbal Performance Scale* for 2–4-year-olds. In each of these tests, the items were selected with deaf subjects in mind, as were the other standardization details.

When, in using such deaf-standardized mental tests, the need arises for obtaining fuller mental or chronological coverage, the test-battery approach is used, that is, a group of tests is administered, of different types (performance, paper-and pencil, single-item) but all centering on intelligence. The examiner will probably have to dip into the pool of hearing-standardized tests for this purpose, owing to the scarcity of tests standardized on the deaf. There is even a place for verbal items and scales with certain deaf pupils, notably the Verbal as well as the Performance portions of the *Wechsler Adult Intelligence Scale* (WAIS) with deaf youth, as discussed in the next chapter, and the use of verbal tests with deaf pupils being evaluated for ability to succeed in full mainstream programs. When verbal test-items are used, they are administered in the subject's favored communicative mode.

As a rule, the battery approach is used with cases requiring detailed clinical inquiry, and interpreting the results of the mix of mental tests involved demands exceptional clinical judgment and insights on an examiner's part as well as sufficient time for testing, analyzing, and reporting. In ordinary practice, where examiners are under time and productivity pressures, there is an understandable temptation to choose tests for ease of administration and scoring, and to aim for a recordable I.Q. But even in such situations, an item-by-item interpretation needs to be made (and reported) in terms of the mental behaviors for which the scores and items stand; and this not only to supply a realistic picture of a mind at work but also to indicate which areas of mental operation are in special need of remedial attention.

Personality Testing

In the conceptual frame of psychological testing, "personality" is conceived as consisting of traits belonging to the emotional, motivational, attitudinal, and interest make-up of an individual, as distinct from those involved in mental and cognitive abilities; and personality tests, as instruments for exposing and measuring various nonintellectual aspects of behavior (as though this dichotomy were possible, to paraphrase Heim [1970]). Psychological test publishers offer several hundred personality instruments, many of which are controversial in both design and standardization (Buros, 1970).

Personality Tests Used with Deaf School-agers

Table 12.2 rank-lists psychological instruments reported as used in personality testing with deaf subjects by two or more respondents to a survey of psychological practices with the deaf (Levine, 1974). All the cited tests were designed for nondeaf subjects.

They may be classified into several types.

1. *Projective techniques*. Such instruments present a subject with a relatively unstructured and seemingly nonjudgmental task, in order to permit him to structure his response in accordance with the dictates of his own characteristic psychological patterns and reactions. Projective tests included in Table 12.2 are: Machover's Draw-a-Person Test (Machover, 1949); House-Tree-Person Projective Technique (Buck, 1966); Thematic Apperception Test (Murray, 1943); Rorschach Technique (Rorschach, 1942); Rotter Incomplete Sentences Blank (Rotter and Rafferty, 1950); Children's Apperception Test (Bellak, 1954); Make-a-Picture Story (Shneidman, 1947); and Symonds Picture-Story Test (Symonds, 1948).

Although the Bender-Gestalt is often classified and used as a projective personality test, its claim to this classification is questionable. As described by Bender, it "is a paper-and-pencil test in which configurations, originally used by Max Wertheimer for research in visual gestalt psychology, are presented to the individual for copying" (1938, p. 11). Since the test task is one of copying, it permits little if any free personality projection. Bender considers the test a "clinical test" whose value lies in detecting disturbances

Table 12.2 Personality Tests in Rank Order (n = 186 Respondents)

Name of Test	Special School: Residential	Day	Total	Regular School: Special Class	Partially Integrated	Totally Integrated	Total	Other Agency: Diagnostic Unit	Speech & Hearing Center	Rehabilitation Setting	Total	Grand Total
Bender-Gestalt	24	19	43	29	6	2	37	1	3	3	7	87
Draw a Person (Machover)	10	16	26	16	3	2	22	0	1	1	2	50
House-Tree-Person	8	5	13	12	3	2	17	6	2	1	9	39
Thematic Apperception Test (TAT)	7	5	12	2	0	1	3	0	2	2	4	19
Rorschach Test	5	5	10	1	0	0	1	6	2	0	8	19
Vineland Social Maturity Scale	5	3	8	2	0	0	2	0	3	3	6	16
Rotter Incomplete Sentences	5	4	9	3	0	1	4	0	1	0	1	14
Children's Apperception Test (CAT)	2	0	2	1	0	2	3	1	1	0	2	7
Make a Picture Story	4	2	6	0	0	0	0	0	1	0	1	7
Minnesota Multiphasic Inventory (MMPI)	1	1	2	0	0	0	0	0	1	1	2	4
Sixteen Personality Factor Questionnaire	2	0	2	0	0	0	0	0	1	0	1	3
Symonds Picture Story Test	0	1	1	0	0	0	0	0	1	0	1	2

SOURCE. Drawn from Levine (1974).

in the perception of gestalt relationships that are associated with organic brain defects, retardation, regression, and personality [illegible] associated with regression. The great popularity of the Bender-Gestalt as a personality test has been attributed to ease and speed of administration. The test serves its clinical function well; but it was not devised to perform personality description in the usual sense of the "personality" concept and is best used in a battery as a diagnostic instrument.

2. *Personality Inventories*. These instruments present a subject with a list of questions or statements involving personality traits, emotional reactions, interpersonal attitudes and habits, and other behavior styles, to which the subject is expected to give an honest answer on the basis of his own behavioral patterns, preferences, and habits. Two such personality inventories are included in table 12.2: the Minnesota Multiphasic Personality Inventory (MMPI) (Hathaway and McKinley, 1951), and the Sixteen Personality Factor Questionnaire (16 PF) (Cattell and Ebor, 1956–1957).

3. *"Maturity" Inventories*. Such instruments, also of the questionnaire type, are used to assess a subject's level of maturity in various life areas. The Vineland Social Maturity Scale (Doll, 1947), cited in table 12.2, is one such inventory. It is designed to assess an individual's ability to take care of his own practical needs and assume related responsibilities.

There is a clear need for much broader information about deaf school-agers' preparation for life and level of maturity than has been available thus far. Examiners should acquaint themselves with the contents of such inventories, most of which are cited in psychological test catalogues. Where the inventories cannot be used as they stand with deaf school-agers, they can be used as interview guides and also as guides in the design of school life-adjustment curricula.

Descriptive Digests of Selected Personality Tests

The following digests of selected tests from table 12.2 may assist the reader in gauging the suitability of these tests for deaf subjects (the stated age ranges are for nondeaf subjects) and also to consider which ones lend themselves to administration and response in signs or pantomime.

1. *Machover Draw-a-Person Test (also called Machover Figure Drawing)*. Used with ages 2 years and over. Test directions are "to draw a person," and, on completion of the first drawing, to draw a person of the opposite sex. Afterward, inquiry elicits various items of information about the persons drawn.

2. *House-Tree-Person Projective Technique (H-T-P)*. Used with ages 3 years and over. Test directions are to draw a "house," and are repeated for "tree" and "person." Then an extensive inquiry is conducted through a series of standardized questions to elicit associations about the subject's home and home life ("house"), life satisfactions and environment ("tree"), and interpersonal relations ("person").

3. *Thematic Apperception Test (TAT)*. Used with ages 4 years and over. The TAT material consists of 31 cards containing vaguely provocative pictures in black and white plus one blank card. The subject's task is to tell a story about each picture. For the blank card, the subject is asked to do the same for an imaginary picture. Interpretation is based on the individual's needs as exposed by the stories.

4. *Rorschach Technique*. Used with ages 3 years and over. Test material consists of 10 differently shaped but bilaterally symmetric inkblots, each printed on its own card; 5 are in shades of black and gray, 2 have added touches of red, and 3 are in various pastel colors. The subject is asked to tell what the blots remind him of. Responses are recorded verbatim along with various response-timings, the way the cards are held, and

numerous other behavioral occurrences. Substantial inquiry is conducted after initial responses to the 10 blots are made. Classic interpretation is based on complex scoring procedures and involves ratios and totals rather than single responses; the outcome is an integrated picture of total personality.

5. *The Rotter Incomplete Sentences Blank*. Used with adolescents and adults. The first word or words of a sentence are given, and the subject is asked to complete it in a way that expresses his feelings. An overall adjustment score is derived through the test's scoring procedures. This and other sentence-completion tests are valuable for screening purposes and as interview guides.

6. *Make a Picture Story* (*MAPS*). Used with ages 6 years and over. Test materials consist of 22 pictorial backgrounds (living room, bedroom, bathroom, schoolroom, etc.) and 67 die-cut figures (male, female, adults, children, minority-group figures, figures with blank faces, nudes, etc.), all held upright by insertion in a wooden base. The examiner places a background before the subject and asks him to choose any figures he wishes to add to the scene and then to make up a story about it. Both scoring and interpretation are complicated procedures, and detailed examples of test interpretation are given in various publications edited by the test constructor.

7. *Minnesota Multiphasic Personality Inventory* (*MMPI*). Used with ages 16 years and over. The inventory is composed of over 500 statements which the subject is asked to classify as true, false, or cannot say. The range of inquiry is extremely wide, covering numbers of psychopathic conditions as well as other areas of behavior and preference. The inventory statements require a rather high literacy and concept level that cannot easily be transposed to signs. The main value of the Inventory is in differential diagnosis; this is facilitated by computerized scoring and computer printouts of diagnostic and interpretive statements descriptive of the subject's personality.

The *Children's Apperception Test* (CAT) and the *Symonds Picture-Story Test* are adaptations of the *Thematic Apperception Test*, with the CAT using drawings of animals in child-centered human situations; and the Symonds Test, drawings depicting situations of concern to adolescents.

A number of other personality tests used in research with the deaf are described in chapter 7. The *Missouri Children's Picture Series*, the *Hand Test*, and the *Impulse, Ego, Superego (IES) Test*, in particular, warrant broader trials.

Projective Techniques and the Deaf: Special Considerations

As can be seen in table 12.2, the personality tests most preferred for use with deaf school-agers are the projective techniques. By and large, the basic principles outlined in the section on General Testing Guides also pertain to projective testing. A number of additional considerations are summarized in this section.

Feasible testing age. The "usable age ranges" noted in the projective test digests do not apply to deaf subjects. With the deaf, the rule of thumb for projective testing favors the age range in which response and inquiry are least hampered by lack of expressive language, whether verbal or sign. The safest age-range for such expressive output is in the adolescent years and beyond. There are exceptions, of course. Examiners are therefore advised to language-scan a given subject before proceeding to test, preferably through a preliminary get-acquainted interview rather than a reading achievement test since a reading score will not disclose a subject's expressive facility in the language of signs, which may well suffice for projective test purposes. Certain projective tests are used with very young deaf children, as discussed shortly, but in a less structural manner than required by conventional testing.

"*Shortcut*" *testing*. For proper use, projective techniques worth their informational salt require special preparation or training (Anastasi, 1961). This involves a considerable expenditure of an examiner's time and effort. To the time and effort so required are added the time and effort taken up by careful testing, scoring, and interpreting. Projective tests can be major consumers of time. As a result, shortcuts are often used. The most common, especially with deaf subjects, are to play down or omit inquiry in tests where it is required, and to bypass scoring by response-scanning. In the hands of less than expert projective testers, these shortcuts rob a test of its psychological teeth, and leave a tester with little more than biased personality fragments. What emerges is a lopsided personality profile, generally skewed toward deficits. The situation argues against the use of complex projective tests by examiners who, by unskilled shortcutting, shortchange their deaf subjects.

"*Matching*" *projective tests to subjects*. After years of exposure to highly structured school environments and routines, numbers of deaf youths, and adults as well, find it hard to handle the loosely structured items of projective tasks. Some are immobilized by Rorschach inkblots. Others are inhibited by sentence completion because they feel their language is not good enough or they experience difficulty in introspective thinking. Some protest a lack of artistic skill when faced with projective drawing tasks; and others find apperceptive story-telling beyond their imaginative faculties. But whatever the situation, in projective testing as in mental testing, an effort should be made to "match" test to subject.

One way of doing this is to include in the pretest get-acquainted interview such questions as: "Have you seen a good movie lately? Can you tell me the story?" (apperceptive story possibilities); "Do you like to look at a cloud in the sky and imagine what it looks like?" (Rorschach possibilities); "Do you like to draw?" (drawing test possibilities). Answers may provide leads, and again they may not. But some such pretest approach should be tried, for it is always possible that inhibited test-response is due as much to the type of projective test used as to the subject's personality.

Another inhibiting factor occasionally arises when the subject is assured that "there are no wrong or right answers; anything you say is right." Deaf subjects know they are being tested; and there must be "wrongs" and "rights," or else what's the point in testing? When a deaf subject's facial or other expression protests doubts about the "no wrong and no right" formula, an examiner can offer as evidence: "Many questions have no wrong or right answers. I will tell you some: What color do you like best? Do you like to go to a party? Do you have brothers and sisters?" and so on. On answering such questions, the subject comes to realize that there are indeed situations in which answers cannot be considered right or wrong, that they simply reflect fact or personal views and feelings. With this realization comes a lessening of constraints as well as a feel for the nature of projective response.

Although an inhibited response pattern (even with a matched test) in itself discloses certain personality traits, it is important to know the rest of the personality picture, the part hiding behind the response-inhibiting defense. Toward this end, I apply generous praise, encouragement, and "tell me mores" where it appears safe to chip away at the defense. Since there are no right or wrong answers in projective testing, in contrast to mental testing, this praise procedure is justified by its purpose. However, the need for extra encouragement is noted in recording and reporting.

Childhood projective testing. Projective techniques customarily used with young children take the form of doll-family sets and play-kit tests that include such articles as dolls representing children and adults of both sexes and various age levels, household furnishings, outdoor objects, animals, and other related materials. Some are interpreted through a scoring system, and others inferentially. The assumption in projective play is that a child projects various personality traits and attitudes in its selection and arrangement of the play materials into a kind of mini-story. Interpretation of what the child projects is helped by the child's accompanying remarks or explanations concerning such matters as whom the doll figures represent, what they are doing, to whom and why, and by the child's emotional investments in the scenarios.

When the techniques are used with young deaf children, examiners need to be alert for influencing variables. One is a young deaf child's customary reaction to a display of toys and dolls by an examiner. Often, the child's first thought is that this is a language lesson, and the child begins by *naming*

the toys. Even after the examiner has managed to get across the idea that the toys are for playing and not for naming, the child's performance may be affected by his original concept, and he may favor toys that he knows by name or from teaching situations. Hence, examiners must enforce the "play" concept even to participating to a limited extent in play until the child is able to play freely on his own. Other influencing variables include the relatively limited range of a young deaf child's life experiences on which to build stories, the locale in which play is conducted, the examiner's watchful gaze, the child's mood at the time, and affective experiences immediately preceding the play activity. A final problem in using toy and play techniques with young deaf children is the communication difficulty of eliciting their explanatory remarks about the stories they are putting together.

In view of these many influencing factors, I am inclined to use the play technique as a kind of interview situation rather than as a "test," relying on the remarkable pantomimic abilities of most young deaf children to tell their stories for them, as illustrated in the later section on Interview.

Selective versus routine use. Many problems argue against the use of projective techniques for *routine* personality-testing with deaf school-populations. A more feasible procedure would be to conduct routine personality-screening by means of a good behavior-rating instrument such as the *Meadow-Kendall Social-Emotional Inventory for Deaf Students*, devised by Kathryn P. Meadow and standardized on a deaf pupil population. Projective techniques could then be used selectively as diagnostic aids with those pupils rated as emotionally disturbed. The projective instruments so used should be carefully chosen tests of established worth, and should be conscientiously administered, scored, and interpreted.

Personality Self-Report Inventories and the Deaf

With hearing populations, verbal self-report personality inventories are considered great time-savers. They can be self- as well as group-administered, much as achievement tests. Scoring is routinized and often computerized, as in the *Minnesota Multiphasic Personality Inventory*, and interpretation follows well-defined lines. However, these advantages do not hold for a deaf clientele.

Some of the weaknesses of verbal personality inventories were noted in chapter 7. Major deterrents to their use with deaf subjects are the time and effort involved in the exhaustive task of rewording test language, screening and simplifying elusive concepts, and detecting and discarding obviously inappropriate items. A case in point is an item from the *Sixteen Personality Factor Questionnaire:* "Do you think that most of us have so many faults that unless people are charitable to one another life would be intolerable?" Even if such statements could be successfully adapted to an average deaf individual's understanding, we are still left with the question of whether any personality inventory that has undergone such drastic reconditioning could measure with the deaf what it was constructed to measure with the hearing.

This is not to say that no deaf people are able to take such inventory tests. Many exceptional deaf persons can do so. But even at this level, how is a deaf individual to answer such questions from the MMPI as: "My hearing is apparently as good as that of most people," or "My speech is the same as always (not faster or slower, or slurring; no hoarseness)"? To answer truthfully would be to risk giving a "maladjusted" response simply because it would not coincide with that expected of an "adjusted" hearing person.

In my opinion, if verbal personality inventories are used with the deaf, they are best used in an exploratory way and should be individually administered and studied. Even the use of manual communication will not override their structural inadequacies as clinical instruments with the deaf-at-large, whether school-age or adult.

Interpreting Personality Test Findings

Problems of interpreting the results of hearing-standardized personality tests when used with deaf subjects are compounded by current issues and problems in personality testing per se. A number have been noted in chapter 7. Detailed discussions can be found in current literature on the subject, including the comprehensive summaries in the *Annual Review of Psychology* publications.

The best an examiner can do in preparation for a formal personality examination of a deaf subject is to know personality tests and testing, to know the deaf, and to know how to communicate with deaf persons. Most importantly, examiners need to bear in mind that all personalities have their share of strengths and weaknesses; there is no such thing as a perfect personality. The presence of deviant test response, though perhaps of diagnostic importance, does not necessarily indicate a malfunctioning personality. Such responses may simply indicate a particular test's diagnostically structured focus which has picked up certain weaknesses in what is nevertheless an effectively functioning personality.

To know whether deviant responses are diagnostically significant requires a *global* rather than a trait-oriented personality picture. But personality tests seldom provide the global view. An examiner must therefore fill in the gaps with information from the case history, observation, and interview. In this way, a picture can be obtained that also includes *personality strengths*. Assessing how well a given personality is likely to function requires balancing the strengths against the weaknesses, with the final assessment the outcome of the ratio between the two. My admiration for the Rorschach technique stems from this system of weighing and balancing in personality scoring and interpretation.

Finally, whatever the test used, identifying positive personality components is generally more important than stressing the negatives, as too often happens. Not only do the positives provide the impetus for managing everyday affairs, they also serve as key supports in counseling and therapy. They must be identified in personality test protocols and interpretation, and included in reporting. In view of the shaky position personality tests occupy in use with the deaf, such identification means that after a test protocol is scored and interpreted according to standardized procedure, it must be reinterpreted in accordance with the examiner's judgment of which responses, while abnormal for hearing subjects, are nevertheless *in line with a deaf subject's background of fashioning* experiences. There are no established guides for this reinterpretation procedure. It is a tricky business and depends almost entirely on an examiner's "knowing" the deaf. But it will indicate roughly the proportion of deviant responses that are more closely related to exogenous factors imposed by the deaf environment than to endogenous deviations in personality.

Achievement Testing

Achievement tests are used in school settings to measure a pupil's level of proficiency in school subjects, generally in terms of a grade score. Tests are available from primary through adult levels but are most heavily used at the intermediate level. The principal measurement targets are language (word knowledge, word discrimination, spelling, reading, language usage, etc.), and arithmetic (computational and problem-solving abilities). Social studies and science are commonly included for upper grade levels, and additional, achievement-like tests or inventories for school-agers are available for such special areas as social insight, health knowledge, and sex knowledge; many more can be found in psychological test catalogues.

Achievement Tests Used with Deaf School-agers

Table 12.3 rank-lists achievement tests reported as used with deaf school-agers by respondents to a survey of psychological practices with the deaf (Levine, 1974). All the tests listed were standardized on hearing populations. They are briefly described in the following digests.

1. *Wide Range Achievement Test* (*WRAT*), 1976 edition. An easily administered and rapidly scored time-saver that measures level of achievement in the basic scholastic skills of reading, spelling, and arithmetic in the age range from 5 years through adult.
2. *Stanford Achievement Test*, 1973 edition, and *Metropolitan Achieve-*

Table 12.3 Achievement Tests in Rank Order (*n* = 166 Respondents)

	Special School			Regular School				Other Agency				
Name of Test	*Residential*	*Day*	*Total*	*Special Class*	*Partially Integrated*	*Totally Integrated*	*Total*	*Diagnostic Unit*	*Speech & Hearing Center*	*Rehabilitation Setting*	*Total*	*Grand Total*
Wide Range Achievement Test	3	16	19	30	3	2	35	5	2	1	8	62
Stanford Achievement	27	10	37	8	3	0	11	0	0	2	2	50
Metropolitan Achievement Tests	9	1	10	4	0	1	5	1	0	1	2	17
Gates Reading Achievement	8	1	9	2	0	0	2	0	0	0	0	11
California Achievement	8	2	6	2	0	0	2	0	0	0	0	10
Gray Oral Reading	0	2	2	0	0	0	0	0	1	0	1	3

SOURCE: Drawn from Levine (1974).

ment Tests, 1978 edition. Two of the most comprehensive achievement tests in the psychological market, the former for grades 1.5–9.9, and the latter for grades kindergarten–12.9. They are probably the best formulated and best designed for both subject coverage and flexibility of usage.

3. *California Achievement Tests*, 1957 edition. Concentrate mainly on areas involving language, arithmetic, and reading, for grades 1–14.

4. *Gates Reading Tests* have been replaced by *Gates-MacGinitie Reading Tests*, 1965 edition. They include new items and more timely material for grades 1–12. The test manual provides for conversion of Gates-MacGinitie scores to Gates Reading scores.

5. *Gray Oral Reading Tests*, 1963, 1967 editions. A series of standardized individually administered reading paragraphs for grades 1–12, scored for speed, accuracy, and comprehension.

Special mention should be given to several other tests used with deaf children for achievement and achievement-diagnostic purposes.

6. *Test of Syntactic Abilities* (Quigley et al., 1978). An achievement-analytic test standardized for prelinguistically, profoundly deaf school-agers aged 10–18 years. Its target is syntactic structures, and the 20 subtests evaluate 9 basic structures and pinpoint specific deficiencies in each, thus supplying valuable guides to teachers concerning remedial needs.

7. *Picture Story Language Test* (Myklebust, 1965). Also an achievement-analytic test, but standardized on a representative sample of public-school populations at selected age intervals within the range of 7–17 years. Its target is measurement and analysis of written language ability. Test-samples of written language are secured by having a testee write a story about a standard test-picture.

8. *Stanford Achievement Test for Hearing Impaired Students* (1972). Adapted from the Stanford Achievement Test, this test provides special procedures for testing five scholastic levels of hearing-impaired students, beginning with the primary level.

9. *Peabody Picture Vocabulary Test* (Dunn, 1959). Not an achievement test although it is used as one by various workers with deaf children. It is an untimed, hearing-standardized, individually administered intelligence test in which a subject is given a stimulus word and responds by indicating which in a group of pictures best illustrates the word. With deaf children, the test is generally used in assessing lipreading and/or word knowledge, with the stimulus word signed when necessary.

Using Achievement Tests with Deaf School-agers

The usual practice is for standard-type achievement tests to be group-administered by classroom teachers. When the tests are used with groups of deaf pupils, a great deal of time can be spent in making sure that every pupil clearly understands the instructions for each test. One ingenious teacher devised a strategy that not only saved time but also assured comprehension of instructions. First she screened the language of the test instructions and reduced it to shorter sentences and simpler forms. She then hand-printed the simplified instructions on large sheets of heavy paper, one chart for each set of instructions. Included on the charts were the matching sample tasks. As each test was administered, its corresponding instruction-chart was hung in a position clearly visible to all group members, and then teacher and group read the instructions and performed the sample tasks together. Further clarifications were made as required for certain individuals in the group. Where signing helped to clarify, it was used; and where additional sample tasks were needed, the teacher had on hand a supply of samples she had devised, all of which were simpler than the least difficult of the test's samples, to avoid a too-detailed preliminary practice. The procedure proved exceptionally workable.

But even when test instructions are administered successfully, the examiner must keep a watchful eye on pupils while they are taking the tests. Some of the tricks used by deaf children can be highly amusing. I observed one youngster drawing outlines of one of his hands on sheet after sheet of paper when he should have been working on a computational test-item. When questioned, he replied that this was to give him an extra supply of fingers on which to count when he ran out of his own allotted 10. His face registered wonder and surprise that his inquisitor lacked the wit to appreciate the strategy.

Not infrequently, notoriously poor readers come up with suspiciously elevated reading-achievement scores. When they are individually interview-checked, it usually turns out that the answers were arrived at through clever guesswork or through close juxtaposition of key words rather than through comprehension. The mental agility involved in the operation is to be admired; but it leaves an examiner wondering what the reading levels of deaf school-agers would be if the tests were individually administered and the responses checked through interrogation instead of group-administered and the responses blind-scored.

Special Clinical Tests

With the steady increase in mentally competent school-agers who are classified as "learning disabled," there is a corresponding emphasis on differential diagnosis. This is so because the label "learning disability" is commonly used as a catchall for a wide variety of learning problems which need to be sorted out in the service of remedial planning.

Although research has not yet come up with a conclusive picture, definition, or treatment of learning disability (McCarthy and McCarthy, 1969), it is generally accepted that cerebral dysfunction is an important etiological factor. Leads to its presence may sometimes be elicited by special clinical tests designed to probe visual-motor-perceptual manifestations of cerebral dysfunction. One of the most widely used is the *Bender Visual-Motor Gestalt Test*. Examples of others are:

1. *Benton Revised Visual Retention Test*, 1974 edition. Probes perception of and memory for spatial relations for age 8 years through adult. Thirty design cards are individually presented to a subject who is required to reproduce each design immediately on its removal.
2. *Frostig Developmental Test of Visual Perception*. A paper-and-pencil test for assessing five areas of visual perception in the age range 3–9 years: eye–motor coordination; figure–ground; constancy of shape; position in space; and spatial relations.
3. *Lincoln-Oseretsky Motor Development Scale*. Tests unilateral and bilateral motor abilities at ages 6–14 years. Test items involve a wide variety of motor skills, such as eye-hand coordination, finger dexterity, and gross activity of hands, arms, legs, and trunk.

When tests such as these are used, two points need special emphasis. The first is that psychological tests are not invariably successful in detecting cerebral dysfunction; the absence of positive signs does not necessarily indicate the absence of dysfunction. As noted by McCarthy and McCarthy, "not all frankly neurologically impaired children show impaired performance on these tests" (1969, p. 22). This leads to the second point of emphasis, namely, that clinical tests are used as *part* of a total psychological examination. Signs of cerebral dysfunction not elicited by such tests or even in the neurological examination may be picked up in case history data, in regular psychological testing, or in the course of observation and interview.

A very different type of clinical testing is that for color vision. Color vision tests should routinely precede the administration of psychological tests involving color discrimination or projective tests such as the Rorschach, in which reactions to color play an important role. The color vision test that I generally use is the *Dvorine Pseudo Isochromatic Plates*, second edition. The plates allow color-ignorance to be distinguished from color-blindness by means of 22 cards, in 14 of which digits emerge from a multicolor context and 8 of which are designed for children and illiterates.

Vocational Interests

Vocational satisfaction plays an important role in the psychological adjustments of deaf youths after they finish school. It is therefore important to find out what their general vocational interests are while they are still in school, in preparation for later vocational advice and training.

Two of the popular instruments for this purpose are the *Geist Picture Interest Inventory: General Form: Male* (Geist, 1959), of which there is an adaptation for deaf and hard-of-hearing males (Geist, 1962), and the *Wide Range Interest-Opinion Test* (WRIOT) (Jastak and Jastak, 1979). Others are mentioned later in the chapter.

1. *Geist Picture Interest Inventory*. Designed for males in grades 7–16 and male adults. Consists of 44 triads of drawings depicting major vocational and avocational activities. Standard answer sheets provide for recording the 44 choices the subject makes. Eleven interest scores are derived: persuasive, clerical, mechanical, dramatic, musical, scientific, outdoor, literary, computational, artistic, social service. To allow evaluation of the motivations governing the choices, a check list of 68 statements is used on which the subject checks those that apply to his choice.
2. *Wide Range Interest-Opinion Test*, 1979 edition. A pictorial test designed for use with ages 5 years through adult. Consists of 450 pictures arranged in 150 triads. The same pictures are used with males and females but the findings are treated differently. Test results are analyzed in terms of clusters of choices, made by the subject, that have been found to be consistently liked (and disliked) by persons in a given occupation. Attitudes are also included in the scope of examination. The broad occupational categories surveyed include: art, business, services, science, mechanics, farming; job titles, as listed in the Dictionary of Occupational Titles, are provided that correlate positively with interest clusters.

Illustrative Testing Programs

The following programs illustrate the use of tests and test batteries for evaluating hearing-impaired children and youth at two different types of facilities. One, the New York League for the Hard of Hearing in New York

City, is an all-service hearing rehabilitation center; the other is the Whitney M. Young Magnet High School in Chicago, Illinois. The League's programs are described by Ruth R. Green, Acting Administrator of the League, and Frances Santore, Director of Communication Therapies and her associates, Elizabeth Ying and Nina Hertz. The High School programs are described by Robert J. Donoghue, Ph.D., School Psychologist for the Hearing-Impaired Program at the school.

Psychological Test Battery:
The New York League for the Hard of Hearing

The New York League for the Hard of Hearing is a nonprofit, multidisciplinary rehabilitation agency providing diagnostic, remedial, and therapeutic assistance to persons of all ages with all degrees of hearing loss, including a sizable deaf clientele. Among the services offered are otological and audiological services, communications assessment, vocational evaluation and job placement, public education, and recreation programs. The League's clients are referred by hospital clinics, physicians, schools, other social agencies, state and city agencies, and members of the community.

Since the League's services are offered to persons of all ages with widely different types of hearing impairment and socioeconomic backgrounds, clearly there can be no "typical" case or test battery. In each instance it is the psychologist's responsibility to select the instruments that are most suitable for a particular subject and that will best secure the information needed for optimum understanding and service. Tests most generally used with deaf children are the following.

1. *Preschool*

   Intelligence

   - *Leiter International Performance Scale.*
   - *Merrill-Palmer Scale of Mental Tests.*
   - *Wechsler Preschool and Primary Scale of Intelligence: Performance Scale;* where possible, the Verbal Scale is attempted.

   Social maturity

   - *Vineland Social Maturity Scale.*

   Other

   - *Harris Tests of Laterality.* Selected subtests are used to assess eye, hand, foot dominance.
   - *Peabody Picture Vocabulary Test.* To evaluate receptive language levels, with one form used to evaluate lip-reading reception, and another form used with deaf children who use sign language to evaluate signed reception.

2. *Primary/Elementary School-agers*

   Intelligence

   - *Wechsler Intelligence Scale for Children,* revised or unrevised. The Performance and Verbal Scales of the tests are used, but intelligence as indicated by the I.Q. is based on the Performance Scale. The gap, if any, between the scales often shows the extent to which functioning in a mainstream program is feasible.
   - *Leiter International Performance Scale* or the *Columbia Mental Maturity Scale* is substituted for the Wechsler Scale if the child has motor difficulties.

   Visual-perceptual

   - The *Bender-Gestalt Test* is used to screen for visual-perceptual dysfunction.

   Maturity/personality

   - *Vineland Social Maturity Scale.*
   - *House-Tree-Person Test* and *Kinetic Family Drawings* are used for information about personality dynamics and adaptations; On the latter test, the child is asked to draw a picture of his or her family.
   - *Children's Apperception Test* is used *only* with children with sufficient verbal skills to express themselves adequately.

   Achievement

   - *Gates MacGinitie Reading Tests* are administered to first-grade children or can be substituted for reading tests on the Stanford Achievement Tests.
   - *Stanford Achievement Tests* are used to measure academic achievement for children who have completed at least first grade. Word meaning, paragraph reading, and arithmetic computation are always administered to see if the child is working up to grade and ability levels and to evaluate whether additional tutoring is required.

Communication Therapies Evaluation:
The New York League for the Hard of Hearing

The communication evaluation at the League provides a diagnostic summary of a child's comprehension and usage of oral language as well as listening skills. Since the habilitation approach at the League is auditory/oral, primarily a child's oral language skills are evaluated. However, parts of the evaluation can be modified to assess manual sign language skills. The evaluation is 2 hours long (more detailed testing is administered once a child is enrolled in a therapy program). The procedures of this evaluation are summarized here.

1. *Preschool*
    - Parent Interview
        - Parent's perception of child's problems.
        - Information concerning sounds, words, phrases child uses or responds to.
        - Parent's response to questions from:
            - *Receptive-Expressive Emergent Language (REEL) Scale.* Used to measure language skills in infancy (from birth to 36 months). The test consists of several items which examine normal development of both receptive and expressive language skills at two-month intervals. Information is either supplied by the parent, observed by the examiner, or obtained by direct interaction with the child.
            - *Communication Evaluation Chart.* Used to examine language and performance levels of children aged 3 months to 5 years. The language portion of the test evaluates such items as coordination of speech musculature, hearing acuity and auditory perception, acquisition of sounds, and receptive and expressive language skills. The performance skills section is used to evaluate the child's growth and development, motor coordination, and some visual-motor skills
    - Observation
        - Parent/child interaction.
        - Child's play behavior.
        - Child's spontaneous language while at play.
    - Receptive language via audition and vision
        - Tests used in whole or part with children who can be tested
            - *Peabody Picture Vocabulary Test.*
            - *Utah Test of Language Development.* A checklist of normal language development from ages 1 to 15 years. It is designed to be an objective measurement of expressive and receptive language skills in both normal and handicapped children.
            - *Houston Test for Language Development.* This test, which measures the development of language, is divided into two parts. Part I measures aspects of language involving reception, conceptualization, and expression in children aged 6 months to 3 years. Part II examines these same areas of language development in children aged 3-6 years.

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            - *Illinois Test of Psycholinguistic Abilities.* A norm-referenced test consisting of 10 primary subtests and 2 supplementary subtests which sample some essential skills and functions of both verbal and nonverbal communication. It is designed to be used diagnostically, with children of ages 2–10 years, to identify specific language abilities and disabilities and to serve as a teaching model for developmental or remedial language training. The following individual subtests have been found to be especially useful in assessing the language knowledge and performance of the hearing-impaired population: Auditory Reception, Auditory Association, Auditory Sequential Memory, Grammatic Closure, Visual Reception, Visual Association, and Visual Sequential Memory.
            - *Test for Auditory Comprehension of Language.* A detailed screening test that examines linguistic comprehension through picture identification or orally presented lexical, morphological, and syntactical constructs. The basal language age of this test is 3.0.
        - Procedures used with children who cannot be tested
            - Toys, pictures, objects are used to assess receptive spoken-language recognition of: body parts, clothing, animals, people, food, common transportation, etc.; own name and family members; familiar commands.
    - Receptive language via audition alone, using earphones, vibrator, individual hearing aid, or speaking close to child's ear
        - Ability to imitate vowel sounds, consonant-vowel syllables, changes in pitch, duration, stress, and intonation patterns.
        - Distance at which the child consistently responds to voice or noisemakers (unaided or with child's aid).
        - Response to name.
        - Detection of five sounds according to Daniel Ling (u, a, i, s, /sh/).
        - If no response to above, try response to drum or bell.
    - Receptive impression
        - Examiner's subjective impression of the major receptive modality favored by the child.
    - Expressive language
        - Observation
            - Spontaneous production and imitation of vowels, vowel-consonant or consonant-vowel combinations.
            - Voice quality.
            - Motor functioning: grasping and pulling, rings on peg, block stacking.
            - Like and unlike matching of objects, pictures.

General behavior: attention span, eye contact, response to structured test situation.

Examination of oral-peripheral mechanism, i.e., movement of the articulators and their structural adequacies.

Tests used in whole or part with children who can be tested: as above.

Evaluation results

Discussion with parents of results of evaluation and examiner's recommendations.

2. *School-age*

General communicative information via parent interview and observation, as with preschool child.

Receptive language via audition and vision (objective language tests)

Peabody Picture Vocabulary Test.

Illinois Test of Psycholinguistic Abilities.

Detroit Test of Learning Aptitude. Essentially a psychological instrument designed to measure specific cognitive skills underlying the learning process. The examiner is instructed, however, to select from the 19 individual subtests those tasks which are appropriate for the purpose of the testing situation and individual needs of the subject to be tested. In attempting to obtain an overall picture of the hearing-impaired child's verbal and nonverbal response to spoken language, the following subtests have been found to be informative and useful in planning language therapy: Orientations, Verbal Opposites, Oral Commissions, Auditory Attention Span for Related Syllables and Oral Directions.

Houston Test for Language Development. Measures the development of language, divided into two parts. Part I measures aspects of language involving reception, conceptualization, and expression in children aged 6 months to 3 years; Part II examines these same areas in children aged 3–6 years.

Test for Auditory Comprehension of Language.

Also tested are the child's ability to follow familiar questions and one, two, and three-level commands.

Receptive language via audition alone

Distance at which child responds to voice.

Perception of vowels.

Ling's five-sound detection test.

Perception of low, mid, and high consonants and vowel nonsense syllables.

Ability to follow familiar questions and commands.

Ability to imitate changes in pitch, duration, stress, and intonation.

Tonality Test, if applicable. This test, which is presently being standardized, consists of lists of 25 words divided into five sound-frequency groups: low, low-mid, mid, mid-high, and high. A low-frequency word might be "wood," a mid word might be "hat," and a high-frequency word might be "sheet."

Auditory memory for sentence material or a series of clued, isolated words.

Receptive language via vision alone (speechreading)

Costello Speechreading Word Test. Consists of 25 monosyllabic kindergarten-level words, each presented to the child once with voicing for a score of 4 points per word. Forms A or B.

Costello Speechreading Sentence Test. Consists of 50 sentences which are to be presented one time each, with no voice. Comprehension of the sentence is gauged by correct manipulation of props provided or oral repetition of the sentence. One point is given for each sentence that is interpreted correctly.

Also tested is the child's ability to comprehend information in a simple paragraph read with minimal voicing.

Expressive language

Subtests of the *Illinos Test of Psycholinguistic Abilities* and the *Detroit Test of Learning Aptitude*.

Carrow Elicited Language Inventory. Designed to assess a child's mastery of specific grammatical forms based on his ability to imitate progressively larger and more complex sentence constructs. Its use with the hearing-impaired population must take into consideration the child's speech intelligibility and auditory perception/comprehension skills.

Objective articulation test Routinely the measurement of articulation ability has been considered essential to a thorough understanding of the development of intelligible and fluent oral speech and language skills within the hearing-impaired population. Standardized picture identification tests such as the *Templin-Darley Test of Articulation* and the *Goldman Fristoe Test of Articulation* provide the trained listener with a sample from which to judge the adequacy of the hearing-impaired child's spontaneous or imitative productions of the individual sounds of speech, at the word level and in connected discourse.

Results of the communication therapies evaluation are taken into consideration for determining appropriate educational planning and additional help in speech, language, and hearing development within either a school or a therapy setting.

Psychological Testing Program: Whitney M. Young Magnet High School

The implementation of Public Law 94-142 on September 1, 1978, required, among other things, the creation of an Individualized Education Program (IEP) for each child registered in a special education program. At Chicago's Whitney M. Young Magnet High School, the diagnostic staff of the Hearing Impaired Program (H.I.P.) had anticipated the provisions of PL 94-142 as early as the summer of 1974. This discussion summarizes some of the problems that were foreseen and the solutions ultimately adopted.

The Hearing Impaired Program is a special division of the school, which in itself draws students on a selective basis from the entire city of Chicago. The H.I.P. staff includes about 60 full-time teachers, 25 supportive paraprofessionals, and 12 diagnostic staff personnel. Nearly 300 students, aged 13–21, currently attend the program. Both deaf and hard-of-hearing children are enrolled. Courses of study are tailored to the student's individual needs and include both segregated and mainstreamed class attendance. The philosophy of total communication is an integral factor in the educational process.

Special considerations. Individualized assessment of children in large secondary programs for the hearing-impaired often poses problems not clearly envisaged by legislators. First is the sheer number of students to be evaluated; second is the continuing shortage of qualified examiners; third is the academic structure—no two educational programs are precisely alike in their offerings. Additionally, a time element is involved; students need to be placed academically as soon as possible after entrance. Finally, since the IEP is subject to periodic review and updating, a huge burden is imposed on the diagnostic facility in an educational system.

In planning how to meet these pressures and responsibilities, the diagnostic staff at Whitney M. Young divided the work into two stages. At the professional level, the audiologist, speech therapist, manual sign experts, and psychologists, aided by the school nurse, counselors, and social workers, focused on their specific areas of interest. The needs of each diagnostic area were then assessed carefully in order to develop a structured program of evaluation from which a standard test battery applicable to all students could be drawn. This test battery was intended to relate directly to the H.I.P. school program, be efficient and reliable in terms of the temporal aspect, and provide for the analysis of most if not all of the psychological factors considered relevant to the educational process.

The Center for Evaluation, Diagnosis, and Research (CEDAR), which was responsible for all diagnostic activities within the H.I.P. program, quickly recognizes the difficulty of administering a global diagnostic process to a large number of students, given the time available. Thus, the test battery was modified by each professional area, and only those portions directly involved with current educational placement were administered at any one time.

Tests used in the evaluation program. Given the foregoing situation, the H.I.P. high-school psychologist considered three aspects of the evaluation process: (1) initial screening and placement at entry; (2) on-going academic/vocational placement within the school program; and (3) postsecondary preparation, whether in terms of additional training or of job placement. To meet these needs, his evaluation program contained the following tests.

1. At entry into the secondary-school program (initial screening)

   Intelligence

   Wechsler Adult Intelligence Scales (performance), or
   Wechsler Intelligence Scales for Children (performance), or
   Wechsler Intelligence Scales for Children, Revised (performance)

   Achievement

   Wide Range Achievement Test, and
   California Achievement Test, or
   Stanford Achievement Test

   Personality

   House-Tree-Person, and
   Bender-Gestalt
   Rorschach Psychodiagnostic

2. Second academic year reassessment (vocational decision)

   Achievement

   Stanford Achievement Test, or
   California Achievement Test

   Aptitudes

   Work Sample Evaluation Program (JVS Philadelphia)
   Purdue Pegboard
   Revised Minnesota Paper Form Board (AA)
   Minnesota Clerical Test
   Farnsworth Dichotomous Test for Color Blindness
   Hooper Visual Organization Test
   Maquarrie Test for Mechanical Ability
   Manipulative Aptitude Test

3. Third academic year reassessment (career-counseling stage)

Intelligence

Wechsler tests as at entry

Achievement

Achievement tests as at entry

Career interest exploration

Picture Interest Inventory (Weingarten)
Geist Picture Interest Inventory
Wide Range Interest-Opinion Test (WRIOT)
Kuder Occupational Interest Inventory

Aptitudes

SRA Pictorial Reasoning Test
Computer Program Aptitude Battery
Short Employment Test (Verbal, Numerical, Clerical)
Manipulative Aptitude Test

Test interpretation and staffing. Under the Individualized Education Program, each student is entitled to an individual staffing conference where input is offered by both diagnostic and supportive personnel as well as teachers, parents, and school administrative representatives. In a school setting, the psychologist has two responsibilities each time a student is evaluated. Besides his commitment to the student, the psychologist must also consider the implications of his findings for the educational program itself. Thus he has to familiarize himself with administrative procedures and resources, curricular offerings, teaching philosophies and methodology, facilities and equipment, community resources, diagnostic testing in other areas such as audiology and speech, bicultural and bilingual factors, and social and socioeconomic conditions in the geographical area. All these aspects and more are vital to the provision of adequate services by the psychologist.

The psychologist's role in a staffing conference, therefore, is far from cut-and-dried; he is expected not only to present his test results but also to offer guidance on the question of placement. To do this effectively, he must consider the test findings in terms of the prevailing educational program, pointing out possible placements available, or be in a position to suggest alternative placement. His role is to offer himself as a resource but not to make decisions; he should relate his findings to information provided by other members of the staffing team, thus contributing to a group decision that will benefit the student and also receive administrative and parental support.

Team staffing is most important for test interpretation. It is here that the psychologist obtains the additional background data that is often inadvertently omitted from case reports and test results. Some questions that can be answered here and that can affect the final psychological interpretation are:

1. Is there any current evidence of aural deterioration? Is a hearing aid worn? How effective is it in the presence of ambient noise?
2. Is medication currently prescribed? What is the effect on behavior? What condition does it purport to treat?
3. Is there any evidence of social drug addiction? Type used? Effect?
4. How does the student perform visually? Are glasses worn?
5. What is classroom performance like? Attitude, application, skills, etc.?
6. By what medium are ideas most comfortably exchanged receptively and expressively?

Observation

The observing eye of an experienced examiner is one of his major clinical instruments. With it he can spot soft pathological signs, perceive suggestive lines of inquiry that need following, and gather a wealth of behavior detail. Without it, the psychological examination is simply a mechanical exercise.

The ideal comprehensive examination would include systematic observation of a subject in as wide a variety of real-life situations as possible—in the home, at school, in recreational activities, and above all in group interactions and interpersonal encounters. This ideal is particularly desirable in the examination of prelinguistically deaf children, whose auditory disability produces ramifications that can greatly hamper psychological testing and interview. Observation fills the gaps. It is crucial at preschool levels, where children are under the influence of a variety of authority figures whose management can determine the social and interpersonal patterns that will be the child's for life. Observation here must include the behaviors of these figures vis-à-vis the child.

However, in the real world, observation procedures such as these and as summarized in chapter 10 can rarely be conducted by overtaxed examiners in school settings. Nevertheless a great deal can be perceived through informal observation by a sharp, clinical eye right in the school or in the psychologist's office, as summarized in the following sections.

General Observation

Health and physical condition. Does the child's physical appearance suggest good health, debility, actual illness? Does he seem "over-energized," "under-energized"? Does he appear to have other physical disabilities, such as the wearing of eyeglasses might suggest? Are there any physical abnormalities or disfigurations present to add to the burden of deafness? What are the possible educational and emotional implications? Is medical referral suggested on the basis of observed physical signs?

Motor manifestations. Is there evidence of impaired motor coordination or control? Is motor activity hyperactive or underactive, random or purposeful, listless or positive? Are any bizarre manifestations present, such as posturing, automatic movements or mannerisms, excessive yawning, gulping, catching of breath? Are there tics, twitching, spastic or athetoid movements, postural deviations, poor balance, peculiar gait? What may be the neurologic and psychiatric implications of the observed motor patterns? Is neuropsychiatric referral called for?

Appearance and dress. How does the subject's general appearance strike an observer? Does his clothing conform to the fashion of the day? Are there evidences of compulsive meticulousness, excessive slovenliness, unusual femininity in a male or masculinity in a female, bizarreness? Is there evidence of careless personal hygiene?

Hearing aid management. Does the subject wear a hearing aid? If not, is there evidence that he could profit from one? If he wears an aid, does he carefully adjust the volume controls as required; fuss with it unnecessarily; forget to turn it on; put it on when entering the psychologist's office, and take it off immediately on leaving? Do oral communication skills appear to benefit from the use of an individual aid? What are the audiological implications?

Interpersonal and Group Behavior

General mood. Does the subject give the impression of interest in others, eagerness to be part of the group, self-assurance, attention-seeking, irritability, apathy, indifference? Is he friendly, bored, hostile, a "loner"? Is he actively cooperative, passively accepting, withdrawn? What are his tolerance levels for frustration, conflict, correction, domination?

Ascendance/submission. What does the subject's dependence/independence ratio appear to be with authority figures, in peer groups, in interpersonal confrontations? Is he a "natural leader"; does he insist on the leadership role and refuse to participate otherwise; does he habitually defer to others to do his thinking for him and seem lost without someone to lean on? Is the subject's dependence/independence ratio the same for all situations and with all figures, or does it alter perceptibly in certain situations with certain figures, and if so, how and with whom?

Psychological Test Behavior

During the administration of test instructions. Does the subject concentrate on understanding the test instructions; does he simply look pleasantly at

the examiner but make no observable effort to understand; plunge into the test before instructions are completed; habitually stop to ask questions about procedure after having begun the task; appear reluctant to begin unless specifically encouraged by the examiner?

During test performance. Does the child think out his approach before beginning; perform step-by-step planning while working out the test task; proceed entirely on a trial-and-error basis? Does the child continually look to the examiner for hints and clues? What are the child's span of concentration; distractibility; use of systematic procedure; tempo of operations; manual dexterity and visual-motor skills? What of the child's initiative and independence; needs for encouragement and praise; ability to profit from mistakes; meticulousness of operations?

Management of difficulties. When the child is faced with difficulties, does he concentrate on solving them himself; show immediate discouragement and refuse to go on with the task; expect to be helped; accept only sufficient help to get him over a rough spot so that he can proceed on his own; use difficulties as an attention-getting device?

Exercise of critical faculties. Does the subject notice errors as he proceeds with a task and correct them before he continues; is he aware of errors only when he is "stuck"; does he check his work before announcing he is finished or does he claim to be finished and then immediately change his mind? Does he express satisfaction on completion of a task?

Behavior on concluding the test. Is the subject eager to know how he did, indifferent, discouraged? Does he want to know the correct answers to items that have given him difficulty? Does he seem a good candidate for future testing, indifferent, reluctant? Is he eager to leave the test room or does he offer to stay and help the examiner put the test materials in order? Does he appear exhilarated, depressed, fatigued?

Personality rating through mental test behavior. Personality leads are disclosed in all human behaviors, including those observed during mental testing, as illustrated in the following rating form, slightly modified from one devised by Stutsman for preschool children many years ago (Stutsman, 1931, pp. 261–62).

Rating of Personality Traits in Mental-Test Situations

Name .... *Age* .. *Date* ....

1. Self-reliance:
   extreme; moderate; average; slightly lacking; markedly lacking
2. Self-criticism:
   extreme; moderate; average; slightly lacking; markedly lacking

3. Irritability toward failure:
   extreme; moderate; average; very slight; none
4. Degree of praise needed for effective work:
   Type 1—moderate praise helpful
   Type 2—indifferent to approval
   Type 3—praise induces self-consciousness
   Type 4—constant praise expected but harmful
   Type 5—constant praise needed
5. Initiative and independence of action
   marked; average; very little
6. Self-consciousness
   not conspicuously present; conspicuously slight; inhibited reactions; show off
7. Spontaneity and repression
   1 Freedom to work: marked; average; very little
   2 Tendency to ask for what he wants: marked; average; very little
   3 Amount and type of interpersonal communication
   (This category replaces the Stutsman items related to talking and voice quality)
8. Imaginative tendencies
   marked, average, very little
9. Reaction type to which the child belongs
   Type 1—slow and deliberate
   Type 2—calm and alert
   Type 3—quick and impetuous
10. Communication skills and exchanges
    (This title replaces Stutsman's "Speech Development")
11. Dependence on parent
    present, not observed, reactions indicate indepedence
12. Other observations

Stutsman stressed that the foregoing outline is "merely offered as a suggestion of the possibilities of using the [mental] test situation for the study of personality" (1931, p. 262).

Classroom Observation: Teacher-Pupil Interactions

The alarming rise in behavior and learning problems among nondeaf pupils has resulted in a vigorous research analysis of teaching styles and practices. The outcome is a sweeping movement in teacher-training programs and evaluation procedures toward demonstrated competence in actual classroom performance (Heath and Neilson, 1974; Hunter, 1977; Rosenshine, 1971).

The movement is not as strong as it deserves to be in the education of deaf children. Yet, next to competent parents, competent teachers represent a deaf child's strongest habilitative lifeline. The extent to which learning disabilities among deaf pupils are simply a reflection of teaching disabilities is a pressing topic for investigation.

In schools for the deaf, psychologists are the traditional referents for problem pupils, and the focus of psychological inquiry has traditionally been the problem child. However, current research findings concerning pupil-behavior correlates of teacher effectiveness means that psychologists must move out of their offices into the classrooms and must be prepared to include educational practices, teacher competence, and teacher–pupil interactions within the frame of diagnosis. To carry out this task requires further competencies on the part of psychologists to the deaf. Not only must they "know" the deaf, they must also know and be able to evaluate the educational influences and teacher practices that go into the fashioning of a deaf pupil.

Formal observational analyses of teacher competence and teacher–pupil interactions pose complex problems of recording, scoring, and interpreting which need not concern us here. But even informal classroom observations can sound important warnings for psychologists trained to interpret them. In my opinion, every psychologist in a school for the deaf should schedule regular class rounds in the form of brief, informal, "sitting-in-for-a-few-minutes" visits for self-instruction on the operational aspects of teaching deaf children at the various chronological levels, and to acquire familiarity with teaching styles and pupil reactions, in particular the reactions of children with deviant behavior. No diagnostic examination of a problem pupil is complete without classroom observation.

Hunter (1977) cites a number of scales devised for evaluating the behavior of teachers and of deviant pupils. Important targets in teacher observations are (1) the affective climate of the classroom, (2) sensitivity to potential problems and conflicts; (3) skill in structuring and applying corrective comments, measures, and constructive feedback; (4) ability to stimulate creative thinking; (5) organization and clarity in the presentation of lessons; (6) ability to exercise democratic controls; and (7) personal enthusiasm. Several other behaviors can be added for teachers of deaf children: (8) sensitivity to the tolerance limits of a deaf child; (9) ability to head off crisis situations through distracting counteractivities; (10) an understanding acceptance and wise management of frustration outbursts; (11) flexibility and variation in the presentation of daily lessons; and (12) empathy with and respect for the dignity and feelings of deaf children. Excellent preparation for "classroom observation" is for a psychologist to serve a teaching apprenticeship in a class for deaf children as part of the training required for psychological practice with the deaf.

A milestone in analyzing teacher–deaf-pupil interactions will be attained when a method is devised for simultaneous recording of a pupil's deviant behaviors and a teacher's eliciting and response behaviors. Until that time comes, the observing eye of the well-prepared psychologist will have to gauge the extent to which problem behavior in a given child is related to problem teaching. Where a relationship appears to exist, the wisest possible judgment will have to be exercised in the delicate matter of suggesting remediations in a way that will not antagonize the teacher.

Psychopathic Behaviors

The well-prepared psychologist can also note signs of severe emotional disturbance and psychopathology in the course of informal observation. In themselves, the signs do not ordinarily point to a diagnosis, for similar signs can be associated with various psychopathic conditions, just as the sign "fever" is associated with a wide variety of physical illnesses. In both instances, the signs signify that something is wrong and so alert the observer to the need for differential diagnostic inquiry.

Checklists of signs commonly associated with childhood behavior/conduct disorders, psychiatric conditions, and antisocial behavior can be found in the case history inventory in Appendix F. Not all the symptoms listed can be seen on inspection. Some are hidden deep in the psyche. But rarely do signs of disturbance exist in isolation. Unseen symptoms are generally accompanied by ones that "show," hence can be observed.

As to the signs themselves, an examiner should expect to find no great difference in manifestations of disturbance between the deaf and the nondeaf. The more experienced the worker is in psychopathology as well as in work with the deaf, the more sensitive he will be to signs of serious deviance in a context of deafness, and the more skilled in distinguishing passing reactive behaviors from pathologically deviant ones.

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Interview

To draw out school-agers through interview is far from the easiest of psychological examination techniques (Rich, 1968). School-agers have a self-conscious aversion to intimate self-revelation, especially to strangers. In the case of school-agers who are deaf, the aversion is compounded by difficulties in interpersonal communication. Nevertheless, the interview represents an important means of assessing how well Muller's "tasks of childhood" been managed, and how well prepared deaf youth is to meet the responsibilities of adulthood. The basic principles of the interview technique have been discussed in chapter 10. The following guides are offered to facilitate interviewing deaf children and youth.

"Interviewing" the Very Young

A conversational interview with deaf preschoolers and very young deaf school-agers is obviously not possible. These children are still in the process of developing language and communication skills, and their attainments are not yet substantial enough for sustained conversation. But many such children have important information to impart. A substitute means for eliciting such leads is through the doll-family kits that are also used in psychological testing. As in that context, the interviewer must make sure there are at least enough dolls available to represent each member of the child's actual family, by age and sex, plus whatever other important figures there may be in the child's immediate life environment. Again, it is helpful to have individual photographs of these persons at hand so that the child can indicate who the actors are in the scenes played out.

This is, of course, an indirect interview approach, but it can prove amazingly informative at times, particularly with disturbed children. One such child in my experience continually grouped together the dolls representing self, mother, and father, while leaving the doll representing the family baby out in the cold, and eventually hurling it to the floor. Another child gave a graphic doll-play of a fight between its mother and father, with brother, sister and self huddled together, and in pantomime indicated intense fear on the part of the children, and a black eye received by the mother. Some children prefer to place the dolls in fixed positions, and themselves act out various incidents while pointing to the doll that is the central figure in the pantomime. Not infrequently, the mini-stories these very young deaf children tell through doll-play and pantomime point straight to the heart of their disturbance and prepare the way for later parent interviews and remedial interventions.

On his part, the examiner resorts to a mix of pantomime, acting, drawing, facial expression, signs, oral communication, or whatever other communicative strategy seems called for to maintain interpersonal exchange with the child being "interviewed." Finally, when the expressive and receptive skills of both child and interviewer are exhausted, there still remain the case history, observation, psychological testing, and parent interviews to tell the rest of the child's story for him.

"Preparation-for-Life" Interview with Deaf Youths

By the time they reach their teens, many deaf school-agers have already been exposed to interview situations, usually for classroom misdemeanors, poor study habits, and the like. However, broader preparation-for-life interviewing is rarely a routine school practice. In my opinion, it should be. Teenagers will soon be leaving the protected school environment, and it is high time that a systematic effort is made to find out how well prepared they are to meet the demands of independent living, so that appropriate remedial measures can be taken as required, and hopefully in time.

In such "preparation" interviews, the interviewer looks to see how well Muller's "tasks" of youth have been managed, namely: the recognition of limitations, achievement of emotional independence, the choice of a career, and the formation of a personal philosophy. In the case of deaf youth, special considerations include: (a) acceptance of deafness; (b) attitudes toward the self, family, and the hearing world; (c) social, conceptual, and sexual maturity; (d) coping mechanisms, including possible use of drugs; (e) occupational knowledge and aspirations; (f) interpersonal and group adjustments and attitudes; (g) motivations, initiative, and enterprise; and (h) "other" topics as determined by the individual case.

As I conceive them, preparation-for-life screening interviews take place in the school setting and are conducted by a communicatively expert staff psychologist or other staff professional, skilled in interviewing and on friendly terms with the school's pupil population. The purpose of the interview is frankly explained at the start. "You will be leaving school soon and you will have a different kind of life. We want you to have a good and happy life. So we are having this talk together to see how we can help you, and if you have any questions or problems." As a rule, this friendly introduction is greeted with a smile and stony silence. The interviewee waits to see what the interviewer comes up with next. Something is needed to break the ice and get the interview moving.

Among the good ice-breakers in my experience was a teenage discussion club I had formed as an elective extracurricular activity for open discussion on any topic of concern to the youthful members. The club proved to be the most popular of the school's extracurricular activities; and the lively group discussions and the togetherness engendered by common concerns and problems went far to dispel any self-consciousness that might have hampered later individual interviews on personal matters.

Other good ice-breakers are sentence completion tests and apperceptive test stories. Sentence completion tests often provide quick and striking leads to the feelings and attitudes of deaf youths toward life, family, and self. The leads can be used as initial "tell me more about that" or "please explain" strategies to draw out the interviewee. From that point on, the interviewer can unobtrusively expand the discussion into other areas. I have found the sentence completion approach generally more applicable and productive than apperceptive stories because of the more structured nature of the sentence

task and the less taxing demands on narrative language and imagination. When psychological tests are used as interview openers, they need not be given in their entirety—that would eat into interview time and fatigue the interviewee. A few selected items suffice. If the tests have already been administered during psychological testing, the original protocols can, of course, be used for interview purposes.

The items to be included in preparation-for-life interviews should be carefully worked out beforehand by the examiner in collaboration with other school personnel, and a standard form should be devised for interview coverage and recording. Of great help in developing the form are the numerous psychological inventories available on such topics as occupational preference, knowledge, and aspirations; sex knowledge and activities; family living; personal values; marital readiness; and many more related life-adjustment topics. The interview findings are used as the basis for counseling, remedial interventions, and therapy as required.

Interviews with deaf youths follow the general principles of the interview technique. As a rule, deaf youths tend to be open, refreshingly frank, and perfectly willing to discuss any aspect of personal life with someone they know, respect, and trust. In this regard they differ considerably from most hearing youths, with whom interviews are often hampered by hostile resentment of invasion of personal privacy, false modesty, or flippant shock tactics.

Finally, this discussion has been based on situations in which the interview is conducted by communicatively expert examiners who are known to the interviewees. This ideal is not always achievable with deaf youths, and is seldom the case with deaf adults. Suggestions concerning the management of these more difficult interview situations are summarized in chapter 13.

Summary Comment

A glance at the preceding discussion shows that considerable space has been allotted the subject of psychological tests and testing. This may suggest that this branch of psychological information-gathering outranks the others in importance. More likely it outranks the others in complexity and frustration when the slim test-resources available to psychologists to the deaf have to be stretched, modified, adapted, reinterpreted, and otherwise reconditioned to accommodate the needs of a deaf clientele.

In the final analysis, the relative importance of the four basic branches of psychological examining depends upon which provides the clearest information about a given subject. It would be contrary to known fact to accord this distinction to testing per se. The technique is, after all, a shortcut form of objective evaluation in which the operational unit is made up of three interlocking components—the examiner, the test, and the subject. In this unit, the subject "sets the stage"; the test constrains his performance; the examiner controls the action and interplay. Further, in all instances but particularly with deaf subjects, much of a test's "objectivity" rests with the *subjective* judgment of the examiner regarding its use and interpretation. Hence, the old clinical dictum that no test is better than the person giving it; and hence the difficulty of "recommending" tests for deaf subjects without taking into consideration the subject and the examiner as well as the test.

For examiners who know their psychological techniques and who know the deaf, a good case history may be all that is needed for diagnostic evaluation. Or observation may give the story away, or interview, or any combination of these. In other words, tests may not be necessary at all in certain cases except for supplementary data and for mandated records. But where tests are used, "the significance of test scores is greatest when they are combined with a full study of the person by means of interview, case history records, application blanks, and other methods," to quote Cronbach again.

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Hearing Deficits

B. Patrick Cox and Patricia Edelin

Children with hearing loss present a unique challenge to individuals responsible for the health, education, and psychosocial needs of children. To the degree that a child's auditory abilities are affected, he may have a problem in communication, the underpinning for many of the developmental tasks of childhood. This is particularly true in our society, which places heavy emphasis on the verbal aspects of communication. Myklebust (1960) stresses the role of hearing in the verbal communication system and points out, from an evolutionary standpoint, that man's primary sensory avenue involved in language acquisition has been hearing. Any hearing loss, then, may critically alter the child's acquisition of the crucial auditory skills (e.g., inner language and receptive language) and may alter his expressive speech and language. Consequently the child's communication patterns, which are intimately tied to his ability to learn and grow emotionally, may be affected.

DEFINITION OF TERMS

It is important at this point to define the most frequently used terms related to hearing loss. Definition of these terms is often unclear. Schein and Delk (1974) noted that definition has been made on the basis of degree of the hearing loss, age of onset, speaking ability, and cause of hearing loss, among others. These same writers make the important point that "since there is neither statutory penalty nor benefit for being deaf, there is no legal definition of deafness" (p. 132). The terms *deaf, hearing impaired*, and *hard of hearing* have all been used to describe hearing loss. Unfortunately these terms are sometimes employed to denote different degrees of hearing loss, while at other times they are used synonymously. Schein and Delk (1974) use hearing impairment as an umbrella term, specifically, for "all significant deviations from normal, including deafness," whereas they define deafness as "the inability to hear and understand speech." The problem with these definitions is that it is unclear whether the inability to hear and understand speech refers to aided, i.e., hearing while wearing a hearing aid, or unaided hearing.

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For the purposes of this chapter the term *hearing impaired* is used to denote all degrees of hearing loss. In instances in which the term *deaf* is used it refers to those persons who, even with amplification, cannot hear or understand well enough to achieve minimal communication. The majority of information in the latter section, devoted to the psychology of deafness, concerns deaf persons. From a clinical standpoint the majority of psychosocial-educational problems concerns deaf individuals. This is not to say that persons with lesser hearing losses do not share these problems.

INCIDENCE

Describing the incidence of hearing impairment in children is almost as difficult as defining the important terms. This is because of a number of methodological problems, not the least of which is an inability to reach hearing-impaired individuals. This is coupled with the invisibility of hearing loss and a general societal attitude of minimizing or ignoring hearing impairment.

It has been noted that hearing impairment is "the single most prevalent chronic physical disability in the United States," surpassing the number of persons with "visual impairments, heart disease, or other chronic disabilities" (Schein and Delk, 1974, p. 1). The American Speech and Hearing Association estimates that there are 14 million Americans with hearing loss in one or both ears and three out of every 100 school children with similar hearing loss (ASHA, 1976). The National Census of the Deaf Population reported a prevalence rate for all hearing impairments of 6,603/100,000; for significant bilateral hearing impairment, 3,236/100,000; and for deafness, 873/100,000 (Schein and Delk, 1974). This same census showed prevalence rates of 203/100,000 and 100/100,000 for onsets of hearing impairment before age 18 years and three years, respectively. Among this latter group it is estimated that 2,000–4,000 infants are born annually in the United States with profound hearing impairment (Bergstrom, Hemenway, and Downs, 1971).

Confronted with these incidences it is natural to ask what proportion of the hearing-impaired population is being served. As might be expected, data necessary to answer this question are fragmented. The United States Office of Education (1976) has reported that among school-age children 8% of the deaf (profoundly hearing impaired) are unserved by any educational facility. This same study indicated that 80% of the "hard of hearing" (less than profoundly hearing impaired) are unserved from an educational standpoint. Statistics of hearing-impaired youngsters whose needs, other than education, are not being met are uncovered less easily. Despite this, clinicians who attempt to meet the

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hearing-impaired child's health, social, and emotional needs, as well as the needs of these children's parents, serve as testimony to the dearth of appropriate services in these areas.

It is the purpose of this chapter to provide basic information relevant to hearing impairment in children in order to facilitate the quality of services provided to them. The initial section of this chapter includes a discussion of several factors that affect the hearing-impaired child's development. Specifically these include: 1) general characteristics, 2) hearing-loss profile, 3) communication, development, and education profile, and 4) family makeup. The second segment of this chapter is related to specific aspects of the hearing-impaired child's psychosocial development. Areas discussed in this part include: 1) parental reaction to the hearing-impaired child, 2) psychosocial implications and problems, 3) psychological needs of parents, and 4) assessment and treatment services.

BACKGROUND FACTORS AFFECTING THE HEARING-IMPAIRED CHILD

It is extremely important that clinicians working with hearing-impaired children have full knowledge of the child's current developmental background and status. As noted earlier, the effects of the auditory-sensory deprivation are far reaching. Consequently, the age of onset of the hearing loss, cause of hearing loss, presence of other handicapping conditions, and general intelligence are important factors to consider. The clinician should also be aware of the child's hearing-loss profile and amplification status, communication and education profile, and family makeup.

General Characteristics

Age of Onset The age of onset of the hearing loss in a particular child is important information because of its effect on the child's development of communication skills, particularly his speech and language. It has been estimated that 95% of primary-school-age, hearing-impaired children are born with a hearing impairment or become hearing impaired before the age of two years (Bolton, 1976). These children are generally referred to as having *prelingual* hearing impairment. It is axiomatic among teachers of the deaf, audiologists, and speech pathologists that the prognosis for development of good speech and language skills for a child born with near-normal hearing who becomes hearing impaired during even the first year of life is much better than that for a child born with a hearing loss. This observation is supported by the research of Eisenberg (1976) and other investigators, who have described the wide array of auditory skills that emerges in the normal hearing child in early infancy. Clinicians, then, should be cognizant of the fact that age of onset is a critical factor involved in the hearing-impaired child's speech and language skills. This must be considered when judgments are made about the child's level of functioning.

Etiology There are many causes of hearing loss in children. These include the prenatal, perinatal, and postnatal conditions summarized in Table 1. The incidence of hearing loss secondary to prenatal and perinatal conditions is generally estimated to be greater than that of hearing loss associated with postnatal conditions. Among prenatal and perinatal etiologies, one major study (Gentile and Rambin, 1973) has shown the following incidence rates, expressed in percentage rate per 1,000 students of total specified etiologies: maternal rubella, 38%; heredity, including recessive transmission, 19%; prematurity, 14%; Rh incompatibility, 8.7%; other complications of pregnancy, 6.2%; trauma during delivery, 5.7%; medication during pregnancy, 1.7%; trauma to mother during pregnancy, 1.4%; and other causes, 5.3%. These estimates corroborate the clinical observation that maternal rubella and heredity are the most frequent causes of hearing loss among the prenatal and perinatal conditions. This is particularly obvious during the periodic epidemics of rubella (1958–59, 1964–65), but they also are evident as continuing high causes of hearing impairment even in nonepidemic periods.

Among the postnatal causes of hearing loss, the previously cited study (Gentile and Rambin, 1973) reported the following incidence rates, expressed in percentage rate per 1,000 students with specified etiology: meningitis, 27%; measles, 15%; otitis media, 12%; fever, 8.4%; trauma, 5.6%; mumps, 4.7%; and other causes, 27.3%.

The etiology of the given child's hearing impairment is useful information to the practitioner as an indicator of the severity of the problem. Although it is impossible to state unequivocal relationships, it is possible to make some general statements relative to etiology and degree of impairment. Among the prenatal etiologies it is axiomatic that the earlier in the pregnancy an insult occurs, the greater the expected impairment. Furthermore, rubella, trauma to mother during pregnancy, and heredity tend to result in the most severe hearing impairments (Gentile and Rambin, 1973). This is true in terms of the degree of peripheral hearing loss and, in the case of rubella, often predicts the presence of central auditory impairment as well as other nonauditory problems (vision, behavior, and cardiac anomalies). Etiology is also an important factor to consider because of the relationship between it and the progressiveness of the hearing loss. Of particular note are the many forms of hereditary hearing impairment that have an onset delayed until sometime during the child's first year of life or, perhaps, during later childhood or adolescence. As with hereditary etiology, maternal rubella

Table 1. Prenatal, perinatal, and postnatal conditions and events that may indicate hearing loss in children

Prenatal	Perinatal	Postnatal
Maternal rubella or other viral infections (toxoplasmosis, cytomegalo virus, Herpes) Ototoxic drugs (gentamycin or kanamycin) or other maternal drugs Maternal diabetes or hypertension Maternal x-ray exposure Family history of hearing loss Family history of kidney, thyroid, or vision disorders	Maternal hemorrhage; premature separation of placenta from uterus; abnormal positioning of placenta (placenta previa) Prolonged, precipitous, or difficult labor Low birthweight (under 1,500 g; either full-term or premature) Jaundice—Rh incompatibility Use of ototoxic drugs to treat systemic infections Seizures Breathing difficulties at birth Structural abnormalities of ears, nose, mouth	Ototoxic drugs Chronic middle infections (otitis media) Trauma to ear(s) or head Meningitis, encephalitis, or severe cases of measles or mumps Other major systemic infections Family history of hearing loss not present at birth Kidney disease Seizures, convulsions Disturbances of balance and/or coordination

Table 2 Rank order of other handicapping conditions by prenatal and perinatal etiological classification[a]

	Other handicapping conditions										
Cause of hearing loss	Brain damage	Cerebral palsy	Cleft lip/ palate	Emotional behavioral problem	Epilepsy	Heart disorder	Learning disability	Mental retardation	Orthopaedic disorder	Perceptual-motor disturbance	Severe visual disturbance
Prenatal/perinatal maternal rubella	9	6	10	2	9	3	7	5	8	4	1
Trauma to mother during pregnancy	9	3	9	1	8	6	5	2	7	3	4
Medication during pregnancy	7	5	10	1	8	6	4	3	9	2	4
Prematurity	8	4	11	2	10	7	6	1	9	3	5
Rh incompatibility	7	1	10	3	9	8	6	4	11	2	5
Heredity	7	7	8	1	8	6	4	2	6	3	5
Other complications of pregnancy	7	3	10	1	9	6	5	1	8	2	4
Trauma at delivery	7	4	10	1	8	9	5	2	10	3	6

[a] Rank order is determined by incidence of other handicapping condition within that same etiological classification. Data based on study of 41,109 students in special education programs, 1970 71 school year (Gentile and Rambin, 1973) and supported by findings of Vernon (1969, 1976).

also may result in a gradually progressive hearing loss. Indeed, most pediatric audiologists have observed the misfortune of children with rubella-induced hearing loss having stable hearing for several years and then suddenly presenting with a dramatic increase in hearing loss.

Presence of Other Handicapping Conditions Along with age of onset and etiology of a child's hearing impairment, it is helpful to look at whether or not there are other handicapping conditions present that might affect his development. As has been noted earlier, it is not unusual to find other handicaps among the hearing-impaired population. Tables 2 and 3 summarize the frequency of occurrence of 11 conditions that have been found to coexist with hearing impairment. These conditions are reported by cause of hearing loss. Thus it is seen that hearing-impaired children whose major cause of hearing loss is maternal rubella are reported to have a severe visual impairment as the most frequently occurring second handicap; or, in the case of those with hearing loss secondary to Rh incompatibility, cerebral palsy is seen as the most frequently coexisting handicap. Across etiological categories the most common coexisting conditions include emotional or behavioral problems, mental retardation, and perceptual-motor and severe visual disturbances. It is imperative, then, that assessment and treatment of hearing-impaired children be carried out with these possibilities in mind.

Intelligence In concluding this discussion of the general characteristics of the hearing-impaired child that should be considered, mention must be made of the child's intelligence. Most of the skills required to develop adequate communicative and psychosocial skills are related to the child's intellectual functioning. As obvious as this would appear, professionals working with the hearing impaired often fail to consider the impact of intelligence on speechreading, use of residual hearing, and overall need and intent to communicate. Indeed the hearing-impaired child must be a superb synthesizer, incorporating the distorted auditory cues available through a hearing aid (if one is used) with the visual imagery of undistinguishable and homophonous lip movement and, if available, gestures. As if this were not enough of a task, the child must perform this in a language system that may be several developmental levels above him! Suffice it to say that the child with normal or above normal intellectual capabilities will perform this feat with greater ease than a child with less intellectual capability.

Hearing Loss and Amplification Profile

Background information relative to the hearing-impaired child's auditory status, including his use of a hearing aid, is vital to the total profile of the child. Necessary information includes: degree of loss, including the con- [illegible] on; stability of loss; kind of loss; speech discrimination abilities;

Table 3. Rank order of other handicapping conditions by postnatal etiological classification[a]

	Other handicapping conditions										
Cause of hearing loss	Brain damage	Cerebral palsy	Cleft lip/ palate	Emotional behavioral problem	Epilepsy	Heart disorder	Learning disability	Mental retardation	Orthopaedic disorder	Perceptual-motor disturbance	Severe visual disturbance
Meningitis	8	7	10	1	6	9	5	2	9	3	4
Mumps	9	7	6	2	9	6	5	1	8	4	3
Measles	6	4	7	1	8	5	3	1	8	4	3
Otitis media	7	8	5	2	10	8	6	1	9	3	4
Fever	6	4		1	6	4	5	2		3	3
Trauma	7	5		1	8	10	4	2	9	3	6

[a] Rank order is determined by incidence of other handicapping condition within that same etiological classification. Data based on study of 41,109 students in special education programs, 1970-71 school year (Gentile and Rambin, 1973) and supported by findings of Vernon (1969, 1976).

presence of any central auditory problems; and the child's hearing aid status.

Degree of Loss The degree of hearing loss presented by a given child is measured using pure tone (single frequency) air conduction, speech awareness, and speech reception threshold audiometry. These measures are part of the standard audiological assessment battery that is used with infants and children. Modification in the response behavior (e.g., putting a peg in a pegboard, localizing to the source of a sound, hand raising) may be made dependent on the chronological and developmental ages of the child to be tested, but the purpose of the assessment is the same.

Figure 1 depicts a standard, pure tone audiogram form. The figures across the horizontal axis (125–8,000 Hertz (Hz)) identify the pure tone frequency tested. In routine clinical testing, the frequencies of 250–8,000 Hz are tested. The area between 500–2,000 Hz is the most critical for everyday spoken communication; therefore, these three frequencies (500, 1,000, 2,000 Hz) are referred to as the speech frequencies.

The values on the vertical axis represent the decibel (dB) (referenced to ANSI, 1969 standards) value reported in hearing level (HL) needed to reach the child's threshold for each frequency. As a matter of reference, some everyday sounds produce the following approximate dB HLs (from Davis and Silverman, 1970):

Faint but understandable speech in a quiet room	40–45 dB
Conversational speech, 3 feet away	65 dB
Shout, 1 foot from ear	100 dB
Aircraft factory noise	90–120 dB

The results of pure tone audiometry may be classified relative to the degree of hearing loss, which varies from normal hearing to profound hearing loss. Figure 2 shows the typical classification. Thus, a child who has a hearing loss of 55 dB in the speech frequencies would be said to have a moderate hearing loss, whereas a 95 dB loss would indicate a profound hearing loss. Speech awareness and speech reception threshold results (obtained using speech test materials rather than pure tones) are also classified using the same dB range criteria.

Knowledge of the child's degree of hearing loss is important for several reasons. Most obviously the degree of loss correlates somewhat with the prognosis for the child's acquisition of speech and language. Although there are exceptions, it would be expected that a child with a mild or moderate hearing loss would develop speech patterns closer to normal than those of a child with a profound hearing loss. The degree of hearing loss also serves as an important factor in educational placement.

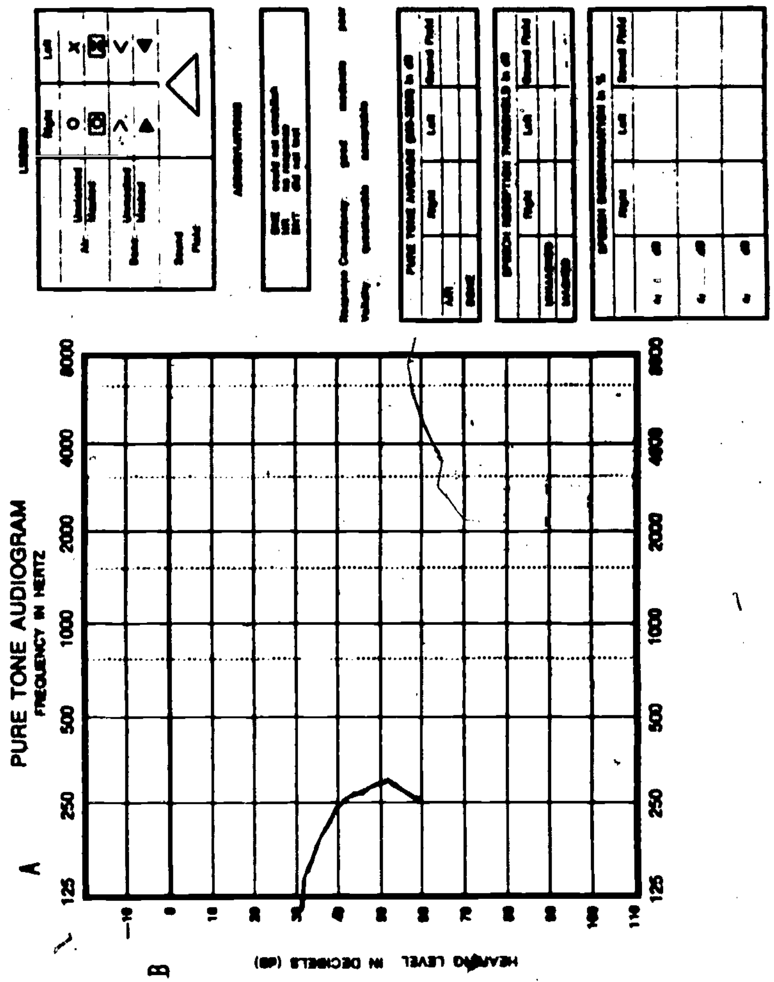

Figure 1. Typical pure tone and speech audiogram form. Note is made of the abscissa scale (A) showing the pure tone frequencies generally tested and the ordinate scale (B) which indicates the range of hearing using the decibel (dB) hearing level (HL) notation.

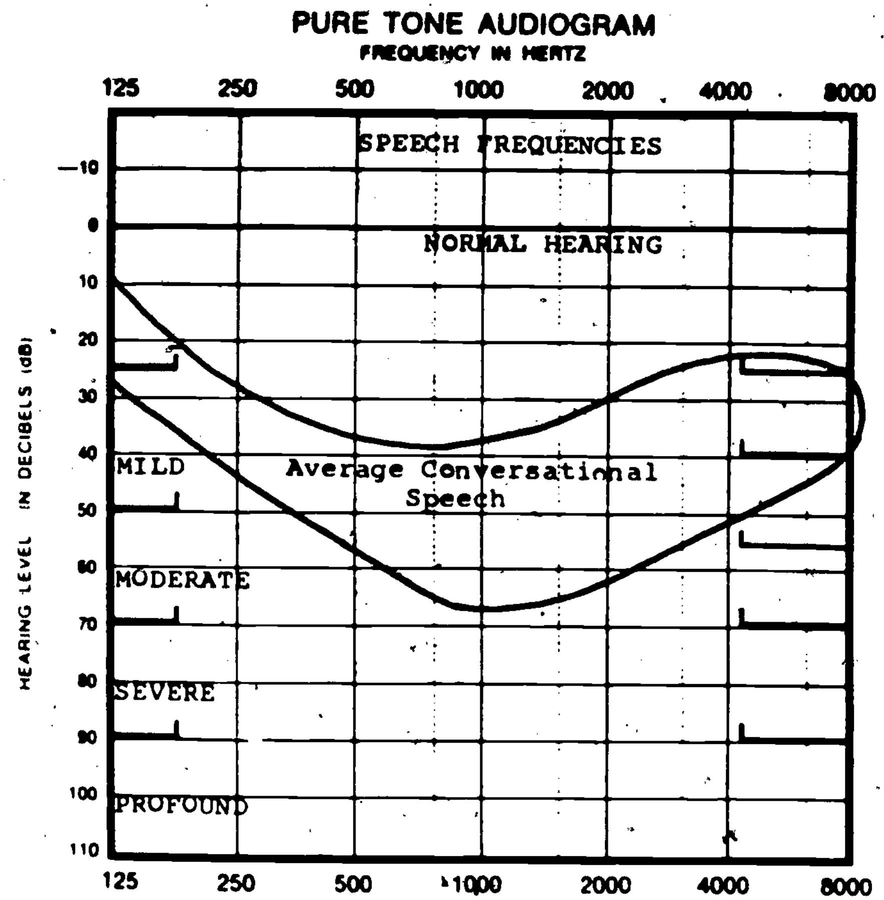

Figure 2 Classification of hearing loss based on response to pure tone stimuli The level of average conversational speech is also depicted This shows the relationship of the child's hearing loss to the average signal that he most often must receive and process

Because a child's hearing (even with a hearing aid) alters the benefit derived from spoken communication, it follows that the educational program that is appropriate for a child with a mild hearing loss generally will not be appropriate for one with a profound hearing loss. This fact is borne out in the findings of one study (Murphy, 1972), which showed that 0.4% of children with average hearing loss (speech frequencies average) of 45 dB HL were in residential schools for the deaf, whereas 43.8% of children with average hearing loss of 85 dB HL or above were in this type of educational placement.

Configuration of Loss Along with the child's degree of hearing loss one should also consider the configuration (degree of hearing loss at each

frequency) of his hearing. Figures 3, 4, and 5 show various pure tone configurations. Although it is impossible to predict an individual child's affective, communication, or educational development based solely on his pure tone configuration, it is possible to state some general observations. Children whose pure tone hearing configuration is relatively flat and comprised of measureable hearing throughout the test range (as shown in Figure 3) generally tend to have the best prognosis. In cases of children who have sharply sloping audiometric configurations (shown in Figure 4), there may be problems with the child's hearing loss not being discovered until quite late. In addition, depending on the degree of near-normal hearing present for the lower frequencies and the degree of loss once the slope begins, these children may have trouble using hearing aids. Children with the sloping configuration may also have social or emo-

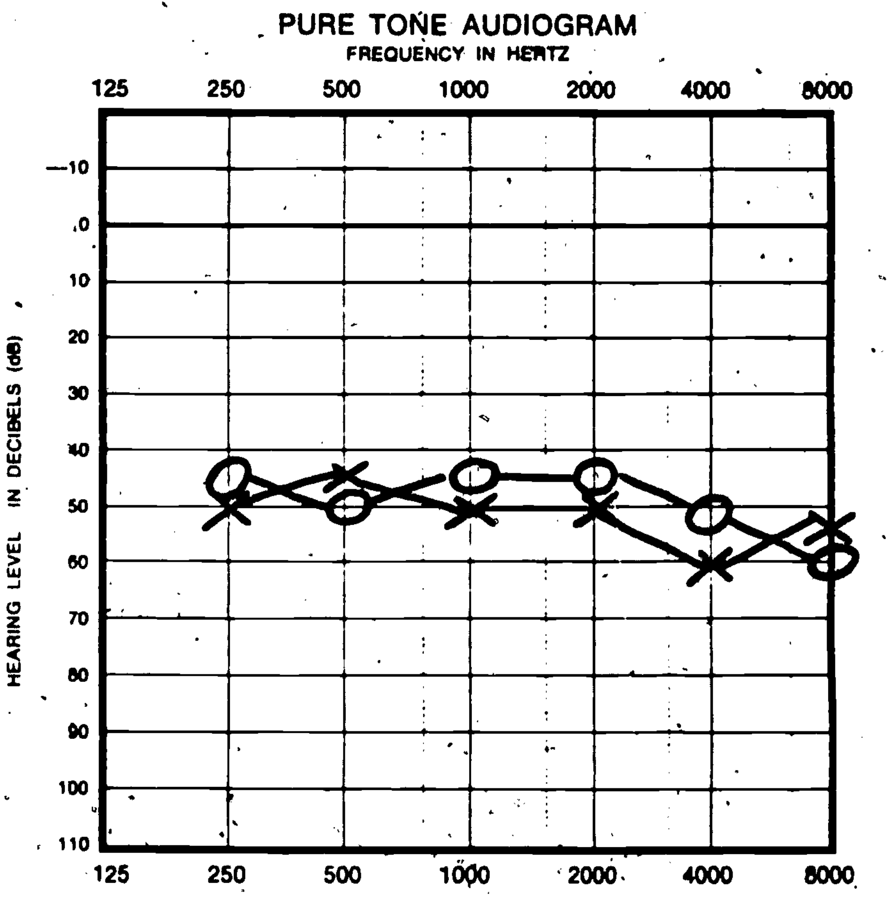

Figure 3 A pure tone configuration.

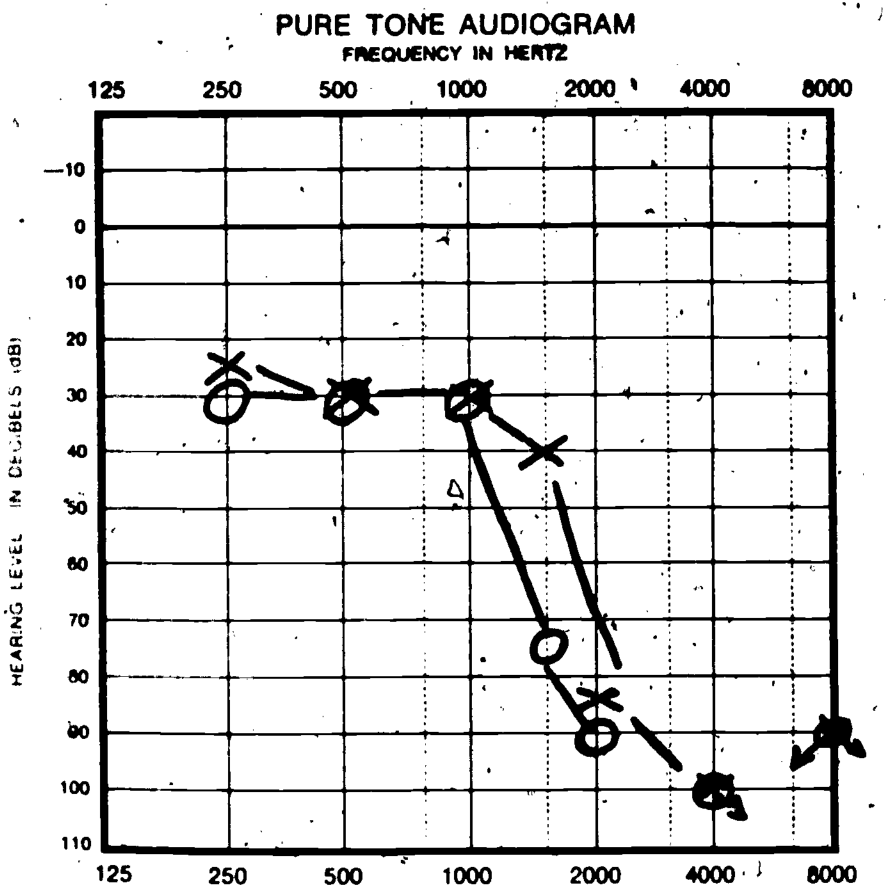

Figure 4. A pure tone configuration.

tional problems in that they appear to hear everything because of the good lower frequency hearing when, in fact, they are missing significant information. Too often these children are thought to be mildly mentally retarded or, at best, antisocial.

In the case of hearing loss similar to that depicted in Figure 5, the child has a marked hearing loss plus no measurable hearing in most of the crucial frequencies for spoken communication. As a result this youngster is listening through a very critical filter, one that allows only low frequency sounds (e.g., some vowels, few consonants, much environmental noise) to pass. Even with an appropriate hearing aid, such a youngster is obviously handicapped. The prognosis for the development of oral communication skills and ability to benefit from mainstream education is guarded.

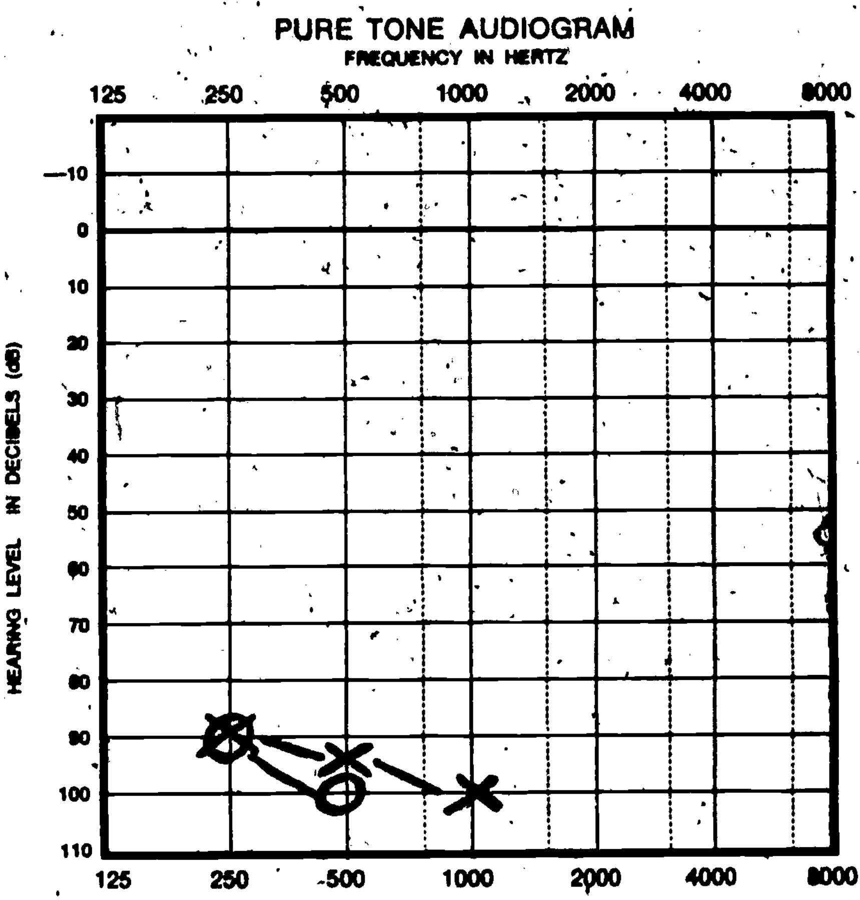

Figure 5. A pure tone configuration.

Stability of Loss As with the other factors noted in the preceding discussion of the degree of loss, the stability of a child's hearing is also important. Although there is no way to predict with absolute certainty which children will have progressive hearing loss, there are certain conditions with which progressive hearing loss tends to be associated. Among the nonhereditary causes of progressive loss, congenital rubella is the most obvious. Hereditary forms of hearing impairment constitute the majority of cases of progressive hearing loss.

In cases in which there is a rapid decrease in the child's hearing sensitivity, alterations may be necessary in the educational approach to the child. In situations in which a child's behavior or academic performance changes, the possibility of an increase in hearing loss should be considered. Children who have progressive hearing loss need continuing emotional support around this issue as do those children with sudden onset hearing loss.

Kind of Loss In addition to the information regarding the degree, configuration, and stability of a child's hearing loss, members of the child's team need to know something about the *kind* of hearing loss. There are three basic types of peripheral hearing loss that reflect the place in the ear in which a deficit occurs. These are referred to as *conductive, sensorineural,* and *mixed* hearing loss. Determination of the type of hearing loss is gained through the relationship between air conduction and bone conduction pure tone audiometry as well as by the use of impedance audiometry.

Conductive hearing loss is generally caused by some obstruction, failure to develop, or destruction of the outer (auricle and ear canal) and/or middle ear (tympanic membrane, ossicles, and Eustachian tube) structures. Frequent causes of conductive hearing loss in children include: foreign bodies or cerumen in the ear canal, allergic reactions or infections of the ear canal, perforations in the tympanic membrane, otitis media (middle ear infection, which may be serous or purulent, acute or chronic), cholesteatomas (tumor-like growth that may invade the middle ear spaces), mastoiditis, and trauma to the ear resulting in problems such as breakage or disarticulation of the ossicles. In addition, children with several types of hereditary hearing impairment may have an absence or partial growth of any of the outer or middle ear structures. The degree of conductive loss caused by any of these problems will vary according to the extent of involvement of the structures and the exact location of the problem. Generally stated, problems involving only the outer ear result in less hearing loss than those involving the middle ear. Conductive hearing loss alone, unlike sensorineural hearing loss, does not result in a hearing loss greater than the moderate degree.

Sensorineural hearing loss results from some aberration in the delicate inner ear structure of the cochlea. This may be caused by a failure to develop or destruction of one or several of the parts of the cochlea. The etiology most often associated with sensorineural hearing loss in children is hereditary in nature. These genetically related problems may result in a failure of the parts of the cochlea to develop in utero or result in a destruction of the cochlea after birth, leading to an onset of hearing loss as late as adolescence. Other frequent causes of sensorineural hearing loss include: prenatal viruses, including rubella, toxoplasmosis, and cytomegalo; postnatal viruses, particularly meningitis, encephalitis, mumps, and measles; skull fracture involving the cochlea; ototoxic drugs (kanamycin, neomycin, streptomycin, and gentomycin, among others) administered prenatally or directly to the child; perinatal problems (low birth weight, anoxia, marked bilirubin elevation); and noise trauma. The degree of sensorineural hearing loss associated with any of these etiologies may vary from mild to profound.

Mixed hearing loss results from the coexistence of problems in the outer/middle and inner ear. The most frequent example of this is the mixed hearing loss seen in children with chronic middle ear infection superimposed on an underlying sensorineural hearing loss. The degree of hearing loss involved in such cases usually is additive, the basic sensorineural loss plus the conductive component.

The type of hearing impairment is important to consider because of the ramifications it has for the child's needs. As has already been stated, children with conductive hearing losses tend to have less extensive hearing loss. Furthermore, conductive loss does not have the associated distortion that is present in many sensorineural losses. Rather, once the sound is made loud enough the child with a conductive loss is generally able to benefit from it fully. Consequently, children with conductive hearing loss, uncomplicated by other handicapping conditions, tend to function well in mainstream educational settings. Although children with sensorineural loss may function equally well, those in the severe and profound loss categories will obviously need special support.

Discrimination Abilities In addition to knowing the child's degree and type of hearing loss, important information needs to be obtained relative to his auditory discrimination abilities. This information is generally obtained clinically by presenting a list of words at an average conversational speech level or at a higher level to compensate for the decreased sensitivity; the child then either repeats the test word or points to the correct picture. The purpose of such testing is to answer the question: When speech is made sufficiently loud, how much does the child understand through audition alone? Formal test results are reported in terms of percentage correct. Interpretation of scores usually follows this profile:

100–90	Excellent speech discrimination
88–80	Good speech discrimination
78–70	Fair speech discrimination
68–60	Poor speech discrimination
58 and below	Markedly reduced speech discrimination

In circumstances in which the child's chronological age, developmental age, or degree of hearing loss precludes formal measurement, informal methods can be used. Typically these would include observations of how well the child imitates sounds or speech when the speaker is not visible.

The child's discrimination ability is perhaps the most significant aspect of his hearing profile. If one had to select any one predictor of ability to benefit and participate in mainstream spoken communication, it would be the discrimination ability. As noted before, discrimination may have very different discrimination abilities; therefore, it is important plete understanding through hearing alone. It should be pointed out that the degree of hearing loss is not a definite predictor of discrimination ability. Two children with almost exactly the same pure tone audiogram may have very different discrimination abilities; therefore, it is important to have both pure tone and speech discrimination information.

Speech discrimination abilities must be considered for educational placement. Too often, grouping is based on pure tone configuration and discrimination is not considered. Discrimination ability should also be considered when estimates are made of the child's potential in terms of speech development. Also, when counseling is conducted with a hearing-impaired child, the practitioner should be cognizant of the child's discrimination ability. It must be recognized that, in many cases, even where the child is a consistent hearing-aid user, understanding of speech used in counseling is minimal. Maximal use, then, must be made of visual, gestural, and contextual cues.

Central Auditory Problems Children may have central auditory problems in addition to the peripheral hearing loss and/or discrimination problems just described. Although it is impossible to present a complete discussion of this subject here, it is important to note the possibility. Central auditory problems involve higher level cortical functions. From a functional standpoint, peripherally hearing-impaired children who also have central auditory involvement exhibit dysfunction in auditory reception, memory, and association. Such dysfunctions frequently coexist with short attention span for visual and auditory stimuli, visual-motor disturbances, and inconsistent use of audition, even after appropriate amplification and auditory training. When such characteristics are observed, alteration in the hearing-impaired child's education and a communication treatment plan may be necessary.

Amplification In completing the profile of the hearing-impaired child's use of audition, it is important to consider his use of amplification. The substantial majority of hearing-impaired children, including those of all degrees of hearing impairment, uses hearing aids from the age at which the loss is confirmed (as young as three months) throughout adulthood. In the case of children with profound hearing impairment, with little or no measurable hearing in the spoken communication range, amplification may be discontinued once parental and educational pressures no longer exist.

The purpose of a hearing aid is to amplify sound. Hearing aids do not necessarily make speech more intelligible. That is, with a few exceptions involving sloping configurations, a child's understanding of speech with an aid will be only as good as it is without the aid, albeit at a lower sensitivity level. It must be stated again that simply because a child is using a hearing aid does not imply understanding of everything through hearing.

Data that add to the knowledge of a given child's aided hearing profile include:

1. *Age at which the child began to use amplification.* Generally, the earlier a child is provided appropriate amplification, the better his educational, communicative, and psychosocial prognosis.
2. *Type of hearing aid used.* Hearing aids are designed in two general styles: body worn (in which the body of the aid is secured on the body with a cord leading to a receiver in the ear) and ear level (complete aid is located behind the ear with sound delivered via tubing to the ear). Aids may deliver sound to the ear canal (air conduction) or directly to the inner ear via vibration of skull (bone conduction).
3. *Monaural, Y-cord, or binaural fitting.* Children may be fitted with one complete hearing aid (monaural); with one aid with two receivers, one for each ear (Y-cord); or with two separate hearing aids (binaural).
4. *Benefits derived from hearing aid.* Note should be made of the child's success in utilizing amplification. Obviously if his aided sensitivity is near normal and his discrimination is good, i.e., better than 80%, the benefits are apparent. However, if aided hearing sensitivity is in the severe hearing loss category with no measurable discrimination, the child does not derive the same benefit.

When the hearing-impaired child is to be evaluated or treated, it is important to look at factors in addition to those related to auditory status discussed above. Specifically attention must be given to information regarding the child's communication development and education profile and family constellation.

COMMUNICATION DEVELOPMENT, EDUCATION PROFILE, AND FAMILY PROFILE

As noted in the opening discussion, communication skills are acquired, in the main, through the visual and auditory modalities and, to a lesser extent, through tactile input. Any alteration in the visual, auditory, or tactile systems may result in decreased communication potential. This is true whether the alteration is attributable to an aberrant peripheral or central system. Although it is impossible to present a complete discussion of the intriguing, complex interaction of factors that comprise communication, focus will center briefly on language skills, speech intelligibility skills, methods of communication used by the hearing impaired, and education profile.

Receptive Language

Language may be divided into receptive and expressive for discussion purposes. Receptive language, simply stated, refers to the child's ability to detect, perceive, associate, organize, and integrate incoming auditory, visual, and tactile information into a meaningful whole. Obviously the child with a peripheral hearing loss may not detect the incoming auditory signal even with amplification. This varies according to the degree of hearing loss and the level of the signal. Not so obvious is the fact that in a number of the hearing impaired there may also be central auditory deficits. In central auditory processing deficits the child exhibits difficulty in auditory short-term and/or long-term memory, perception, association, organization, and integration. This is in addition to the hearing sensitivity and discrimination problems that also exist. For example, the child with a peripheral hearing loss alone may have trouble detecting the telephone ring if it is below his aided sensitivity level. In contrast, the child with a peripheral and central auditory dysfunction may have trouble associating the telephone ring (once it is loud enough) with the object (telephone); or, at a higher level, may have difficulty attaching meaning to the label "telephone." When such deficits occur, the child often has difficulty benefiting from any method of communication or instruction that relies solely on oral-aural input.

The visual aspect of receptive language must also be stressed. As is the case with audition, children may have peripheral vision deficits or may have central visual deficits including short-term and/or long-term memory; perception; association, organization, and integration. Because of the peripheral hearing loss and the central hearing loss that may be present, the hearing-impaired child is heavily dependent on the visual channel for receptive language. This is true for children who use speechreading (formerly called lipreading) as well as for those who use sign language and fingerspelling. Unfortunately recent studies measuring visual defects have found about half of the deaf children tested had visual problems (Suchman, 1967; Lauson and Myklebust, 1970; Pollard and Neumaier, 1974). In addition to these problems, Usher's syndrome, a type of retinitis pigmentosa involving congenital deafness, progressive blindness, and central nervous system degeneration, has also been described (Vernon, 1969). It has been estimated that 5–10% of the genetically deaf population have Usher's syndrome (Grinker, 1969; Vernon, 1969; Rainer, Altshuler, and Kallman, 1963). Among these persons, many become deaf and blind by early adulthood.

Speechreading Speechreading deserves special mention as it is the chief visual input for children who communicate or learn in an oral-aural framework. Speechreading refers to the activities involved in watching the speaker's face, the lips in particular, and general body language in

order to facilitate reception of spoken language. Streng (1958) summarized speechreading succinctly, noting that the child derives meaning from partial cues observed as the speaker's articulators pass rapidly from sound to sound, some of which are invisible. Herein lies the dilemma of even the most precocious speechreader. Only 33% of *isolated*, English speech sounds are readily visible (Hardy, 1970), and this drops to approximately 20% for rapid, ongoing speech! In addition to the low visibility of many speech sounds, one finds wide variance in individual speechreading ability. Jeffers (1967) ascribes this variance to three abilities: perceptual (ability to rapidly perceive elements or speech sounds and gain additional information from speaker's facial cues), synthetic (ability to identify essence of words and phrases into meaningful units), and flexibility (ability to reorder initial perceptions in light of ongoing ones). Thus, a given hearing-impaired child may not be benefiting from speechreading to the degree that the casual observer might predict. Interestingly, Johnson (1976) showed that, among young adult students attending the National Technical Institute for the Deaf, Rochester Institute of Technology, only 7% ($n = 243$) achieved a speechreading rating equivalent to 75–100% correct identification of a message when only visual cues (filmed sentence list) were provided. The percentage achieving this competence level rose to only 37% even when sound was used along with the visual presentation.

The final point that warrants attention is the myth surrounding an innate endowment deaf persons supposedly have to be superior speechreaders. There is no research evidence or clinical observation to support this hypothesis. Indeed, it can only be surmised that, to the degree a given child—hearing impaired or not—has the attributes described above, his speechreading skills will develop.

Expressive Language

Expressive language refers to the ability to translate the received message into a meaningful response (spoken, written, gestural, signed, etc.). Simply stated, this involves the use of a known vocabulary, grammar, and syntax. Many hearing-impaired and deaf individuals do not develop skills in these areas that are commensurate with their expected potential. Among 245 deaf students entering the National Technical Institute for the Deaf in 1975, only 5% were judged (as assessed by the *NTID Test of Written Language*) to have skills that enabled them to express a complete message in acceptable *written* English (Johnson, 1976). This is in contrast to 60% who were judged to have skills that, at best, could only express one-half of the content of a written message in acceptable English (Johnson, 1976).

Without reiterating the factors, discussed earlier, that influence a given child's acquisition of receptive and expressive language skill should be stressed that the child seen for medical, educational, and/or psychosocial services may not have age-appropriate skills. Thus, it could be catastrophic for a deaf person to be presented an informed consent form written at several grade levels above his abilities. Equally serious would be a psychologist's attempt to use either intellectual or projective test materials on an inappropriate level. Indeed, as is discussed later, one can imagine trying to do language-based psychotherapy with a youngster whose language is markedly delayed because of deafness!

Speech Intelligibility

Speech intelligibility is an important factor to consider when assessing the hearing impaired. In our society speech is the main mode of communication, and, to the degree that the child's speech is unintelligible, he suffers. Speech intelligibility is based on a complex interaction or articulation, rate and rhythm of speaking, and voice quality. Most important, speech intelligibility is controlled by a feedback system based largely on auditory input with some visual and kinesthetic contribution. Because of the effect of the hearing loss, the feedback system is altered and speech is thereby distorted, despite the growing technology involving visual and tactile speech aids for the deaf.

The intelligibility of a given child's speech is determined by a myriad of variables. The most important are probably his degree of hearing loss, configuration of loss, and age of onset (a person who becomes deafened in adolescence will probably maintain good speech throughout life). Also one must consider the child's early speech training; motivation (of child and parents) to establish and continue to use speech, and educational placement which reinforces the use of speech. Once the child begins to use speech, the reaction of listeners (parent, sibling, peer, grocery store clerk, etc.) influences his use of speech.

It is of vital importance to the child that professionals working with him be sensitive to the child's intelligibility and desire to use speech as a means of communication. Many hearing-impaired and deaf people are alienated by a society in which everyone corrects their speech, thereby failing to focus on the need and intent to *communicate*, rather than only to speak.

For the hearing professional who works with a hearing-impaired person, it is important to establish at the outset how well the client can be understood. Although there are no standardized evaluation tools, there have been attempts to write behavioral criteria to describe a client's speech. The following is the behavioral description component of such an instrument developed at the National Technical Institute for the Deaf:

> Listener understands the complete message.
> Listener understands most of the content of the message.

> Listener understands, with difficulty, about half of the message. (Intelligibility may improve after a listening period.)
> Listener understands little of the content of the message, but does understand a few isolated words or phrases.
> Listener cannot understand the message.
>
> (Johnson, 1976, p. 421)

Use of this type of judgment scale may help the clinician make the decision to accept or continue a relationship. It is also helpful in deciding to use an interpreter, either one who signs or one who is more skilled in understanding deaf speech. This scale should also assist the clinician relative to realistic expectations for the client in social, educational, or vocational environments.

Methods of Communication Used by the Hearing Impaired

Before concluding the discussion of communication skills, note should be made of the various methods of communication and instruction used by and with the hearing impaired and deaf. Figure 6 summarizes these methodologies along a continuum from auditory alone to visual alone.

AUDITORY	AUDITORY AND VISUAL	VISUAL
Unisensory (Use of residual hearing alone—child is not encouraged to make use of any cues other than auditory ones during habilitation)	*Oral-Aural* (Child is encouraged to use residual hearing, speechreading, and natural gestures and context in all communicative situations)	*Manual Communication* (Child uses hand signs and finger spelling without the use of residual hearing and, often times, without the use of speechreading cues.)
	Cued Speech (In addition to aspects noted in the oral-aural system, child is taught with, and learns to use 8 hand configurations which add more meaning to the visual configurations of speechreading.)	*Total Communication* (In addition to aspects noted in the oral-aural system, child is taught with, and learns to use, hand signs and finger-spelling which reduce the ambiguity of speechreading and the distortion of listening through a distorted auditory system.)

Figure 6. Summary of methods of communication and instruction. (From Cox, B. P., and Blane, K. F. 1978. Hearing loss in children. Curr. Pediatr. Ther. 8. (S. S. Gellis and B. M. Kagan, eds. Reprinted by permission.)

These descriptions are self-explanatory, with one exception. There are several forms of sign language ranging from sign to what may be referred to as Manual English. Sign, also referred to as American Sign Language (ASL) or Ameslan, is historically related to nineteenth century French Sign and does not have a one-to-one relationship to spoken English. The spoken question, "Have you been to Baltimore?" would be signed, "Touch Finish Baltimore you Question." In contrast, another form of sign language attempts to implicate the spoken message through showing such markers as plurals, past tense, word order, etc. This is referred to as Manual English or Signed English.

Without discussing these methodologies further, note should be made that there is a wide range of communication and education methodologies used by the hearing impaired and deaf. Obviously the child's routine and preferred method of communication must be considered.

Education Profile

Education of hearing-impaired children may be viewed along a continuum of total integration with hearing children versus no integration with hearing children, as well as day classes versus residential classes. When a hearing-impaired child is seen, it is important to consider his educational background to that point in time. This is necessary because the prior educational placement and the age at which education began affect the child. Examples of this include the philosophy of communication used with the child as well as the relative emphasis placed on developing academic and social skills. Perhaps the most obvious example is the characteristic social profile of children educated in residential schools for the deaf. (Further discussion of this appears later in this chapter.) Finally, relative to the education profile, it must be kept in mind that a substantial portion of the hearing impaired and deaf do not have age-appropriate academic skills. Indeed, among the profoundly hearing impaired, reading and writing skills, as measured by tests whose standardization samples did not include the deaf, may not exceed primary levels (DiFrancesca, 1972). Specifically data showed that the average deaf person had reading skills like those of a hearing fourth grader. Furthermore, it was concluded that less than 10% read at or higher than the seventh-grade level (Bolton, 1976).

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Family Profile

A discussion of variables that affect the hearing-impaired child's development would not be complete without at least an allusion to the child's family background. In addition to variables related to any child's family background, with the hearing impaired one must consider whether the child comes from hearing-impaired or deaf parents, also whether the parents are first-generation hearing impaired or the result of a multigenerational background.

From a statistical standpoint the majority of parents of the hearing impaired has normal hearing. Data from the National Census of the Deaf Population (Schein and Delk, 1974) revealed that both parents had normal hearing in 91.7% of the cases surveyed, 3.2% of the cases involved two hearing-impaired parents, and 0.8% of the cases had one hearing-impaired parent.

Knowledge of this aspect of the child's background assists in understanding his familial orientation toward hearing impairment. It is often seen that children who have hearing-impaired parents have a better adjustment to the problem and, oftentimes, have much better adaptive behavior skills. Note is also made of the clinical observation that children whose parents use some form of signed English have better language skills than those children from hearing parents. Even in situations in which the child's parents use the least spoken English-related sign, the children have better language skills than children from normal hearing parents.

Testing the Difficult-to-Test Child

The judgments the clinician makes on children's hearing abilities often necessarily involve a differential evaluation. In the presence of other disorders the child's behavior or his level of functioning may be so erratic that standard techniques of audiometry cannot be used. In order to apply appropriate tests for hearing, the clinician must be able to recognize the dysfunction that is present and to adjust the tests to it. The classical disorders that are to be differentiated are mental retardation, cerebral dysfunction, and autism (Myklebust, 1954). More than one of these may be present in one child. If the clinician has been trained in evaluating any of these disorders, he may also test the child's functioning in that specific area as well as in the hearing area. But at the very least he has the responsibility of recognizing the disorder that exists. He must be able to apply the proper tests for hearing and to make referral for diagnosis and treatment of the other disorder.

In discussing the entities which must be recognized, it is necessary to reiterate an important fact—that neither cerebral dysfunction nor central auditory disorders nor mental retardation nor autism result, in themselves, in a decrease of auditory acuity as represented by the audiogram. The responses which can be elicited certainly require more ingenuity to obtain. But when credible responses reveal reduced hearing for pure tones and speech, a peripheral hearing loss is present, in addition to any central disorder that may exist (Goldstein et al., 1972; Kleffner, 1973). The clinical audiologist's task is to choose the appropriate test procedures that will reveal the presence or absence of peripheral hearing loss. It is not always a simple task to make this distinction.

To guide the clinician in fulfilling his

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charge, we will attempt to describe the salient features of the various disorders and to suggest appropriate tests that may be chosen.

Mental Retardation

One principle should be kept in mind when dealing with the mentally retarded child. If generalized developmental retardation is his only disorder, he will behave in all areas at the level of his mental age. This principle will hold up in all cases except those in which autistic behavior or cerebral dysfunction is superimposed upon the general retardation. Then the testing problem is further compounded, but is not insoluble.

0 to 5 Years. Infancy is an ideal time to test the retarded child's hearing. He has not yet developed the social behaviorisms, the self-stimulating activities, or the inattention patterns of the older retardate. In the first few months of life he sleeps a great deal, giving an opportunity for good observations of his responses in a sound room. Until 4 months the quality of his auditory responses cannot be distinguished from those of the normal child. It must be remembered that until 4 months of age we still apply the same criteria of hearing responses that are used at birth. Only after 4 months can we depend on searching activity to be present. So the hearing testing for 0 to 4 months will follow the procedures described for the normal child at that age, and the audiologist may not be able even to recognize the retardation. He can, however, make the observations suggested of the infant's developmental landmarks. Any impression of a deviation from these norms should be recorded and followed up with referral for developmental testing.

After 4 months we begin to identify the retardate through his auditory behavior as well as through the developmental landmarks present. If by 5 months he is not making even a partial head-turn toward the sounds, determine whether he can reach for and hold objects, and if he laughs aloud. He may not even be holding his head erect, or be able to follow a moving object—behavior which would place him below the 3-month level of functioning. In this case one can expect only the auditory responses that are listed for the child under 4 months old. If he then responds to all acoustic stimuli like a child under 3 months old, his hearing is judged to be normal.

The same observations of auditory behavior and developmental behavior should be made of the older child, referring to the developmental landmarks. If all behaviors are consistent for a certain age level, and the auditory indices are within the normal limits listed for that age level, the hearing level is judged to be normal. For example, if a 15-month-old child's behavioral landmarks are at the 8-month level, a speech awareness level of 15 to 20 dB and pure tone awareness of 45 to 55 dB are considered to be normal hearing.

If previous developmental scales or IQ test results are available, the clinician will have no difficulty in correcting the auditory test results for mental age. It is when the intellectual status is unknown that the clinician must apply his own observations of developmental landmarks. If these are not consistent at a certain age level, another disorder should be suspected. The 5-year-old who has normal motor coordination and good personal-social adjustment for his age, yet is unable to identify all of a group of familiar toys should be evaluated further, providing that his hearing test is normal.

The severely mentally retarded child with random motor movements is the most difficult to test. One must apply the kinds of behavioral observations that are made for young infants, yet the noises of his movements and the inattention prevent responses to soft sounds. Sometimes the only observations that can be made are of startle responses to 65-dB speech. A good startle response indicates normal range of hearing, or at the least rules out everything but a mild sensorineural loss. If behavior is too hyperactive even for this test, mild sedation can be ordered by a physician. Even a little reduction of the hyperactivity may permit both the observations of responses in the sound room and the use of the acoustic impedance meter.

However, the behavioral responses previously described for infants (response to 45-dB speech level, and startle to 65-dB speech) have been shown to yield a high percentage of successes in severely mentally retarded children. Knight (1973) studied 100 mentally retarded institutionalized students from 2 to 35 years of age, and applied to them this technique and the related criteria, as suggested by the authors. The functioning levels of the students were classified predominantly as severe to profound retardation levels. Of these, 25 were designated as untestable for mental age. Knight also applied tympanometry tests to this population. The average test time for the subjective observations was 3 min 10 sec. Impedance testing was done in an average time of 2 min per ear.

Among the audiologic and otologic studies on the prevalence of hearing loss and ear disease in institutions for mental retardation, the percentages of loss range from about 10% to 45% or greater. Lloyd (1970) has presented a review of the literature on the audiologic aspects of mental retardation in which a summary of the various reported incidences is given. Each percentage is affected by the chronologic and mental age of the population tested, by the testing procedures used, and by the criteria for failure which are applied. Thus, it is difficult to estimate an average incidence of hearing loss in this group. Lloyd's excellent review article is recommended to all who seek to study these problems in detail.

The objection may be voiced that 45 dB is too high a screening level and that it may miss milder hearing loss. But if we estimate the intellectual functioning level of these severe retardates as equivalent to the first 4 months of infancy, then response to a 45-dB speech signal is the normal threshold level for this group. True, some with mild sensorineural loss and recruitment may respond at the 45-dB level but these would be very rare. We feel that at the present time the procedure of behavioral responses plus tympanometry offers the most practical means of testing this group.

5 to 16 Years. The very severely retarded in this age group can be tested only in the way described by Knight (1973). However, a large number of these children will have a level of functioning that permits other tests to be used. If their mental age is over 2 years, the tests described for children of that age can be applied. Play-conditioning techniques often are successful with the older retarded child when standard techniques fail.

A period of pretest observation will reveal what can be expected of the child. Present him with toys and see how familiar he is with them. Can he hand them to you on a command? If he recognizes most of the toys and can give them to you on command, he is probably able to give both a speech reception threshold and play-conditioned thresholds. If not, the routine observations of behavioral responses can be made.

When precise thresholds are desired in such a borderline functioning child, the techniques of visual reinforcement audiometry and tangible reinforcement operant conditioning audiometry described under "Other Techniques of Behavioral Testing" above can be employed.

The Centrally Disordered Child

The suggested techniques for testing the brain-damaged child rest on two basic assumptions.

1. That any reduction in auditory acuity for pure tones, speech, or other signals is caused by lesions in the peripheral auditory system, not in the midbrain or higher pathways (see our discussion in Chapter 4 on "Disorders in Auditory Learning"). No real evidence has ever been presented that lesions central to the cochlear nuclei result in reduction in auditory sensitivity.

2. That only in the extremely severe centrally damaged child with gross motoric involvement will we see the complete absence of all of the four basic auditory reflexes: head-turn, eye-blink, startle response, and arousal from sleep.

The first rule in testing such a child is to determine his level of behavior. Pretesting will show what he can and cannot do. Sit and talk quietly and play with him in the sound room. Can he attend for any length of time to anything that you say or do? Can he give his name, age, or other appropriate information? Can he hand you toys or repeat words on request? In the case of a very young child, as well as an older one, is his eye contact steady and does it have integrity? Can he sit still for any length of time? Is he hyperactive and does he throw things around?

The child who has auditory perceptual dysfunction may be able to sit quietly and attend to visual stimuli but not be able to repeat words or to pick up objects on command. Such a child may, however, be perfectly able to do play-conditioned audiometry with pure tones and speech signals. Do not give up on formal testing unless it is proved to be ineffective.

If it is evident that formal testing techniques will not be successful, it is best to start at the lowest level of testing procedure, as has been described for the infant from 4 months on. The entire battery of observations should be made, from localization procedures to startle reactions. Remember that this child may be inconsistent in his responses to various stimuli, and at various times. A clear-cut response to one stimulus at 5 to 10 dB can be relied upon, even when responses to other stimuli cannot be seen at that level. The startle or the eye-blink response will always confirm the observation of some reactions to soft levels.

We have stated that it is rare for all of the auditory reflexes to be absent in a child. The reflexes are mediated at the level of the brain stem and are usually intact in the presence of higher cortical dysfunction. Auditory reflexes only tell us about the integrity of the peripheral auditory system through the brain stem. They tell us nothing about the higher orders of perception and integration.

In order to demonstrate the relationships between the peripheral, midbrain, and cortical auditory functions, and the levels of the auditory reflexes, Table 5.3 has been prepared.

From this table it can be seen that only in the presence of degeneration of the brain stem at the olivary complex can the absence of the head-turn and eye-blink reflexes be expected. Even then, the startle reflex, mediated at a low brain stem level, should be active, unless there is widespread motoric damage that prevents the muscular system from coordinating. Even in severe cases of mental retardation, these reflexes are evident, as shown by Knight (1973). Although the startle or eye-blink reflexes to a 65-dB (SL) signal do not eliminate the presence of a mild sensorineural loss, one may be sure that the loss is not of a degree that would produce the severe degree of symptoms found in a child whose only testable avenue is the reflex. Often the audiologist's task is to identify the primary disorder: a hearing loss may be only secondary to the major problem. The startle reflexes will enable him to do so. When reporting on such a case, the audiologist can say with confidence: "Hearing loss is not the primary problem in this child's communication dysfunction." Where the clinician is equipped to apply tests for central auditory dysfunction, he will be able to include the type and degree of the disorder.

The Autistic-Like Child

It is seldom that one sees the purely autistic-like child; but when one does, the bizarre behavior he displays can be recognized almost immediately: refusal to meet any person's eye gaze, disregard of all human speech stimuli, long term fixation on some object, and refusal of physical contact with humans. He will consistently fail to attend to any speech stimulus, yet he will attend to some other acoustic signals. One such child will look for pure tone signals at low intensities, another will search for a cat "meow" at soft levels, and another will localize a white or a complex noise signal at normal levels. All will startle or eye-blink to 65-dB voice in a structured sound room situation if hearing is normal. All the stimuli described for testing from birth on should be tried. Something is guaranteed to produce a response if the hearing is normal, even if it is only a startle reaction.

The real testing problem arises when autistic behavior is superimposed on central dysfunction. Indeed, one wonders whether all brain damage is not accompanied by some degree of autistic behavior. The symptoms are often so similar that they defy separation. In addition to the behavior described above, there may be the heightened activity and lashing out at humans. If such a child is difficult for the neurologist and psychiatrist to understand, so he is for the audiologist.

The testing procedures described for mental retardation and for central nervous system disorders are applicable here. Keep in mind the fact that autistic symptoms are sometimes found in the deaf child, so do not let anything mislead you in the search for peripheral hearing loss. The audiologist's task in identifying the hearing level is unique, and no other discipline can lend guidance here. One must simply remember that the auditory reflexes cannot be suppressed even in an autistic child when the properly structured sound room

Table 5.3. Relationships between Reflexes and Auditory Responses

Reflexes and Other Auditory Responses	Level in CNS	Auditory Dysfunction at This Level	Tests which Identify the Dysfunction
Startle reflex	Pontomedullary junction and below	None	Lack of response to 65 dB speech or noise (85 dB SPL) in quiet sound room.
Acoustic reflex (stapedius)	Pontomedullary junction or below	Amplitude regulation (mild tolerance problem)	Intra-aural reflex test with impedance meter (Anderson, 1969)
Head-turn reflex (perinatal period) Orientation-localization (4 mo. or older)	Lower pons accessory Olivary nuclei but dependent on temporal auditory cortex in man	1. Binaural integration disorder 2. Inability to localize sound source 3. Time integration problems for speech	1. Frequency fusion test in dichotic mode (Matzker, 1959) 2. Localization tests (Deatherage and Hirsh, 1959; Matzkker, 1959) 3. Interrupted speech test (Bocca and Calearo, 1963; Berlin and Lowe, 1972)
Eye-blink reflex (auropalpebral)	Pons	Same as above	Same as above
Higher level functions: Discrimination of parameters of speech signal Auditory memory Auditory closure Auditory sequencing	Secondary auditory area of temporal lobe: association areas of temporal lobe (superior temporal gyrus)	1, 2, 3. Auditory disorders 4. Auditory sequencing disorders	2. Dichotic speech tests (Kimura, 1961; Berlin and Lowe, 1972) 2, 3, 4. Identification of order of presentation signals (Efron 1963; Jerger et al., 1969)

condition prevails. If one is lucky, a stimulus may be found that will confirm perfectly normal hearing, aside from the reflexes. Acoustic impedance tests may provide valuable information.

Freedman and Kaplan (1967) list the four chief identifying features of autistic-like children.

1. They exhibit aloneness, and will occupy themselves for long periods of time without attention to anyone.
2. Some fail to use any language or communication; others may show precocious speech with scholarly words that have no real meaning to the child.
3. They show an obsessive desire for the maintenance of sameness. Fearing new patterns, they endlessly reiterate old patterns, almost as rituals.
4. They have a fascination for objects in place of interpersonal relationships, and will occupy themselves endlessly with a familiar object.

The autistic-like child is different from the mentally retarded or the brain-damaged child in that he usually has a high intellectual capacity, as indicated in IQ tests when they can be performed.

One form of autistic-like behavior is demonstrated by extreme anxiety at being separated from mother. Freedman and Kaplan label this behavior as a "symbiotic psychosis" indication. When such behavior is evident, the clinician can overcome it by keeping the child close to the mother, on her lap if he is small enough or sitting next to her during the test situation.

The Deaf-Blind Child

Except for the eye-ear syndromes described in the Appendix, most of the etiologies for deafness-combined-with-blindness fall at the present time into the maternal rubella category. These cases are most often confounded by central nervous system damage which makes it difficult to structure the testing situation properly. The rare cases of meningitis resulting in deafness and blindness may also have associated neurologic and cognitive dysfunction. Not all are as intact centrally as Helen Keller, nor do they all have a full 2 years of auditory language experience.

In severe cases of multiple involvements, we have found it most expedient to rely again on the auditory reflexes, on orientation responses, and on quieting responses. In the absence of speech and language, one must apply the tests as for the infant proceeding to the upper limits of the auditory abilities present. As in the infant, the absence of auditory reflexes is the confirmatory evidence of a peripheral hearing loss. Reliance on the absence (or presence) of this response will rarely lead one astray. If a doubt remains, diagnostic therapy with a trial hearing aid will reveal the true condition in a short time. One rule we have been adamant about: the deaf-blind child should always be fitted with true binaural amplification, even if the hearing loss appears asymmetrical. A careful frequency-gain balancing will compensate for the differences. The blind child needs every binaural clue he can get to function at his best level and to locomote adequately.

It is the audiologist's responsibility to make the decision about the blind child's hearing abilities. It must, perforce, be a bold decision, for any equivocation is not useful to the child. The conservative hearing aid trial with careful observations by all concerned during a diagnostic therapy period will not hurt the child. Hesitance may deprive him of critical time for learning auditory skills and thus do him a disservice.

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Impedance Audiometry with the Mentally Retarded

The evaluation of hearing in the mentally retarded patient presents a most difficult task. The problems are so vast that an entire book devoted to audiometry for the retarded has recently been published (Fulton and Lloyd, 1969). Many retarded children do not condition well to pure tone play audiometry. They may not have sufficient maturation to perform auditory localization tasks or may lack consistent startle response. They may be too hyperactive to cooperate or too lethargic to be aware of changes in the environment (Fig. 6.9). Difficult problems are commonly encountered with other physiologic tests in patients with questionable cortical function. Incidence studies have established that there is a higher incidence of hearing impairment among the retarded than among the nonretarded (Lloyd. 1970; Rittmanic, 1971). Yet the retarded are excluded from traditionally recommended screening techniques because of their limited capacity for responding.

The evaluation of hearing in the mentally retarded population presents a most difficult task for the audiologist. They may not have sufficient neurological maturation to perform reflexive auditory awareness or localization tasks. They may be too hyperactive to cooperate or too lethargic to respond. Brain damage in these children often makes physiological auditory responses unreliable. Yet, accurate assessment of hearing function or middle ear status of these children may be critical for educational placement or medical/surgical treatment. Sometimes even a tympanogram or acoustic reflex measure can be a valuable result since the clinician can then make reasonably accurate assumptions regarding the presence or absence of middle ear problems and the need for medical referral. Impedance audiometry is also valuable in the evaluation of the severely mentally retarded "mattress care" children, who are virtually impossible to test with any other testing procedure. These institutionalized youngsters are certainly at high risk for developing chronic middle ear disease.

Fig. 6.9. Impedance testing can be accomplished with difficult-to-test patients as shown above with this mentally retarded rubella youngster.

The earliest acoustic impedance studies with retarded children were published by Lamb and Norris (1969, 1970). They compared acoustic reflex thresholds in 15 mentally retarded children and 15 children of normal intelligence. All subjects had normal hearing, and the acoustic reflex thresholds for both groups were at similar levels. Although it was reported that considerable variability in reflex thresholds was noted among the mentally retarded subjects, the authors note that the retarded subjects were easily tested, and they recommended that the impedance technique should be included as a part of the audiometric test battery. Fulton and Lamb (1972) reported normative results from a retarded population with tympanometry, and demonstrated that tympanometry can be of use to help differentiate etiology of hearing loss.

Borus (1972) used impedance measurements in a group of 23 young retarded children to establish the value of impedance audiometry in determining the nature of hearing loss. She concluded that impedance measurements "offer great promise" in quickly determining normal hearing in a retarded, difficult-to-test child, identifying cases where there is clearly a conductive component, and singling out retarded children who do have some auditory anomaly requiring further evaluation.

A rather comprehensive report on tympanometry in "developmentally disturbed" children was recently published by Bashore (1976). Developmentally disturbed children are described as youngsters with mental deficiency or severe physical disabilities who are not testable under Pennsylvania mandate which requires pure tone evaluation. Some 1.4 million children are given annual pure tone hearing tests in Pennsylvania and an estimated 50,000 are classified as "developmentally disabled." The Bashore study reported otoscopic findings and tympanometric results in 340 such children composed of 308 trainable retardeds, 31 physically handicapped, and 1 profound mental retardate. The study was conducted to evaluate six tympanometry failure criteria: (1) no well defined maximum compliance peaks, (2) compliance greater than normal, (3) maximum compliance worse than −100 mm H_2O, (4) less than normal compliance, (5) inability to secure and maintain seal, and (6) untestable children.

Bashore found 97% of the population to be testable, and only 5 children could not be tested because of too much crying and the ears of 5 children could not be sealed with an air-tight probe cuff. An agreement of only 62% was found between otoscopy and tympanometry, although it should be pointed out that the article specifically stated that the "otologic examination did not have the benefit of a pneumatic otoscope," and tympanograms were considered abnormal when middle ear pressures were worse than −100 mm H_2O—a rather rigid failure criteria. Almost certainly better correlation would have been achieved between tympanometry and otoscopy if pneumatic otoscopy has been employed and if the failure criterion for tympanometry had been established at −150 mm H_2O or even −200 mm H_2O.

Jordan (1972) points out that even a mild degree of hearing loss may have a disproportional impact on the mental retardate because he is less capable of compensating cerebrally with the aid of his other senses. Mentally retarded children now considered to be educable were "mattress cases" 10 or 20 years ago. Standards set forth by the Accreditation Council for Facilities for the Mentally Retarded in 1971 require that all new residents of institutions, and all other residents, at regular intervals must be given audiometric screening. Audiologists in such facilities find themselves faced with great numbers of retarded patients of all ages and functioning levels, for auditory screening. We see no alternative for auditory evaluation of such patients without impedance audiometry.

The Deaf-Blind Child. In our opinion, evaluation of hearing in deaf-blind children is the most difficult task faced by the audiologist. The task is even more formidable when mental retardation accompanies the deaf-blind handicap. Audiometrically we are limited to observation of basic behavioral auditory orientation responses, the acoustic startle reflex, and quieting behavior to brief introduction of various interesting sound stimuli. When severe visual, motor, or other neurological deficits are present, the primitive reflexive auditory behavior responses may be inhibited or absent. The audiologist is often left with little upon which to base the hearing evaluation.

It is the audiologist's responsibility to make the decision about the blind child's hearing ability. Little textbook information or standardized developmental scales are available regarding techniques for evaluating the hearing response in these children. It is often useful to the audiologist to discuss the hearing potential of deaf-blind children with the parents and or teachers who are with the child for long periods of time. Sometimes the peripheral reflexive hearing mechanism seems within normal limits but the child is "functionally deaf" since sounds are seldom imitated, little vocalization occurs, and response to verbal cues is inconsistent.

Impedance Audiometry with the Congenitally Deaf Child

The work-up of patients with substantial sensorineural deafness will usually not iden-

Recently Rossi and Sims (1977) reported the use of acoustic reflex measurements in the severely and profoundly deaf in an effort to evaluate the validity of audiometrically-determined air-bone gaps. They conducted impedance studies of 35 deaf students showing that some 80% of the "air-bone gaps" produced by audiometry were, in fact, invalid. They recommend the use of impedance measurements of the acoustic reflex to resolve the ambiguity of responses due to probable tactile-vibratory stimulation with the audiometric bone oscillator from true conductive components.

These studies show that impedance audiometry provides a useful means of evaluating the conductive mechanism in patients with profound deafness. The Brooks study (1975) brought out an important additional fact about the increase in hearing loss which accompanies middle ear problems. In deaf children this additional hearing loss may have significant deleterious effect on hearing aid performance. If the child is mature enough to recognize the need to turn up the hearing aid gain, problems may be created with distortion and feedback, if the child is too young to note the change in hearing, poor performance with the hearing aid may also result. Impedance audiometry should, by all means, be a routine procedure for children attending schools for the deaf.

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THE ASSESSMENT OF AUDITORY ABILITIES

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A speech and language assessment is incomplete unless the client's auditory abilities have been evaluated. Normal auditory ability is a prerequisite to normal speech and language development. Except in the case of purely manual communication, the treatment of communication disorders is inefficient at best, and possibly unethical, if the clinician does not know about the auditory abilities and limitations of the client. Knowledge of the client's auditory abilities is also critical to other educational and habilitative programming. In light of the critical role of hearing and the high prevalence of hearing impairment among the retarded in general, it would seem that reliable and valid audiological assessment would be of the highest priority in habilitative programming for the retarded. Unfortunately, this is not the case. Many retarded individuals have not had the benefit of even a puretone screening test, or a puretone threshold test of auditory sensitivity. As Fristoe (this volume) has pointed out, many programs fail to provide diagnostic services in hearing.

Why do we find this sad state of affairs? Is it because we do not have the technical capabilities of obtaining reliable and valid measures of the auditory sensitivity of most retarded individuals? Or, is it the lack of application of our currently available technology? I fear it is the latter.

In reviewing the literature on the audiologic aspects of mental retardation, it is clear that we have at present the technology to ascertain accurately the auditory sensitivity and to detect middle ear pathologies in most retarded individuals (e.g., Lloyd, 1970; Lloyd and Moore, 1972). With only minor modifications, behavioral audiometry can even be used to define a number of significant auditory functions that are deemed critical in habilitative planning. While there is still a need for considerable research in the area of speech discrimination and speech processing by retarded individuals, we have at present the capability of providing considerable service for all but the more severely and profoundly retarded in this area. The major problem has not been one of a lack of available technology, but of lack of application. I hope that through meetings such as this one, more administrators and other professionals concerned with providing the best possible habilitative service to the retarded will understand the significance of hearing and will demand the best possible audiologic information on all of the retarded individuals they serve.

Because time limitations do not permit a discussion of the application of all audiologic procedures to the retarded, I have elected to present a brief presentation of operant audiometry for testing auditory sensitivity, and then to discuss the extension of such procedures along with other considerations to obtain speech discrimination information.

APPLICATION OF OPERANT PRINCIPLES

I have previously emphasized the careful application of operant principles such as: 1) simplicity of responses, 2) selection of reinforcers, 3) reinforcement contingencies, 4) immediate reinforcement, 5) reinforcement schedules, and 6) reinforcement shifting with a number of audiometric procedures, including a) conventional or standard hand raising, b) ear choice, c) play (e.g., dropping blocks in a box, putting rings on a peg), d) visual reinforcer (e.g., peep show and slide show), and e) TROCA (Tangible Reinforcement Operant Conditioning Audiometry) (Cox and Lloyd, 1976; Lloyd, 1966; 1975a; 1975b). All of these principles are critical in testing the retarded, but this portion of the chapter will discuss TROCA as a procedure for testing the more severely retarded, with the primary focus on the first two principles—responses and reinforcers. More extensive presentations on TROCA have been presented previously (e.g., Cox and Lloyd, 1976; Lloyd, 1975a and 1975b; Lloyd and Cox, 1975; Lloyd, Spradlin, and Reid, 1968; Spradlin, Lloyd, Reid, and Hom, 1968). The following part of this section has been modified from a recent presentation on the use of operant procedures to obtain thresholds of infants (Lloyd, 1976).

To minimize tester or observer bias and increase reliability, the response to be used should be one that is both easily observed and unambiguous. The response should be simple and a behavior that is easily within the motor and eye-hand coordination of the particular individual being tested. It should be something that is already within the individual's behavioral repertoire. For example, many retarded individuals have the eye-hand coordination required for play audiometry, but play audiometry also requires the grasping, moving, and releasing behaviors all to be associated and sequenced with the auditory stimulus. While play audiometry has been quite successful with many retarded individuals, it has not been useful with the more severely retarded. Therefore, the law of parsimony indicates we should use a simpler response that is easier to bring under stimulus control. For example, the simple hitting of a relatively large response button would be an easier task that is within the capabilities of most retarded individuals.

One of the most common bits of misinformation about operant procedures is the nature of a reinforcer. Too frequently the clinician thinks that giving someone an M & M (a candy-coated chocolate) is giving positive reinforcement.

An M & M may be reinforcing to some of the individuals some of the time, but not all of the time, and it is not reinforcing to all individuals. Actually, with some retarded individuals we found M & Ms were not positive reinforcers. For many (but not all) retarded individuals, sugar-coated dry breakfast cereal was a good reinforcer. Like candy, sugar-coated cereal is sweet and in some cases it has an appealing color and shape (e.g., the breakfast cereal called Froot Loops). It has the advantage, however, of resisting satiation better than some of the richer, more filling items such as M & Ms. Such cereal also has the advantage of being something that does not last long; it is rapidly consumed.

I have previously emphasized (Lloyd, 1966; 1976) three points in the selection of a reinforcer. First, *it must be reinforcing* for the particular individual and not just be assumed to be reinforcing. (This will be discussed later in the paper.) Second, *it must not interfere with the task.* The reinforcing stimulus (or consequence) must not be an event that can compete or be confused with the discriminative stimulus or test signal, and must not be an event that will serve as a masker, or that will fatigue the sensory system being tested. For example, music has been found to have reinforcing properties for some individuals and has been used quite effectively in sheltered workshop settings for the retarded, but music (and especially some of the loud music that seems so reinforcing to our teenagers) would be a totally inappropriate reinforcer for audiometric testing. Likewise, in the name of parsimony, the reinforcer should not take a long time to consume. Third, *it should not make habilitation difficult.* This point is of relevance when considering punishment. A strong aversive consequence that is used to extinguish false positive responses (i.e., responses when no test signal is present) may be generalized to the audiologist, the clinic, and/or earphones, any of which could be crucial to the subsequent habilitative program. For example, years ago I saw young children who had readily worn earphones in the past return to the clinic after being tested with GSR or EDR audiometry and reject the earphones. This required us to take time to reorient the child to earphones before we could continue with auditory training.

The point that the consequent event must truly be a reinforcer to that particular child cannot be overemphasized in testing infants and other difficult-to-test individuals. The clinician cannot assume that because some young children like play activities such as putting blocks in a box, that all children will like that activity, or that a given child likes that activity all the time.

Selecting the appropriate reinforcer may be the most crucial step in operant audiometry. In developing TROCA for the profoundly retarded, we (Lloyd, Spradlin, and Reid, 1968) used a cafeteria procedure to see what the child preferred in a wide choice of edibles. Once the child indicated a preference for one item, we did a simple test to see if the child would work for that item. As the child reached for the item, we would close the hand and see if the child would make an effort to get the item out of the closed hand.

Once a reinforcer has been determined, the clinician must watch for the initial signs of satiation, such as decrease in response strength, increase in response latency, and even obvious lack of interest in the reinforcer such as not retrieving it or consuming it more slowly.*

AUDITORY ABILITIES

Threshold testing is just one aspect of the audiologic assessment which each retarded citizen deserves. A complete audiologic assessment includes much more than just audiometric data (ASHA, 1974; Cox and Lloyd, 1976; Lloyd, 1972), but for this presentation I will limit my remarks to audiometric data. As a minimum, the audiometric assessment should provide information about abilities (or behaviors) and aspects of the type of pathology that have major implications for communication programming, including the following data: 1) auditory sensitivity across the frequency range, 2) stability of the auditory sensitivity, 3) dynamic range and tolerance, 4) recruitment or distortions of loudness, 5) basic auditory discrimination, 6) speech discrimination, 7) habituation and fatigue, and 8) interaural differential of the above measures. A wide variety of acoustic stimuli may be used in the audiometric assessment, as is shown in Figure 1. These stimuli range over a continuum of degree of specificity or control (listed from easiest to most difficult to specify or control acoustically). The stimuli may also be considered along a continuum of human communicative value representing the frequency of human use in aural/oral communication and a general approximation of the ordering of the stimuli in terms of communicative importance. It will be noted that the two continua run counter to each other or have a negative relationship. For some fundamental auditory abilities (e.g., sensitivity, recruitment, or habituation), an easily specified stimulus is quite appropriate, but for other high level auditory abilities (e.g., speech processing), the more difficult to specify stimuli have the highest face validity. Therefore, the audiologist sometimes makes a compromise between specificity (or reliability) and communicative value (or validity). In each case, the choice of stimuli is the one with the highest degree of reliability and validity. It should be noted that at least six of the first seven auditory abilities listed above as critical for habilitative planning may be quite reliably and validly assessed with pure tone or noise stimuli. The only one that would definitely require a speech type stimuli for higher face validity is that of "speech discrimination." The interaural differentiation of the seven measures is naturally based upon the measures used to assess the ability. Using pure tone and/or noise band stimuli with currently available behavioral audiometry and impedance audiometry procedures, it is possible to assess the auditory sensitivity across the frequency range, the stability of this auditory sensitivity, and the possible recruitment (or distortions of loudness) and the interaural differential of these measures on most retarded individuals. Also, pure tone and noise band stimuli can be used to test the dynamic range and tolerance, and the auditory habituation and fatigue of many retarded individuals. (See: Fulton, 1974; 1975; Katz, 1975; Lamb, 1975). Although there is a need to further improve such assessment procedures, the major need is for the application of currently available clinical tools.

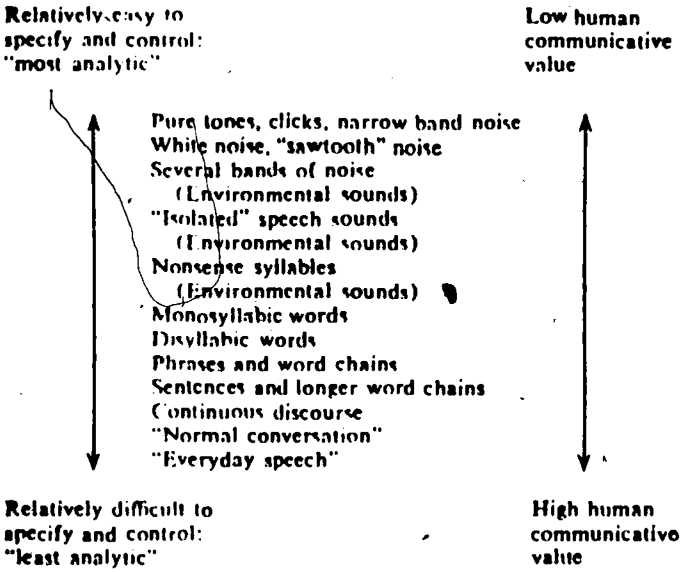

Figure 1. Continuum of acoustic stimuli relative to specificity and control. Since various environmental sounds may fall at a number of points along the continuum, they are shown in parentheses at their three simplest levels. Sounds from noise-makers, toys, musical instruments, and animals have been omitted to simplify the table, but they may be considered along with environmental sounds. It should also be noted that for speech-type stimuli, synthetic speech such as that produced by the Bell or Haskins Laboratories for experimental purposes would rank higher in specificity or control than human speech. The stimuli may also be considered along a continuum of human communicative level. (From: Cox and Lloyd, 1976; Lloyd, 1972, Lloyd and Cox, 1975).

SPEECH AUDIOMETRY

Now that I have reiterated a basic point about how much information of value for habilitative planning we can get with simple pure tone (or noise band) stimuli I would like to conclude this chapter by referring to some developments in speech reception testing, which I hope will point the way to improved speech audiometry for the retarded.

For many years audiologists depended upon the use of the so-called spondaic and phonetically balanced word list as developed at the Harvard Psychoacoustic

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*At this point a six-minute video-tape demonstrated the use of TROCA to obtain thresholds from a seven-month-old. This was one of the original three infants tested by Lloyd, Spradlin, and Reid (1968).

Laboratory (Egan, 1948; Hudgins, et al., 1947) and revised at the Central Institute for the Deaf (Hirsh, et al., 1952). These word lists and their typical administration procedures involving verbal responses of the subject have been of only limited value in testing the retarded and other difficult-to-test subjects. Therefore, speech reception threshold and speech discrimination tests have been developed using limited vocabularies that are more appropriate for use with children, and a point-to-the-picture response (see Giolas, 1975), of which probably the four most commonly used are the Threshold by Identification of Pictures (TIP) and the Discrimination by Identification of Pictures (DIP), developed by Siegenthaler and Haspiel, 1966); the Word Intelligibility by Picture Identification (WIPI) by Ross and Lerman (1968; 1970; 1971), and the Goldman-Fristoe-Woodcock (G-F-W) Tests of Auditory Discrimination (Goldman, Fristoe, and Woodcock, 1970). These tests have several features that might be considered in developing and/or selecting tests for use with the retarded:

1. They all have broken the old tie to the so-called spondee and phonetically balanced word lists.
2. The TIP and G-F-W recommend that you make sure the child can identify each of the pictures used to represent the test words before starting the test. The child is taught unfamiliar items.
3. They all use practice before testing.
   - A. The TIP and WIPI use different words and pictures than are subsequently used in the test.
   - B. The DIP uses four of the words and pictures subsequently used in the test.
   - C. The G-F-W uses all of the words and pictures subsequently used in the test.
4. They all use relatively familiar words that can be represented by pictures but have differing approaches to the repeated use of words in different forms or lists.
   - A. The TIP and WIPI use different words in each list.
   - B. The DIP uses some of the same words but also has some different words on each of the three forms.
   - C. The G-F-W uses the same 30 words (in different order) on both the quiet and noise tests.
5. They all use a close-message set but they vary in the degree of constraint (or size of set).
   - A. The DIP has a choice of two pictures per stimulus.
   - B. The G-F-W has a choice of four pictures per stimulus.
   - C. The TIP has a choice of five pictures per stimulus.
   - D. The WIPI has a choice of six pictures per stimulus.
6. The G-F-W uses prerecorded stimuli to administer the test in quiet and with a 9 dB S/N cafeteria noise background.

7. The scoring on the DIP and G-F-W are designed for error analysis.
   - A. The DIP for voicing, influence, and combinations of these acoustic factors.
   - B. The G-F-W for the distinctive features of voicing and manner (plosives, continuants, and nasality).
8. The test administration and scoring of the WIPI is designed to test auditory, visual, and combined auditory-visual speech reception. Therefore, in addition to testing auditory discrimination you can get an index of visual speech reception or speechreading ability.

These tests were standardized on normal children as young as three years of age and have been used with some older retarded individuals. Unfortunately, there has been very little research reported on the use of these tests as originally developed or in modified form with the retarded. It would seem that the above tests could be successfully used with more retarded individuals and younger children if the procedures were modified to include the operant principles previously discussed. This is especially true of contingent reinforcement, which has been recently used with point-to-the-picture (Beckwith and Thompson, 1976); Sidman, 1971, this volume) and head-turning (Eilers, Wilson, and Moore, 1977; Wilson, 1978) responses. These two response-reinforcement procedures are worthy of mention. The point-to-the-picture response to an auditorially presented word procedure is just one of several stimulus-response tasks in Sidman's (1971; this volume) cross-modality procedure.

Recently, Beckwith and Thompson (1976) developed a point-to-the-picture procedure with visual reinforcement for testing the vocabulary comprehension of children between the ages of 17 and 30 months of age. They project 35-mm slides of real objects or events on two 25-cm square rear view screens. The child sits on a small chair or on his/her parent's lap facing the response and reinforcement apparatus which has a 15-cm rabbit face located above each screen. The examiner sits to the side and slightly to the rear of the child to present the stimulus items live voice and to operate remote control switches to present the pairs of response pictures on the screens and to illuminate the eyes and mouth of the rabbit above the correct screen when the child makes a correct response. Thirteen trials are used before beginning the test as an operant training procedure to teach the child to touch the picture that is named by the examiner. Both in the training and in the test the illumination of the rabbit's eyes and mouth is assumed to be a reinforcer.

The Beckwith procedure could be immediately used for clinical speech discrimination testing by using words and pictures such as those in the DIP designated for speech discrimination. It could also be modified to use a larger set such as four pictures per stimulus (e.g., G-F-W) or six pictures per stimulus (e.g., WIPI). (With a deviation from the standardized administration of a test such as the DIP or G-F-W, the published norms may no longer be valid and new norms may need to be established.) The procedure may also be improved by developing more appropriate word lists, using prerecorded stimuli (and controlling the level of presentation), and automating the reinforcement delivery.

Wilson and his colleagues (Eilers, Wilson, and Moore, 1977; Wilson, 1978) have developed a Visually Reinforced Infant Speech Discrimination (VRISD) paradigm that uses a head-turning response and visual reinforcement to test infants six to eight months of age. The infant is seated on the parent's lap and entertained at the midline while prerecorded speech sounds at the rate of one syllable per second at 50 dB SPL are presented. Then a contrastive syllable is presented, and when the infant makes a normal localizing response to a change in auditory environment by looking at the speaker, an illuminated, animated toy provides visual reinforcement. During the training phase the contrastive (or figure) syllable is presented 10 to 20 dB above the referent (or ground) syllable. The reinforcement maintains the head-turning response to the intensity and/or syllable difference. When the infant is consistently responding to the change, the stimulus levels are equated and the speech discrimination is assessed with three presentations of the contrastive syllable and three control periods with no syllable change.

VRISD is presented as an illustration of combining operant principles with the stimulus paradigm previously used to obtain infant speech perception information from groups of infants (see Butterfield and Cairns, 1974; Eimas, 1974; Eimas et al., 1971; Morse, 1974, 1978). VRISD provides speech discrimination data on individual infants. Procedures such as this offer exciting possibilities for testing the speech discrimination abilities of retarded and other difficult-to-test individuals.

There are other procedures that could be presented, such as asking the child to point to a picture *when* it is correctly labeled rather than to the picture that was named. This procedure is used in the Washington Speech Sound Discrimination (WSSD) Test (Prather et al., 1971) and more recently in a "preference procedure" described by Waryas and Waryas (1974).

SUMMARY

In summary I have: 1) provided a brief review of the major audiological movements in the area of mental retardation, 2) presented a method for obtaining measures of the auditory sensitivity of most retarded individuals, 3) commented on the auditory abilities that should be examined in an audiological assessment, and 4) considered the use of various speech discrimination procedures with the retarded. Although there is a need for more research, the major need is for the application of already available audiometric assessment procedures.

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BEHAVIORAL AUDIOMETRY VIEWED AS AN OPERANT PROCEDURE

Lyle L. Lloyd

Behavioral audiometry as defined by Frisina (1963, p. 137) is based on the principle of reinforcement. The essence of behavioral audiometry is to bring operant responses of the subject under stimulus control and then use such responses to obtain a reliable index of some aspect of the subject's hearing. This generalization is true in the case of both threshold and suprathreshold measures. The purpose of this paper is to discuss the more frequently used forms of pure-tone behavioral audiometry in terms of reinforcement and other operant principles.

THE CONVENTIONAL OR STANDARD METHODS

Conventional or standard pure-tone audiometry, where the subject is asked to raise his hand or press a signal button when he hears a sound, uses verbal reinforcement. Frequently the subject's first appropriate response is followed by the examiner's statement of "good," "that's fine," or some other statement which serves as social reinforcement. The verbal forms of social reinforcement are usually paired with, or in some cases supplemented by, other forms of social reinforcement such as a smile or nod of the head. Throughout the testing session the astute examiner administers additional social reinforcement as frequently as he thinks is appropriate. For example, when testing an intelligent, motivated, and cooperative adult, verbal reinforcement may be provided after the first appropriate response and then only an additional time or two throughout the testing session. However, when testing a suspicious, uncooperative, or poorly motivated young child, the examiner will initially follow each of the child's appropriate responses with social reinforcement. With a child of this type the

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social reinforcement will probably include a "pat on the back," "hand clapping," or some other animated actions indicating approval and fun. Actually such overt behavior by the clinician is the main form of social reinforcement paired with verbal forms of social reinforcement. As the child's response is strengthened, e.g., it has shorter latency and is more decisive, the examiner will reduce the reinforcement schedule from 100 per cent reinforcement. Although the schedule may be reduced, the frequency, either variable ratio or fixed ratio, will probably be higher at the end of the test session in the latter case than in the previous case of the adult.

Once the pattern of responding to sound is established, the clinician usually reduces the frequency and amount of reinforcement. This reduction during the testing session results in greater testing efficiency. The skilled audiologist attempts to apply a sufficient schedule and amount of reinforcement to maintain a high rate of responding but does not waste time administering excessive reinforcement, which is not only inefficient in terms of measurements per unit of test time but which also increases the chances that the subject will become satiated and cease responding.

A typical example of the intrasession reduction in reinforcement may be observed in the example mentioned above of the doubtful, suspicious child. The clinician reduces the schedule from reinforcement once every appropriate response to every several responses. In addition to this reduction in the schedule of reinforcement, the clinician would probably reduce the amount of time and energy in the reinforcement. Initially, the reinforcement includes overt, animated approval behavior paired with verbal praise is reduced to less overt behavior and verbal output. On the basis of clinical observation the reinforcement with such a child is frequently reduced to an occassional nod of the head or smile.

Since reinforcement increases the frequency of the subject's responses, the audiologist makes the reinforcement contingent upon the desired behavior or responses, usually raising a hand or pressing a button when the auditory signal is heard. The audiologist knows only when the signal is presented, not when the subject hears the signal. Therefore, the initial signal presentations are usually at levels assumed, upon the bases of clinical observation and case history data, to be above the subject's threshold. These suprathreshold presentations afford the opportunity to administer reinforcement for appropriate responses. When reinforcement principles are applied in behavioral audiometry the primarily descending, and the descending-ascending or bracketing, methods over the ascending methods are apparently advantageous. The threshold searching methods that include suprathreshold presentation offer more opportunity to administer reinforcement when the subject has met the appropriate response contingency. Although such methods do not automatically eliminate the possible error of reinforcing a subject for responding when he did not hear the sound, they do reduce such errors. The primarily descending methods allow the audiologist better control of the delivery of reinforcement under the appropriate contingencies.

One minor problem in the use of reinforcement with a primarily descending threshold searching method is the danger of administering reinforcement only at suprathreshold levels, and thereby training the subject to respond at these levels but not near threshold. This danger is reduced by the instructions and demonstrations given to the subject. The effectiveness of typical instructions depends primarily upon the subject's ability to understand the audiologist's verbal communication system. Dependence on the subject's understanding of verbal instructions is reduced by demonstration of the task. By using reinforcement principles the subject is taught to respond to lower and lower signals during the instruction and demonstration phase of the test session. During the threshold searching phase the reinforcement of responses to various levels of signal presentations further strengthens the response to signal at any level.

The use of partial reinforcement schedules was discussed as a testing efficiency measure, but partial reinforcement is also useful in maintaining response patterns. In general, partial reinforcement schedules may result in learning a given task more slowly, but when a task is learned the use of partial reinforcement tends to result in a response more resistant to extinction. The use of partial reinforcement is one of the clinician's best safeguards against failure of the subject to respond to the signal control as a result of satiation.

EAR CHOICE METHODS

Once the most conventional forms of behavioral audiometry, use of standard hand raising or button pressing response, are viewed as operant procedures, the application of these principles in other forms of behavioral audiometry becomes apparent. In the original Curry and Kurtzrock (1951) ear choice technique and the modified ear choice technique (Lloyd, 1965a), the application of reinforcement is almost identical to that described above for the conventional or standard method. The same forms of verbal and nonverbal social reinforcement are used in the same schedules for reinforcing appropriate responses. In applying reinforcement principles to the ear choice methods the only thing that has changed is what is considered an appropriate response. In the standard methods either raising a hand or finger or pressing a signal button is defined as the response. In the ear choice methods the appropriate response is pointing to the ear in which the signal is presented.

PLAY METHODS

When confronted with young children, especially those between 2 and 6 years of age, many audiologist employ various forms of play audiometry (e.g., Barr, 1955; Donnelly, 1965; Frisina, 1962; Lloyd, 1965a; Lowell and others, 1956; O'Neill and others, 1961; Utley, 1949). Play audiometry has involved a number of responses such as putting rings on a peg, putting pegs in holes, hitting a peg board, hitting a drum, stacking blocks, putting marbles in a box, and putting blocks in a box. In this paper the block dropping, putting blocks in a box, response will be used to illustrate the various play audiometry techniques. The child is taught through verbal instruction and demonstration to drop a block in a box when and only when the auditory signal is presented.

It is assumed that the child's play activity is of interest to him and that completion of the response is rewarding. The child's block dropping behavior may be considered as high probability behavior, and the proper structuring of such as a play activity is an extremely useful operant technique. High probability behavior may be used to increase low probability behavior. However, in the typical application of play audiometry the clinician simply uses the child's high probability behavior by structuring the contingencies which allow the child to respond with such behavior.

Although the child's block dropping response may in itself be reinforcing, the skilled clinician usually pairs the inherent reinforcement of the play response with considerable social reinforcement. Actually with some children the play activity may be of only limited interest; it may be a relatively weak reinforcer. In such cases, the verbal and nonverbal behavior of the clinician may be the more powerful reinforcer and the block dropping response a secondary reinforcer. In some cases the game played alone is not reinforcing but with a partner, such as a lively clinician, it is extremely reinforcing. The social reinforcement used in play audiometry is similar to the verbal and nonverbal reinforcement discussed above for other forms of behavioral audiometry. The clinical application of a variation in the amount and schedule of social reinforcement is also similar.

In general, a combination of the high probability behavior of the child and the social behavior of the clinician provides a powerful reinforcer for testing most young children, although obviously what is reinforcing for one subject may not be for another. The novice clinician frequently makes the mistake of assuming that because a given method or procedure was successful with several subjects, it is infallible. The experienced clinician recognizes individual differences and exercises ingenuity in finding an appropriate reinforcer for each subject.

What may be reinforcing for a subject at the beginning of the test session may be a relatively weak reinforcer by the end of the session. Such subject satiation can be extremely perplexing to the audiologist. It is easy to observe satiation in experimental animals when food is the reinforcer, but it takes a keenly observant clinician to recognize the early signs of a client's satiation in the audiometric testing session.

The individuality of reinforcers and the problem of satiation in play audiometry can be illustrated by the following two cases. The first is a relatively negative and extremely aggressive six year old boy seen in a university outpatient clinic. During the day he failed to cooperate on the psychological tests and in the speech and language examination. He showed no interest in several forms of play audiometry using blocks, rings on a peg, or various toys, but did indicate interest in playing with a drum. High probability drum

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beating behavior was therefore structured into the test. The boy's drum beating was put under stimulus control. Approximately fifteen minutes and two broken drumsticks later an entire air conduction threshold test was completed.

The second example is a relatively cooperative five year old girl, who quickly conditioned to play audiometry using a block dropping response paired with a social reinforcer. She responded quickly while the first three frequencies were tested, but when the fourth frequency test was begun her responses were slower. When this change in response pattern was observed, the clinician increased his verbal and nonverbal behavior in an attempt to increase social reinforcement. The girl's responses again were sharp and quick. Four additional frequencies were tested with short latency responses but again the responses slowed down; consequently, the clinician increased his verbal and nonverbal behavior to increase the reinforcement. This change in the clinician's behavior did not, however, bring the girl's block dropping under sharp stimulus control as it did earlier. Therefore, the clinician, enthusiastically changed the game and had the girl stack the blocks as a response to the auditory stimulus, which, once more brought the response under good stimulus control. Before the test was completed two additional responses—putting rings on a peg and hitting a toy xylophone—were used. Although the reinforcer varied slightly during the test, it was basically the same reinforcer; namely, a combination of some form of high probability play behavior of the girl and the social reinforcer of the clinician's contingent behavior.

VISUAL REINFORCER METHODS

Since the successful use of audiometric tests with visual reinforcers was first described (Evans, 1943; Dix and Hallpike, 1947), numerous variations of these instrumental or operant conditioning methods have been employed to test young children. Basically, the child's responses to auditory signals are increased by reinforcing his pressing of a button when the signal is presented and not reinforcing his button pressing when no signal is presented. The multitude of visual reinforcement methods previously described by audiologists are enumerated below under the five main types of visual reinforcers utilized.

1. *Pictures* (Dix and Hallpike, 1947; Evans, 1943; Kaplin, 1957; Lloyd, 1965a, 1965b; Miller, 1962; Miller, 1963; Shimizu and Nakamura, 1957; Weaver, 1965)
2. *Miniature Scenes* (Statten and Wishart, 1956)
3. *Animated Toy Animals or Puppets* (Cotton and Hall, 1939; Green, 1958; Guilford and Haug, 1952; Miller, 1962; Sullivan and others, 1962; Waldrop, 1953)
4. *Toy Trains* (Ewing, 1930; Gaines, 1961; Ishisawa, 1962; Keaster, 1951)
5. *Other Mechanical Toys* (Denmark, 1950; MacPherson, 1960; Schwartz, 1952)

Typically, the visual reinforcers are presented on a 100 per cent reinforcement schedule. In the clinical application of these visual reinforcer methods, social reinforcers are also employed. In most behavioral audiometry methods, regardless of response method and the kind of reinforcer, verbal and nonverbal social reinforcers are important. The prominent role may be related to the universality of this type of verbal and nonverbal behavior as a positive reinforcer. The generalized reinforcement value of much of the clinician's behavior is apparent when one considers that a smile is usually associated with pleasurable experiences. The same is true of many other types of clinical behavior such as a nod of the head, a pat on the back, clapping of hands, the word "good," or even the expression "oh boy!" Such behavior is a powerful tool when used with proper contingencies, i.e., when it occurs immediately after the child's appropriate response.

Two findings are of interest in the literature on visual reinforcement audiometric methods. First, the study by Statten and Wishart (1956) demonstrated superiority of the operant conditioning procedure with visual reinforcers over the classical conditioning psychogalvanic skin response (GSR) procedure. A second finding was the relative lack of success with the early use of the tunnel test (Ewing, 1930, p. 51) and the toy dog test (Cotton and Hall, 1939). The reinforcers were strong in these two unsuccessful attempts to use visual reinforcement. The children engaged in high probability behavior of playing with the objects intended as reinforcers and did not attend to the listening task because the contingencies were not properly structured. The children were allowed considerable access to the reinforcers for a minimal amount of responding. By restructuring the contingencies later investigations have eliminated the difficulty and have found the test quite useful. Gaines (1961) has even reported success in using the train test with institutionalized moderately retarded subjects. More recently Lloyd (1965a, 1965b) and Weaver (1965) have reported the successful use of the slide show type of visual reinforcers with institutionalized retardates.

A variation of the button pressing procedure is the conditioned orientation reflex (COR) previously described by Suzuki and Ogiba (1960, 1961). The COR reinforces a localization response and does not require the child to make a button pressing response to receive visual reinforcement. If the child looks at the appropriate loudspeaker when an auditory signal is presented, a doll located near that speaker is illuminated as a form of visual reinforcement. MacPherson (1960) and Fulton (1962) in their doctoral dissertations reported on the use of COR procedures with severely retarded subjects. Fulton's (1962) data indicated greater success with the behavioral conditioning (COR) procedure than with the classical conditioning (GSR) procedure. This basic procedure of reinforcing the location of the signal has been modified by several audiologists who use lights rather than an illuminated doll (Houston Speech and Hearing Center, 1964; Kimball, 1964; MacPherson, 1960).

TANGIBLE REINFORCER METHODS

Relatively intangible reinforcers have been used in the forms of behavioral audiometry mentioned above. Such intangible reinforcers as the word "good," a smile, a pat on the back, or the opportunity to see a picture function as reinforcers for many children, but for some subjects such behavior or consequences are relatively ineffective. More tangible reinforcers have been used with operant conditioning procedures to obtain audiometric data on retardates (Meyerson and Michael, 1960; LaCrosse and Bidlake, 1964; Spradlin and Lloyd, 1965). Edible items such as candy, popcorn, sugar coated cereal, crackers, dietary supplements, and various fluids as well as nonedible objects such as miniature toys or trinkets have been used in various forms of tangible reinforcement operant conditioning audiometry (TROCA).

In some cases the examiner decided that a single tangible item would be given to each subject. In other cases each subject was given a variety of these tangible items as selected by the examiner. With others, the experimenter has attempted to determine which items are effective reinforcers before starting the audiometric test; then that reinforcer is used during the test. Spradlin and Lloyd (1965) have described one procedure for determining which tangible items are effective reinforcers for a given subject. Since the only reason for using tangible reinforcers is that the other more conventional forms of reinforcement were not effective, it would seem that the audiologist using TROCA should attempt to determine an effective, tangible reinforcer for each subject rather than use an arbitrarily determined reinforcer. It should be noted that a reinforcer is defined in terms of its functional relationship to the behavior being reinforced and is not some item or event that the experimenter or clinician has predesignated as a reinforcer.

One of the TROCA reports (LaCrosse and Bidlake, 1964) did not give details on their procedure; however, the other two (Meyerson and Michael, 1960; Spradlin and Lloyd, 1965) did describe their procedures. These investigations were designed to test the retarded child who did not respond to verbal instructions. After using a variety of procedures Meyerson and Michael (1960) concluded by suggesting that the most effective procedure involved two responses. When there was no auditory signal present, the response of pressing one button was reinforced on a partial schedule, and when the signal was present the response of pushing a second button was reinforced on a similar schedule. They also provided extra reinforcement for appropriate quick switches.

Spradlin and Lloyd (1965) also tried various procedures, but they reported that a single response system which reinforced pressing the button when the auditory signal was present was the most efficient for clinical testing. They used a 100 per cent reinforcement schedule with the single response system. This TROCA procedure is similar to the operant audiometry procedures which use visual reinforcers. The primary difference is in the reinforcers.'

Both investigations (Meyerson and Michael, 1960; Spradlin and Lloyd, 1965) used automated programs of signal presentation. The programming equipment also reduced the latency of reinforcement delivery. Some of the visual reinforcer operant procedures involved immediate (automated) reinforcement, but most of the behavior audiometry procedures considered were not automated for reinforcement delivery. In the typical audiometric test an extremely small latency in reinforcement delivery is of relatively little consequence, but in some cases the reinforcement latency may be an extremely critical factor. With the more difficult cases special attention should be afforded the reinforcement timing. The reinforcement should be presented immediately after an appropriate response.

SUMMARY AND CONCLUSIONS

Several behavioral audiometry methods are reviewed in terms of operant conditioning principles. A primary focus of the paper is upon reinforcement principles. The importance of stimulus control is obvious in all forms of audiometry. The obtaining of stimulus control is related to factors such as simplicity of response, selection of an appropriate reinforcer, reinforcement contingencies, immediate reinforcement, reinforcement schedules, and reinforcement shifting. Sensitivity in the use of these variables frequently marks the difference between the skilled and the unskilled clinician. Many of the rather vague clinical qualities considered under the term "rapport" may also be analyzed in terms of operant principles.

ACKNOWLEDGEMENTS

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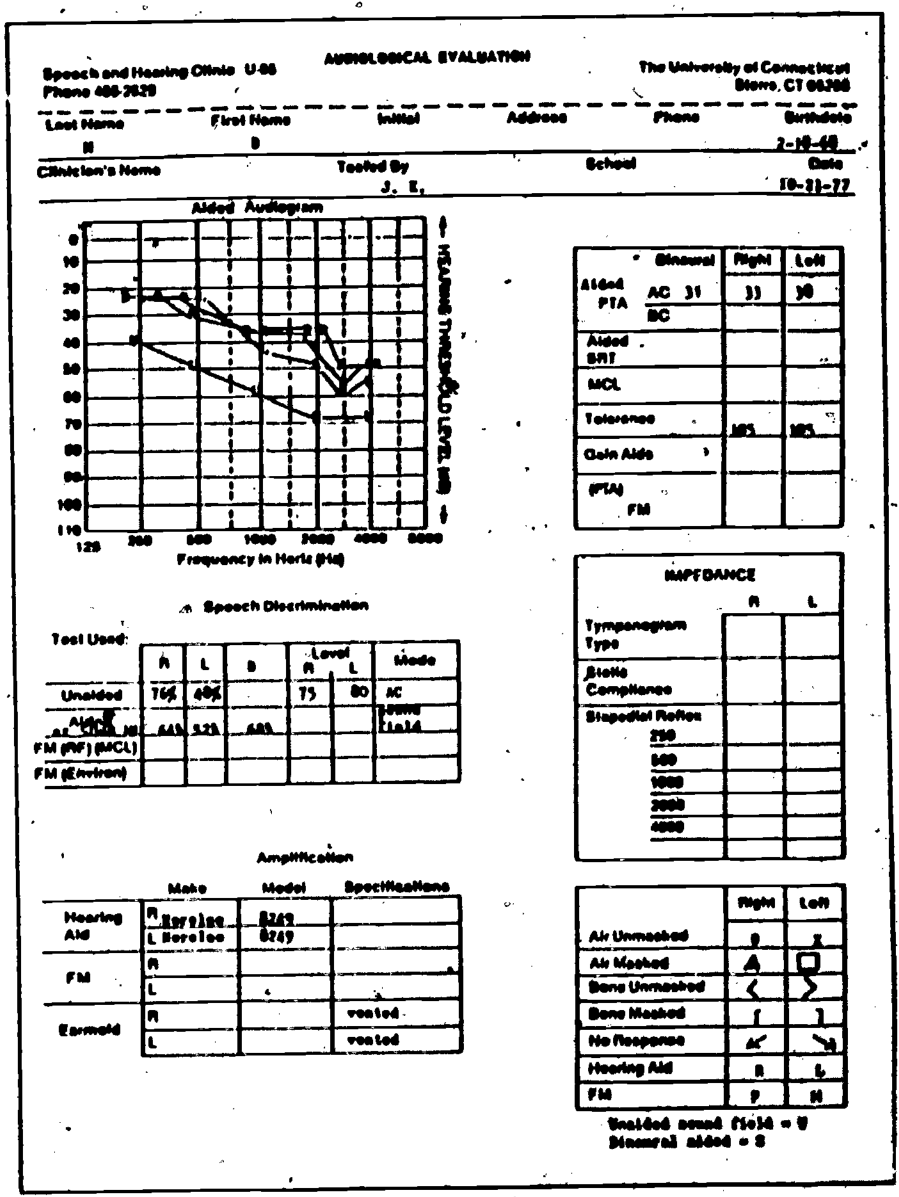
Ross,M./ Brackett, D./ Maxon, A. Hard of
Hearing Children In Regular Schools, 1982,
pp. 70 - 81

communicating the results

In our judgment, a quantum leap in the audiological management of hearing-impaired children is attainable right now if audiologists would expend as much effort in ensuring the dissemination of their results and then the follow through of their recommendations as they do in devising and administering audiometric tests. If the persons involved in the day-to-day education of a child have not received or do not understand the implications of the audiological evaluation, or if they have simply ignored or overlooked the audiological report, we have been wasting a lot of time and money. More importantly, the very act of an evaluation raises expectations (which we often encourage): it carries with it an implicit promise that our expertise can make a difference in the child's life, else why the evaluation at all? We are accustomed in our society to having a diagnostic session, of any kind, followed by treatment. This continuity—diagnosis followed by treatment—is sundered in instances where the results and recommendations of an evaluation are not available or comprehendable to the individuals who are responsible for instituting the treatment.

We are not overly impressed with those who ascribe the communication breakdown, between the tests and their implications, to obtuse school authorities. In decoding our jargon, in explaining the communication/educational consequences of our findings, we have to meet them more than half way. In brief, our evaluation is not complete until we have expended every reasonable effort to ensure that our evaluation has some significance outside the clinic.

Writing an effective report, following it up with a personal visit and a personal explanation, and occasional phone calls, is more than the frost- on a diagnostic evaluation; on the contrary, such endeavors justify the procedure. The reports should go to all relevant personnel working with the child. It is also important for the parents to get a copy of the written report, not only so that they know what has been sent to the school, but so that they are kept informed as to the status of the child's hearing and amplification performance. This can help ensure their informed participa-



AUDIOLOGICAL EVALUATION

Speech and Hearing Clinic U-85
Phone 486-2629

The University of Connecticut
Storrs, CT 06268

Last Name	First Name	Initial	Address	Phone	Birthdate
H	D				2-10-68

Clinician's Name	Tested By	School	Date
	J. E.		10-21-77

Aided Audiogram

	Binaural	Right	Left
Aided PTA AC	31	33	30
BC			
Aided SRT			
MCL			
Tolerance		105	105
Gain Aids			
(PTA) FM			

Speech Discrimination

Test Used:

	R	L	B	Level R	Level L	Mode
Unaided	76%	48%		75	80	AC
Aided	64%	52%	68%			[illegible]
FM (RF) (MCL)						
FM (Environ)						

IMPEDANCE

	R	L
Tympanogram Type		
Static Compliance		
Stapedial Reflex 250		
500		
1000		
2000		
4000		

Amplification

		Make	Model	Specifications
Hearing Aid	R	[illegible]	8249	
	L	[illegible]	8249	
FM	R			
	L			
Earmold	R			vented
	L			vented

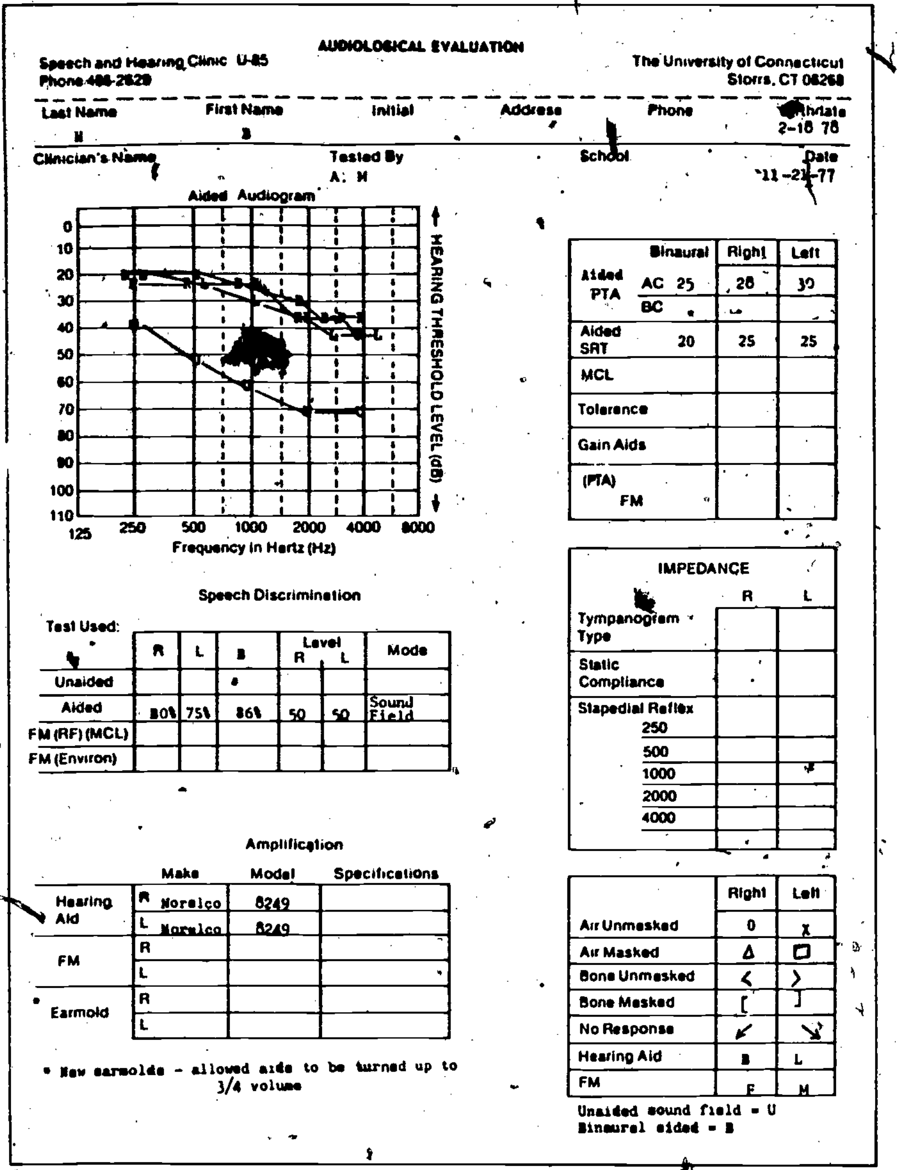
	Right	Left
Air Unmasked	O	X
Air Masked	△	□
Bone Unmasked	<	>
Bone Masked	[	]
No Response	↙	↘
Hearing Aid	R	L
FM	F	M

Unaided sound field = U
Binaural aided = B

FIGURE 3-3A Hearing aid recheck results (on HB), indicating inappropriate high frequency amplification, as well as poor aided speech discrimination scores.

tion in the education of their child. Furthermore who has a better right to be included?

Our communication with the parents must extend beyond this written report, however. It can be devastating to a parent to receive a report which contains language with which they are unfamiliar. The audiologist is obligated to personally contact the parents and explain the results in language they can understand. The older child, too, should not be ignored. We have evaluated his ears and affected his life, so we should strive to explain his problem to him in ways he can absorb and accept.



AUDIOLOGICAL EVALUATION

Speech and Hearing Clinic U-85
Phone 486-2629

The University of Connecticut
Storrs, CT 06268

Last Name	First Name	Initial	Address	Phone	Birthdate
H	B				2-18 78

Clinician's Name	Tested By	School	Date
	A. H		11-21-77

		Binaural	Right	Left
Aided PTA	AC	25	28	30
	BC			
Aided SRT		20	25	25
MCL				
Tolerence				
Gain Aids				
(PTA) FM				

IMPEDANCE

	R	L
Tympanogram Type		
Static Compliance		
Stapedial Reflex 250		
500		
1000		
2000		
4000		

Speech Discrimination

Test Used:

	R	L	B	Level R	Level L	Mode
Unaided						
Aided	80%	75%	86%	50	50	Sound Field
FM (RF) (MCL)						
FM (Environ)						

Amplification

		Make	Model	Specifications
Hearing Aid	R	Norelco	8249	
	L	Norelco	8249	
FM	R			
	L			
* Earmold	R			
	L			

* New earmolds - allowed aids to be turned up to 3/4 volume

	Right	Left
Air Unmasked	0	X
Air Masked	Δ	□
Bone Unmasked	<	>
Bone Masked	[	]
No Response	↙	↘
Hearing Aid	B	L
FM	F	M

Unaided sound field = U
Binaural aided = B

FIGURE 3–3B Hearing aid recheck results (on HB) after a new hearing aid had been purchased. Note the improvement in the high frequency thresholds, as well as the aided speech discrimination scores.

The report of the initial evaluation is of necessity more comprehensive than the reports of follow-up evaluations. In the initial report, information is included regarding probable etiology (obtained from the child's physician), age of detection, all communicative behaviors (auditory responsiveness, speech and language status, gesture utilization), interpretive discussion of the audiometric results, initial counseling attempts with the parents (Luterman 1979), type of amplification system recommended, and provisions for an intensive follow-up in a parent/child program.

In this book, devoted to the school-aged child, we will assume that such an initial comprehensive evaluation has been completed (see Martin 1978, and Boothroyd 1982, for a complete account); our task here is to communicate the results of the continuing evaluations conducted for each child. Let us now consider the general components of such an interim audiological report.

(1) The first step is background—a review of changes in the child's overall status since the last evaluation. Have previous recommendations been implemented? If new aids, earmolds, classroom management schemes, or tutoring arrangements were recommended previously, were the suggestions followed? How is the child doing in school. Not just academically but socially? An interim evaluation must be considered part of a series, and subsequent assessments must be viewed as part of the continuity of management and not as an isolated entity.

(2) The presentation of the audiometric results usually follows the background. The type and degree of the child's loss is reported; any changes in any audiometric dimension are noted. If impedance measurements suggest the presence of a conductive element, a medical referral is required. Progression of loss also requires such a referral. The audiogram is explained in communicative terms in the report and personally to the parents, if they have accompanied the child, and then to the child in terms that can be understood.

(3) The status of the child's amplification system(s) is then reviewed. If he does not have one, or if a new aid is warranted, the audiologist presents the results of the hearing aid evaluation and reasons for the hearing aid recommendation. In the case of a child with mild to moderate loss, who has been "getting along" without an aid, the audiologist reviews the communicative and academic implications of the loss on the child and possible amelioration of these difficulties with amplification.

If the child already has a hearing aid, the electroacoustic data are presented (minus the technical jargon) and the behavioral results presented. The question to be answered here concerns the continuing appropriateness of this aid. Is it (or they) functioning as expected? Were electroacoustic changes made, perhaps to increase or decrease output or vary the frequency response; if so, what were they? Presumably they were made to increase the auditory potential of a child; how can such changes be expected to increase the child's reception of speech?

At this juncture, the audiologist is required to display his knowledge of speech acoustics. For example, as in Figure 3–3B, the audiologist should be able to communicate the hearing aid's influence on the child's increased ability to detect such high frequency phonemes as /s/ and /t/ and then communicate any implications of this improvement on the child's speech and language problems.

(4) Children outgrow their earmolds at fairly frequent intervals. If a new one is needed, either because of the sudden occurrence of feedback (but first consider the point made above regarding tympanometric results and feedback), or because it is desired to modify the acoustic properties of the mold, then this information is included in the report. In this instance, if the audiologist had taken ear impressions, the person or procedure for delivering the new earmold to the child must be specified.

(5) An evaluation report may include the necessity of a child obtaining an FM auditory trainer for classroom use. It is difficult—but not impossible—to make this determination just on the basis of a clinic-centered evaluation. Such a recommendation can best be made in cooperation with the speech-language pathologist as part of the continuing audiological management of a hearing-impaired child in the schools (see the section on audiological management). Depending upon the circumstances and location of the audiological evaluation, either a definite or tentative (to be corroborated by a personal visit in collaboration with the school personnel) recommendation for an FM auditory trainer can be included in the report. To reduce administrative confusion, we have found it helpful to write a separate report requesting such a unit for a child, because such systems are purchased by a school, unlike hearing aids, which are purchased by families or are obtained through other state agencies. (An example of a separate report requesting an FM system is given in Appendix B.)

(6) The final section of the report details and summarizes the recommendations made throughout the report. If new hearing aids, auditory trainers, or earmolds are required, this section should include all the details of these recommendations including adjustments—where they can be obtained, and reference to subsidary reports and contacts in respect to their acquisition. In other words, the report must specify how and by whom the recommendations will be implemented. The audiologist may want to comment on particular problems which should be considered in future evaluations. If there is a reason for a followup prior to the scheduled yearly evaluation, the date of the reevaluation should be included in the

In summary, the comprehensive audiological assessment should include:

1) routine pure tone and speech measurements and impedance;
2) objective amplification evaluation:
    a) electroacoustic or listening evaluation of hearing aids
    b) electroacoustic or listening evaluation of FM
3) subjective amplification evaluation:
    a) speech discrimination and warble tone thresholds with hearing aids
    b) speech discrimination and warble tone thresholds with FM
4) report:
    a) updated background, audiometric results
    b) hearing aid–which settings, good volume, type of earmolds
    c) academic implications
    d) expected difficulties due to classroom acoustics
    e) recommendations

We can best demonstrate what was described in this section on audiological evaluation by example. Included below are representative reports on several hard of hearing children enrolled in the UConn Mainstream Project at the University of Connecticut. No one evaluation and the subsequent report includes all the evaluation components outlined above; moreover, because of the diversity of children and their needs, some considerations pertaining to these children may not have been discussed above. Both these points support the observation made much earlier—all these children have to be dealt with on their own terms and not in terms of some average concept.

case report #1

This report, taken from our files, concerns a 4-year-old child with a moderate, bilateral, sensorineural hearing loss. The referral information we received, which proved to be erroneous, indicated to us that he was going to be difficult to test. Firmly but kindly managed, he was quite cooperative during testing. He was also reported as having a tolerance problem, because he kept reducing the volume control on his hearing aids to the #1 setting. When the volume control was taped in place, and he was observed carefully, no tolerance problems were evident. This was possibly another method he used to manipulate his environment (everybody would pay a lot of attention to him when he turned the volume down). Since this report was written, an FM auditory training system was obtained for him.

Background Information JK was seen at this center for a complete audiological evaluation and hearing aid check on November 15, 1978, as part of the UConn Mainstream Project. J is presently enrolled in a preschool class at S School and was referred here by Mr. AM. J has a known bilateral moderate sensorineural hearing loss for which he wears binaural Zenith P5077 ear level hearing aids. He has been wearing the aids for approximately seven months and there is reportedly a question of tolerance problems because he turns them off. J has a history of middle ear infections, but Mrs. K reported that since his tonsillectomy and adenoidectomy in 1977, he has had no problems. This evaluation was to check J's hearing and amplification and to determine if tolerance problems exist.

Test Results Pure-tone thresholds indicated a bilateral moderate to severe sensorineural hearing loss. Speech Reception Thresholds (SRT) of 55 dB HL were obtained bilaterally, corroborating the pure-tone findings. Speech discrimination was 76% in the right ear and 80% in the left ear at 85 dB HL as measured by the Word Intelligibility by Picture Identification (WIPI).

Electroacoustic impedance measurements indicated normal tympanic membrane mobility, middle ear pressure and static compliance bilaterally. Stapedial reflexes were as expected (Figure 3–4).

A hearing aid check was performed with J's Zenith P5077 ear level hearing aids (¾ volume) in place. Warble tone sound field thresholds indicated that J was receiving appropriate gain from his hearing aids across the frequencies tested. A binaural aided speech discrimination score of 80% at 45 dB HL (normal conversational level) was obtained using the WIPI. It should be noted that no tolerance problems were observed at the maximum output of the audiometer when J was wearing his hearing aids (Figure 3–5).

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An electroacoustic evaluation of the hearing aids was made using the Fonix 5500 analyzer. The aids are performing according to manufacturer's specifications with no significant distortion.

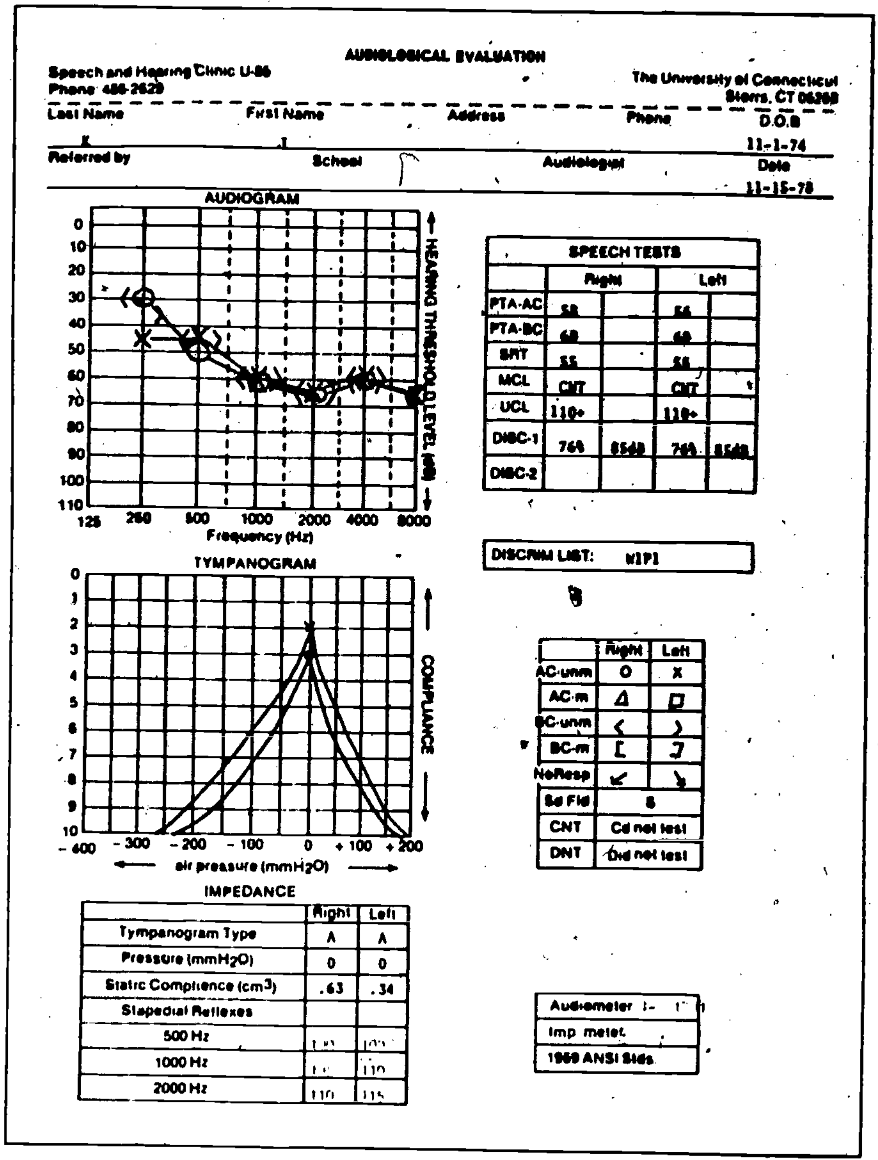
Impressions and Recommendations J continues to demonstrate a bilateral moderate sensorineural hearing loss. He appears to be obtaining good amplification from his hearing aids when they are set at ¾ volume. In order to keep J from turning the volume down, tape was placed over the volume control. It was also suggested that the volume control be marked with nail polish so that the correct level can be easily observed. It is recommended that:

(1) J use his hearing aids with the volume control taped at the appropriate setting.
(2) J use the available FM auditory trainer in school once it has been set for him.
(3) J return to this center for a check of his FM when he has worn it for several weeks.
(4) J have an annual audiological evaluation and amplification recheck to monitor the status of his hearing and his performance with personal and school-worn amplification.

I hope this information is of benefit to you. If there are any questions, please contact me.

case report #2

This report concerns an 11-year-old child with a bilateral severe to profound sensorineural hearing loss. He uses his hearing exceptionally



AUDIOLOGICAL EVALUATION

Speech and Hearing Clinic U-85
Phone 486-2629

The University of Connecticut
Storrs, CT 06268

Last Name	First Name	Address	Phone	D.O.B
K	J			11-1-74

Referred by	School	Audiologist	Date
			11-15-78

SPEECH TESTS				
	Right		Left	
PTA-AC	58		56	
PTA-BC	60		60	
SRT	55		55	
MCL	CNT		CNT	
UCL	110+		110+	
DISC-1	76%	85dB	76%	85dB
DISC-2				

DISCRIM LIST: WIPI

	Right	Left
AC-unm	O	X
AC-m	Δ	□
BC-unm	<	>
BC-m	[	]
NoResp	↙	↘
Sd Fld	S	
CNT	Could not test	
DNT	Did not test	

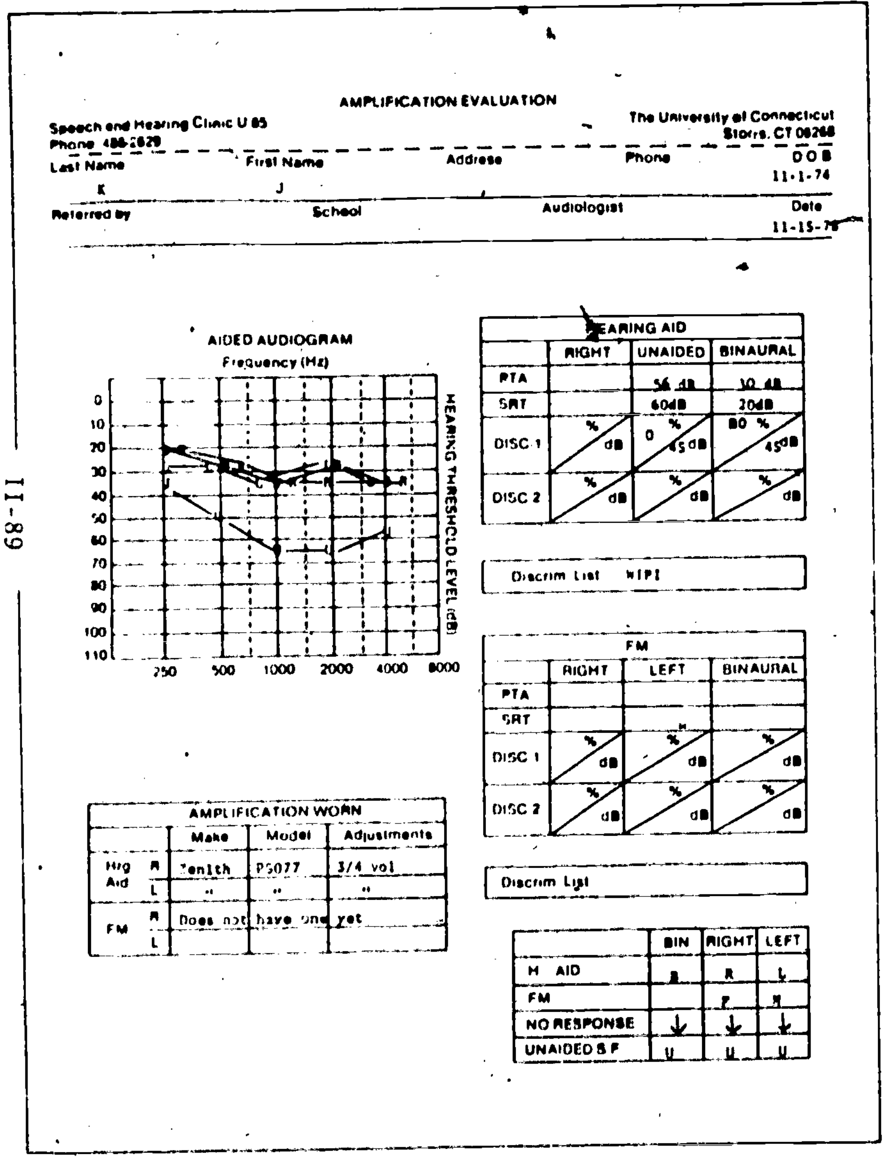
IMPEDANCE

	Right	Left
Tympanogram Type	A	A
Pressure (mmH$_2$O)	0	0
Static Compliance (cm^3)	.63	.34
Stapedial Reflexes		
500 Hz	[illegible]	[illegible]
1000 Hz	[illegible]	110
2000 Hz	110	115

Audiometer [illegible]
Imp meter
1969 ANSI Stds.

FIGURE 3–4 Audiological evaluation results for Case #1.

well, loves his hearing aids, and is doing well in school both academically and socially. Without the use of an FM wireless auditory trainer in school, it is doubtful if his performance would have been as good as it is.



AMPLIFICATION EVALUATION

Speech and Hearing Clinic U 85
Phone 486-2629

The University of Connecticut
Storrs, CT 06268

Last Name	First Name	Address	Phone	DOB
K	J			11-1-74

Referred by	School	Audiologist	Date
			11-15-78

HEARING AID			
	RIGHT	UNAIDED	BINAURAL
PTA		56 dB	30 dB
SRT		60dB	20dB
DISC 1	% dB	0 % 45 dB	80 % 45 dB
DISC 2	% dB	% dB	% dB

Discrim List WIPI

FM			
	RIGHT	LEFT	BINAURAL
PTA			
SRT			
DISC 1	% dB	% dB	% dB
DISC 2	% dB	% dB	% dB

Discrim List

AMPLIFICATION WORN				
		Make	Model	Adjustments
Hrg Aid	R	Zenith	P5077	3/4 vol
	L	"	"	"
FM	R	Does not	have one	yet
	L			

	BIN	RIGHT	LEFT
H AID	B	R	L
FM		F	H
NO RESPONSE	↓	↓	↓
UNAIDED S F	U	U	U

IURE 3-5 Amplification evaluation results for Case # 1.

Background Information L was seen at this center for a complete audiological evaluation on December 18, 1978, as part of the UConn Mainstream Project. L was referred here by Ms. FY, his speech-language clinician at H School. He has a known bilateral severe to profound sensorineural hearing loss for which he wears an Audiotone C401 body hearing aid (right) and a Zenith Heritage body hearing aid (left). Both hearing aids are approximately six years old and Mr. B expressed an interest in purchasing new aids for L. Today's evaluation was to assess the status of L's hearing and the functioning of his amplification systems.

Test Results Pure tone air and bone conduction testing demonstrated a severe to profound sensorineural hearing loss with no measurable response above 2000 Hz in the right ear and a moderate to severe sensorineural hearing loss in the left ear. Speech Reception Thresholds (SRT) of 85 dB HL and 75 dB HL were found in the right and left ears respectively, corroborating the pure tone findings. Speech discrimination scores of 32% at 110 dB HL in the right ear and 84% at 105 dB HL in the left ear were obtained using the PB-K half lists.

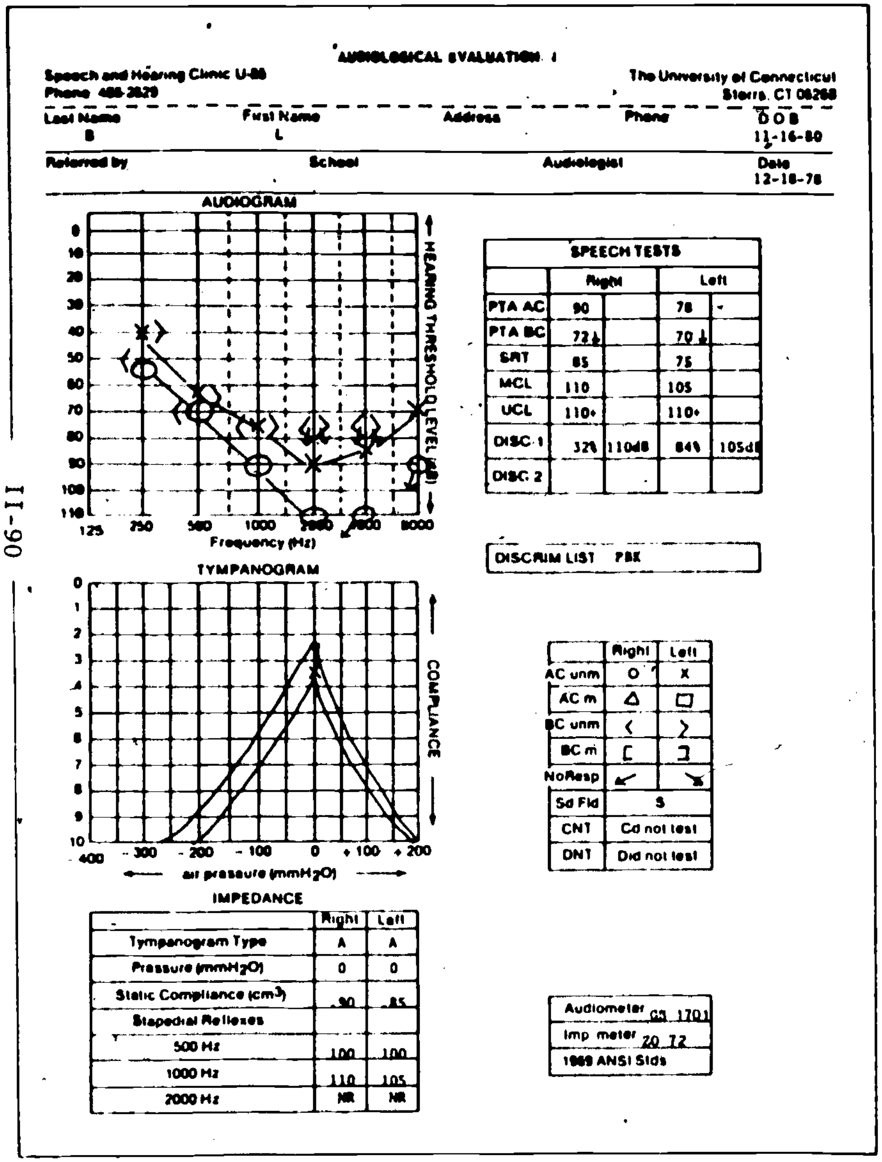
Electroacoustic impedance measurements demonstrated normal tympanic membrane mobility, static compliance and middle ear pressure bilaterally. Stapedial reflexes were elevated (at 500 and 1000 Hz) or absent (2000 Hz), which is not unusual in light of L's hearing loss (Figure 3-6).

Sound field warble tone thresholds were obtained with L's hearing aids in place and were in a downward sloping configuration. These thresholds indicated that L was obtaining too much amplification in the low frequencies and not enough in the high frequencies. The binaural aided SRT was 25 dB HL and the aided speech discrimination score was 92% at 50 dB HL using the PB-K half lists. With L's Phonic Ear FM auditory trainer receiver in place, the aided sound field warble tone thresholds were 15 dB HL in the low frequencies extending to 55 dB in the higher frequencies. (Figure 3-7). At the time of the evaluation, the teacher's microphone was not transmitting, although it had been charged. L reported that it had not been working for "a while."

Electroacoustic evaluations of L's hearing aids and FM auditory trainer (environmental microphones) were made using a Fonix 5500 analyzer. The analysis of the hearing aids demonstrated that the Zenith aid was not providing enough gain in the high frequencies and too much gain in the low frequencies. The analysis of the Audiotone aid demonstrated that it was not providing enough gain in the high frequencies, was providing too much gain in the low frequencies and had more distortion than was tolerable. The analysis of the FM receiver unit demonstrated that it was not providing enough gain in the high frequencies, particularly in the left channel.

Impressions and Recommendations L continues to demonstrate a bilateral severe to profound sensorineural hearing loss. Based on the results of today's evaluation it is recommended that:

(1) L have a hearing aid evaluation to select new appropriate hearing aids.



AUDIOLOGICAL EVALUATION

Speech and Hearing Clinic U-85
Phone 486-2629

The University of Connecticut
Storrs, CT 06268

Last Name	First Name	Address	Phone	D O B
B	L			11-16-80

Referred by	School	Audiologist	Date
			12-18-78

SPEECH TESTS	Right		Left	
PTA AC	90		78	-
PTA BC	72↓		70↓	
SRT	85		75	
MCL	110		105	
UCL	110+		110+	
DISC 1	32%	110dB	84%	105dB
DISC 2				

DISCRIM LIST PBK

	Right	Left
AC unm	O	X
AC m	△	□
BC unm	<	>
BC m	[	]
NoResp	↙	↘
Sd Fld	S	
CNT	Cd not test	
DNT	Did not test	

IMPEDANCE

	Right	Left
Tympanogram Type	A	A
Pressure (mmH2O)	0	0
Static Compliance (cm³)	.90	.85
Stapedial Reflexes		
500 Hz	100	100
1000 Hz	110	105
2000 Hz	NR	NR

Audiometer GS 1701
Imp meter 20 72
1969 ANSI Stds

FIGURE 3–6 Audiological evaluation results for Case #2.

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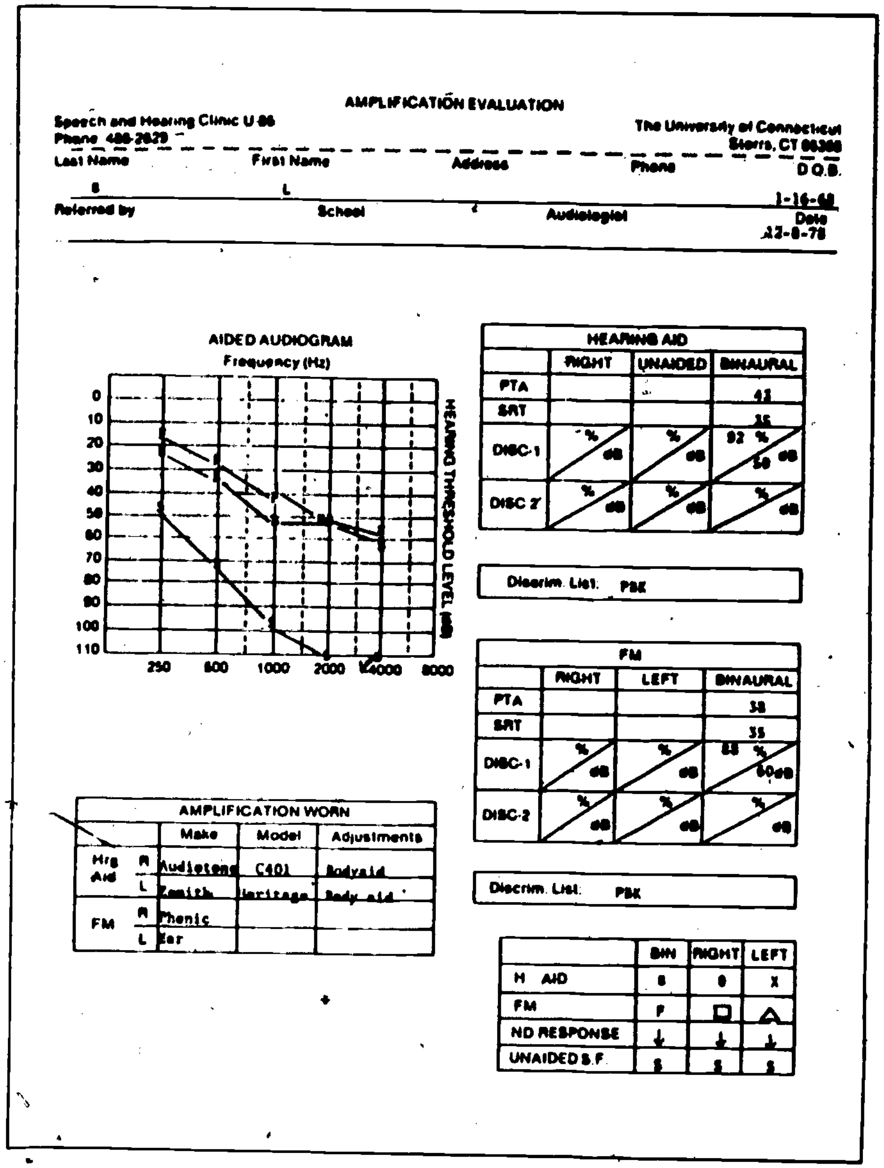
(2) The Phonic Ear unit be repaired and reset. The possibility of purchasing a new binaural unit which allows for separate setting of the channels should be considered. The importance of an appropriately functioning FM unit in the classroom to reduce the problems of noise, distance and reverberation cannot be overstated.



AMPLIFICATION EVALUATION

Speech and Hearing Clinic U 85
Phone 486-2629

The University of Connecticut
Storrs, CT 06268

Last Name	First Name	Address	Phone	D.O.B.
B	L			1-16-68

Referred by	School	Audiologist	Date
			12-8-78

HEARING AID	RIGHT	UNAIDED	BINAURAL
PTA			42
SRT			35
DISC-1	% dB	% dB	92 % 50 dB
DISC 2	% dB	% dB	% dB

Discrim. List: PBK

FM	RIGHT	LEFT	BINAURAL
PTA			38
SRT			35
DISC-1	% dB	% dB	88 % 60dB
DISC-2	% dB	% dB	% dB

Discrim. List: PBK

AMPLIFICATION WORN		Make	Model	Adjustments
Hrg Aid	R	Audiotone	C401	Bodyaid
	L	Zenith	Heritage	Body aid
FM	R	Phonic		
	L	Ear		

	BIN	RIGHT	LEFT
H AID	B	0	X
FM	F	□	△
NO RESPONSE	↓	↓	↓
UNAIDED S.F.	S	S	S

FIGURE 3–7 Amplification evaluation results for Case #2.

Excerpted from Robert B. Johnston, "Motor Function: Normal Development and Cerebral Palsy" in Robert Johnston and Phyliss Magrab (eds.) Developmental Disorders: Assessment, Treatment, Education. University Park Press, 1976

chapter 2

Motor Function: Normal Development and Cerebral Palsy

Robert B. Johnston, M.D.

II-91

The principles underlying normal development are outlined and provide a basis for the understanding of aberrant development, as exemplified in cerebral palsy. Considerable importance is placed on the role of postural reflexes as a basis for habilitation techniques utilized by physical therapy in Chapter 9.

PART I. MOTOR DEVELOPMENT: NORMAL

INTRODUCTION

Definition

Motor development refers to that process of gradual acquisition of skills that incorporate *movement*. Gross motor skills have to do primarily with crude movements involved in rolling over, sitting, walking, stair climbing, and running, whereas fine motor skills include more precise movements necessary for such activities as grasping blocks and pellets, piling blocks, and manipulating a pencil.

The progressive maturation of the nervous system underlies the sequential development of these motor skills. This process of maturation entails progressive alterations in the biochemistry, physiology, and anatomy of the brain and its connections: the so-called central and peripheral nervous systems. At some point, usually in the midteen years, the adult level of maturation is reached and the process is terminated.

Perspective

Significance Of all the spheres of development, the motor aspects are probably the most readily observed and easily recorded. Although many parents recall very little about their child's early development, they usually can remember that infamous day when he first rolled over (off the changing table) or that glorious day when he took his first independent step. Recordings of developmental data in baby books are notoriously biased towards motor development, with documentation of motor milestones far outweighing the other spheres: language, personal-social, or adaptive skills.

It is not surprising, then, that many people mistakenly equate a child's "development" with his acquisition of motor skills alone. This is misleading. Brain maturational processes affect many areas of function, only one of which is motor development. In an individual child whose motor development is progressing at a normal rate, one can assume that normal neuromotor maturation is taking place, but cannot necessarily assume that other brain functions are likewise progressing normally. Thus, despite its popularity with the general public in terms of its recall and recording, dependence on it *alone* for overall developmental assessment is inappropriate, inaccurate, and misleading.

Neuromotor Maturation The motor system is considered to be the one area of development that most accurately reflects specific *neurological maturation*. As the brain, its peripheral connections (nerves), and the muscular system undergo maturational changes, a sequence of motor functions and skills evolves which is fairly predictable from individual to individual and minimally affected by environmental influences.

Environmental influences have little effect on the acquisition of skills until such time as there is sufficient neurological maturation to support the required motor functions. Attempts to acquire a specific skill, such as walking, by frequent stimulation and practice will be fruitless if the underlying necessary neurological prerequisites are not yet present. Likewise, understimulation or lack of practice does not appear to grossly affect the motor maturational process to a great degree. There have been cultures who swaddle their infants' legs during the first year of life so that little or no practice is permitted. Yet, the skill of walking appears within days after the restraints are removed at one year of age. This reflects the uninhibited progression of neuromotor maturation during that year of inactivity.

This is not to say that *severe* environmental deprivation with excessive understimulation would not impede the acquisition of motor skills to some degree. The point is that, relatively speaking, motor development is the developmental sphere least affected by outside influences, and the expression of motor abilities is a fairly direct indication of the degree of neuromotor maturation.

This phenomenon is important to understand when intervention is considered. Efforts should not be directed toward having the child acquire skills that require elements of motor function that have not sufficiently developed. Active intervention in encouraging and fostering the acquiring of skills can best be initiated when there is evidence of neurological "readiness." (See Chapter 9.)

Rate and Sequence There is much more to the study of development than memorizing its rate of progression. This may come as a surprise to the myriad of students who, before examinations, memorize the ages at which developmental milestones appear. Scales denoting developmental rates are available and should be referred to for that specific type of information.

On the other hand, motor development involves rather unique sequences and patterns of activity that occur during the acquisition of skills and are consistent from individual to individual. Understanding of the underlying sequences of development is vital; memorization of the appropriate age levels becomes of secondary importance.

Summary

Therefore, it is important to put motor development in its proper perspective. In the general scheme of development, it is one of many spheres of behavior that evolves which reflects underlying neurological maturation. As such, motor development, in and of itself, is a good indicator of neuromotor maturation and, although a considerable degree of interdependence exists with other areas, it does not necessarily reflect the level of maturity in other spheres such as language or intelligence. Although the maturational process usually progresses uniformly in all spheres, this is not necessarily so, especially in the brain-damaged population. Motor development is least affected by environmental influences. Therapeutic intervention can most efficiently be utilized when sufficient neurological readiness for a given skill has been determined. Sequence and rate are important aspects in understanding motor development.

PATTERNS OF MOTOR DEVELOPMENT, FIRST YEAR

Introduction

When one considers the enormous strides in motor skills that the newborn baby is expected to achieve in a short period of 12 months, one is duly impressed with the amount and quality of nervous system maturation that must take place.

At birth, the baby is quite motorically inept, to say the least. Since the elements of his motor activity are at such a primitive, crude level, his repertoire of motor skills is negligible. His motor system is basically at a reflex level, i.e., movements and postures are being generated automatically with no component of voluntary control. Certainly, there is movement of body parts, but there is no meaningful, voluntary activity in a directed or coordinated fashion. Yet, in 12 months, this totally dependent, nonfunctioning motor system progresses to acquire a sufficient degree of proficiency in many of the basic motor functions to accomplish a number of complex motor skills.

Rather extensive study of the principles, mechanisms, and characteristics of motor development in the first year is stressed for many important reasons. The improvements in function that occur reflect dramatically the underlying dynamic maturational processes. Second, the unfolding of these early functions and subsequent skills is the foundation and basis for all future motor development. Finally, many motor-disabled children represent arrests in motor development at this infantile level, so that understanding of their aberrant manifestations can be enhanced by an awareness of these basic normal patterns.

Cephalocaudal Progression

The nature of the maturation process occurring in the brain and its peripheral connections is reflected in the pattern of skill acquisition noted in the first year of life. The metabolic activity and anatomical changes involved in the maturational process are concentrated in different areas of the nervous system at different times. In the brain, there is initially intensive activity in those areas having to do with head control and eye movements. Subsequently, this increase in intensity is transferred to other areas of the brain serving various parts of the body. In addition, there are further maturational changes taking place in the peripheral nerves, such as completing the nerve linings and increasing connections with muscles that are serving similar body parts. Thus, there evolves a pattern of skill development that starts with the head and gradually progresses down the body sequentially to include upper trunk, arms, lower trunk, and legs, respectively. This progression is termed "cephalocaudal," literally meaning from top to bottom.

Table 2 summarizes this sequential progression. During the first three months, the majority of progress centers around head and eye control so that by the end of the third month the head can be held up and visual tracking through an arc of 180° is possible. During the second three months, the upper part of the trunk and the arms come under better control so that by the end of six months the sitting posture is maintained, reach and grasp are coordinated, and creeping, involving upper trunk and shoulders, is begun without much of a contribution from the legs. During the third three-month period, the lower part of the body joins in so that by nine months of age the ability to crawl, using a coordinated effort of alternate arm and leg movements, is acquired. Additional ability to integrate arm and leg efforts to pull to stand is also possible. Finally, in the last three months, integration of the upright posture and coordination of leg movements culminate in successful attempts to begin walking independently. Thus, the emergence of motor abilities in the first year of life reflects nicely the cephalocaudal progression of maturation within the nervous system and the subsequent skill acquisition from head to toe.

Table 2. Cephalocaudal progression of motor skills

Year 1	Maturation	Skill accomplished
Quarter I, 0–3 months	Head and eyes	Head up, follow 180°
Quarter II, 3–6 months	Upper trunk and arms	Sit, reach, creep
Quarter III, 6–9 months	Lower trunk	Crawl, pull to stand
Quarter IV, 9–12 months	Integration of legs	Walk

The progression of maturational changes occurring in the first year of life follows a distribution from head to foot, resulting in a sequential acquisition of skills.

Proximodistal Progression

The progressive development of fine motor or manipulative skills demonstrates yet another sequential pattern. Advances in use and control are noted first in those muscle groups close to the body (proximal), progressing to those muscle groups located further away (distal). Specifically, this means that the ability to control movements in the shoulder and elbow occurs before the time that finger movements are controlled effectively. This pattern reflects not only maturation of certain brain centers, but also progressive maturation of the peripheral nerves as they make more extensive and effective connections with the more distally located muscle groups.

Once movement control begins in the fingers, there is a long period of time required for development of refined, well coordinated movements necessary for certain manipulative skills. The responses to one-inch blocks during the first year outline this process well.

Initially, the young baby, when seeing the blocks, becomes generally active and grossly flails his arms and legs in a discoordinated way. At this early age, the grasp is reflexive, meaning that the fingers will automatically fold over the block when it touches the palm. This mechanical grasp is suppressed by the effect of higher brain center maturation at about two months of age.

By four months of age, the baby's shoulder and elbow movements are somewhat coordinated and are strong enough to approximate the block so that he can grasp it in an awkward fashion. The evolution of hand positioning and finger use in grasping advances from the lateral side of the palm, with use of the fourth and fifth fingers (ulnar grasp), to the midpalm area and middle fingers (palmar grasp), and finally to the medial side of the palm with the predominant use of thumb and index finger (radial grasp) (Figure 4). With this gradual concentration of activity in the thumb and index finger, increasing degrees of precision and refinement of grasp are possible by 9 to 10 months of age.

Concomitant with the developing abilities to grasp is the unfolding of the ability to voluntarily release the block. The six-month-old infant can grasp a block in each hand. However, when offered a third block, he cannot release either one and therefore often attempts to grasp the third block with his "third hand," his mouth. However, in a month or two, he is able to release one block in association with grasping another, so that he will drop the second cube and pick up the third. However, it is not until 9 to 10 months of age that he is able to voluntarily release a block independent of the desire to grasp another one. Thus, by 11 months, he is

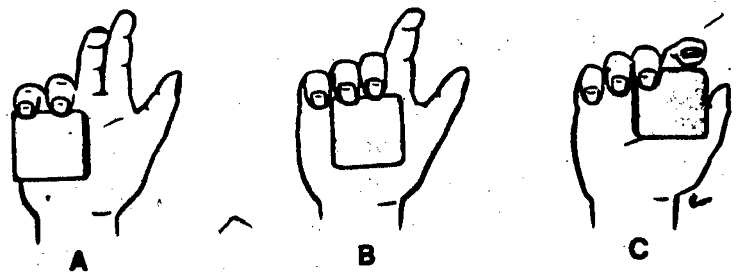


Figure 4. Evolution of cube grasp. As maturation progresses, the predominant position of grasp evolves from ulnar (*A*) to palmar (*B*) to radial (*C*).

able to release the block into a cup, not just thrust it away as noted earlier. Finally, by 12 to 13 months, he begins to refine his release to such a degree that he can pile one block on top of the other. It is the further maturation of this release mechanism that permits the child to gradually coordinate his release movements to such a precise degree that he can build a six- to seven-block tower by two years of age.

Likewise, the refinement of extreme distal finger skills can be discerned by observing the child's manipulative abilities with a pellet. In this case (Figure 5), sequential changes range from an initial raking type of grasp involving all fingers to a scissoring type of movement with the pellet between thumb and the base of the index finger (scissors grasp) and finally to the approximation of the tips of the thumb and index finger, holding the pellet in a refined, delicate fashion (pincer grasp). This progressive pattern takes approximately six months to complete and, again, reflects the underlying maturational changes occurring in the brain and peripheral nerves. This ability to oppose the thumb to the index finger is a developmental achievement which separates man from his primate (monkey) relatives who are, unfortunately, stuck with a palmar grasp!

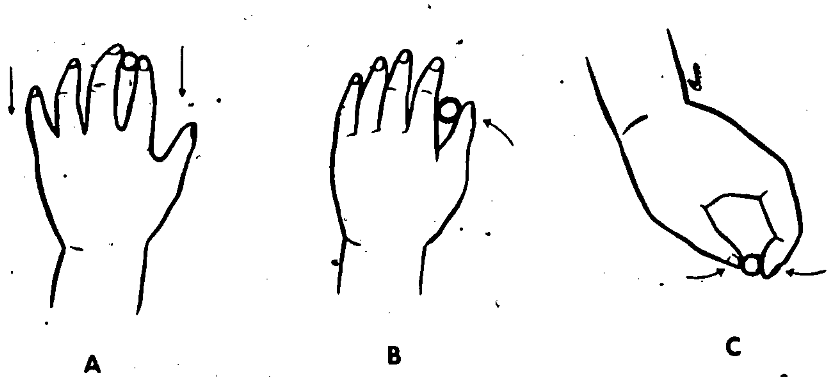


Figure 5. Evolution of pellet manipulative skills. The types of grasps progress from raking (*A*) to scissors (*B*) to pinces (*C*).

Postural Reflex Evolution

Basic to the understanding of motor development in the first year of life is an appreciation of the nature of the changes occurring in *control* of motor activity. First, there are gradual adjustments in the involuntary-voluntary control continuum, and, second, there are changes in the nature of the involuntary reflex activities.

The term "reflex" is used to connote a specific automatic patterned motor response which is induced by a particular stimulus and does not involve any voluntary or conscious control. Postural reflexes primarily involve changes in tone and its distribution that affect posture and movement. In contrast, the so-called "deep tendon reflexes," of which the "knee-jerk" is a well known example, represent a different category of reflexes that involve limited movement but not necessarily posture.

Control Mechanisms At birth, the body is under the unopposed control of the lower brain centers, which basically generate involuntary reflex movements and postures. Like the plane that is placed on automatic pilot, the body responds mechanically and automatically to a number of influences such as head or body position through changes in muscle tone which affect posture and/or movement in a number of consistent patterns termed "primitive reflexes." As the higher brain centers, those involved in conscious, thought-induced, voluntary activity, mature, they counterbalance and gradually suppress the influence of the primitive reflexes. This change in type of dominant control mechanisms frees the body of the limiting involuntary reflex patterns and makes a wider range of voluntary movements possible.

Primitive vs. Automatic Responses As these primitive reflex patterns are being suppressed, there appears another set of patterned responses termed "automatic reflexes." These reflex patterns involving changes in tone and/or movement actually contribute to the acquisition of new motor skills by supporting such functions as balance and equilibrium. For instance, if sitting balance is disturbed by an outside force, the automatic reflexes provide the necessary tone changes to overcome the shift in weight and assist in regaining the normal sitting posture.

The interplay of influences between voluntary control and involuntary control, between primitive and automatic reflexes, as well as the interplay between the two sets of influences, determines to a great extent whether development will progress normally or defectively. Review of some of the more influential reflex patterns and their significance in motor development will provide clarification of these facts.

Primitive Reflexes By definition, these are involuntary responses, usually noted at the time of birth, affecting posture and movement, which are gradually suppressed as higher control centers mature. There are literally dozens of primitive reflexes noted around the time of birth. Those that seem to have most clinical relevance during the first year of life have been chosen for discussion.

The *Moro response* (Figure 6) is frequently studied in the newborn period. It is elicited by extending the infant's head backwards and results in movement of the arms in an "embracing" posture. Although oftentimes this response is elicited by slapping the surface on which the baby is lying, it is not an auditory reflex and should be distinguished from the "startle response," which is a persistent reflex response. In contrast, the Moro response disappears at about three to five months of age. Short of its importance in assessing neurological maturity in the newborn period, this reflex is not as clinically significant as many of the others in terms of interference with function. Its absence at birth or its presence beyond five months is evidence of neurological dysfunction.

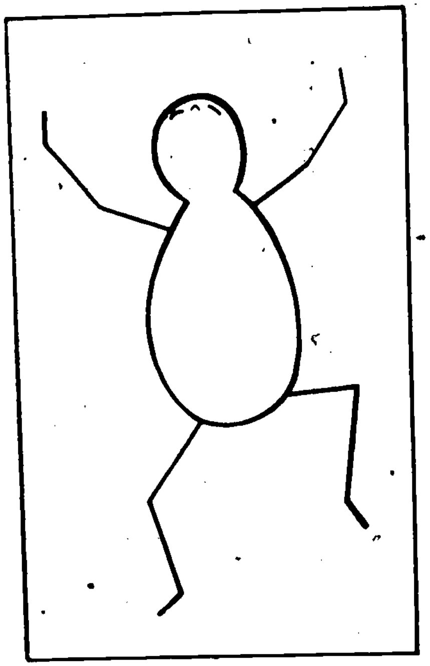


Figure 6. Moro response. When the head is rapidly extended, the arms assume a characteristic embracing posture.

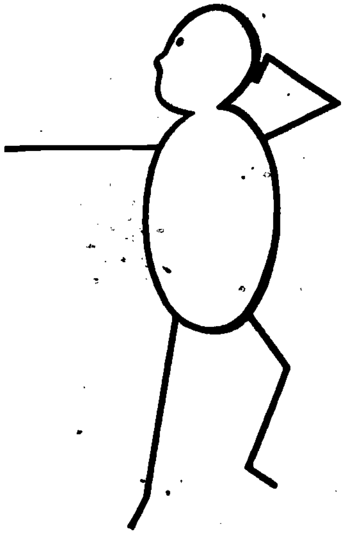


Figure 7. Asymmetrical tonic neck reflex. The characteristic "fencer's posture" is elicited by turning the head to one side causing flexion on the skull side and extension on the chin side.

The *asymmetrical tonic neck reflex* (Figure 7) is a frequently referred to reflex pattern of movement and is elicited by turning the head to one side. There is subsequent movement of arms to the characteristic "fencer's position," i.e., if the head were turned to the right the right arm would straighten and the left arm would flex at the elbow. The legs might also be involved in similar postural changes, but this is variable. There are two important aspects in the clinical assessment of this reflex. The first is the strength of the induced posture. In the very young baby, each time the head is turned, actively or passively, the posture is elicited. However, at no time in the evolution of this response should this posture be obligatory since the child should be able to break out of the pattern with crying or struggling. The important thing to note, then, is how influential this position is in interfering with the child's overall posture and voluntary movements. The second important aspect is the time at which the reflex loses its influence. In most cases, the posturing disappears by three to five months of age with, however, some exceptions extending until nine months of age during sleep.

The *tonic labyrinthine reflex* (Figure 8) influences posture predominantly and its response depends upon the position of the head, or, more specifically, upon the position of the labyrinth, which is an organ located in the inner ear. Under its influence, when the body is in the supine position (on back), the predominant posture of extension is noted with the legs straightened out, shoulders retracted, neck arched, and head pressed back against the surface (Figure 8, *a* and *b*). This posture makes it difficult to raise the head, to reach out, or to roll over. On the other hand, in the prone position (on the stomach) the predominant posture induced is one of flexion, with the arms and legs bent under the body and the neck and head flexed toward the surface (Figure 8*c*). This posture makes it difficult to lift the head up or to straighten out the arms and legs. These reflex patterns usually lose their influence between one and three months of age, thus permitting the lifting of the head from the prone position at one month and from the supine position at two to three months.

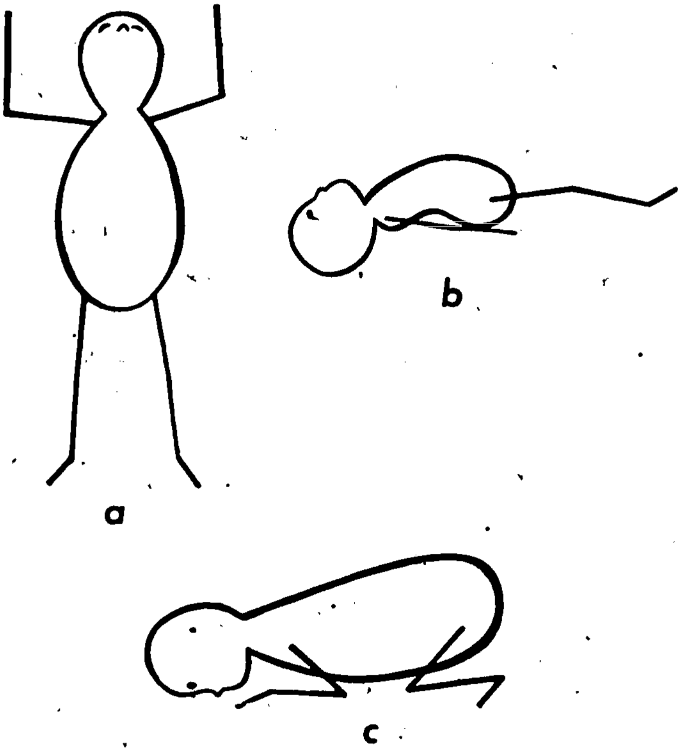


Figure 8. Tonic labyrinthine reflex. In the supine position (*a*, *b*), the predominant posture is one of extension at the neck and legs, retraction at the shoulders, with variable positioning of the arms. In the prone position (*c*), the predominant posture is one of flexion involving neck, arms, and legs.

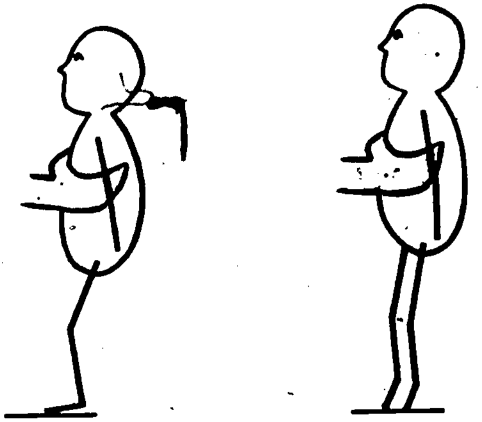


Figure 9. Positive supporting reflex. When the soles of the feet are stimulated on a surface, there is extension of the hips, knees, and ankles, providing a rigid pillar of support.

The *positive supporting reflex* (Figure 9) is elicited by touching the soles of the feet on a hard surface and results in stiffening of the muscles of the legs so that they straighten out and support the body's weight. This type of response is noted at two different times in the first year of life. The initial neonatal reaction is present at birth and wanes between six and eight weeks of age. The infantile form reappears somewhere between six and nine months. This latter pattern causes tensing of most muscle groups of the legs with stiffening of the legs, standing on the toes, and a tendency to bring the legs together. If the reflex is excessively strong, the legs will assume a scissors-like posture, remaining quite stiff and obviating any voluntary movements that would be necessary for walking. In addition, the marked increased tone in the muscles of the legs makes it impossible to incorporate any subtle changes in tone that might be necessary to maintain balance and equilibrium. This reflex, then, must lose its influence before the onset of walking.

The *placing reflex* (Figure 10), elicited by touching the upper surface of the hands or feet, results in movement of the hands or feet over and above the stimulus. Frequently, the tops of the feet are touched lightly by the undersurface of the examining table, with the resultant movement of the feet over and subsequently onto the table top. This response is present in the newborn period and is gradually integrated into voluntary activity during the first year of life.

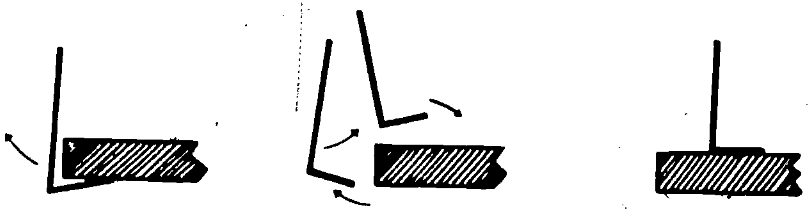


Figure 10. Placing reflex. Stimulation of the dorsum of the foot results in movement of the foot and leg so that the foot is placed onto the overriding surface.

The *stepping reflex* (Figure 11) is another involuntary reflex that is found in the newborn period and often is a source of false parental pride because of the mistaken notion that their prodigy is an early walker! The infant, being supported in a standing position, will alternate leg movements in a stepping fashion from a time early after birth to approximately three to four months of age.

The *Landau reflex* (Figure 12) involves postural changes when the child, who is suspended in a horizontal prone position, lifts his head up. The resultant increased neck muscle tone induces a specific response of leg straightening and back arching. When the head is moved downward, the leg and back postures dissipate. The initial appearance of this reflex is variable, but usually it is present by six months of age and is gradually suppressed by voluntary activity during the second year of life. Although the functional significance of this reflex is questionable, it may be of some help in maintaining trunk stability and hip extension in the standing position when the neck is extended.

Figure 11. Stepping reflex. When supported in a standing position, the infant will alternate leg movements in a stepping fashion.

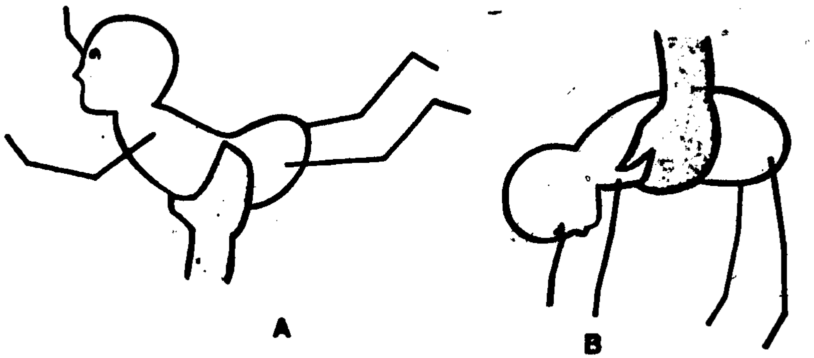


Figure 12. Landau reflex. *A*, when the neck is actively extended, there are concomitant arching of the back and extension of the legs. *B*, with flexion of the head, there are concomitant relaxation of the legs and loss of back arching.

Both the Landau and the symmetrical tonic neck reflexes are not considered classical primitive reflexes because they are not present near the time of birth. However, they both share the characteristic of being inhibited as a result of maturation, and for this reason are classified under the primitive reflex category.

The *symmetrical tonic neck reflex* (Figure 13) involves changes of posture in the head, neck, arms, and legs. When the child is in the

Figure 13. Symmetrical tonic neck reflex. *A*, when the head is extended, the arms extend and the hips flex. *B*, when the head is flexed, the arms flex and the hips extend.

hands-and-knees kneeling position and the head is lifted upward (extended), the arms will straighten (extend) and the hips will bend (flex) (Figure 13*A*). Conversely, if the head is bent downward (flexed), the arms will also flex at the elbows and the hips will extend (Figure 13*B*). These positional changes can be initiated either by movements originating at the head, as described, or by similar movements at the hips. Although some observers feel that this reflex does not appear in normal development, others feel that it does appear around six to eight months, with a rapid disappearance by nine months of age. It could assist a child in getting up on his hands and knees when he extends his head in the prone position, but it would interfere with maintaining this position once the head is flexed since automatic flexion of the arms would result in a loss of upper trunk support.

Automatic Reflexes This category of reflex patterns, unlike the primitive reflexes, is not present at birth but evolves during the first two years of life. The reflexes are specifically involved with righting, protective, and equilibrium activities and are vital assists in achieving and maintaining many motor skills.

Righting Reflexes This group of automatic reflexes assists in maintaining the position of the head, trunk, arms, and legs in proper relationship to one another and to gravity, i.e., they aid in supporting the upright posture by actually supplying information about and responding to which end is up.

The *head righting reflex* (Figure 14) is responsible for keeping the head in an upright posture and is the very basis for further development of skills in the upright position. The reflex is noted in the response of head movements when the body is tilted from side to side or when it is held upside down. The induced response will attempt to keep the head in such a position that the face is vertical and the mouth is horizontal to the ground. Its influence begins at about four to six weeks of age and is apparent when the child, who is lying on his stomach, begins to lift his head up. With further maturation, the reflex becomes more dominant so that during the next two to three months, head lifting from the prone and supine positions (stomach and back) is more readily accomplished.

Another type of righting reaction is the so-called *derotative reaction* (Figure 15). Very simply, these induced movements can be thought of as the response of the rest of the body when one part rotates out of line. For instance, if the head and neck are rotated to one side, the shoulder, rib cage, abdomen, hips, and legs will, in a sequential order, rotate in the same direction as the initial movement and get the body back into alignment. Likewise, if the rotation is initiated at the hips, there is a sequential

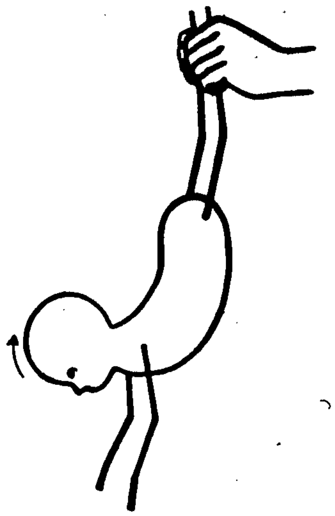


Figure 14. Head righting reflex. There is an attempt to maintain the head in such a position that the face is vertical and the mouth is horizontal to the ground.

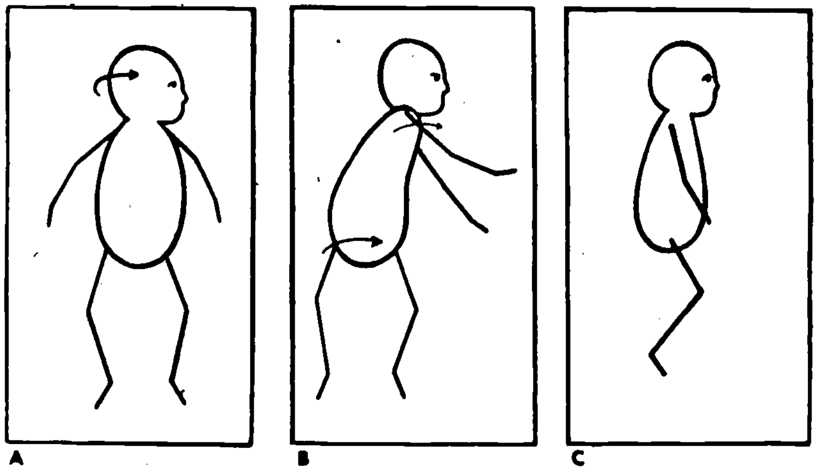


Figure 15. Derotative reaction. When the head and neck are rotated (*A*) there is a segmental sequence of movements from the shoulder, trunk, and legs (*B*) to "derotate" the body and maintain normal alignment (*C*).

rotation up the body from the abdomen, ribs, shoulders, neck, and head to derotate and regain the original alignment. This type of sequential rotation is distinguished from the "log rolling" phenomenon seen in the newborn period, in which any attempt to produce a rotation is immediately responded to by total, simultaneous movement similar to that seen when rolling a log. In contrast, the true derotational reactions usually start around four to six months and become quite influential by eight to ten months. They contribute to the child's ability to roll over, as well as to other activities that require rotation.

Protective Reflexes (Figure 16) These responses are activated by rapid changes in body position simulating a fall and are characterized by movement of extremities in an attempt to "break" the fall.

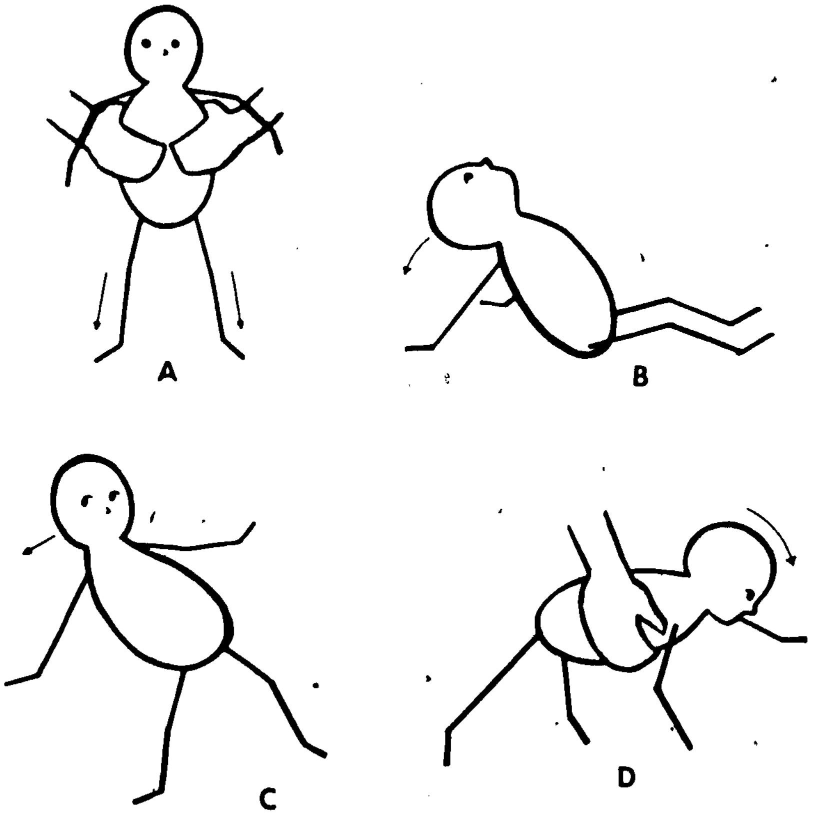


Figure 16. Protective reflexes. These are a series of responses to changes in body position. *A*, downward; *B*, posterior; *C*, lateral; *D*, forward.

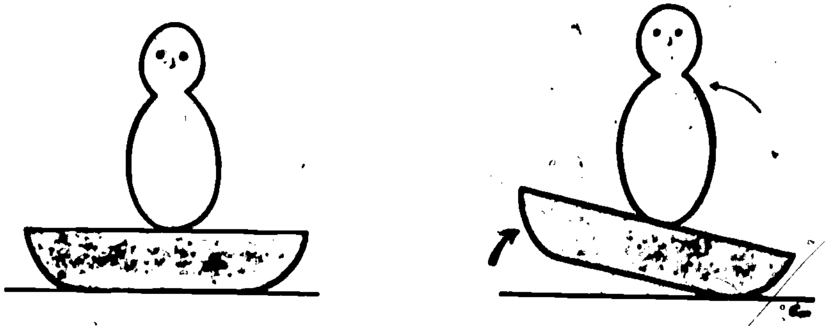


Figure 17. Equilibrium responses in sitting. In response to tilt, the body will adjust to maintain its upright position.

The legs extend when the fall is downward. The arms stiffen and move in the direction of the fall when it is *forward* or *backward*. The arm toward the side of the fall straightens when the direction of the fall is *lateral*.

There is a sequential appearance of these responses beginning with the downward response at four months, forward response at seven to nine months, lateral response at eight months, and ending with the posterior response at 10 months.

Equilibrium Responses (Figure 17) This set of reactions comes into play in order to maintain a given posture when there are mild changes in position such as those induced by tilting (angular acceleration). They differ from protective responses because they are stimulated by more subtle changes in position. They are developed in all body positions, including prone, supine, sitting, and standing postures. Although present at characteristic ages, their proficiency increases as maturational changes progress. They initially appear at four months in the prone position, eight months in the sitting position, and one year in the standing position, but their full development requires additional time.

These automatic responses—righting, protective, and equilibrium—can be thought of generally as supporting influences that are necessary for the further progression of motor skills during and after the first year of life. They are among the very fundamental requirements for coordination, balance, and movement, and are called upon constantly in a wide variety of activities.

Functional Significance It is apparent, then, that a number of postural reflexes play an important role in the progressive acquisition of motor skills in the first year of life. The interaction between the diminishing influence of the primitive reflexes that interfere with the development of voluntary movements and postures and the gradual increasing influence of the automatic responses that assist in motor skill acquisition during the first year of life is discussed below (Table 3).

Early Prone and Supine Activity Under the influence of a strong tonic labyrinthine reflex, there is little effective activity in the prone or supine positions because of the predominant flexion and extension postures, respectively. This effect on head position must be overcome by the head righting reflex if the head is to be raised from either the prone or the supine positions. Thus, as the tonic labyrinthine influences lessen and the head righting responses become more influential, voluntary head movements become possible.

Table 3. Functional significance of postural reflexes

Activity	Postural reflexes	
	Assist	Interfere
1. Early prone		
Head lift	Head righting	Tonic labyrinthine Asymmetrical tonic neck
2. Early supine		
Head lift	Head righting	Tonic labyrinthine Asymmetrical tonic neck
Reach		Tonic labyrinthine Asymmetrical tonic neck
3. Rolling		
Rolling over	Head righting Derotation	Tonic labyrinthine Asymmetrical tonic neck
4. Sitting		
Come to sit	Head righting Derotation	Asymmetrical tonic neck Tonic labyrinthine
Stable sitting	Protective Equilibrium	Asymmetrical tonic neck Symmetrical tonic neck Tonic labyrinthine
5. Crawl		
Reciprocal crawl	Equilibrium	Symmetrical tonic neck Tonic labyrinthine Positive support
6. Stand		
Pull to stand	Positive support	Positive support Asymmetrical tonic neck
Stable stand	Positive support Protective Equilibrium	Positive support Tonic labyrinthine
7. Ambulate		
Cruise	Equilibrium	Positive support
Walk	Protective Equilibrium Asymmetrical tonic neck	Positive support Tonic labyrinthine Asymmetrical tonic neck

The role played by certain postural reflexes in assisting and interfering with developmental milestones is outlined. Note the positive supporting reflex may be assistive or interfering, depending on the intensity of the reaction. Selection of postural reflexes is not necessarily complete for each milestone but represents those that are most frequently significant.

Reach and Grasp In order to accomplish an effective reach and grasp, adequate eye-hand coordination as well as sufficient freedom from the influence of the asymmetrical tonic neck and tonic labyrinthine reflexes are necessary.

Rolling Normally, an effective roll is initiated by head righting, followed by rotation of the head and subsequent derotation of the remainder of the body to effect the desired movement. If the tonic labyrinthine response is strongly influential in the supine position, these basic movement patterns will be hampered because of the stiffness in the legs and the retraction of the shoulders. The asymmetrical tonic neck reflex would also interfere with rolling because the initial rotation of the head would induce extension of the arm to that side and block further rolling at the shoulder.

Sitting Maintaining a stable sitting posture requires the basic righting reflexes to keep the upright posture, the protective reactions to counteract any sudden, abrupt changes in position, and equilibrium reactions to respond to the more subtle changes in position (tilt). On the other hand, if the asymmetrical tonic neck reflex, with its characteristic arm postures and associated tone changes in the supporting back muscles, is influential, it will cause the child to topple when he turns his head to one side. If the tonic labyrinthine reflex is influential, it will interfere with the sitting child when he extends his head backwards, since the resultant hip extension will force the trunk backwards and cause loss of sitting support. Likewise, equilibrium reflexes requiring subtle tone changes will be ineffective when tone is predominantly influenced by the tonic labyrinthine reflex.

Locomotion Locomotion is achieved through coordination of arm and leg movements while on hands and knees. Certainly equilibrium reactions in the hands-and-knees position would have to be quite well developed if these complicated postural changes and movements were to be effected. Interference comes from the symmetrical tonic neck reflex which would induce collapse of the supporting arms when the head was flexed or the hips were extended. A strong positive supporting reflex, which is induced by pressure on the soles of the feet, could be initiated in the crawling position and would interfere with alternate leg movements by its general extensor thrust of both legs simultaneously. The tonic labyrinthine reflex, by its influence on flexor and extensor tone of the extrem-

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ities, would also inhibit coordinated movements necessary for locomotion in prone or hands and knees position.

Standing In addition to several other factors, such as motivation, strength, and attention, rather well developed protective and equilibrium responses are necessary to maintain the standing position. Although the positive supporting reaction can help in getting to stand, it can interfere with standing if it is so strong that subtle tone changes cannot be produced. Thus, the "rigid pillar of support" that can be produced by an excessively strong positive supporting reaction will make a functional standing position untenable.

Walking Along with voluntary control, the reflex mechanisms involved in righting, protective, and equilibrium responses are necessary for the maintenance of this skill. A strong positive supporting reaction, with its excessive extension and scissoring of the legs, will, in addition to its interference with effective equilibrium responses, make it impossible to initiate voluntary stepping because of the difficulties of flexing at the knee or hip.

PART II. MOTOR DEVELOPMENT: ABNORMAL

INTRODUCTION

Deviation from motor developmental norms can occur for a number of reasons. Essentially, things can go wrong anywhere along the line, from the bones to the brain. The complexities of developing motor function normally require the entire system to be intact. If the bones or joints are abnormally formed or if the muscles are intrinsically weak or malfunctioning, then the normal progression of motor development will be impeded. These peripheral concerns dealing with bones and muscles are not detailed in this chapter. Instead emphasis is placed on the role of the deficient nervous system in deviant motor development based on background information on normal development discussed above.

Influencing Factors

Failure to progress through normal developmental stages in the appropriate fashion may be due to an underlying slow *rate* of maturation, an interruption of the pattern or *sequence* of events by specific defects in motor elements, or a combination of both of these factors.

Rate Many "slow" children progress through normal sequences of motor abilities but do so at an abnormally slow rate. This type of deviation may be seen in mental retardation where the slow motor developmental rate is part of a global delay and limitation of ultimate potential. It should be noted, however, that not all mentally retarded children have marked delay in motor development.

Likewise, all children with delayed rates of motor development are not mentally retarded. There is a group of children who exhibit early delays in the rate of motor development, only to "catch up" later with no residual sign of motor or mental impairment. This phenomenon is not well understood and has been noted to appear throughout certain family trees.

Defective Patterns In certain other examples, despite a normal underlying rate of maturation, there is a delay in developmental progress because of a specific defect which interferes with the acquiring of an expected motor skill. A defect, such as excessive tone, may so interfere with control of movement that effective use of the involved extremity will be impaired. Because of this impairment, the acquiring of certain skills will be impeded. A child with cerebral palsy who has increased tone, discoordination, and apparent weakness on the right side of his body will require significantly more time than would normally be expected to cultivate motor functions to the degree necessary to compensate for these defects. For instance, in order to walk in the presence of a specific defect, compensatory mechanisms involving balance, coordination, and equilibrium will have to be more proficient than would be necessary for a normal child with no defect. Therefore, the delay in attaining motor skills and milestones is not due to a retarded rate of maturation but due to an exaggerated requirement for functional proficiency that is necessary to compensate for specific defects.

Rate and Defect The combination of slow maturational rate and specific defect in tone, strength, and/or control is often seen in aberrant motor development. The mentally retarded child who has, in addition, characteristics of cerebral palsy is a classic example of this pattern.

In summary, the proper understanding of the child with abnormal motor development requires assessment as to whether the problem rests with *rate*, as seen in normal familial patterns and mental retardation, with *defective patterns* interfering with skill progression, as seen in cerebral palsy, or with both components, slow rate and defective patterns, as seen in mental retardation with cerebral palsy.

The significance of abnormal motor development rests in its nature and depends on the degree, type, and pattern of delay. It should be noted that motor delay in and of itself is a poor predictor of future intelligence and should bear little weight in overall judgments in this regard.

CEREBRAL PALSY

Definition

The term "cerebral palsy," although literally meaning "brain weakness," actually defines a limited group of motor handicaps of a specific nature and etiology.

The source of the motor deficiency is limited to *nonprogressive lesions* of the brain which occur during the *maturing years*. This limitation omits that group of motor problems that are due to progressive brain lesions, such as brain tumors or metabolic degenerative diseases; abnormalities outside the brain affecting the peripheral nervous system (neuritis) or the muscular system (muscular dystrophy); and those deficits occurring after the nervous system has reached maturity, such as adult cerebrovascular strokes.

Therefore, because cerebral palsy is limited to motor problems secondary to abnormalities in the maturing central nervous system, the study of its various manifestations reflects deviations from the patterns and mechanisms underlying normal development discussed above.

Classification

As noted previously, there are a number of basic elements of motor function, such as tone, strength, and control, that interact to produce motor functions and, ultimately, motor skills. Although most elements are disturbed in one way or the other in the cerebral palsied child, there usually is one prominent dysfunctioning element that primarily affects the others. This major defective element, commonly, disordered tone or movement control, is used to categorize various types of cerebral palsy (Table 5).

Terminology

The terms used to describe the nature and location of the motor impairment are sometimes confusing. To identify areas of the body that are involved, several Latin or Greek prefixes are used: "*hemi-*" refers to involvement of one side of the body, usually affecting the arm more than the leg: "*di-*" and "*para-*" refer to involvement primarily of both legs; and "*quadra-*" refers to involvement of both arms and legs, with greater effect on the legs. On occasion the term "*bilateral hemi-*" is used to describe involvement in arms and legs, with greater effect in the arms. The suffix "*-plegia*" technically means paralysis or inability to move, and "*-paresis*" refers to weakness. Usually both terms are used interchangeably and imply various degrees of difficulty with movement.

Table 5. Classification of cerebral palsy based on the major defective element involved

Primary defect	Descriptive term
Tone	
Increase	Spastic Rigid
Decrease	Atonic
Control	Choreoathetoid Tremor
(Balance)	Ataxic
Strength	Paresis Plegia

Description

The manifestations of disordered motor function are legion but their basis in cerebral palsy is focused in the brain. The role of the brain is to produce motor skills by initiating, coordinating, and integrating a number of increasingly complex activities. To do this, the brain must control a precise and delicate balance between a number of sets of interacting opposing forces. In cerebral palsy the damaged brain fails in this regard. Throughout the cerebral palsy world are dysfunctions due to improper balance between voluntary and involuntary controls, stimulating and suppressing influences, flexion and extension postures, to name just a few. The results of these imbalances, their effect on the basic *elements* of motor activity and their ultimate manifestations in disordered motor development, will be studied in the remainder of this discussion.

Tone Disturbance: Manifestations Tone refers to the degree of muscle tension and its resultant resistance to stretching. Classically, the tense, frightened individual has increased muscle tone, whereas the relaxed, sleeping individual has decreased muscle tone. Persistence of exaggerations of these extremes of tone are termed *hypotonicity* (decreased) and *hypertonicity* (increased).

Hypotonicity Although there are degrees of involvement, at its extreme, the muscles are so flaccid that they are unable to maintain any tension or resistance to stretch. Consequently, with this loss of tone there is little basis for any motor activity. The affected child assumes the motor characteristics of a "rag doll," effecting marked deficiencies in all the basis elements of motor function and leading to discoordination, a paucity of movement, and lack of postural stability.

Hypertonicity Certain muscles are maintained in an excited state of excessive tension and resistance to stretch. Although these "tight" muscles give the appearance of strength since much force must be used to overcome their resistance, in reality their hypertonic state impedes efficient control and coordination of movement and results in apparent "weakened" performance.

The key to the effect on function lies not only in the *degree* of hypertonicity, but also in its *distribution*, which determines the prominent posture of the extremities, i.e., whether increased tone is predominantly in those muscles that flex the arms or extend the legs will have considerable effect on the development of manipulative and ambulation skills, respectively.

Clinically, there are two types of hypertonicity: spasticity and rigidity. The difference between the two rests in the nature of their resistance to stretch. In the spastic muscle, when a force is applied to stretch it, there is initially marked resistance to movement, but after a certain point there is a "break" and a rapid decrease in resistance. It has been compared with the mechanism of opening a clasp knife, where initially there is tension on the blade, but past a certain point it springs open: therefore the eponym "clasp knife spasticity" (Figure 19). On the other hand, in the rigid muscle, the resistance to the force remains constant throughout and has been compared with the resistance noted when attempting to bend a lead pipe: "lead pipe rigidity." An example may clarify. Returning to the elbow joint (Figure 2*b*), assume that the flexors of the elbow are hypertonic. If they are spastic when pressure is applied to stretch them by straightening out the arm, there will be initial resistance followed by sudden relaxation and ease of movement to the straightened arm position. However, if muscles are rigid, the resistance to stretch of the flexed muscle will remain constantly increased throughout the range of motion. Additionally, there are some other technical aspects that differentiate the two. Spasticity is usually more constant and does not appear to be appreciably affected by sleep, mental state, or shaking of the extremity, whereas rigidity is more variable and is influenced by the above mentioned factors.

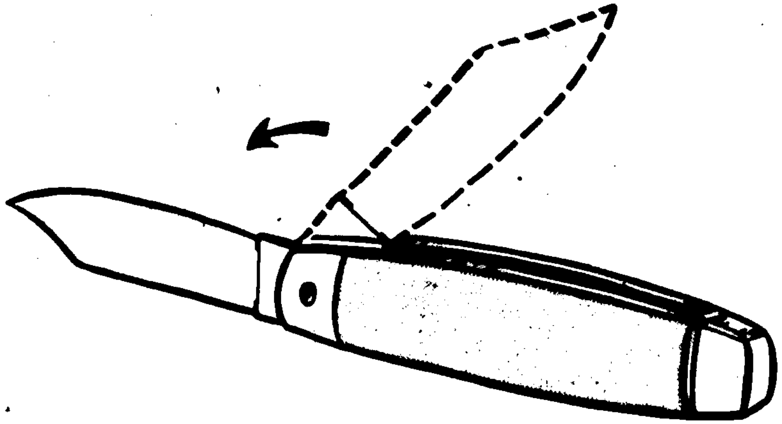

Figure 19. Clasp knife spasticity refers to that muscle tone phenomenon characterized by initial resistance to opening which is overcome so that after the "break point," there is a marked decrease in resistance.

Tone Disturbance: Mechanisms A fine balance is preserved between positive stimulating influences and negative inhibiting influences from the brain to the muscles so that *tone* necessary for postural stability and movement can be maintained. If brain areas that emit "positive" influences are damaged, there will be an overabundance of negative impulses, with resultant hypotonicity. Likewise, damage to the "inhibitory" brain areas will lead to excessive stimulation and hypertonicity. In addition, release from the normal inhibitory brain controls results in increasingly active deep tendon reflexes, such as the knee jerk, and other pathological reflexes, such as the infamous Babinski response (see Glossary).

The distribution of these tone changes is influenced in part by the postural reflexes. Again, the brain is responsible for maintaining proper balance between those reflex patterns that interfere with function (primitive reflexes) and those reflex patterns that assist with motor functions (automatic reflexes). When there is an imbalance because of the failure to suppress primitive reflex patterns and/or to generate needed automatic reflex patterns at the proper time, abnormalities of tone and posture that interfere with function come into existence (see Table 5; for further detailed explanation, see Chapter 9).

Movement Disturbances: Manifestations Deficits in movement control are noted in a number of types of involuntary movement disorders. *Chorea* refers to rather dramatic rapid, jerky movements occurring predominantly proximally in the arms and legs. *Athetosis* refers to slower, more writhing movements, usually noted distally in the hands and feet but also in other body areas such as the face and tongue. Often these two types of movement can be seen in combination and are referred to as choreoathetosis. These involuntary movements often directly interfere with the voluntary control of motor activities and impair other functions such as coordination, balance, and equilibrium. *Tremor* or fine quivering of muscles, noted primarily in the arms, fingers, and legs, is another movement disorder that is uncommon.

Movement Disturbances: Mechanisms The fine balance between voluntary and involuntary movements is disrupted. When the ability to initiate and carry out conscious activity is impaired by damage to the major cortical motor areas, there are ensuing apparent weakness and breakdown of movement coordination. In addition, the loss of suppressing influences from the damaged cortical areas results in the release of such lower brain centers as the basal ganglia, which then are free to generate a variety of involuntary purposeless movements.

Balance Disturbances: Manifestations The primary inability to maintain normal balance is a major factor in that type of cerebral palsy termed "ataxic." With the loss of balance, there are subsequent disequilibrium and discoordination when attempting motor skills. Depending on the degree of involvement, many specific functions that require underlying postural stability are affected. Manipulative abilities are deficient because of unsteady and poorly controlled movements. Gross motor skills such as walking are characterized by frequent lunges and lurches, a pattern not unlike the infant's early attempts at mastering such motor skills.

Balance Disturbances: Mechanisms There are a number of intricate and complex mechanisms contributing to the maintenance of balance. Basically, there are numerous sensors located throughout the body that monitor the body's position in space, as well as the relationship of its parts (head, arms, legs) to one another. For instance, a major sensor is the vestibular apparatus which is located in the inner ear and monitors changes in head position. Other sensors are located in strategic locations throughout the musculo-skeletal system. These sensors, then, send their reports to the brain where they are filtered, coordinated, and integrated. The cerebellum is one of the major computing areas that sifts this incoming information and response by generating messages to various muscle groups for the purpose of initiating such motor activity as would maintain balance and equilibrium. Many of these messages are seen in the reflex patterned responses described under the righting, protective, and equilibrium reflexes. When there is a failure of these intricate mechanisms to properly integrate

the information and to generate effective responses, the resultant impairment, as described above, is seen.

Conclusion

The motor impairments of the cerebral palsied child are the result of the brain's failure to maintain normal balances between many influences. There are imperfect control and orchestration of muscle tone and movement with subsequent incoordination, purposeless movements, imbalance, or postural instability. It is unnecessary to describe in detail the various findings of each specific type of cerebral palsy since each represents only a variation of degree of impairment of the same basic elements and functions.

The significance of these motor disabilities is two-fold; not only is the acquisition of a particular motor skill impaired, but further developmental progress is impeded. Since most motor skills are based on a foundation of basic elements, further progression is impossible if the foundation is found lacking.

Obviously, there are a number of important considerations other than motor concerns when discussing the problems of cerebral palsy: education, ego development, speech, etc. These concerns are discussed in the case presentations in Section IV.

In conclusion, motor development proceeds in a sequential manner in accord with maturation of central and peripheral neurological systems. Dramatic manifestations of this maturational process are seen emphatically in the first year, with decreasing dramatics over the ensuing 12 to 13 years. The basis for aberrant motor-development is often found in the brain. An imbalance of forces which interferes with the normal progression of motor activity is set up by damage or dysfunction in one or several of the motor centers of the brain. The resultant manifestations are seen in the wide spectrum of motor impairments in cerebral palsy. These impairments can be identified as deficiencies in basic motor elements and functions that underly motor skills and vary only in degree within various functional categories of cerebral palsy.

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POTENTIAL FOR EXPRESSIVE SIGNING BASED ON MOTOR CONTROL

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Abstract. This paper[1] outlines a procedure for predicting the appropriateness of signing as a communication technique for individuals with speaking impairments. The procedure compares a potential learner's motor control with the motor skills necessary for producing intelligible signs. Motor requisites for signs were determined by a task analysis of handshapes, locations, and movements. The percentage of occurrence of the various motor components was calculated from an analysis of a core vocabulary selected to be appropriate as an initial vocabulary for nonspeaking individuals. A generalization procedure predicting ability to produce additional vocabulary items (from the Dictionary of American Sign Language on computer) is presented, allowing estimation of expressive vocabulary potential for American Sign Language.

Introduction. In recent years there has been an escalating interest in providing communication systems for persons whose inability to speak is not due primarily to hearing impairment. Use of these systems has resulted in increments in expressive communication ability for persons having a variety of communication disorders, including congenital dysarthria (Shane 1980, Vickers 1974, McDonald & Schultz 1978), apraxia of speech (Skelly et al. 1974, Rosenbek et al. 1976), mental retardation (Fristoe & Lloyd 1977, 1979a, 1980, Shaffer & Goehl 1974, Hoffmeister & Farmer 1972, Bricker 1972), and autism (Schaeffer et al. 1977, Fulwiler & Fouts 1976, Miller & Miller 1973).

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Such systems belong to one of two generic types: aided communication techinques (i.e. physical displays of graphic symbols on communication, conversation, or "talking" boards); and unaided techniques such as sign language. Which of these systems to introduce clinically to the nonspeaking person has been the focus of considerable controversy and confusion. According to one survey (Fristoe & Lloyd 1977), selection of a system for clinical use was likely to be based more on familiarity with a particular method than on knowledge of available options.

Shane and Bashir (1980) outlined a clinical decision-making process for determining an individual's eligibility for a nonspeech system. Only after such a determination has been made is the question of which system to use relevant. One significant factor in choosing among available systems ought to be the potential user's motor control: It may seem intuitively obvious that extreme motor control deficits should preclude sign language selection. However, our experiences attest to the exclusive introduction of sign with persons having mild to severe motor impairment.

To date no systematic assessment of the motor control necessary for competent signing appears in the published literature. The purpose of this paper, therefore, is to outline a procedure for predicting expressive signing potential based on an individual's motor control. The procedure identifies the motor components of a sign and assumes that if a given individual is unable to make that component, that individual will be unable to produce signs that contain the component. The prediction can then be made that the proportion of signs a given individual will be unable to produce is a direct reflection on the number of motor components he cannot produce. The procedure does not assume the converse; i.e. that if an individual can produce a motor component, he or she will be able to produce all signs containing that component. Interactions between components will result in some signs being too difficult for an individual with motor impairment, even though the motor components contained in them may be producible separately.

Method. Existing descriptions of sign structure were modified to determine the motor components required for sign production. With these modifications, an analysis of a selected core vocabulary was made, indentifying the percentage of occurrence of each motor component. Finally, generalization from the analyzed core vocabulary was made by applying the same procedure to the larger vocabulary of American Sign Language compiled by Stokoe, Casterline, and Croneberg (1965).

The core vocabulary. The vocabulary from the review made by Fristoe and Lloyd (1979b) was used. This vocabulary they constructed from an analysis of 20 manuals of signs being used with retarded individuals. Approximately 840 signs are included in the Fristoe and Lloyd vocabulary; however, they did not eliminate English words that synonymously gloss the same sign (e.g. 'have to' and 'must'). When such duplication is removed, 696 signs remain in the core vocabulary of the present study. A semantic comparison of this reduced vocabulary to the items contained on the 400 item Blissymbol Board showed that 77% of the Bliss Board items also appear in the sign vocabulary, further suggesting that the signs in our list represent items for which a nonspeaking individual might have expressive need.

Determining the motor components. For purposes of analysis, sign structure was divided into three aspects as proposed by Stokoe (1960): location, handshape, and movement. Although there have been recent attempts at reformulation of this basic three aspect division (cf. Battison, Markowicz, & Woodward 1975) and at providing distinctive feature characterizations (cf. Woodward 1973, Friedman 1977, Kegl & Wilbur 1976, Lane, Boyes-Braem, & Bellugi 1976), such descriptions tend to be concerned with linguistic details too fine-grained for the present purpose. The resulting analytical procedure draws from various sources and includes several of our own innovations.

1. Location: At the broadest level of distinction, four main areas of sign formation have been identified, face, trunk, arm, and hand (Battison et al. 1975, Kegl & Wilbur 1976). It is also possible to distinguish between those signs in which the working hand(s) actually touch the body and those which do not make contact; but this distinction was not made for the present analysis, in part because contact requirements for a given sign may differ from citation form to connected discourse in ASL, and in part because contact is a variable that may be manipulated to enhance training procedures with certain severely language-impaired populations (Fristoe & Lloyd 1977, 1979a, Wilbur 1979).

Elbow angle was determined to be a primary gross motor parameter. An inability to bend the elbow so as to bring the hand (in any handshape) to the center of any one of the four main areas would eliminate all signs normally made in that area.

Using elbow angle, we also identified several locations within the major areas; e.g. four heights were identified on the face: eye height, cheek height, mouth height, and chin height. These are not all the possible heights the hand can reach: they do not take into account the exact placement on the face or the interaction of location with handshape and motion (cf. Woodward 1978). Instead, these heights represent fine adjustments in the elbow-arm relationship.

An inability to produce distinctly these four different heights would eliminate the possiblity of making those signs on the face that require finer control for placement. Thus, not only would a distinction between APPLE (lower cheek) and ONION (upper cheek) be impossible, but presumably so would the distinction between BORING (side of nose) and SOUR (on chin). Thus the four heights chosen are representatives of possible necessary fine motor distinctions; they are <u>not</u> all possible distinctions.

Similar criteria were used for other motor components identified. Within the trunk area, eight different positions were identified. No additional distinctions were identified for the arm and hand areas.

2. Handshape: In the literature on ASL the number of handshapes identified varies widely, depending on whether one is working at a phonetic or phonemic level, and whether one is including or not initialized signs, which use handshapes borrowed from the manual alphabet—occurring infrequently and primarily in signs that are loans from English. Thirty-four handshapes, gleaned from various sources and presented in Wilbur 1979 were used for the present analysis. Each handshape was treated individually for the primary analysis.

The handshapes were then grouped into six categories to provide summary data: Sign requires— 1. a fist handshape; 2. extension of the index finger; 3. a flat open hand; 4. a curved hand; 5. thumb to cross fingers; 6. fingers to touch thumb. Two handshapes, which did not conveniently fit into these six categories, were grouped together as "Other."

3. Movement: For the analysis of movement a combination of movement characteristics from Stokoe 1960 and Supalla 1978 was used. From Stokoe 1960 the handshape changes from closed to open and from open to closed and the finger wiggle were used. From Supalla 1978 six movements were taken: linear, rotate/twist, circular, arc, hold, and elbow pivot. "Repeat" was added because of the likelihood that a repeated movement would be more difficult to coordinate for an individual with motor sequencing problems.

Generalization and results. The procedure used with the core vocabulary was then applied to a larger vocabulary of ASL signs; i.e. to the 1628 primary entries of the Stokoe, Casterline, and Croneberg Dictionary of American Sign Language on Linguistic Principles (1965, rev. 1976), which have been entered in a computer program at the Department of Psychology, Northeastern University (see Teuber et al. below this issue). Summary percentages and totals of the non-compound signs were provided to us by the Department. One analysis made by the program divided signs into one-handed, two-handed with the same handshape, and two-handed with different handshapes. The percentages of location, movement, and handshape values were given separately for each of these three major types of sign. These data were recalculated by us into a form matching the data for the present study; i.e. percentages of all entries for location, handshape, and movement.

When signs in the core vocabulary are analyzed into components, many signs are found to require more than one component in each of the three aspects (location, handshape, and movement); e.g. a sign may have two handshapes or two locations. Therefore the number of entries (in the tables below) for the three aspects is not equal to the number of the signs analyzed, nor is the number of entries for the three aspects the same. (There were 717 entries for location, 893 entries for handshape, and 825 entries for movement for the

696 signs in the core vocabulary.) For each value within each aspect category, the relevant statistic is the percentage of all entries requiring that value.

The motor components for location, handshape, and movement and their percentage of occurrence in the core vocabulary are given in Tables 1, 2, and 3 respectively. The percentages indicate the percentage of the 696 signs an individual would be unable to make if he or she were unable to perform the specified motor task. For example, one unable to bring the hand (in any handshape) to the center of the chest would not be expected to produce 37.0% of the signs (Table 1; col. 5).

	N	%	Ind. rank	Group %	Group rank
CHEST				37.0	1
Bilateral, Ipsilateral Mid Clavical	97	13.5	2		
Ipsilateral, Mid Clavical	93	13.0	3		
Bilateral, Ipsilat., Waist/Hip	29	4.0	8		
Ipsilateral, Waist/Hip	17	2.4	9		
Ipsilateral, Shoulder	13	1.8	10		
Bilateral Contralat., Mid Chest	7	1.0	12		
Contralateral, Mid Clavical	6	0.8	13		
Contralateral, Shoulder	4	0.6	14		
Total Chest	266				
HAND	236	32.9	1	32.9	2
FACE				29.0	3
Height: Corner of Eye	73	10.2	4		
Corner of Mouth	55	7.7	5		
Chin	48	6.9	6		
Cheek Bone	30	4.2	7		
Total Face	206				
ARM	9	1.3	11	1.3	4

Table 1. Summary of LOCATION motor requirements for 696 ASL signs (No. of entries, percentage of occurrence, individual and group rankings of analyzed vocabulary, n = 717).

If an individual can do most of the finer distinctions but not, e.g., the 6th from the top (used in LOVE and HUG), then only 1% of the signs in the core vocabulary would be out of his or her capability.

Handshape (symbol)	Entries No.	Occurrence %	Ind. rank	Group %	Group rank
flat hand	270			30.2	1
B	200	22.4	1		
5	66	7.4	3		
4	4	0.4	29		
index finger	232			26.2	2
G	86	9.6	2		
V	37	4.1	7		
H	35	3.9	8		
L	18	2.0	15		
G_2	18	2.0	15		
D	11	1.2	21		
3	4	0.4	29		
Ψ	2	0.2	32		
⊥	1	0.1	33		
X	20	2.2	14		
curved hand	153			17.0	3
C	45	5.0	5		
O	40	4.5	6		
$\bar{B}$	34	3.8	9		
$\bar{5}$	27	3.0	10		
babyO	7	0.7	24		
fist	130			14.4	4
S	58	6.5	4		
A	27	3.0	10		
$\dot{A}$	23	2.6	12		
Y	14	1.5	19		
I	8	0.8	23		
thumb touch	46			5.0	5
9	23	2.6	12		
6	15	1.6	18		
8	7	0.7	24		
7	1	0.1	33		
thumb cross	45			4.8	6
K	16	1.8	17		
T	13	1.4	20		
M	7	0.7	24		
E	5	0.5	28		
N	4	0.4	29		
other	17			1.9	7
⋎	6	0.7	24		
R	11	1.2	21		

Table 2. Summary of HANDSHAPE motor requirements for 696 ASL signs (No. of entries, percentage of occurrence, individual and group ranking, based on analysis of components in signs; n = 893).

Motion	Entries	%	Ind. rank	Group %	Group rank
linear	435			52.6	1
horizontal	251	30.5	1		
vertical	174	21.1	2		
diagonal	10	1.2	10		
handshape change	93			11.3	2
open-to-close	53	6.4	6		
close-to-open	40	4.9	9		
rotate/twist	76	9.2	3	9.2	3
repeat	63	7.6	4	7.6	4
circuler	60	7.3	5	7.3	5
arc	46	5.6	7	5.6	6
hold	44	5.3	8	5.3	7
elbow pivot	6	0.7	11	0.7	8
wiggle	1	0.1	12	0.1	9

Table 3. Summary of MOTION motor requirements for 696 ASL signs (No. of entries, percentage of occurrence, individual and group ranking, based on analysis of components in signs; n = 824).

For each aspect of sign formation a series of motor components was used to analyze the vocabulary. Within each aspect, natural classes, along with certain salient dimensions, were available. A summary of the motor components that are used in 5% or more of the analyzed vocabulary is given in rank order in Table 4. The dimensions in Table 4 account for more than 90% of the entries in the core vocabulary.

Table 5 presents the percentages of the 2,637 entries in the computer-entered Dictionary of American Sign Language that are accounted for by our motor components (including only those which occur in more than 5% of the Dictionary entries).

Motor component	Percentage of occurrence
LOCATION	98.9
chest	37.0
hand	32.9
face	29.0
HANDSHAPE	92.8
flat hand	30.2
index finger	26.2
curved hand	17.0
fist	14.4
thumb touch	5.0
MOTION	99.1
linear	52.8
handshape change	11.3
rotate/ twist	9.2
repeat	7.3
circular	7.3
arc	5.6
hold	5.3

Table 4. Summary of motor components used in five per cent or more of analyzed core vocabulary.

Motor component	Percentage of occurrence
LOCATION	94.9
chest	44.9
hand	27.8
face	22.2
HANDSHAPE	94.8
flat hand	38.8
index finger	28.5
curved hand	10.9
fist	15.2
thumb touch	5.4
MOTION	87.5
linear	56.6
handshape change	9.7
rotate / twist	11.1
circular	7.1

Table 5. Summary of motor components used in five per cent or more of entries in computerized <u>DASL</u>.

Discussion. In Table 1 the analysis of locations needed for ASL signs shows that the most frequent location is in the chest area, followed by hand, face, and arm. Together, chest, hand, and face account for 98.9% of all entries (see Table 4). There are several factors which may contribute to this overall pattern of frequency.

1. The entries which are included in the chest area involve signs which actually contact the chest (so-called "body contact" signs) and those which are made in "neutral space" (i.e. without contact, cf. Stokoe 1960). The size of this group is partially the result of its inclusion of the inflectable verbs (those inflectable for subject and/or object in actual discourse). The entries analyzed here are citation forms of these signs and do not include the wide variety of morphological variations which are possible. Since verb agreement in ASL is in large part based on the modifiability of signs in space, it follows that "neutral space" signs contribute to the frequency and importance of the chest area, even in citation forms. (For extensive discussion of verb agreement from several perspectives, see Wilbur 1979; for morphological modifications which utilize planes within "neutral space," see Klima & Bellugi 1979.)

2. The second most frequent location for sign formation is on the hand. This group includes signs with identical handshapes, such as CAN'T and SIT, and those which obey the Dominance Condition (Battison 1974, 1978) utilizing a dominant, active hand and a base hand consisting (usually) of one of the "unmarked" handshapes (Battison et al. 1975, Kegl & Wilbur 1976). Many of these signs involve the lexical expression of relative locations: e.g. IN, ON, and UNDER (Bernstein 1980) and utilize classifier handshapes. (The prevalence of such forms increases in actual conversation, as classifiers substitute for noun phrases and are used in locative predicates; see discussion in Kegl & Wilbur 1976, Liddell 1977, Kantor 1980, Wilbur 1979, Bernstein 1980, Coulter 1979). In general, the widespread use of classifiers, even in citation forms of such sign as FOLLOW or MEET contributes to the frequency of signs in both the chest and hand areas, but not to the face and arm areas, where classifiers are rarely (if ever) used.

3. The frequency of signs made on the face is in part attributable to its being within the area of high visual acuity (Siple 1978).

4. The low frequency of signs made on the arm is expected cros[illegible]nguistically (Woodward 1978).

In Table 2, the frequency of occurrence of the motor components for ASL handshapes is indicated. The pattern of frequencies confirms several previous observations which have been made concerning handshapes:

1. In accordance with the observations of Battison et al. (1975) on "unmarked" handshapes, the observed frequencies of B, G, 5, S, C, and O reveal them to be the most frequently occurring in both the core vocabulary and the larger computer-entered Dictionary of American Sign Language corpus.

2. The frequency of these "unmarked" handshapes, followed by 'V' and 'H', agrees with observations made by Johnson (1978) on Extended Oregon Sawmill Sign Language and British Columbia Sign Language and those made by Poole (1980) on Martha's Vineyard Sign Language. Both handshapes function as classifiers in ASL.

3. Those handshapes which are highly "marked" and which tend to occur infrequently in sign languages (cf. Woodward 1978, Johnson 1978, Poole 1980) are least frequent also in the analyzed corpus. These infrequent handshapes involve the motor components of thumb touch and thumb or finger crossing, identified by Boyes-Braem (1973) and McIntire (1974, 1977) as motorically more complicated and hence later developments in early sign language acquisition.

The motor requirements for the citation forms of ASL signs are presented in Table 3. (Modifications of movement for morphological inflections have not been included in the present analysis; these additional modifications require movement path and manner of formation alternations which are assumed to be outside the requirements of the populations of concern here.) Several observations concerning the relative frequencies may be made:

1. The high frequency of linear movement is primarily a result of two factors, horizontal and vertical. Horizontal linear movement predominates in those signs which may be inflected for subject and/or object and for other morphological purposes within the horizontal plane (Klima & Bellugi 1979). As already indicated, the importance of this aspect of ASL syntax and morphology contributes to the frequency of signs in the chest area, where most linear movements would occur. The vertical dimension occurs in movements of lexical items such as DECIDE and in signs which differ in meaning on the basis of the direction of the movement, such as the opposition of APPEAR (upward) and DISAPPEAR (downw[illegible]).

2. The frequency of repetition as a motor component is surprisingly low, given the wide variety of functions which reduplication serves in ASL (cf. Klima & Bellugi 1979, Supalla & Newport 1978, Kegl & Wilbur 1976, Wilbur 1979). Although these functions are primarily morphological, repetition does occur in citation forms. Most probably the low frequency in the present analysis results from failure to recognize, and hence enter, the distinctions in terms of repetition (as well as manner) such as those identified by Supalla and Newport between nouns and verbs. Thus many cases where repetition may have been a defining difference may have been omitted in the two vocabularies, with the result that the unrepeated form (verb) is listed as a basic entry. [Editor's note: This conjecture by the authors is probably quite correct; twenty years before Supalla, a native signer of ASL, discovered and published the now well known distinction between noun and verb action in otherwise identical signs, the senior editor of the DASL gave such signs a single entry with the designation *n* or *v*.]

Clinical application. The results of this investigation provide the basis for a clinical assessment procedure aimed at predicting whether a nonspeaking individual's motor control is sufficient to allow expressive communication through sign. As such, it should have applicability to a wide variety of severely communicatively handicapped persons having a variety of etiological explanations for their speechlessness.

Eligibility for manual signing is determined through a clinical assessment of one's ability to execute the various motor components delineated in Tables 1-3. Inability to perform certain of these motor components eliminates a predictable portion of the analyzed vocabulary. It follows that the inability to produce a significant portion of a functional core vocabulary would make signing a less desirable expressive communication option than a method that required less motor control (e.g. pointing to graphic symbols contained on a communication aid).

A systematic application of these results to a clinical population is under way currently. The actual motor factors used in the clinical protocol are based on the data contained in Table 4, where the more frequently occurring motor components are listed. The ability of the clinical subject to perform each of the 15 motor acts is determined through either imitation, observation (by parent, teacher, etc.), physical shaping, or verbal analogy (e.g. "Act like Tarzan"– where the expected response is to bring hand to chest). Preliminary clinical findings reveal: (1) that inability to perform the motor components involved in various handshapes is the major factor for eliminating a potential user for sign. This finding presumably relates to the greater fine motor control needed for accurate handshape as opposed to that needed for location and motion of signs. The individual being considered for a manual system to supplement inefficient speech often evidences fine motor difficulties; (2) that inability to perform an isolated motor aspect does predict inability to execute a sign containing that aspect.

Note that the individual unable to perform a substantial portion of the motor aspects may nonetheless be capable of benefiting from a manual approach. Such is the case when a motorically handicapped person uses a limited number of motor approximations to the sign target. Hoyt (1980), for example, introduced a limited number of functional signs to severely physically handicapped subjects whose principal expressive means was formerly electronic communication aids. The two adolescent subjects were able to communicate basic need concepts such as hunger and thirst through signed motor approximations of the idealized target. It must be recognized, however, that with an increased number of signs within one's sign repertoire there is a corresponding increase in the difficulty of interpretation by a receiver, when approximations to signs are used in place of the more standard ASL citation forms.

Although motor control plays a significant role in determining eligibility for a manual system of communication, it is not the sole criterion. A host of personal factors as well as issues pertaining to the environment in which the potential user resides, socializes, learns, and/or works need to be considered if effective program implementation is to take place. Speed of sign-referent learning, motivation to use the method, previous exposure and success with a manual system are among the personal factors entering into decision making. Environmental decision factors which will impact on program success include willingness to introduce and use signs by significant people in the potential user's environment.

NOTE

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NEUROLOGICAL EVALUATION

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I. Introduction
The goal of this chapter is to help the physician recognize when neurological disease is responsible for a developmental delay and know what should be done about it.

II. The Medical History and Physical Examination
  A. The physician should explore the history by using the Parent Questionnaire (Appendix A in Chapter 4) and the History of the Present Illness Form (Appendix C in Chapter 4).
  B. Next, the physician should identify aspects of the Medical Examination which have potential neurological implications, by using Appendix D of Chapter 4.
  C. Items in the Parent Questionnaire, the History of the Present Illness, and the Medical Examination form which have possible neurological implications have been preceded with an "N."

III. The Neuromotor Developmental Examination
  A. A simple and brief developmental examination for use with children 24 months of age or less is the Milani Comparetti Neuromotor Developmental Examination.
  B. When completed, the Milani Comparetti developmental chart provides a profile of the infant's motor function in relationship to the expected ages of appearance and disappearance of primitive and developmental reflexes.
  C. The four major components of the evaluation are righting reactions, parachute reactions, tilting reactions, and primitive reflexes.

IV. The Neurological Examination
  A. After evaluating a child for neuromotor development, the physician should conduct a thorough neurological examination.
  B. Appendix B of this chapter is a Neurological Examination Checklist for use during the examination.

V. Intracranial Lesions
  A. One intracranial lesion is microcephaly; this includes primary (or congenital) microcephaly, and secondary microcephaly.
  B. Primary microcephaly usually reflects problems arising early in pregnancy and is immediately evident at birth; possible causes include intrauterine insults such as congenital infections, X-ray procedures during the first trimester, and familial, inherited forms.
  C. Secondary microcephaly may reflect insults to the brain late in pregnancy, at the time of delivery, or after delivery; affected children have small, but normally-shaped heads.
  D. A rare cause of microcephaly is craniosynostosis of all sutures; single suture closure does not cause microcephaly.
  E. Another type of lesion is intracranial bleeding caused by birth trauma or by postnatal causes such as falls or blows to the head.
  F. A third type of intracranial process is hydrocephalus resulting

from a blockage in the flow of spinal fluid, a blockage in the resorption of spinal fluid, or excessive production of spinal fluid.

G. Whenever an intracranial lesion is suspected, the child should be referred to a neurologist for an extensive evaluation.

VI. Cerebral Palsy

A. Cerebral palsy is often secondary to a static intracranial neurological impairment, and is commonly associated with prematurity, intracranial hemorrhage, hypoxia, and kernicterus.

B. Signs of an intracranial lesion may—or may not—be found with cerebral palsy; there will probably be delays in motor development or persistence of primary motor patterns upon evaluation with the Milani Comparetti, and the more traditional neurologic signs may be seen by a year and one-half of age.

C. Although some children with cerebral palsy also manifest intellectual impairment, many are intellectually normal.

D. Children with cerebral palsy should be referred to physical or occupational theraptists to teach or facilitate functional development of normal movement pattems, to prevent the development of contractures and deformities, and to assist the parents in dealing with the child.

E. The neurodevelopmental treatment approach of the Bobaths involves the inhibition of pattems of abnormal reflex activity and facilitation of normal motor patterns.

VII. Minor Motor Seizures

A. Minor motor seizures are an infrequent cause of delays, especially of delays in intellectual development.

B. Symptoms include poor attention span, decreased comprehension, staring spells, inappropriate pauses in speech, unusual facial movements, repetitive movements, and sudden alterations in body posture or tone; signs include cerebral dysgenesis and skin lesions.

C. A child suspected of minor motor seizure disorders should be referred to a child neurologist for an evaluation.

VIII. Peripheral Neuropathy

A. Peripheral neuropathy may be due to a variety of conditions, including toxic metabolic disease, Guillain-Barre, Werdnig-Hoffman infantile muscular atrophy, and heredito-familial diseases or degenerative disorders.

B. Symptoms and signs will depend upon which nerves are involved; mental status is generally intact.

C. A child with peripheral neuropathy should be referred to a neurologist.

IX. Muscle Diseases

A. Muscle diseases, although quite rare, should be kept in mind when evaluating a child who seems slow in motor development or who manifests signs of hypotonia.

B. Generally, muscle diseases start gradually after infancy, and often there is a positive family history.

C. The differential diagnosis of muscle disease would be muscular dystrophy, myasthenia gravis, dermatomyositis, periodic paralysis, and endocrine disorders.

D. Any child suspected of a muscle disease should be referred to the nearest muscle disease clinic or neurologist.

X. Degenerative Disorders

A. Although degenerative disorders are extremely rare, they are generally not treatable; it is important they be identified for family counseling purposes.

B. Symptoms and signs will depend upon the type of degenerative disorder, the etiology, and the site of the lesion; any child suspected of such disorder should be referred to a neurologist.

XI. Summary

INTRODUCTION

When a developmental delay is not caused by an orthopedic, metabolic, or endocrine abnormality, in many cases an abnormality of the nervous system is implied. Because of this, it is important for the physician in his or her decision-making process to: discriminate between a static encephalopathy and a progressive central nervous system lesion; discern whether the disability is permanent, whether it is remediable, or whether it is self-correcting; and identify when a potentially remediable condition is causing the developmental delay. The goal of this chapter is to help the physician recognize when neurological disease is responsible for a developmental delay and what should be done about it.

To enable the primary care physician to identify the disorders referred to above and to make appropriate referrals, the first goal of this lesson is to teach the physician to identify intracranial lesions, cerebral palsy, minor motor seizures, peripheral neuropathy, muscle disease, and degenerative disorders. The second major objective is to teach the physician what to do if a child having any of these disorders is encountered.

THE MEDICAL HISTORY AND PHYSICAL EXAMINATION

Many of the questions which the physician will ask to establish the presence or absence of disease of the nervous system are outlined in the printed Parent Questionnaire (Appendix A in Chapter 4), and the History of the Present Illness form (Appendix C in Chapter 4). The physician should ordinarily begin with the presenting complaint, which may be a delay or a regression in the child's motor, intellectual, or social-emotional development. After exploring this in some detail to learn the onset of the disorder and how it has progressed, the physician should look into the family history for historical risk factors. To assist in identification of items which may be of neurological significance, the questions that have potential neurological implications have been preceded with an "N" in these appendices.

The second step in identifying significant neurological disorders is to identify aspects of the medical examination which have potential neurological implications. (The physical findings of syndromes that have neurological implications are discussed in Chapter 10.) As in the case of the history, the items have potential neurological significance are preceded with an "N" in Appendix D of Chapter 4.

THE NEUROMOTOR DEVELOPMENTAL EXAMINATION

The third step is to conduct careful developmental and neurological examinations of the integrity of the central nervous system. The two differ in aims and techniques. Since the infant and preschool-age child's neurological system is still developing, there is a need to determine the age-appropriateness of the child's motor, language, and emotional development, as well as the localizing signs of the more traditional neurological examination. As Towen has pointed out, *both* the developmental and the neurological evaluations serve important needs; that is, they are complimentary, and one cannot replace the other.

A simple, brief, and useful developmental examination which can be used in developmental diagnosis is the Milani Comparetti Neuromotor Developmental Examination. This examination is designed for use with children who are 24 months of age or less. It provides a standardized way of examining a child's primitive and developmental reflexes by stressing the evaluation of primary motor patterns* along the developmental continuum. The procedures provide an opportunity for direct visual evaluation of age-related, spontaneous motor patterns (such as postural control of the head or trunk, the protective or parachute reactions, etc.) evoked as a result of the body's

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*Comparetti more recently no longer talks of "primitive reflexes;" rather, he now calls them "primary motor patterns." He writes: "Within the developmental perspective the fact that a certain motor behavior can be evoked by a stimulus does not reduce it to a reflex [i.e., according to the model of the reflex arch]. . ."

response to gravity (i.e., anti-gravity control of the body axis). The Milani Comparetti developmental chart, when completed, provides a profile of the infant's motor function in relationship to the expected ages of appearance and disappearance. Thus, the examination is not only suited for the evaluation of a child who is suspected of manifesting a developmental deviation, but can also be used to monitor the development of infants as a part of periodic health visits. When performing the examination, one looks for asymmetry, delayed onset of primitive reflexes, or abnormal persistance of primitive reflexes. There are four major components of the Milani Comparetti evaluation, which are as follows:

a. The first is righting reactions, which are important for achieving erect body posture; this includes head and body righting, as well as derotative righting. In head righting, the baby (when held in a vertical position and then tilted away from the vertical axis) will attempt to maintain the head in an upright position, with the eyes horizontal and the nose vertical. Body righting takes place when a 10-month-old child is put on his or her back; normally the child rolls over to prone and stands up. Derotive righting is an untwisting when rotation is applied to the long axis of the body. For instance, if the head is rotated, lower segments will tend to follow the turning of the head, and will therefore derotate the body.

b. The second type of evoked reactions—the parachute reactions—are reactions of the limbs to sudden replacement relative to gravity of the erect structure. For example, if a four-month-old child is suddenly moved downward toward a table in a vertical position, he or she will extend his or her upper limbs; if a seven-month-old child is moved suddenly forward, the upper limbs will move forward; if a nine-month-old is moved backward, he or she will extend the arms backward.

c. The third kind of reactions are the tilting reactions. These are reactions to stimulating the body at an angular acceleration (or tilting) to prevent the tendency of falling. The central feature in these is curving of the spine.

d. The importance of the primary motor patterns of primitive reflexes (especially the tonic labyrinthine, asymmetric tonic neck, positive support, and less so the symmetric tonic neck reflex, Moro, and hand and foot grasp) lies in the fact that the baby utilizes them functionally in different ways, and that each functional use is a precise marker of the developmental process. For example, E. A. Gidoui wrote in *Developmental Medicine and Child Neurology* that the foot's plantar grasp response "...may be elicited even at two or three years of age, but when tested in this context—that is, when the child is standing—it must disappear before the child is able to stand with support [i.e., at about nine months]."

Excerpts from the Milani Comparetti Neuromotor Developmental Examination are reprinted with permission in Appendix A which accompanies this chapter. It is recommended that this be closely read by those wishing to learn how to conduct the examination.

THE NEUROLOGICAL EXAMINATION

The next step in evaluating a suspect child for neurological problems is to conduct a thorough neurological examination. The neurological examination of infants and small children differs significantly from that in adults and older children both because of the maturation of the nervous system and the inability or unwillingness of the child to cooperate in a formal examination. An initial observation of spontaneously-produced activity, posture, behaviors, and so forth, can often provide as much or more information than attempts to elicit the more formal responses. Examiners should also be prepared to modify the order and content of the examination to fit the child and the circumstances. A Neurological Exmaination Checklist is presented as Appendix B in this chapter. (Although certain aspects of the physical examination, such as head circumference, general alertness, and speech are important parts of the neurological examination, these have been omitted from the Checklist to avoid repetition.)

INTRACRANIAL LESIONS

There are several important neurological problems which the physician may encounter when evaluating children who are suspect on developmental screening; one such category includes intracranial lesions—and, of these, the first is microcephaly. It is important for the physician to know about and be aware of microcephaly because it is often an indication of neurological impairment.

There are two kinds of microcephaly—primary or congenital microcephaly, and secondary microcephaly. Primary microcephaly usually reflects problems arising early in pregnancy and is of such a degree as to be immediately evident at birth, when the cranial vault is relatively flat above the orbital ridges, the ears, and the occiput. Possible etiological factors include significant intrauterine insults such as congenital infections or X-ray procedures, particularly during the first trimester, and familial forms with varying patterns of inheritance. Microcephaly may also be inherited; genetic causes may suggest the need for karyotyping for trisomies or, in one rare autosymal dominant syndrome, an X-ray of the skull for intracranial calcifications. (These are discussed more fully in Chapter 10.) The diagnosis of microcephaly rests upon obtaining a measurement of the head circumference which is below the third percentile for the child's chronological age.

The next condition which must be considered is secondary microcephaly. Secondary or acquired microcephaly may reflect insults to the developing brain occurring late in pregnancy, at the time of delivery, or after delivery. Affected children have craniums that are normally contoured, but small. Microcephalic mentally retarded children are often relatively small; however, non-microcephalic children who are small should have normal brain growth, since the head growth is not dependent on the total body growth. In fact, in situations of intrauterine malnutrition, the last organ of the body to be impaired in growth is the brain. Thus, the child who fails to thrive for reason of gastrointestinal disorders—such as malabsorption—will usually continue to have a normal rate of cranial growth.

A rare cause of microcephaly which will be mentioned briefly is craniosynostosis of all sutures. Single suture closure does not cause microcephaly. It does produce a cosmetic deformity, but it generally does not lead to neurological or developmental problems.

Because of the possibility of the existence of microcephaly, it is important for the physician to measure the head circumference of all children who manifest delays in development. In the event that a child who manifests microcephaly is discovered, the physician must demonstrate that the child is functioning normally intellectually and otherwise, since microcephaly may reflect neurological impairment.

The second type of disorders of cerebral lesions which will be considered is intracranial bleeding. Sometimes such bleeding results from birth trauma, which in turn may be associated with precipitous deliveries, cephalopelvic disproportion, and breech deliveries. Postnatal causes of intracranial bleeding include falls or blows to the head (such as may be seen in accidents and cases of neglect or abuse). Such trauma may result in subdural hematomas, brain contusion, or subarachnoid hemorrhage.

A third type of intracranial lesion is hydrocephalus. This may result from: a blockage in the flow of spinal fluid that is seen in an Arnold-Chiari malformation; a blockage in the resorption of the cerebral spinal fluid following meningitis (subarachnoid hemorrhage); or the excessive production of spinal fluid from a choroid plexus papilloma. All of these conditions occupy space in the head. Therefore, they may produce pressure upon the existing brain tissue if the skull sutures have closed; or in the presence of unfused sutures, they may produce excessive enlargement of the head circumference. Thus, the signs and symptoms are to some extent age-related. More importantly, they relate to whether or not the cranial sutures had closed prior to the development of the space-taking lesion.

In general, symptoms are nonspecific and may include headaches, nausea, vomiting, lethargy, irritability, and personality changes. An early sign that may be noticed is a change in the shape of the skull. This may be an excessive growth in the head circumference, so that the head circumference may change more than 50 percentile units within a relatively short period of time. Other signs may be the frontal bossing that is commonly seen with hydrocephalus, or bulging on one side of the head due to up-going subdural hematoma. For infants below two years of age, if an intracranial lesion is suspected. the physician is strongly urged to transilluminate the head. Transillumination may be positive when there is a very thin cortex secondary to hydrocephalus, or when there is fluid on top of the brain, as in hydranencephaly or subdural hematomas.

Other signs that might be seen when there is an intracranial process in the posterior fossa are a stiff neck and a head tilt. If the flow of spinal fluid is blocked, there will be an enlargement of the lateral ventricles; this in turn produces a stretching of the pyramidal fibers, especially those of the lower extremities. As a result, one may see poor coordination, hyperreflexia, ankle clonus, and an extensor plantar response (Babinski).

If trauma to the head is suspected, it is of paramount importance for the physician to thoroughly examine the retina to determine if there are any hemorrhages. During the neurological examination, there may be a variety of cranial nerve signs, including blurred vision, papilledema, enlargement of the blind spot, optic atrophy, abnormal eye movements, facial paralysis, and possibly cerebellar signs, including ataxia of the trunk, arms, and legs.

In addition, there may be corticospinal weakness of the wrist and finger extensors and of the hip and ankle flexors. Ankle clonus and upgoing toes should be checked for as well. If there is a focal space-occupying lesion, the physician may also find seizures, localized impaired function, and/or impairment in somatic growth.

In the event that a case of microcephaly is identified—even though it would generally be a static, non-progressive lesion—it is important for the physician to attempt to establish whether the microcephaly is primary or secondary. This may have implications in determining the etiology of the child's developmental problem, and may also have implications in counseling the parents regarding the probable course of the child's condition.

Whenever an intracranial space-taking lesion is suspected, it is very important that the primary care physician refer the child for a thorough evaluation. Most often such a referral will be to a neurologist for a very careful and more extensive evaluation. Though CAT scans can be helpful in identifying and localizing such lesions, the CAT scan is very expensive. Therefore, if the physician has sufficient concern to refer the child for a CAT scan, the child should first be referred to determine if, indeed, that kind of diagnostic evaluation and others are indicated.

CEREBRAL PALSY

A relatively common group of neurological problems which are encountered during evaluations of children with developmental delays are the cerebral palsies. Most often cerebral palsy is secondary to a static intracranial neurological impairment which commonly is associated with prematurity, intracranial hemorrhage, hypoxia, and kernicterus. Cerebral palsy is defined as a nonprogressive disorder (static encephalopathy) of movement and posture due to brain insult or injury, occurring in the period of early brain growth and development (including the prenatal period through early childhood to three to five years of age). Different clinical signs representative of the underlying brain damage may appear throughout motor development.

The most common symptom associated with cerebral palsy is a delay in motor development such as rolling over, sitting, standing, crawling, or walking. Other early symptoms of cerebral palsy include: excessive irritability (constant crying and sleeping difficulties); feeding problems (difficulties in sucking, swallowing, chewing, spitting up); jitteriness; excessive startle reactions to noises and changes in posture; stiffness of the body which make it difficult to feed and bathe the infant; early standing due to hypertonia; and a definite hand preference during the first 18 months of life.

On physical examination, the physician may find signs of an intracranial lesion such as those described previously; however, more commonly nothing specific will be found. On the neurological examination of infants with cerebral palsy, there will probably be delays in motor development and delays on the Milani Comparetti examination. For instance, primary motor patterns may persist when they should be disappearing, and/or there may be a delay in the onset of or asymmetry in some of the motor patterns (such as head control and/or the parachute reactions).

The more traditional neurologic signs of cerebral palsy in children are generally seen at an older age—namely, between approximately a year-and-one-half and six years of age. On the neurological examination, the physician will find either hypotonia or hypertonia, as well as an increase in the reflexes, up-going toes, ankle clonus, and long tract signs. These findings may be limited to the limbs of the lower extremities or to one side of the body. Though there are names given to patterns of sites of involvement, these will not be discussed in this chapter since the physician is not being asked to make a specific diagnosis. Instead, the physician is expected to identify cases of cerebral palsy and to know what to do about them. (More detailed information about cerebral palsy can be learned from a standard neurological text, or from one of the articles listed in the Bibliography which accompanies this chapter.)

It is important for the physician to realize that although some children with cerebral palsy also manifest intellectual impairment, many are intellectually normal. Therefore, it is extremely important that a child with early manifestations of cerebral palsy not be labeled mentally retarded when an accurate reflection of the child's intellectual development has not been obtained. Instead, the physician should follow the child and obtain psychological evaluations of the child's intellectual status at appropriate intervals.

It is generally agreed that infants and children manifesting cerebral palsy should be referred to physical or occupational therapists for two main reasons. The first is to teach or facilitate functional development of normal movement patterns, and the second is to prevent the development of contractures and deformities. Professionals working with children who have cerebral palsy are of the firm opinion that the earlier these children are identified and treated, the better the outcome. A common misconception is that treatment should not be started until a diagnosis is conclusively made. This does not take into account the fact that parents of cerebral palsied children also need assistance in dealing with the feeding, handling, sleeping, and temperament problems that so often accompany the condition. No doubt the reason why primary care physicians often fail to refer such children for treatment is due to the physicians' mistaken assumption that nothing can be done to assist these children and their families. Nothing can be further from the truth.

There have been many philosophies of the approach to these children, but in recent years therapy has been dominated internationally by the neurodevelopmental treatment approach of the Bobaths. In the normal developmental sequence, there is an evolutionary integration of the early primitive reflexes, and they are gradually brought under the influence of higher centers of control. In such a way, postural reactions gradually appear. These processes and their interrelationships are the basis of understanding the Bobath approach, and enable the application of these concepts to the treatment of infants and children with cerebral palsy or other movement disorders.

The neurodevelopmental rationale is that treatment techniques aimed at inhibition of patterns of abnormal reflex activity and the facilitation of normal motor patterns positively affect the motor development of these children. If these techniques are begun early and there are no interfering fixed contractures or preceding orthopedic procedures, treatment then becomes a combination of inhibition and facilitation by using special handling techniques.

MINOR MOTOR SEIZURES

An infrequent cause of delays (especially in intellectual development) is minor motor seizures. These do not include grand mal seizures which are very evident and common in developmentally disabled children. Rather, this chapter is intended to alert the physician to signs of minor motor seizures such as infantile spasms, akinetic seizures, petit mal seizures, and psychomotor seizures. It is beyond the scope of this chapter to teach the physician how to differentiate these types of seizures and how to treat them; rather, it is the aim here to teach the physician to recognize children manifesting such seizures.

The symptoms that should alert the physician to minor motor seizure disorders are poor attention span, decreased comprehension, staring spells, inappropriate pauses in speech, unusual facial movements, seemingly preprogrammed repetitive or perseverative movements, and sudden alterations in body posture or tone.

Signs on the examination which indicate a possible seizure disorder are signs of cerebral dysgenesis (including microcephaly), and skin lesions which might be indicative of a neurocutaneous disorder such as tuberous sclerosis; these are discussed further in Chapter 10. Unfortunately, the neurological examination is always not helpful in diagnosing all children with a seizure disorder. If the physician suspects petit mal seizures, he or she may be able to elicit such a seizure by asking the patient to hyperventilate. If the history is suggestive of a seizure disorder, the physician may wish to order an electroencephalogram.

If a child is suspected of having any of the minor motor seizure disorders, it is recommended that referral be made to a neurologist, preferably a child neurologist, to evaluate the child more thoroughly and consider what treatment may be indicated.

PERIPHERAL NEUROPATHY

Peripheral neuropathy may be due to a variety of conditions including toxic metabolic disease, Guillain-Barre syndrome, Werdnig-Hoffman infantile muscular atrophy, and heredito-familial diseases or degenerative disorders.

The symptoms and signs of peripheral neuropathy obviously will depend upon which nerves are involved. Thus, it may be that the physician will find isolated or mixed dysfunction involving motor, sensory, and/or autonomic pathways. Generally, the mental status is intact and the patient shows hyporeflexia in the involved area. Often there is a distal extremity weakness which frequently is bilateral, especially when the peripheral neuropathy is due to a toxic origin. Another finding is the weakness and atrophy of muscle. When the autonomic nervous system is involved, there may be decreased sweating and changes in the vasomotor tone.

It is recommended that if a child with peripheral neuropathy is identified, that referral should be made to a neurologist.

MUSCLE DISEASE

The next condition that will be discussed encompasses the various muscle diseases that may be encountered. These as a whole are quite rare; however, they should be kept in mind as the physician evaluates a child who seems to be slow in motor development or who manifests signs of hypotonia.

The symptoms of muscle disease are delays or regressions in motor milestones, much as might be seen in the case of cerebral palsy. The young child may have trouble getting into the standing position and have to "walk" the hands up the body in order to right him- or herself. Generally, however, muscle diseases start after infancy with a gradual onset and often there is a positive family history of similar muscle disease, so that diagnosis should not be difficult. The signs include weakness, particularly in the proximal limb muscles. Sometimes the muscles which are involved may appear to be enlarged, but actually are quite weak. Sensation and intellectual function generally remain intact. Bowel and bladder function and deep tendon reflexes are usually relatively well preserved. The differential diagnosis of muscle disease would be muscular dystrophy, myasthenia gravis, dermatomyositis, periodic paralysis, and endocrine disorders such as hypothyroidism.

It is recommended that any time a child with probable muscle disease is encountered, referral should be made to the nearest muscle disease clinic. If such a clinic is not available, it is recommended that the child should be referred to a neurologist.

TABLE 8-1 Neurological Disorders

Problem	*Symptoms (History)*	*Signs (Physical, Neuromotor, And Neurological Examinations)*	*Differential Diagnosis*
Intracranial Lesion	Headaches, nausea, vomiting, lethargy, enlarging head, stiff neck	Microcephaly, megacephaly, papilledema, retinal hemorrhage, blurred vision, enlarged blind spot, optic atrophy, transillumination, cranial nerve signs	Subdural hematoma, abscess, tumor, hydrocephalus, CNS dysgenesis, cerebellar cyst
Cerebral Palsy	Delayed motor development (non-progressive), possible seizure disorders, excessive irritability, feeding problems, jitteriness, excessive startle, body stiffness, (precocious) hand preference	Primitive reflex (delayed appearance and disappearance), slow motor development, delays on Milani Comparetti, increased or decreased tone, Babinski present, ankle clonus	Intracranial mass, muscular dystrophy, peripheral neuropathy, degenerative disorder
Minor Motor Seizures	Poor attention and comprehension, staring spells, pauses in speech, facial movements, repetitive movements, lapses in body posture	Microcephaly, congenital malformations, skin lesions (tuberous sclerosis), development delayed, focal or lateralized signs	Types: infantile spasms, akinetic seizures, petit mal seizures, psychomotor seizures
Peripheral Neuropathy and Lower Motor Neuron Lesions	Sensory, motor, and/or autonomic dysfunction	Intellect intact, DTR decreased, weakness symmetrical or in area of nerve distribution, muscle atrophy, decreased sweat and vasomotor tone	Toxic and metabolic disorders, post-infectious disorders, arteritis, Werdnig-Hoffman, heredito-familial disorders, degenerative disorders
Muscle Disease	Delayed motor development, weakness, muscle cramps, stiffness, gradual onset, family history positive	Greater weakness proximal than distal, sensation intact, bowel and bladder okay, DTR okay, sometimes pseudohypertrophy	Muscular dystrophy, myasthenia gravis, dermatomyositis, periodic paralysis, endocrine disturbance
Degenerative Disorders	Arrest in acquisition of intellectual and motor milestones, regression in skills	Intellect deterioration, possible seizures, spasticity, Babinski positive, central blindness, deafness, systemic manifestations	Intracranial mass, hydrocephalus, toxic disorders, minor motor seizures, meningitis, encephalitis

DEGENERATIVE DISORDERS

Fortunately, the degenerative disorders are extremely rare; unfortunately, they are generally not treatable. Nevertheless, it is important for the physician to identify such degenerative disorders as specifically as possible for family counseling purposes.

The hallmark symptom of degenerative disorders is an arrest in the development of a child, or regression in previously-acquired skills. The specific symptoms will naturally depend upon the type of degenerative disorder and its pathological nature. Signs—just as the symptoms—depend upon the type of degenerative disorder, the etiology, and the site of the lesion.

It is recommended that anytime a child is suspected of having a degenerative disorder, he or she should be promptly referred to a neurologist.

SUMMARY

This chapter has reviewed some of the more common neurological disorders which may be encountered during evaluation of children who are suspect on developmental screening. Although this list is far from complete, these include microcephaly, intracranial lesions, cerebral palsy, inapparent seizures or minor motor seizures, peripheral neuropathy, muscle disease, and degenerative disorders. Table 8-1 summarizes these disorders, their signs, symptoms, and recommendations for treatment.

This chapter also has discussed several important points regarding procedures to use during the evaluation of suspect children. First, the physician should gather appropriate data through the history, the medical examination, the neuromotor developmental examination, and the neurological examination. Second, the signs and symptoms of neurological disorders should be identified, for these may explain the cause of a child's slowness in development. Finally, this chapter has discussed indications for referral for a more extensive evaluation by a neurologist. It has not discussed indications for specific sophisticated neurological investigations (such as the CAT scan), because in general, if a child has problems severe enough to warrant further evaluation, that child should be referred.

In summary, the vast majority of children who manifest delays in development will not have obvious signs of neurological disorders. However, these signs may be identified if they are carefully sought. It is expected that the primary care physician will be able to identify children who have serious neurological disorders, will be able to make appropriate referrals for further evaluation and/or treatment, and will participate in the ongoing process of explanation and counseling of the child's parents.

Communication

The communication chapter is divided into two sections: audiologic management and language and speech facilitation. It is in these two areas that educational programming and instruction for hearing impaired developmentally disabled students will most likely differ from programs for similarly developmentally disabled hearing peers. The articles selected for this module are intended to be supplementary information for professional practitioners who are well trained with a single disability group but are less familiar with issues related either to hearing impairment or to specific developmental disabilities. While both transdisciplinary and transdisability training are highly desirable for professionals working with multiply handicapped individuals to have prior to assuming professional responsibilities with individuals with complex needs, this chapter addresses the reality that much <u>can</u> and <u>must</u> be learned "on the job". The motivation of professionals to seek needed information and keep abreast of recent developments in service and technology is exciting both for the individuals served and the field at large.

The audiology section contains both the current ASHA/CEASD <u>Guidelines For Audiology Programs in Educational Settings For Hearing Impaired Children</u> and a 1981 draft prepared by the ASHA Ad Hoc Committee on Extension of Audiological Services in the Schools entitled <u>Audiology Services in the Schools</u>. The former document suggests standards for implementation of educational audiology programs and job/role descriptions for audiologic personnel. The latter position statement provides a more comprehensive description of the needs of hearing impaired children and models for delivering audiologic services in educational settings. (For information on developing collaborative arrangements intrinsic to models 3 & 4, see "Interagency Services: A New Era for an Old Idea" in the Programmatic Options chapter.) Particular attention must be paid within each of these models to insure that more severely handicapped students are included in screening and service provisions. It is interesting to note that the highest percentage of referrals to the Arizona Model Demonstration Program (MDP) for comprehensive audiological assessment and management were made for students already enrolled in special education programs.

Assessment of auditory sensitivity is a first step in the auditory management and training programs for any child suspected of experiencing a hearing impairment. Noel Matkin's article "A Critical Assessment of Current Practices in the Audiologic Management of Preschool Children" urges that, in addition to documenting a hearing loss, audiologists take further steps to identify: the child's potential for functional use of residual hearing, indicators of central auditory processing difficulties that would limit the use of residual hearing, and the child's responses to various hearing aids. This combined information is crucial to both parents and educators in understanding the consequences of hearing loss and in setting realistic expectations for each child. Sanders, in his article "Audiologic Assessment...", goes further in specifying those dimensions of audiologic assessment that are particularly important in optimizing the conditions for both receptive and expressive speech acquisition. For audiologists, these two chapters outline those audiologic findings that are most useful for speech/language pathologists, educators, and parents in conducting comprehensive educational/habilitation programs; reciprocally, the latter individuals can infer the components of comprehensive audiologic assessment and formulate questions that will elicit from audiologists information necessary for competent educational management. (O.T. Kenworthy's article in the Assessment chapter suggests a model for integrating auditory training into the overall instructional program.)

The last three audiology articles provide brief descriptions of individual amplification devices and FM auditory training systems and guidelines for their care and maintainance. The authors reiterate the fact that hearing aids are only effective when working properly; thus, teaching appropriate use and care along with daily monitoring is essential for all users to receive optimal benefit.

The communication section of this chapter provides a sociologic, philosophic, and content overview of the issues affecting HIDD persons. The importance of communication to personal well being and adjustment within family, educational, and community environments is summarized by Kathryn Meadow in her chapter "Policy Implications of the Research Findings". The importance of communication and language to the dignity and well-being of communicatively impaired mentally retarded individuals is further amplified in the recent ASHA position statement "Serving The Communicatively Handicapped Mentally Retarded Individual".

Against this backdrop specific content information on language development approaches with hearing impaired and multiply handicapped individuals is presented. In "Perspectives on Intervention Strategies for Persons with Developmental Disorders", Yoder identifies crucial dimensions of communication and language that impinge on the design of language intervention programs for developmentally disabled students. He outlines some interactional/environmental variables that effect the election/selection process. Excerpts from chapter 6 of Kretschmer & Kretschmer <u>Language Development and Intervention with the Hearing Impaired</u> provide descriptions of major procedures used in language instruction with hearing impaired youngsters, including attention to facilitation of language with more severely handicapped hearing impaired learners. The article by Kriegsmann et al. reviews the use of sign language systems with nonverbal hearing children and suggests guidelines for evaluating the appropriateness of a manual communication system for a given child. These guidelines, with additional attention to functional sensory capabilities, are applicable to HIDD students. Caution should be exercised in the weight given to correlationally determined prerequisite skills when deciding whether an individual is a candidate for an alternative communication system. Adequate linguistic input in an accessible modality is essential to develop linguistic competence. Both alternative communication systems and alternative instructional strategies will be necessary for some individuals to derive meaning from symbolic communication forms. (See Wacker article in J. Association for the Severely Handicapped, 1981, <u>6</u>, for assessment procedure to identify HIDD individuals who could benefit immediatly from sign language training.) Fristoe and Lloyd have analyzed sign lexicons used with mentally retarded and autistic students and suggest modifications of initial sign curricula based on child language research findings and the communicative needs of individuals. (Refer to Zylstra Owner and Arkell articles in the Instructional Management chapter for additional functional considerations important with older children.)

The use of manual communication as part of the 'total' approach to communication has increased in both settings for hearing impaired and for developmentally disabled students. Excerpts from the article "Signs and Manual Communication Systems: Selection, Standardizations, and Development" (SSSD) describe some of the issues that have arisen with this increased use. Included are clarifications of terminology, thumbnail descriptions of manual communication systems, a statement of the need for sign standardization and development, along with guidelines and processes for doing so. While much of the pressure for SSSD has arisen from the needs of academically advanced students, HIDD students often experience needs for non-existent signs to encode more concrete every day phenomena. The interests of this sub-group of sign users can potentially be met through national and regional SSSD efforts.

The selections from <u>Introduction to Interpreting</u> and the brochure "Communicating with HIDD persons" have been included to provide some guidelines for successfully meeting multiply handicapped hearing impaired individuals' communication needs and to highlight the fact that they can be consumers of interpreter services.

The final selections in the communication section address other augmentative communication systems to facilitate receptive and/or expressive communication when additional disabilities render spoken or manually coded communication inaccessible. Included is the ASHA 1981 position statement on nonspeech communication. While, by definition, people with speaking difficulties arising from hearing impairment are excluded from this definition, some of the service needs of multihandicapped hearing impaired individuals arising from their additional disabilities are addressed in this statement. This statement delineates several dimensions of communication; namely interactive communicative behaviors, symbol systems, and transmission techniques (devices), indicating the need to consider each dimension before recommending any one communication approach.

"Blissymbolics" by Shirley McNaughton describes one alternative symbol system that has been useful in making higher level communication accessible to individuals with severe sensory and motor disabilities and outlines some of the variables to be considered in evaluating the advantages and limitations of this alternative approach. Shane and Bashir offer a decision-making maitrix in an effort to promote more systemmatic analysis in decisions regarding the election of augmentative systems with hearing developmentally disabled individuals with severe motor impairments. For some severely communicatively impaired individuals augmentative devices may prove to be the method of choice, enabling them to engage in direct, complete expressive as well as receptive communication in social, instructional, vocational, and community settings. Yoder reviews research on nonspeech augmentative systems and devices and presents some assessment and implementation recommendations in "Communication Systems for Nonspeech Children". The final article in this section is reprinted from "Communication Outlook", a quarterly newsletter of the International Action Group for Communication Enhancement. Considering communication as an essential life function, Justice and Vogel advocate that speech prostheses be available to all who need them as a matter of right.

DRAFT

AUDIOLOGY SERVICES IN THE SCHOOLS

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AUDIOLOGY SERVICES IN THE SCHOOLS

Introduction

Two factors have contributed to the growing concern of school administrators about providing appropriate educational and related services to children with hearing impairment. First, evidence of the importance of adequate hearing to language learning and academic achievement is growing. Second, state and federal mandates, combined with increasing parent advocacy, have prompted demand for audiology services within the school system itself. The responsibility of the local education agency (LEA) to provide audiology services is clearly outlined in federal regulations (Federal Register, August 23, 1977). At the same time, educational administrators are faced with declining enrollments that erode their state and local funding bases while costs are accelerating. As a result, administrators are confronted with the need to deliver services that are both cost-effective and accountable. The need for guidelines for the development of a feasible delivery system that will provide comprehensive audiology services is urgent. This document is intended to meet that need by providing administrators with information about the following:

1. The characteristics and needs of children with hearing impairment
2. The contributions audiologists can make to meeting these need
3. The most common delivery models for providing audiology services in the schools.

Characteristics and Needs of Children with Hearing Impairment

Although it is well recognized that hearing is critical to learning, the multiple nature of the effects of hearing impairment is not so well-known. A hearing impaired child suffers both from sensory deprivation and from the complex effects this deprivation has on learning. The effective management of hearing impairment must address both the physical (medical/health) considerations and the communicative (habilitative/educational) considerations.

Incidence and Types of Hearing Impairment

Although complete demographic data have never been collected, available data suggest there are between 2 and 3 million school children with some degree of hearing impairment (Eagles, Wishik, Doerfler, Melnick, and Levine, 1963; Berg and Fletcher, 1970; Ross and Giolas, 1978). It is probable that there are between 30-50 hearing impaired children per 1000 students. Included in this number are children with middle ear infections resulting in conductive hearing loss, children with sensorineural hearing loss, and those with central auditory processing problems.

The most common cause of hearing loss in young children is middle-ear infection, which results in a conductive hearing impairment. Usually, conductive hearing loss is amenable to medical treatment. Conductive hearing loss occurs most frequently in children under the age of 8-10 (Shepard, Davis, Gorga, and Stelmachowicz, in press). Conductive hearing loss is usually not severe, ranging more in the slight to moderate range. It may result in significantly delayed speech, language, and academic skills (Holm and Kunze, 1969; Ling, 1969; Needleman, 1977) because it most often occurs during the early critical learning period.

Sensorineural hearing loss is caused by a variety of illnesses and conditions. It is usually permanent and may range from mild to profound. This type of hearing loss can occur at any time, but its prevalence is approximately equal across age groups of children. Sensorineural loss in the high frequencies increases dramatically with age and is becoming more common in high school students (Shepard, et al., in press). The effects of sensorineural loss on language and learning are greater as the degree of hearing loss increases.

When conductive and sensorineural hearing loss are present simultaneously, the resulting loss is called mixed. In addition to the types of losses mentioned above, many children exhibit central auditory processing problems, the cause and exact nature of which are largely unknown. Children with this type of auditory problem may have auditory memory, sequencing, and blending deficits.

Hearing loss may occur alone or in combination with other handicapping conditions. The presence of conditions such as mental retardation or more specific brain damage increases the probability that hearing loss also will occur. Children with other language and learning disorders are at-risk for hearing loss as well.

Effects of Hearing Impairment

The earlier that hearing impairment occurs in the child's life, the more serious are the effects upon the child's development. Similarly, the earlier the problem is identified and the intervention begun, the less serious the ultimate impact.

There are three major ways in which hearing loss affects school children:

1. It causes delay in the development of receptive and expressive communication skills (speech and language).
2. The language deficit causes learning problems that result in poor academic achievement.
3. Reduced ability to understand the speech of others and to speak clearly often results in social isolation and poor self-concept.

These three problems significantly affect the educational lives of children. Studies of the language and academic skills of hearing impaired children reveal several disturbing facts (Kodman, 1963; Craig, 1965; McClure, 1966; Quigley and Thomure, 1968; Peterson, 1972; Davis, 1974; Wilcox and Tobin, 1974; Davis and Blasdell, 1975; Reich, Hambleton, and Houldin, 1977; Davis, Shepard, Stelmachowicz, and Gorga, in press). Some of these findings are summarized below.

Vocabulary Delay

- Vocabulary develops more slowly than normal in hearing-impaired children
- Hearing-impaired children learn concrete words more easily than abstract ones, such as before or after, equal to, or product. Function words such as is and are also are misued frequently.
- The gap between the vocabulary of normally hearing and hearing-impaired children widens with age. Hearing-impaired children don't catch up.
- Hearing-impaired children have difficulty understanding the multiple meaning of words.

Sentence Structure

- Hearing-impaired children comprehend and produce shorter and more simple sentences than normal.
- Hearing-impaired children often misunderstand complex sentences (such as relative clause or passive voice) whether they hear the sentence or read it.
- Verb usage is impaired; improper tense, lack of noun-verb agreement, and improper use of auxiliary verbs are common errors.

Academic Achievement

- All areas of academic achievement are affected, including mathematical concepts.
- Children with severe to profound hearing loss usually achieve no higher than the 4th or 5th grade level unless appropriate educational intervention occurs early.
- Children with mild to moderate hearing loss on the average achieve from 1-4 grade levels poorer than their normally hearing peers.
- The gap between them widens as they progress through school.
- The level of achievement is related to the number, type, timing, and quality of the support services children receive.

Social Problems

- Hearing-impaired children often report feeling isolated, friendless, and unhappy in school.
- Social problems appear to be more prevalent in children with mild or moderate hearing loss than in those with severe impairments.

Service Needs of Children with Hearing Impairment

Minimizing the handicapping effects of hearing impairment depends upon early identification and intensive, broad-based management of each child. To effectively contribute to this management process audiologic services within the schools should include the following components.

Prevention. Information concerning methods of prevention as well as causes and effects of hearing loss needs to be provided to the public on an ongoing basis. This may take the form of parent counseling, professional inservice, public information campaigns, etc., and is closely tied to efforts in early identification and intervention.

Identification. An ongoing identification program, which allows for the periodic screening of all children between birth and 21 years of age, needs to be provided. The identification program may include the establishment of at-risk registries, pure-tone and acoustic-immittance screening programs, and development of expedient lines of communication and referral. An idenification program should be systematic, carried out by trained personnel, and supervised by a person with demonstrated expertise in this area.

Assessment. Ongoing assessment needs to be established in order to provide information concerning the nature and extent of hearing impairment and its effect upon communicative function and educational performance. An assessment of amplification needs, educational needs, and communicative needs must be completed for all children with a hearing loss. Assessment efforts should be directed toward all children who fail screening; all children with known hearing impairments; all pupils placed in special education programs, all children referred by parents, teachers, and concerned third-parties; and all children considered "at-risk" for hearing impairment.

Children with hearing impairment must be assessed in order for appropriate treatment to be planned. Appropriate assessment includes, but is not limited to:

- Compiling and interpreting available audiometric information.
- Determining the need for further pre-assessment information, including otologic consultation.
- Administering, scoring, and interpreting a complete audiologic assessment.
- Selecting, administering, scoring, and interpreting tests determining the benefits of amplification.
- Determining the influence of the hearing loss on communication and learning.
- Identifying co-existing factors that may require further evaluation.
- Referral for assessment and/or treatment using both school and community resources. These may include assessments related to

cognitive, academic, visual, and motor skills, emotional status, the need for financial assistance in the purchase of a hearing aid, and vocational interest and aptitude.

Rehabilitation and Instructional Services. Rehabilitation and instructional services must be provided for all children identified by a multidisciplinary team as needing such services. Activities to acquire and interpret information relative to communicative skills, cognitive abilities, motor functioning, social/emotional development, adaptive behavior, health history, and academic status (where appropriate) need to be completed. An Individualized Education Program (IEP) should be tailored to meet the needs of the child and the parents. Educational services may be provided through any of the commonly used placements, such as home intervention, itinerant services, resource rooms, special classes, and residential placement.

The rehabilitative needs of children with hearing impairment encompass many broad and sometimes overlapping areas. Some of the needed related services may be provided directly by audiologists while others will be provided by other specialists, such as speech-language pathologists, teachers of the deaf, psychologists, or physicians. Some of the most important aspects of rehabilitation are:

- medical treatment, if indicated
- selection of appropriate amplification (hearing aid or auditory training unit) at the earliest possible age
- training in the use of hearing in various settings (including use of amplification in noisy classrooms and social situations)
- remediation of speech and language
- training in the use of visual information to supplement auditory input
- academic tutoring

Training in the effective use of hearing is a primary consideration in intervention because such training directly affects the success or failure in other areas. Two factors contribute most to the successful use of hearing: 1) appropriate amplification that is working properly and 2) a favorable acoustic environment. Research indicates that many children who are good candidates for hearing aid use do not wear them (Shepard, Davis, Gorga, and Stelmachowicz, in press; Karchmer and Kirwin, 1977). Furthermore, children's hearing aids often malfunction. Studies have shown that 50% of the hearing aids worn by school children are functioning poorly at any given time (Gaeth and Lounsbury, 1966; Zink, 1972; Kemker, McConnell, Logan, and Green, 1979). These data strongly suggest that programs to monitor hearing aid performance and use are essential to the effective management of school children with hearing impairment.

Even when properly functioning hearing aids are worn, the high levels of noise and reverberation that exist in most classrooms reduce their effective use (Crum and Matkin), 1976). Open classrooms constitute a particularly difficult situation for hearing-impaired children. These children require a clear signal if they are to understand instructions, class discussions, and other spoken comments. For this reason, noise sources must be eliminated or reduced. Therefore, it also may be necessary at times to substitute auditory training equipment for personal hearing aids to insure that the child receives the best possible auditory input. In addition, the complex interactions between noise, distance from the speaker, acoustic characteristics of the room, and type of amplification make simple recommendations for preferential seating inadequate to insure good use of hearing in the classroom.

Follow-up, Referral and Monitoring. Follow-up services need to be provided as an ongoing and underlying aspect of each component of the hearing conservation and educational services program. These services include referral for otological evaluation, referral for selection of amplification, parent and teacher counseling, monitoring of communicative function, monitoring of educational performance, monitoring the performance of individual and group amplification, as well as periodic detailed reassessment.

Technical Assistance and Administrative Support. Technical assistance should be actively sought from outside sources such as local, state, and national professional organizations, university education and training program, state departments of education and health, community speech and hearing centers, private providers of service, and equipment distributors and manufacturers. Such support is critical to maintaining up-to-date services and facilities. In addition, administrative mechanisms should be developed to insure continuing fiscal support at a level sufficient to properly maintain both the services and the facilities.

Evaluation and Research. Individual pupil as well as program evaluation must be an ongoing activity to determine the efficacy of a hearing conservation and educational services program. Ongoing research into the best practices of delivering hearing conservation and educational services is deemed of utmost importance to education agencies, and the children served.

Role of the Audiologist

Not only are the effects of hearing impairment multi-faceted and complex, but identification and audiometric assessment techniques have become increasingly complex and sophisticated. There is evidence, however, that overall management techniques have not kept pace with advances in assessment (Garstecki, 1978; Davis, Shepard, Stelmachowicz, and Gorga, in press).

Garstecki (1978) reported that audiologic services in the schools have focused primarily on identification audiometry and pure-tone testing. The responsibility for providing these services has typically been delegated to speech-language pathologists or school nurses. However, the nature of their training and their broad responsibilities restricts their opportunity to implement truly comprehensive hearing services.

Furthermore, the identification process has usually not been structured to differentiate hearing impairment, for which health considerations are primary (such as middle-ear infections), from hearing losses requiring more educational consideration. Referrals have most often been medical ones, and follow-up has typically been limited to that associated with treatment of the medical problem. In the absence of the appropriate type and number of professionals with audiologic expertise, the educational and communicative aspects of hearing impairment are often neglected.

Audiologists are specifically trained in the assessment of hearing and the habilitation of persons with hearing impairment. To meet national professional standards established by the American Speech-Language-Hearing Association, audiologists must complete a master's degree, complete at least 300 hours of supervised clinical practicum, pass a national examination in audiology, and complete a Clinical Fellowship Year under the supervision of a fully certified audiologist. When combined with training or experience in education, these requirements result in the qualifications necessary to effectively complement the expertise of other school staff. This, in turn, allows delivery of the services necessary for comprehensive management of children with hearing impairment. Specifically, the audiologist is uniquely qualified to perform the following activities:

1. develop a high-risk registry in conjunction with local medical personnel
2. organize and supervise a hearing screening program
3. train audiometric technicians to screen hearing
4. perform follow-up, threshold hearing tests
5. make appropriate referrals for further assessment
6. interpret assessment results to other school personnel
7. act as a member of the educational team and make recommendations about: placement, communication needs, and modification of classroom environments for the deaf and hard of hearing
8. educate parents, children, and school personnel about ways to prevent hearing impairment
9. make recommendations about use of amplification, personal and group
10. monitor hearing aids and auditory training units and train others to do so
11. analyze classroom noise and make recommendations as to how to reduce its effects
12. calibrate audiometric equipment
13. serve as a liaison between the school and parents, teachers and special support personnel, and the school and relevant community agencies.

Due to the complex and varible nature of hearing impairment and its effects, the hearing-impaired population is quite heterogeneous in nature.

It is therefore imperative that an individualized intervention plan be developed and implemented by a multidisciplinary team. In addition, the efforts of that team need to be guided by an overriding understanding of hearing impairment. This understanding must, in turn, be coordinated with and integrated into ongoing classroom instruction. Yet most school personnel are unfamiliar with the nature and specific effects of hearing impairment. The audiologist is the team member whose training focuses on audition, characteristics of hearing impairment, and the impact of hearing impairment upon the individual. Therefore, audiologists provide an excellent resource for direct service, in-service activities, and public information efforts that can significantly enhance the intervention efforts of the educational team.

Delivery of Audiology Services

The audiologic needs of hearing-impaired children can be realized in a variety of ways. Implementation of any audiology program will depend on the administrative philosophy of the individual school system. Given that there is general agreement on what constitutes comprehensive audiologic services to persons in the schools, a number of questions arise which need to be studied and answered. These questions relate to whether education agencies should provide services directly or should contract for services through other public agencies or private providers. The questions to be answered include the following:

- What are the populations to be served - preschool, school-aged, pupils with amplification, etc.?
- What federal and state statutes and regulations impact on the provision of the services?
- What resources are available within the community or reasonably nearby?
- What facilities and equipment are available to provide the desired services?
- What are the qualifications and/or competencies of the personnel that provide the services?
- What are the administrative and supervisory capabilities of the school agency, and/or private providers?
- What are the channels of communication and the possible gaps in communication between agencies?
- What are the time factors, including travel, average wait for scheduling, average wait for reports, etc.?
- What levels of time commitment is required for parent counseling, attendance at staffings, attendance at Individualized Education Program (IEP) conferences, etc.?
- What are the comparative costs of providing the services?
- If services are contracted, for what are the liabilities, that is, malpractice insurance, physical injury insurance, and so forth, of the respective parties?

To facilitate a systematic response to the above questions it is recommended that schools initiate the following activities. Schools should:

1. determine the service needs of their population and the internal resources available to meet those needs. This evaluation should include, but not be limited to: (1) size and nature of the population to be served; (2) personnel needs and resources; (3) equipment and physical plant needs and resources; (4) proximity of services and facilities to the population requiring them; (5) transportation needs and resources; and (6) cost of services (direct and indirect). This needs assessment might be accomplished by internal staff and/or outside consultant(s).
2. determine what resources are available in the surrounding community to address the observed needs.
3. analyze the cost/benefit ratio for services provided by full-time school staff and contrast that with the cost/benefit ratio for the same services provided by nonschool vendors.
4. solicit bids and contract-proposals from prospective nonschool audiologists, as part of their total survey of needs and cost/benefit factors.
5. continuously monitor and evaluate population needs and the services provided to insure appropriate planning, service delivery, and economical use of funds.

Delivery of Service Models

At present there are four models for delivery of audiologic services that commonly are used: 1) parent referral, 2) school-based/self contained, 3) school and community based, and 4) contractual agreement.

The basic characteristics of each of these models are described below, but each is subject to modification according to local needs and resources. The models are based on the following assumptions:

1. Audition is critical to learning; educational achievement is affected when children have unidentified or unmanaged hearing impairment.
2. Services should be comprehensive and designed to meet the specific needs of the children involved.
3. If these children are to effectively address their impairment, related and support services are necessary for all but a few, regardless of the type of hearing loss they exhibit.
4. Services must be provided by personnel who demonstrate the necessary competencies. In addition to services provided by the audiologist, services from other specialists may be warranted and should be sought through appropriate referral and follow-up.
5. Services delivered must comply with the letter and intent of state and federal mandates.

Model I: Parent Referral

General Description

In Model I, the Parent Referral model, identification services are provided by the local education agency (LEA) or the intermediate educational agency, if one exists. Typically, identification procedures consist of pure-tone screening conducted by a speech-language pathologist or school nurse. Following hearing screening, the parents are notified of the results and recommendations are made for their consideration. The parents become the primary case managers, making the decision whether or not to arrange for evaluation of the suspected loss by medical or audiological personnel in the community. If assessment occurs, it is the parents' responsibility to ensure that the results of any evaluations are transmitted to the LEA. After receiving the relevant reports, LEA personnel initiate those intervention procedures which they are competent to provide.

Efficiency of the Model

The delivery of services under Model I is decentralized. Ordinarily LEA staff members are responsible for providing services only in the schools to which they are assigned. As a result, no one person within the LEA has responsibility for: 1) following up on children referred to parents; 2) collecting, interpreting and disseminating information received from sources outside the LEA; and 3) providing routine calibration and maintenance of equipment.

Model I requires active participation by parents and the existence and use of community resources for the model to be successful. As a result, the LEA loses control of many of the organizational and management decisions that are made concerning the child. In some instances audiologic information needed to develop an appropriate IEP may not be readily available within the schools. When audiologic information is available, LEA staff may not have enough background in audiology to appropriately interpret the information received from outside agencies. Although Model I avoids duplicating within the LEA those services provided by other agencies, there is no assurance of continuity of service from year to year. In many small communities, appropriate audiology services are not available.

Compliance

Because primary assessment activities related to a child with a suspected hearing loss take place outside the schools, it is difficult for the LEA to determine if acceptable standards of service delivery are being met. Although the LEA must ensure that all services are provided by qualified personnel, this is difficult to do without having audiological expertise available within the schools. Without continuing education, it is possible that those personnel responsible for the identification program within the LEA may not be fully qualified to provide such services. To effect comprehensive services using this model, the LEA must ensure also that there is: 1) control of and access to assessment data, 2) appropriate interpretation of assessment data, 3) centralized responsibility for hearing services, and 4) continuing inservice education of LEA staff on the needs of hearing-impaired children.

Cost

Model I is relatively inexpensive to the LEA for the following reasons:

1. Capital expenditures are limited to audiometric equipment required for hearing screening.
2. Identification and intervention services provided within the LEA are assigned to existing staff. Hence, no additional staff allocations are supported.

Model I may, however, impose additional costs for assessments completed by audiologists and physicians who are not employed by the school. Also, the costs of calibrating audiometric equipment, monitoring and maintaining amplification systems, and providing appropriate inservice training will require additional expenditures.

Model II: School Based/Self Contained

General Description

Under Model II, all audiology services are directed or performed by audiologists employed full time by the LEA or intermediate educational agency. Although identification services may be delegated to other professionals or volunteers, the audiologist is responsible for supervising and coordinating the hearing screening program. Threshold testing is accomplished by the audiologist and results are shared directly with others involved in case management. Appropriate referrals are made with parental consent and the audiologist makes direct contact with physicians and other relevant professionals. The audiologist in the school also is responsible for the maintenance and calibration of audiometers and the monitoring of hearing aids and auditory trainers.

Efficiency

Because all audiology services are provided directly by school personnel, Model II allows for good control of the data necessary for case management. The audiologist is available to collect and interpret audiologic data, monitor amplification, and serve as a member of a multidisciplinary team. Classroom conditions can be directly monitored and inservice can be readily provided to teachers and other school personnel.

Since Model II allows for provision of audiologic services within the schools, a duplication of services may result if audiology services are readily available in the community. Therefore, a common modification of Model II is to refer to external agencies for special services such as hearing aid selection.

Compliance

The degree to which audiology services provided under Model II meet acceptable professional standards and federal, state, and local requirements is under the direct control of the education agency. The degree of compliance will, therefore, be a function of planning and allocation decisions made by the LEA.

Cost

The cost of Model II includes the salaries of audiology personnel and the purchase of sophisticated audiometric and calibration equipment. A diagnostic audiometer, hearing aid test box, and sound-treated testing booth are examples of the type of purchases to be made. In addition, special supplies related to the monitoring of hearing aids are required. The size and nature of the school population served will influence the number of staff members and equipment needed.

The greatest outlay of funds occurs then this model is first instituted, and again when major equipment is replaced. Naturally, equipment depreciation, maintenance, and replacement costs may be pro-rated over a period of years (typically a 5-year period) but this will reflect higher annual costs of operation. The method of budgeting such costs is, of course, at the discretion of the administrator. Finally, it should be noted that Model II may reduce out-of-pocket expenses for parents of children not covered by health insurance or some other third-party payer.

Model III: School and Community Based

General Description

The responsibility for providing comprehensive audiology services is shared by the school and other community agencies under Model III. Identification services are provided within the LEA under the supervision of an audiologist. This school-based audiologist interprets hearing screening data and either administers follow-up screening or informs parents that a referral for further assessment will be needed. If further assessment is required, the school-based audiologist obtains permission from the parents to make a referral and to exchange information with a community-based audiologic service provider. Further audiologic assessment is obtained through the community-based provider. The audiologist in the schools then actively follows the case to be sure recommendations are carried out.

Assessment information obtained from outside the LEA is interpreted by the audiologist in the school and made available to parents and school personnel. The audiologist often serves as case manager, coordinating information and efforts of the school team and providing inservice training. As in Model II, calibration and maintenance of equipment is the audiologist's responsibility. In most cases, intervention is provided by school personnel, although community agencies can serve as providers of certain of these services as well.

Efficiency

Although educational agencies that choose Model III rely on outside agencies for much of the assessment information, they maintain control of the delivery of audiologic services. The flow of information between community agencies and the school is facilitated by the school-based audiologist who assumes responsibility for follow-up activities. Continuity of services is also facilitated by the fact that the audiologist in the school and other school personnel assume direct responsibility for the delivery of appropriate services. Alterations in community-based services may, however, influence continuity in cases where there is a large dependence on community-based service providers. Also, if there are many sources of audiology services in the community, an acceptable system for making referrals must be devised. These may involve parental choice, systematic rotation through agencies, or some other equitable method.

Compliance

The audiologist in the school is responsible for ensuring that audiology services meet local, state, and federal requirements. Compliance will, therefore, be a direct function of the audiologist's ability to elicit cooperation from community-based service providers.

Cost

Model III costs include the salaries of audiologist(s) and purchase of the audiometric equipment necessary for services provided by the staff audiologist. Since most diagnostic audiologic assessment is done by non-school personnel, only equipment needed for identification audiometry and hearing aid monitoring need by purchased. It may, however, be necessary to provide payment of fees for the services delivered by community agencies.

Model IV: Contractual Agreement

General Description

Under Model IV the school system contracts with community service providers and agencies for audiologic services. The contract specifies the exact nature of the services to be provided, by whom, when and how services will be provided, and the nature of the reporting requirements. The LEA may contract for all audiology services or only for those it chooses not to provide. The responsibility for ensuring that comprehensive audiology services are delivered to the school population remains with the school system.

Efficiency

The key to the use of Model IV is the care with which contractual arrangements are made. The school loses control over factors such as the employment of personnel (including specifying the standards they must meet) and their supervision. If clear lines of authority and communication are established, however, procedures for collecting, storing, and disseminating audiologic information can be established and monitored. Care must be taken to assure that reports and records meet federal, state, and local requirements. Of special importance is the external providers' understanding of educational policies and procedures within the LEA. Therefore, staff development activities should be included in all contracts.

Many contracts involve only clinical audiologic assessment. The use of test results for educational planning and all remediation efforts must then be covered by school personnel.

By contracting for services, the LEA or intermediate educational agency may avoid the task of recruiting and directly employing personnel. Model IV also reduces the probability that the LEA will duplicate services available elsewhere in the community.

Compliance

To achieve compliance the LEA must develop a contract that provides for appropriate services delivered by qualified personnel who follow all mandated procedures. This is, perhaps, more easily accomplished when only selected services are included in the contract, with the school providing the remainder. The degree to which compliance is achieved will also be a function of the administrator's content level and/or willingness to seek input concerning service needs of hearing-impaired children.

Cost

The major cost of Model IV is the fee-for-service contract, the actual cost of which can be negotiated according to community standards. It is possible that the contract costs will exceed those involved in providing all audiology services within the schools. Responsibility for and costs of evaluating service delivery alternatives remain with the LEA. Model IV should also be chosen with care, since its success will depend on continuity of funds for negotiating the contract. If funds are unavailable, services may not be provided, placing children with hearing impairment in jeopardy.

Summary

The educational needs of children with hearing impairment are the responsibility of local and regional education agencies. Comprehensive audiology services include: <u>prevention</u>; <u>identification</u>; <u>assessment</u>; <u>reha-</u>

bilitation and instructional services; follow-up, referral, and monitoring; technical assistance and administrative support; and evaluation and research. The needs of hearing-impaired children are so diverse that a team approach is the most feasible way to ensure that they receive appropriate services. Audiologists, because of their training and experience, are indispensable members of the educational team.

Under most circumstances, a program of related services for children with hearing impairments is significantly enhanced by having audiologists on the school staff. Including audiologists makes possible the proper integration of audiologic data into educational planning. Their participation on the educational team discourages overemphasis on the medical aspects of hearing impairment to the exclusion of the intervention activities necessary for school achievement.

Input from audiologists can be obtained by employing them within the schools or by contracting for their services. Four general models for providing audiologic services are presented: the parent-referral model; the school based/self-contained model; the school and community based model; and the contractual agreement model. Each model has its own general characteristics, efficiency, costs, and prospect for compliance with regulations and provision of comprehensive service. A summary of the four models' relative characteristics appears in Table 1.

For further information concerning the needs of hearing impaired children and models of service delivery contact:

The American Speech-Language-Hearing Association
10801 Rockville Pike
Rockville, Maryland 20852

or

The State Speech-Language-Hearing Association

or

The Consultant, Audiology/Hearing, in your
State Department of Education.

Table 1. Summary of characteristics of four models of service delivery.

	Model			
	I Parent Referral	II School Based	III School & Community	IV Contractual
Services Provided Within the Schools (Yes, No)				
Identification	Yes	Yes	Yes	Yes
Assessment (clinical)	No	Yes	No	No
Referral	No	Yes	Yes	Yes
Follow-up	No	Yes	Yes	Yes
Intervention	Yes	Yes	Yes	Yes
Staff development	No	Yes	Yes	Yes
Use of team approach	No	Yes	Yes	No
Logistics (high, low)[1]				
Control over services (availability and quality)	Low	High	High	Low
Flow of information among school personnel	Low	High	High	?
Non-duplication of services	High	Low	High	High
Continuity of services	Low	High	High	?
Cost (high, low)[1,2]				
Personnel	Low	High	Moderate	?
Equipment	Low	High	Moderate	?

[1] Items marked with ? indicate those that may vary considerably according to local procedures and policies.

[2] Costs have been referenced to Model I which is assumed to be "Low" because it presumably is implemented using available allocations and limited equipment (pure-tone audiometers only).

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7

A Critical Assessment of Current Practices in the Audiologic Management of Preschool Children

Noel D. Matkin

THE PRIMARY PURPOSE of this presentation is to express a number of concerns with respect to the identification, evaluation, and habilitative strategies currently utilized by many audiologists while managing young children at risk for educationally significant hearing impairments. In this writer's judgment, there is a pressing need for pediatric audiologists both to modify the traditional service delivery model and to facilitate interdisciplinary communication. Therefore, recommendations based upon both a consideration of the current literature and clinical experience will be offered.

While some similarities do exist in the audiologic management of adults and children, significant differences must be recognized at the outset. The effects of a hearing loss in early childhood are pervasive, with habilitative and educational needs being complex, extensive, and long term. To complicate matters further, successful management of pediatric cases depends in large part upon the acceptance, understanding, and cooperation of the child's parents. For these reasons, the audiologic evaluation of children is most effective when undertaken as one facet of a team endeavor. Yet, far too frequently, the audiologist's contribution is limited in its effectiveness because services are often provided as a specialty assessment in isolation and then communicated to parents, clinicians, and educators in a lexicon which has limited meaning, at best.

Identification

A continuing concern is the relatively late identification of many children with hearing losses. Despite the efforts to develop neonatal and preschool screening programs, far too many youngsters are referred on account of a failure-based identification model: It is only after a child repeatedly fails to achieve major developmental milestones in communication that a referral is initiated. Even in instances of severe and profound bilateral impairments, there is often a 9- to 12-month delay from the first statement of concern by parents to the initial confirmatory evaluation (Malkin et al., 1976; Matkin, 1973). In milder degrees of hearing loss, a delay of one to two years is not uncommon. In fact, many high-frequency and unilateral impairments are not identified until the first pure-tone screening is undertaken in the public school.

Since the preschool years represent the prime period of oral language development, such delays in identification are clearly unacceptable. An aggressive educational program regarding the major milestones in receptive and expressive communication development must be initiated, not only for the general public, but also within the medical community. Far too often, a well-meaning physician allays initial parental concerns with a "wait and see if he/she outgrows it" response rather than aggressively referring to a speech and language center to determine whether or not the child is significantly delayed in communication skills as compared to normal development. As a profession, we should be concerned about the late identification of all communication disorders, whether related to a hearing loss or not.

Assessment of Residual Hearing

A second major shortcoming in the management of many young hearing-impaired children is the reliance upon the pure-tone audiogram as the definitive measure. A host of internal and external factors interact to influence the auditory function of each youngster with a hearing loss. Obtaining reliable and valid minimal response levels to pure tones across a variety of test frequencies is recognized as basic to any audiologic assessment. It is upon such information that the type, degree, configuration, and symmetry of the impairment between ears can be established. Further, generalizations regarding possible etiology, the need for amplification, and the probable effect upon communication development can be made. However, it must be recognized that two children with identical audiograms may function very differently. Thus, to assume homogeneity by grouping children for educational and habilitative purposes on the basis of audiograms is quite naive.

The focus, either when classifying the hearing losses among children or when planning individualized education programs, must be shifted from the loss of hearing to the potential for utilizing residual hearing. Such a shift in focus will require several major changes in the routine practice of pediatric audiology. First, while working within the child's receptive vocabulary knowledge, the same effort and emphasis must be placed upon the measurement of auditory discrimination as has been placed in the past upon the measurement of auditory sensitivity. With young children, this commitment, in the author's professional judgment, means that:

1. A developmental approach must be taken to select an appropriate auditory task, appropriate test materials, and an appropriate response mode, and
2. The audiologic evaluation must be an ongoing process during the preschool years so that with maturation and specialized training the emergence of auditory skills can be monitored.

Unfortunately, there has been limited research with respect to the development of appropriate test materials and techniques to permit the assessment of auditory discrimination among young children. The only pediatric test that has been widely used are the PB-K 50 lists of monosyllabic words developed by Haskins (1949). The lists were developed by utilizing vocabulary of kindergarten-aged children. Therefore, the use of these materials with a broad spectrum of hearing-impaired children with delayed language development often is inappropriate, resulting in depressed scores due to limitations in the child's receptive oral language, as well as in auditory discrimination.

Several discrimination tests have been developed that make it possible to examine a larger number of children having limited speech and language skills. The Word Intelligibility by Picture Identification test (Ross & Lerman, 1970) and the NU-Chips by Katz and Elliot (1978) are examples of materials that are appropriate for use with children who are delayed in receptive language. Further, these tests utilize a picture-pointing rather than a verbal response, so it is possible to accurately judge whether or not the child's response is correct.

As has been recommended when measuring auditory sensitivity, the pediatric audiologist must rely on a battery of materials that can be employed for testing auditory discrimination rather than on any one single test (Matkin, 1977a). In this way, the validity of the test procedure can be assured if one works within the child's level of language mpetence. Unfortunately, clinical and laboratory investigations

suggest that none of the available measures can be appropriately applied with youngsters who are functioning at less than a three-year language level. For this reason, a pressing research need is to develop alternative procedures that will yield information with respect to the auditory function in the child with very limited language. While the tradition has been to use a single test, usually comprised of monosyllabic words, Erber and Alencewicz (1976) suggested that the audiologic assessment of residual hearing should include measures of detection, discrimination, recognition, and comprehension. In the professional opinion of this author, nonverbal stimuli, such as common environmental sounds, as well as verbal materials also should be utilized. The Sound Effects Recognition Test (SERT) developed by Hieber et al. (1975) can often be used to differentiate the level of auditory function even among nonverbal youngsters.

Recent publications suggest that the use of Visual Reinforcement Audiometry to assess speech sound discrimination abilities of children as young as 5 to 6 months of age may be feasible (Eilers, Wilson, & Moore, 1977). So far the procedure has been used primarily with normally hearing children and in a laboratory setting. However, research reports suggest that with certain modifications the basic principle and procedures may be quite adaptable to the clinical setting.

Analysis of Response Behavior

Failure to analyze each child's response behavior during audiologic testing is another major concern in relation to current practices in pediatric audiology. To explain, the audiologist traditionally has focused on careful control of stimulus parameters and recording a child's response level to a particular test signal. Yet, clinical experience suggests that a good deal of useful information is lost if the sole objective is an analysis of psycho-acoustic response data. Of equal importance is an analysis of each child's response behavior, even during routine threshold test procedures.

At present, there is growing interest among educators and clinicians in the assessment of central auditory processing. It is suggested that central processing problems, in addition to peripheral hearing loss, compound the effect of the handicapping condition in many children. Information from the Office of Demographic Studies indicates a high prevalence of multiple handicaps among hearing-impaired children (Gentile & McCartney, 1973). Yet, most audiologic tests designed to assess the integrity of the central auditory system require the presence of normal hearing sensitivity. In other words, it is not possible to administer many of the standard measures in a central auditory test battery once a peripheral hearing loss has been determined. Very often, observations regarding response behavior yield important clues to the possible presence of additional handicapping conditions. Such an analysis of response behavior often reveals that significantly more conditioning trials are needed to obtain stimulus-response control. A review of clinical records reveals that most children are conditioned successfully in six trials; often less are required, even with toddlers. Once a child is conditioned for behavioral testing, it then becomes important to assess the youngster's ability to generalize and transfer such conditioning across various test signals. Also, the rate of habituation is an important consideration; it often is more rapid in the case of the multihandicapped youngster. It must be kept in mind that even a simple operant conditioning procedure such as Visual Reinforcement Audiometry (suitable for use with infants as young as 6 months of age) taps basic cognitive and motor abilities. Further, visual and auditory attending abilities, as well as short-term memory, are required to maintain such behavioral conditioning during a test session.

Observation of aberrant reaction times during pure-tone and speech testing may be an additional clue to specific deficits in auditory reception and processing. As is the case with most auditory abilities, there is evidence that reaction time is developmental and becomes shorter with maturation. Further, in both children and adults, reaction time tends to become longer as one approaches absolute threshold. Finally, it has been noted that some young children respond to termination of the auditory signal rather than to its onset. Therefore, developmental age, the sensation level at which the stimuli are being presented, as well as the possibility of a "tone off" response, must be considered when analyzing reaction time. Focusing on the characteristics of a child's response behavior as well as upon the audiogram may facilitate early identification of additional handicapping conditions. Confirmation of such clinical impressions may be possible through a similar analysis of electro-physiological auditory activity obtained during brainstem evoked response audiometry.

In recent years, several conditioning techniques including visual reinforcement, tangible reinforcement, and conditioned play audiometry have been found to be effective with preschool children (Matkin, 1977a). Thus there is little basis for the continuing misconception, especially among allied health professionals, that youngsters nnot be reliably tested under the age of 5. Further, sufficient normative data are now available for the major techniques in the pediatric audiologic test battery to permit a judgment of the functional age range within which the particular child falls. For example, good success has been encountered in the audiologic testing of multihandicapped school-aged children having quite limited cognitive abilities. Yet, the use of Visual Reinforcement Audiometry, which is typically appropriate for much younger children, was necessary. The point is that each audiologic report should include a comment on the conditioning technique utilized and the appropriateness of the approach relative to age.

Obviously, caution must be exercised to avoid overinterpretation of such observations of response behavior. However, it has been found productive to alert the clinician or teacher to the fact that the child's response behaviors during audiologic testing suggest that compounding problems may be present. Further evaluation and subsequent modification of remedial and educational strategies may result after sharing such concerns with respect to patterns of auditory behaviors.

Aided Testing

Far too frequently, the typical audiological report only stresses the degree, type, and configuration of the hearing loss. While such information is useful to the managing otologist, it often is of minimum utility to the educator. It is important to note that each of the behavioral conditioning techniques appropriate for use during the pediatric audiologic assessment also can be utilized while evaluating a young child's response with various hearing aids (Matkin, 1977b). In the case of the child with limited verbal abilities, educators and clinicians would be far better informed if audiologists routinely provided response data in the form of an aided audiogram which reflects the youngster's ability to perceive various auditory test signals across the frequency range while wearing the particular recommended hearing aid(s). It has been found that teachers often are far more realistic in establishing levels of expectation after being provided with an aided audiogram. With such information, it is possible at the outset to comprehend which segments of the acoustic spectrum of speech will and will not be audible while the child is wearing amplification.

As soon as the auditory discrimination tests can be reliably administered, aided scores obtained not only in a quiet listening environment but also in a background of competition should be available for education planning. It is well documented that the acoustic environment in which a hearing aid is used will determine in large part the benefits to be derived (Hieber & Tillman, 1978). Adult hearing aid users frequently complain about the adverse effects of the listening environment on their perception of speech. Yet, in the writer's experience, the limitations imposed by classroom acoustics are rarely discussed when the benefits and limitations of hearing aids for children are considered. With the current thrust toward mainstreaming of hearing-impaired children, the importance of providing information relative to a youngster's ability to understand speech in a background of noise cannot be overstated. Youngsters with excellent aided auditory potential are being placed in acoustic environments in regular classrooms which severely limit their auditory function. Since it is not reasonable to acoustically treat each classroom in a school, the use of a radio frequency auditory training system rather than a conventional hearing aid must be given careful consideration during individual educational programming.

Parent Management

As mentioned earlier, the successful management of preschool hearing-impaired children depends, in large part, upon the participation and cooperation of the parents. Since the audiologist often is the first member of the communicative disorders team to evaluate the child and confirm the presence of a hearing loss, the issue of parent management must be given primary consideration. Yet, few graduate training programs provide formal course work and practicum in the area of parent counseling. As a result, many audiologists feel they have fulfilled their role with parents when they have explained the child's audiogram, discussed the hearing aid, and referred for special education. Of even greater concern is the practice of excluding parents from observing the audiological testing. As a consequence, many parents, at best, have a limited understanding of the significance of the audiological results.

As indicated in a recent publication by Ling and Ling (1978), and previously by this writer (Matkin, 1976), the management of parents includes three endeavors: parent education, parent guidance, and parent counseling. It is readily acknowledged that each of these activities cannot be considered mutually exclusive. Yet, it has been quite helpful to organize clinical activities and to establish short-term goals for parents with these three endeavors in mind. To explain, parent education is viewed as an orientation through discussion, programmed materials, and selected readings to acquire the basic information (including terminology, concepts, and rationale) needed to understand the meaning of the audiological findings. Obviously, the content of a parent education program must be continuously expanded and extended as the child matures. Only through the development of an ongoing educational thrust for parents will the meaning and importance of many recommendations be understood and acted upon.

In contrast to parent education, parent guidance in this triad means assisting parents in their understanding of the various options that are available when planning for their child's future. In the author's judgment, this activity represents a critical step in fostering independence among parents and in assisting them to assume the role of parent advocate for their child. Too frequently, clinicians—whether audiologists, speech/language specialists, or teachers of the hearing impaired—assume that they must dictate the preferred program of management. Such a strategy suggests that the clinician knows both what is best for the family and what habilitative or educational approach will be most appropriate for the particular child under study. Unfortunately, our knowledge on such matters is not absolute. Further, such an approach fosters dependence rather than independence among parents.

Finally, it is suggested that the term "parent counseling" be utilized in a restrictive rather than general context. If the audiologist is willing to identify and describe the hearing impairment, it is imperative that he/she be prepared to support the parents in the inevitable emotional response that our findings initially elicit. There was a time when the author naively believed that the intensity and depth of the parents' emotional outcry would be reflected by the degree of the hearing impairment just identified. Unfortunately, there is no adequate way to predict the parents' level of expectation of their child or their ability to cope with adversity. It is not suggested that the audiologist attempt to assume the role of psychotherapist. However, it is recommended that the audiologist understand the grieving process and that there be a willingness to allot time for empathetic support of parents, which is considered mandatory.

Conclusion

A critical analysis of current practices in pediatric audiology indicates the need for significant modifications in the traditional service delivery model. Increased effectiveness of early identification programs to assure referral of all children with significant delays in communication development; the utilization of a developmental approach to evaluation of residual auditory potential as well as hearing loss; careful analysis of each child's response behavior during testing; detailed assessment of performance with amplification and the active involvement of parents in evaluation and remedial planning are all needed if the potential benefits of pediatric audiologic management are to be realized. Finally, involvement of the audiologist in the child study team as an active participant in multidisciplinary management is necessary if, as professionals, we honestly believe that maximal use of residual hearing is beneficial, regardless of the particular educational approach taken.

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8

Audiologic Assessment: Interpretation Relative to Optimal Amplification and Speech Training

Derek Sanders

IN CONSIDERING THIS TOPIC, it is necessary first to clarify the meaning of the phrase "speech training." In this conference one cannot easily justify limiting the application of the phrase to stimulating production of speech. To do so would narrow too sharply current concepts of speech, and disassociate articulation training from receptive and expressive use of speech.

What is the audiologist required to do for the speech teacher? This can best be answered in the perceived goals of the teacher. The author suggests that major goals for teachers of speech at the primary and secondary levels are the improvement of oral communication and the improvement of the students' abilities to participate fully in oral communication. If these goals are accepted, then the teacher must be concerned not only with the pupils' amplification needs related to teaching of speech, but also their needs for amplification which permit conversation in academic and social activities.

Specifically, the speech teacher expects the audiologist to provide amplification to increase the student's ability:

1. To receive and decode the acoustic signal;
2. To internalize an acoustic image of sound patterns down to syllabic level;
3. To self-monitor attempts to generate an equivalent production model;
4. To improve the intelligibility of speech; and
5. To improve understanding of speech in various academic and social situations.

In providing appropriate amplification, the difference between the segmental and suprasegmental components of speech must be acknowledged. In this regard, the segmental components refer to the phonemic information derived from formants and transitions arising from articulation and coarticulation. The suprasegmental components refer to the melodic patterning arising from vocal inflection, stress, and duration. The development of articulated speech under normal circumstances is predicated upon the speaker's ability to effect vocal-articulatory behavior resulting in an acoustic signal which matches the model of the adult. This necessitates that speech be loud enough and have the full complement of frequencies when received. These, then, constitute three primary requirements of amplification for speech:

1. That it raise the intensity of speech into the pupil's range of residual hearing;
2. That it raise all frequencies important to speech to within the range of residual hearing except as deemed inappropriate; and
3. That the sound intensity will never exceed the student's loudness tolerance.

Two further considerations must influence the choice of amplification specification and, therefore, the assessment procedures. The first is the significant distortion which reverberation can exert on the acoustic speech signal. The second is the negative effect of environmental or speech noise upon discrimination. These requirements must be considered in the audiologic assessment as applied to speech processing.

Is diagnostic audiologic data sufficient to specify amplification? To answer this question, the difference between diagnostic and rehabilitative evaluations must be considered. The goal of diagnostic audiology is to assess the auditory system. In searching for objectivity, the diagnostician seeks to eliminate the client from the process as far as possible. One feels that ideally the diagnostic audiologist would say to the patient: "If you can drop your ears off by 9 a.m. tomorrow, we can have them all tested and fitted with an aid by 5 p.m." Rehabilitation assessment, by contrast, is concerned with the client's *functional* use of hearing. The rehabilitation audiologist seeks to determine the influence of the very factors which the diagnostic audiologist seeks to exclude. In rehabilitation, the audiologist must relate the audiologic assessment data to speech perception and production. To do this, parameters of residual hearing must be defined carefully to answer the following questions: What is the frequency range of residual hearing, and how much hearing remains within that range? That is to say, "How intense does sound have to be in order to be audible?" How much intensity can be accepted? In other words, "What is the dynamic range of residual hearing between threshold and maximum acceptable comfort level?" Frequency range and tolerance limits represent the boundaries of residual hearing. This information relates to the selection of amplification, since amplified sound is expected to fill the area defined by these boundaries. As stated earlier in this paper: The sound must be made loud enough; it must amplify the full range of frequencies unless otherwise prescribed; and its loudest components must not exceed comfortable limits.

Gain

Making sound intense enough presents no problem to the hearing aid industry. The problem is to raise essential speech components sufficiently to make them clearly audible without exceeding comfort acceptability. This requires that the amplification unit used—personal hearing aid or auditory trainer—be set to a maximum power output appropriate to the student's maximum tolerance. McCandless (1976) has indicated that at some time loudness discomfort troubles 50 percent of hearing aid users. By limiting maximum power output, optimum use of the gain control is provided.

Currently, there is concern that audiologists are providing too much gain in the fitting of hearing aids. In this regard, a general guide proposed by McCandless (1976) specifies that user gain should be approximately 50 percent of the hearing deficit.

Gengel (1974) determined that user gain averaged 20–25 dB (at most 30 dB) above detection threshold, which was probably determined by the perceived loudness of the first formant. Maximum vowel discrimination occurred at 22 dB above speech detection threshold; however, maximum consonant discrimination occurred at 33 dB above speech detection threshold. This evidence suggests that adults (Gengel, 1974) and children (Byrne & Fitfield, 1974; Bess, 1976) with moderately severe to profound deficits tend to set the volume control lower than the position optimal for speech perception.

These reports also suggest that students should be encouraged to use a higher gain level for speech training than for general use. This suggestion receives further support from Gengel's demonstration that his subjects could become accustomed to a higher gain setting.

Frequency Response

Since frequency response in amplification should encompass the range of residual hearing, it is helpful to replot the pure-tone audiogram into sound pressure level (SPL) either by use of an equal loudness contour table (Sanders, 1971, p. 109) or by use of the Bragg SPL Converter (Bragg, 1977). This permits you to depict residual hearing levels in sound pressure level. The measured, or claimed, response curve of the hearing aid or auditory trainer then can be plotted on the same chart, allowing the teacher to see how well the amplification curve encompasses the residual hearing curve.

It should be stressed that low-frequency attenuation with associated high-frequency emphasis may prove beneficial in teaching or improving speech for students with residual high-tone sensitivity. Low-tone emphasis, however, is contraindicated for students with hearing at or above 500 Hz. For children who have only corner audiograms (response at 125, 250, 500 Hz only), extension of frequency amplification below the usual 400 Hz may prove of value in perceiving voicing components of speech sounds which may otherwise be inaudible.

Aided Frequency Response

The child's auditory reception with a hearing aid and with a particular auditory training unit is most important to the speech teacher. The speech teacher should have a pure-tone audiogram indicating both unaided and aided thresholds from 125–8000 including 750, 1500, 3000, and 6000 Hz. The audiologist can help by providing comparative aided audiograms for alternate frequency response settings. This information, together with the student's acoustic gain requirements and maximum output acceptance limits, should be converted into guidance about recommended control settings for auditory trainers.

Many teachers of speech choose to use the child's personal hearing aid for speech training because they do not understand how to set the controls on the auditory training unit to accommodate individual needs of different children. The audiologist should therefore be quite specific about the frequency response setting, gain, and maximum power output limits appropriate for each child. These should be written as a tentative prescription with trial modifications encouraged. The teacher will gain further insight into the effects of the child's

hearing impairment on speech perception if the audiogram is plotted on a chart indicating the distribution of the formant energy F_1, F_2, F_3 for vowels, diphthongs, and voiced consonants and the energy concentrations for unvoiced consonants (Sanders, 1971, p. 100). This chart will give the teacher an indication of which sounds are inaudible, distorted, and/or confused for the student. The teacher needs audiologic data, therefore, which indicate the capabilities of the child wearing amplification:

1. To detect speech—to hear the vocal tone;
2. To discriminate among words of dissimilar phonetic structure;
3. To discriminate between words of similar phonetic structure;
4. To discriminate individual phonemes as a function of a wide range of phonetic contexts.

Room Acoustics—Speech Perception

Furthermore the teacher must be aware of the influence of room acoustics on speech perception (Börrild, 1978, Ross, 1978) and therefore on speech modeling and monitoring. This influence has been well documented. Tillman, Carhart, and Olsen (1970) showed that while normal-hearing subjects could achieve 40 percent discrimination even when the signal was 12 dB less intense than the noise, hearing-impaired subjects required the signal to be 18 dB greater than noise to achieve the same level of discrimination, a 30 dB difference. Under normal environmental conditions the effects of noise are compounded by room reverberation. While optimum classroom reverberation time should not exceed 1/2 sec., most rooms exceed 1 sec. The results of a number of studies confirm that discrimination decreases as reverberation time increases, and that persons with impaired hearing are far more adversely affected than those with normal hearing (Finitzo-Hieber, 1975; John, 1957; Nablek & Pickett, 1974a,b).

The implications of these findings for teaching speech are clear. If hearing-impaired children are to learn and improve speech production and comprehension, they must listen under optimal acoustic conditions. The simplest and most effective method of combating both noise and reverberation is to ensure that the input microphone for the teacher and the child's speech remain at a constant distance of 4 inches from the speaker's mouth. In the writer's opinion the mouth-to-microphone distance specification must apply to both student and teacher to provide the most favorable signal-to-noise ratio and minimize the effects of reverberation. Speech training using the child's aid with a nondirectional microphone picking up all sound including the sound echoes of reverberation is *not* acceptable.

Speech Discrimination

Speech discrimination in noise can be a helpful test administered as part of the rehabilitative audiologic assessment battery. Bode (1975, p. 293) has recommended that each audiologist "make arbitrary but tentative decisions" concerning the choice of noise and the manner in which it is used during testing. He urges the selection of noise representative of the environment in which the individual must function, and the collection of comparative normative data for that noise. The author believes the noise selected should include competing speech (cocktail party noise with simultaneous conversations) or speech-noise (equal intensity to 1000 Hz, then 6 to 12 dB drop-off in intensity per octave). Signal-to-noise test levels recommended by Berger and Millin (1971) are +10, +6, and 0 dB. This range encompasses the signal-to-noise ratios for a teacher's voice in the normal classroom specified as +5 dB (Sanders, 1965); and as +3 dB (Paul, 1967).

Rehabilitative Audiologic Assessment

What does the teacher of speech need from the rehabilitative audiologic assessment? Why is such assessment necessary? The process of speech acquisition and improvement is one of auditory and auditory visual modeling. Modeling involves:

1. Reconstructing as accurate an image as possible of the articulatory acoustic model presented;
2. Attempting to reproduce the acoustic pattern via articulatory behavior;
3. Comparing the actual output to the intended output; and
4. Using an external judge to determine the closeness of the actual output to the model presented.

The success of speech modeling depends primarily on the fidelity of the acoustic signal received, the success with which the pattern is internally represented, and, in spoken language, the determination of the phonemic categorization of the internal representation. The speech teacher needs to know, therefore, the extent to which the hearing impairment reduces the fidelity of the acoustic signals which represent the various speech sounds and speech sound combinations. The speech teacher needs to know:

1. Which sounds fall entirely within the range of the child's residual hearing?
2. Which sounds will be audible but distorted?
3. Which sounds will be indiscriminable from one or more other sounds?
4. In which combinations of phonemes are sounds most accurately discriminated?

This information has the potential to influence the teacher's approach to speech training. When it is known that a given speech sound falls fully within the range of residual hearing, heavy emphasis on auditory modeling will be justified. Those sounds which can be demonstrated to be audible but indiscriminable from other sounds will necessitate supplemental cues to auditory modeling, while those sounds not audible to the child must be taught exclusively through nonauditory monitoring.

The audiologic assessment must also address the child's ability to understand speech in the less than ideal conditions of the classroom. It is necessary that ~~the audio~~logist become involved in ensuring that everything possible is done to provide the child with the type(s) of amplification which will minimize speech processing difficulties encountered in the learning environments. The audiologist must be prepared to investigate whether binaural aids will improve discrimination in noise, whether the use of an FM unit is advisable, and whether an FM-loop-telecoil system will overcome some of the child's difficulties, while reducing others.

At present, there is a need to identify a comprehensive battery of rehabilitative audiologic test procedures for widespread use. It is too easy to blame the inadequacy of present assessment practices on the audiologist. However, there is doubt that a large part of the problem rests in the audiologist's lack of understanding of the nature of speech, speech articulation, speech assessment, and speech teaching. The audiologist must learn what the speech teacher does and needs. Similarly, the speech teacher must recognize amplification as the most valuable aid in speech training. He/she must understand its capabilities and limitations and must be competent in its use.

Conclusion

The teaching of speech requires a team approach utilizing the knowledge and skills of the classroom teacher, speech teacher, and audiologist in a coordinated teaching plan. Coordination means an integrated, not parallel, process. These observations urge the author to argue for a modification in the training of audiologists and speech teachers. It is important to recognize our need for each other and the child's need for both of us. The nature of this conference should facilitate this recognition.

III-35

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FM auditory trainers: description, selection, utilization

Given even a moderately acceptable aided residual hearing pattern, the single most important determiner of speech perception through an electroacoustic system is the relationship between the intensities of the speaker's voice and the noise level existing at the microphone. If the speech signal is buried in the noise, no amount of other considerations is going to make that signal intelligible. The greater the degree the speech signal exceeds the noise (that is, the higher the signal to noise ratio), the more intelligible the speech signal will become. This function levels off for hearing-impaired individuals at a sensation level of 33 dB for consonants and 22 dB for vowels (Gengel, in Stark 1974, p. 131) or at about an overall signal to noise ratio of 25 to 30 dB.

The main purpose, and major attribute of an FM auditory training system, is to enhance the signal to noise ratio, and thus help create the acoustic conditions for maximizing speech perception. This enhancement is a consequence of exploiting the concept illustrated in Figure 4-3. In brief, by locating the microphone of the auditory trainer close to the speaker's mouth, the intensity of the speech signal is augmented relative to the ambient noise levels. Actually, of course, the effect will occur with any kind of

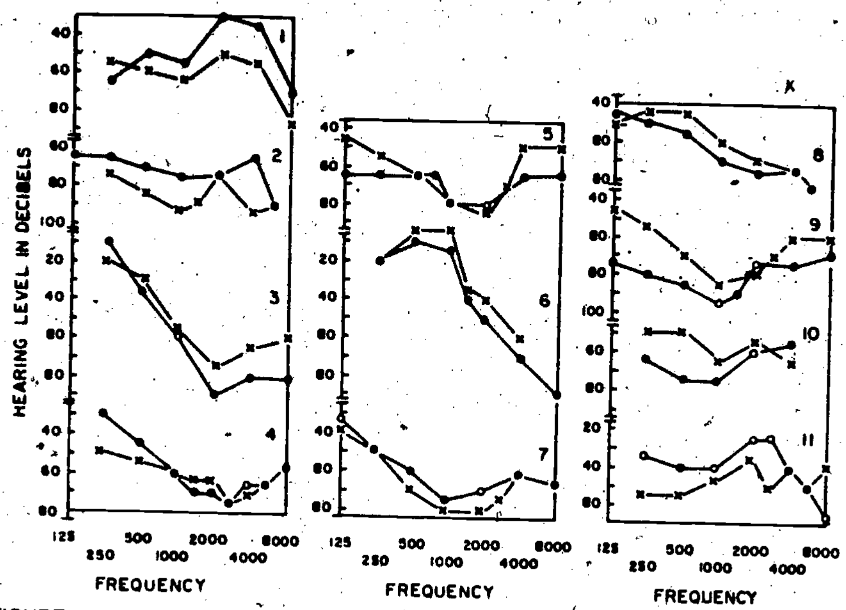

FIGURE 4–13 Pure-tone threshold audiograms of eleven hard of hearing children whose speech discrimination scores were tested in an ordinary classroom under FM and no FM conditions (results given in Table 4–9).

electroacoustic system (hearing aids, hard-wire auditory trainers) as long as the microphone positioning is favorable (Ross 1978).

We stress, as indicated above, the FM wireless auditory trainer to capture this effect in regular classrooms because it is the only such device currently available that will permit this advantage in such settings. There is no way that we can assert with enough vigor how crucial the provision of such devices can be for hard of hearing youngsters being educated in our educational mainstream. We personally know of many instances where it has made the difference between educational success and educational failure.

For example, consider the eleven hard of hearing children whose air conduction pure-tone thresholds are given in Figure 4–13. Their speech discrimination scores were measured in an ordinary classroom, at a distance between 8 and 14 feet from the talker, with an FM auditory trainer and with their usual amplification condition (Ross, Giolas, and Carver 1973). The results are given in Table 4–9. The differences are apparent, sometimes dramatically so—ranging from a minimum improvement of 12% to a maximum of 76%! Nine of these eleven children had been tested in a similar study three years previously, with very similar results (Ross and Giolas 1971).

Consider the scores once again. Note how poorly the children understood speech under their usual amplification condition and the magnitude of the improvement with an FM system. Is it possible to think of any other kind of remedial measure which can be applied to hard of hearing children which can pay greater, more immediate dividends? Somehow its very simplicity militates against its acceptance; it is as if we can only accept those improvements in children's functioning which require great expenditures of energy (not to mention blood, sweat, and tears!).*

TABLE 4–9
Word Discrimination Scores Obtained with Eleven Hard of Hearing Youngsters While Receiving an FM Transmitted Speech Signal and While Wearing Their Usual Amplification Device (binaural, monaural, or none)

Nine of these children were tested three years previously with similar results

SUBJECT	FM AUDITORY TRAINER	USUAL AMPLIFICATION CONDITION*	DIFFERENCE
1	48	20 (M)	28
2	98	52 (M)	46
3	24	12 (M)	12
4	68	16 (M)	52
5	22	8 (B)	14
6	58	36 (N)	22
7	50	30 (B)	20
8	24	4 (B)	20
9	52	16 (B)	36
10	98	22 (B)	76
11	96	26 (N)	70
Mean	58	22	36

*M = Monaural; B = Binaural; N = None

Description An FM wireless auditory training system consists of a microphone/transmitter worn by the teacher and an FM receiver/hearing aid worn by the child, and, except for battery rechargers, that is all there is. There are no wire loops around the room or earphones which have to be plugged into a fixed location. The microphone is normally suspended around the teacher's neck, thereby ensuring the favorable talker-microphone distances responsible for the resulting good signal to noise ratio. The transmitters, which ordinarily broadcast in the 72s to 76 MHz band, are permitted sufficient transmitting power by FCC regulations to virturally guarantee an equal distribution of signal strength within the confines of even large classrooms (in other words, no "dead" spots which may occur with other kinds of systems).

There are 32 carrier-wave frequencies within the band, thus obviating possible interference from nearby transmitters on the same frequency. If

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*New developments are adopted at a snail's pace. This is evident from the date of these references. The first study was reported ten years ago. One wonders just how many hard of hearing children have been under or maleducated in the ensuing years at the same time, a therapeutic tool has been available which could significantly reduce the extent of these children's school-based problems. We firmly believe that most educators and administrators have the best of intentions; unfortunately, this is not always accompanied by effectiveness of information. As we mentioned before, time is not on our side when we work with children, and we trust that the next ten years will see more children using FM systems appropriately in classrooms.

interference occurs, it is a simple matter to select another carrier-wave frequency. The children's receivers (not a hearing aid transducer, which is also termed a "receiver", but the device which detects or "receives" the FM signal) are tuned to the required frequency, either with plug-in modules or with a two-position selection switch.

One (monaural) or two (binaural) environmental microphones are included with FM receiver units, permitting them to also serve as body monaural or binaural hearing aids when the FM transmission is not appropriate. These microphones enable the children to monitor their own vocal output and to directly hear the other children.

Most FM auditory trainers are powered by rechargeable energy cells. Essentially, the system can be conceptualized as no more than an FM radio, with the teacher "broadcasting" a signal which the child detects on his own "radio."

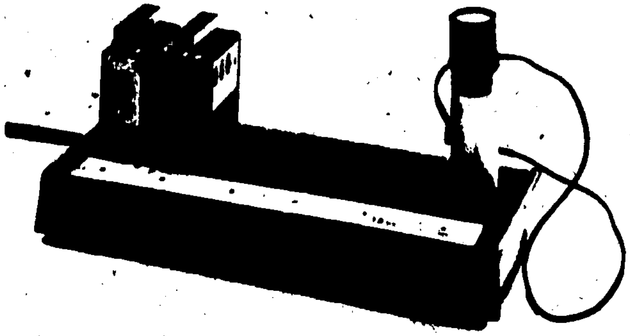
Four representative makes of currently available FM auditory training systems are shown in the following figures. In Figure 4–14, the device is displayed in a five-unit recharger. The numbers on the microphone and the receiver are transmission frequencies; this model permits the selection of one of two transmitting and receiving frequencies.

A slightly different arrangement is shown in Figure 4–15. In this model, the microphone and transmitter are separated; the transmitter is worn on the teacher's belt, while the microphone is positioned via a velcro fastener on the upper torso.

Still another kind of arrangement is shown in Figure 4–16. The transmitter is in the middle, made to be worn around the teacher's neck. The right hand unit converts the speech signal to a magnetic field via the loop which is worn around the child's neck. This signal is converted to an electrical signal by the telephone coil of a postauricular hearing aid. An environmental microphone on the receiver permits child-to-child communication and self-monitoring. The left-hand unit is designed to operate with a personal hearing aid, via a direct wire connection from the FM receiver to the aid. When the FM receiver is not needed, or at home, the cord can easily be disconnected.

A close-up view of a stereo receiver is shown in Figure 4–17. As indicated, the unit permits a great deal of electroacoustic modifications to be made to each ear separately.

FIGURE 4–14 FM auditory training unit in a five-unit battery recharger. (Courtesy of Biocoustics, Inc.)



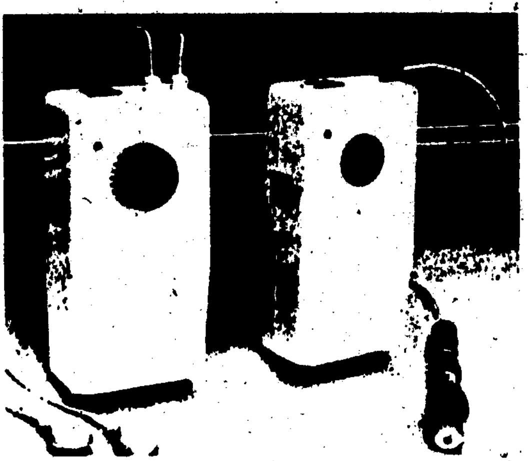
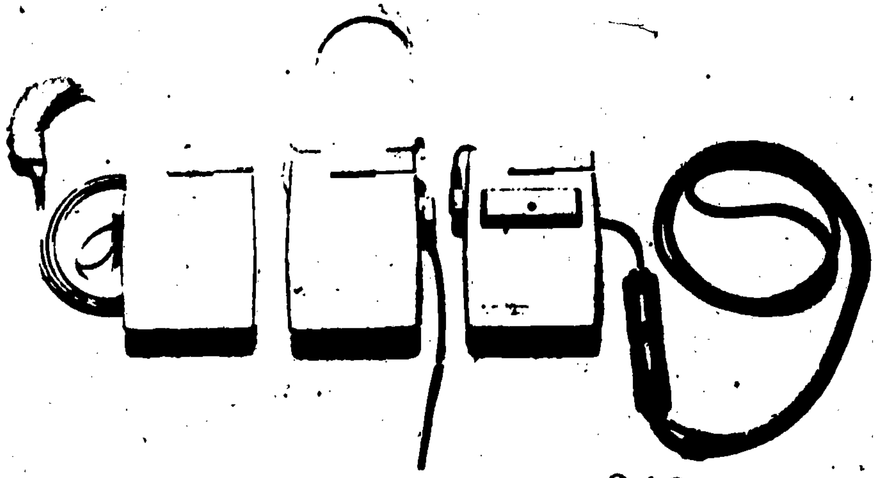


FIGURE 4–15 FM microphone/transmitter and receiver. The microphone and transmitter are separate units. (Courtesy of Earmark, Inc.)

FIGURE 4–16 FM auditory training system with two types of receiver. The center unit is the microphone. The right-hand unit is a receiver with an induction coil output; the loop is placed around the child's neck and the resulting electromagnetic field is picked up by the child's hearing aid set on the telephone or microphone/telephone position. The output from the receiver on the left connects to a personal hearing aid via a wire cord. (Courtesy of HC Electronics, Inc.)



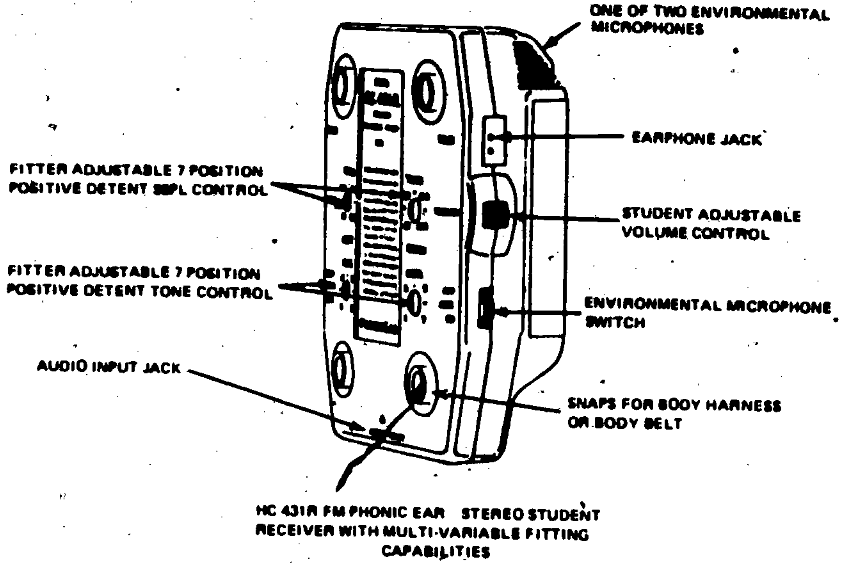


FIGURE 4–17 A close-up view of an FM receiver that incorporates binaural microphones for the reception of environmental signals. (Courtesy of HC Electronics, Inc.)

In Figure 4–18, the microphone and the speaker (the hearing aid receiver) are both located in the housing of a postauricular hearing aid. The auditory signals are detected at ear level, referred back to the receiver pack on the body for electroacoustic processing, and rereferred back to the ear-level aid. This arrangement permits the additional control over an acoustic signal which modifications in earmolds can produce. The FM signal is received by the body unit and the signal is routed to the ear-level transducers. This unit is also made to be used with either rechargeable or disposable batteries as shown in Figure 4–19.

These devices have come a long way since they were first introduced on the educational scene about twelve years ago. They generally did not, at that time, permit the choice of varying electroacoustic possibilities, and their performance stability and repair record can only be termed abysmal. More often than not, some component of the unit (the microphone, transmitter, FM receiver, or environmental microphones) would not operate at all, or would function very poorly. Teachers, children, and everyone involved would simply get discouraged and revert to using hearing aids, in spite of the occasionally successful use and apparent benefit of the FM instrument. Their performance stability is much better now—though still in need of improvement—and back-up units are available when the devices are inoperable or are being repaired.

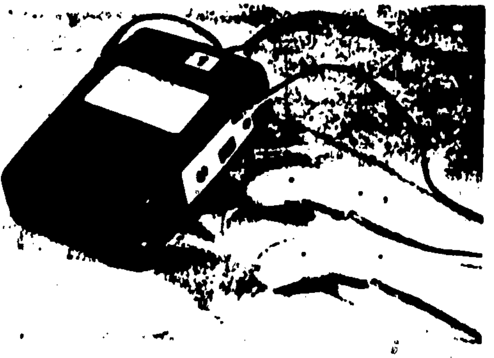


FIGURE 4–18 An FM receiver in which the environmental microphones and the hearing aid receivers are located at ear level; signals detected by the environmental microphones are shunted to the body unit where they are directed back to the ear-level hearing aid transducers (receivers). The FM signal is detected by the FM receiver located in the body unit and delivered to the same transducers in the usual manner. (Courtesy of Telex Communications, Inc.)

Recommended Features In the paragraphs to follow, we shall list and describe some of the recommended features to be found in current FM wireless auditory training systems. Not all of them are incorporated in every manufacturer's unit, and not all are equally desirable. Since research support is lacking for many of the features, we are defining a "desirable" feature on the basis of our own judgment and experience. Also, the order in which they appear below is no indication of their relative importance; except for possibly the first one, we simply have no basis for making this distinction.

(1) All FM systems that we are aware of incorporate controls for modifying the frequency response and the ouput of the receiver unit. This is an essential provision in all such instruments, permitting variations

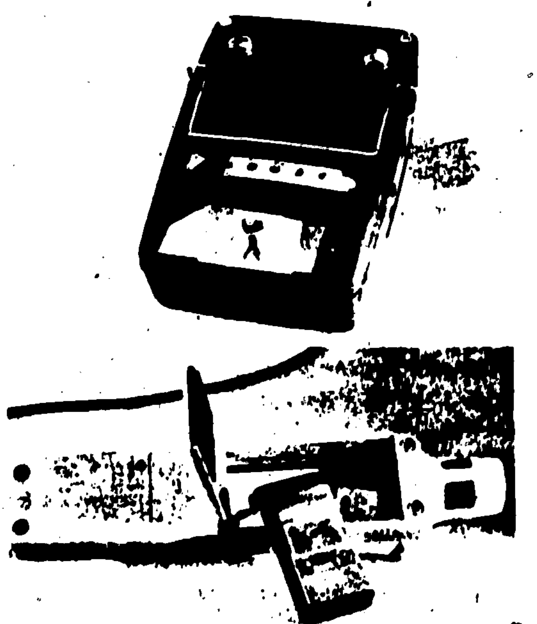


FIGURE 4–19 A close-up view of an FM microphone/transmitter and receiver that can utilize either rechargeable or disposable batteries. (Courtesy of Telex Communications, Inc.)

in the electroacoustic characteristics to suit individual requirements. The modifications are such that the output can be reduced to accommodate the mildest hearing loss, and frequency response can be adjusted to suit most hearing loss configurations. In binaural units, each channel can be set separately, for the child who does not have the same hearing loss in both ears.

(2) A number of systems include a provision for routing the output of the FM receiver through personal postauricular hearing aids, rather than the snap-on transducers. The hearing aids function as they ordinarily would, but they also process the FM transmitted signal. The children wear their own hearing aids (which have been properly adapted) to school, attach the FM unit to the aids, and remove it when it is time to go home.

(3) We think it is desirable for FM devices to include binaural reception of environmental signals. This is not an issue when the focus is on the teacher's speech, but it very well may be during periods when it is not appropriate to employ the teacher's microphone—for example, during lunch. At such times, the child's unit is used like a hearing aid and in most cases should be binaural.

(4) It is sometimes useful for the teacher's microphone to include the capability of receiving an auxiliary input, such as from a tape recorder, sound movie projector, or television monitor. These devices often emit noise while they are operating, which would be picked up by an acoustic coupling of the microphone to the sound source.

An auxiliary input permits a direct electrical connection between the teacher microphone and the sound source. And some FM microphone/transmitters include an optional talkover circuit to enable the teacher to override the auxiliary input for instructional purposes. It is also possible with some systems to make a direct electrical connection with an auxiliary input to the child's receiver. Problems may arise when using the auxiliary input if the sound source is not capable of accommodating both an auxiliary output and an external speaker. That is, the use of the auxiliary circuit deactivates the external speaker of the source. In such cases, the only one to hear the sound would be the hard of hearing child.

(5) Several FM systems allow for the use of an induction loop which the child wears around his neck. In such a condition, the child's personal hearing aids are used in the telecoil mode and the FM signal is transmitted to the loop, converted to a magnetic field, and delivered to the hearing aids through the telecoil. In order for this to work, the child's personal aids must either have a telecoil or be modified to have one. Several problems arise in this arrangement stemming from the lack of manufacturer's specifications for the telecoil, therefore, one does not know if the output and frequency response of the hearing aid microphone are the same with the telecoil.

The receiver that the child wears must also have an environmental microphone on it so that the child can receive environmental signals in addition to the FM transmission. The problem with this or any other arrangement which incorporates the child's personal hearing aids is that when the aids break, the child is without any form of amplification. Therefore, it is usually recommended that if one of these arrangements is obtained that a set of cords and snap-on transducers, as well as snap-on earmolds, are kept for use when the aids break down.

(6) Several FM systems include a light on both the microphone/transmitter and the receiver which either glows or flickers when the battery is losing its charge. Younger children, in particular, frequently do not know, or will not say, when they are no longer able to hear the teacher through the FM microphone/transmitter, the environmental microphones, or both. This feature is a convenient way to visually check the battery charge during the entire day. We hate to estimate just how often children run out of sound sometime during the school day.

(7) FM auditory training systems should include a switch on the receiver unit to permit the child to receive just the teacher transmission, just the environmental signals, or both. Often, teachers will forget to turn off their microphones when the child should *not* be hearing what they are saying (sometimes to their embarrassment, as when they leave the room to talk to someone and the child is gleefully "tuned in" to a private conversation). Most FM receivers include capability for turning the teacher off (we shall have more to say about this later).

(8) At least one FM system incorporates a cardioid directional microphone in the teacher's transmitter. This element favors signals arriving at the teacher's microphone from her direction with a reported improvement in the signal to noise ratio arriving at the child's ear. We do not know if the theoretical advantage of this feature is superior to conventional omni-directional teacher microphones under normal conditions of use (microphone 4 to 6 inches from the teacher's mouth and in the presence of an average amount of classroom noise). It is, however, a feature which does merit consideration.

(9) All FM systems include rechargeable batteries; a few, however, will also operate on a 9 volt transister radio battery. This is a useful option to have available in any emergency, such as when the charger itself is not working.

(10) A few FM systems have considered the issue of the simultaneous reception by the child of signals arriving at the teacher and the environmental microphones. The specifics of how this is accomplished varies from a "muting" switch, which automatically deactivates the environmental microphones when the teacher is talking, a "trimmer" control, by means of which

the intensity ratio of the signals deriving from the teacher and the environmental microphones can be varied as desired, a high and constant intensity level emanating from the teacher source and a variable child-controlled output from the environmental microphones (but at maximum still less intensity than from the teacher source), to evidently equal sound levels arriving at the child's ear from both sources (given sufficiently intense environmental inputs).

At the present time, we do not know which one of these provisions would be the most desirable under actual use conditions. The audiologist, however, should at least be aware of a how a specific FM system deals with the problem.

(11) At least one FM instrument permits the selection of one of two carrier wave frequencies on both the transmitter and the receiver, while another such device allows for this option on the transmitter only. For other systems, it is necessary to request a microphone/transmitter with a specific carrier frequency, and 1 of 32 RO (receiver/oscillator) modules for use with the receiver. Having the capability to instantly switch from one frequency to another can be very useful in any school where more than one hard of hearing child is enrolled—so is having an instantly available "loaner" microphone if necessary. The major advantage of this provision, however, would be realized in programs where large numbers of hearing-impaired children are enrolled: an "assembly" frequency can be common to all the children and used for large-group communication.

(12) All FM auditory training systems make provisions for recharging the batteries of the transmitters and the receivers. Some, however, have incorporated a few interesting extra features in the charger, such as fast and slow recharge provisions, automatic shut-off to prevent overcharging, and troubleshooting and electroacoustic analysis circuitry. Not all of these extra features are available in single unit chargers, however, which would likely be the type found in schools where just one hard of hearing child is enrolled. In instances where a larger charger is needed, such as in a resource room for hearing-impaired children, then these extra features in the charger could be quite useful.

Selection We view all hard of hearing children enrolled in regular schools as potential candidates for an FM auditory training system. The urgency of our recommendation, and the degree to which the child can benefit depends upon the educational practices in the school and how the school day is organized. If the school follows the classical tradition—the teacher lecturing from up front, the children neatly lined up in rows and few questions or discussion encouraged—an FM system can be very effective. The hard of hearing child will be able to hear the teacher to the limits of his auditory capacity and therefore have the same access to material as the normally hearing children. Very few schools, to our knowledge, adhere to this rigid kind of formalism (except perhaps colleges and universities); most display a mix of educational models including formal lectures, small group instruction centered around specific topics, and seat work or other individual activities during which the teacher circulates among the children.

The hard of hearing child can benefit from an FM transmitted speech signal during periods when the speaker's output is directed to him, whether as part of a group or individually. The FM advantage would be least during individual instruction when the teacher positions herself right next to a child, since in those circumstances the distance between the teacher and the microphone of the hearing aid would also normally be the least, thereby maximizing hearing aid reception. However, even under this condition, the teacher would not or could not position her mouth within six inches of the hearing aid microphone, which would be the distance from her mouth to the FM microphone, so the FM advantage could still be realized.

Our judgment regarding whether a child is an FM candidate depends upon the number of periods during the day the teacher's speech is directed to him, and the nature of the material covered. If the day is organized around large and small group instruction, then an FM recommendation is appropriate. We have no formulas to offer (such as, to be facetious, exposure time to the teacher's speech multiplied by the relevancy of the academic topic) to assist the teacher and clinicians in making a definitive judgment regarding a specific child's candidacy. Our experience has demonstrated that most hard of hearing children in public school settings, regardless of degree of hearing loss, will receive benefit from the proper use of an FM system. The key to success is flexibility on the part of the classroom teacher and other personnel working with the child. Our philosophy has been to look for the conditions which demonstrate the child's need for an FM system rather than vice versa. The recommendation for an FM system is usually the result of consultation among the speech-language pathologist, audiologist, and the special and classroom teacher of the hearing impaired.

Once an FM recommendation is made, then our task is to ensure that it is employed correctly. It is amazing how often these devices are used incorrectly. In the paragraphs below, we shall give a number of examples (all of which we have observed) of classroom conditions that make hearing aid usage difficult, and the appropriate and inappropriate use of an FM system in a classroom. Our intention, in presenting a large number of them, is to enable readers to deduce the general principles of correct FM auditory trainer usage in classrooms.

Difficult Classroom Conditions Four examples are given in Figure 4–20 of typical and difficult listening conditions for a child operating in a classroom just using hearing aids. These situations were actually observed at the UConn Mainstream Project. A "traditional" situation is depicted in A; the teacher is talking, the children are generating the usual amount of classroom noise, and the child with the hearing aid (X) is receiving a speech

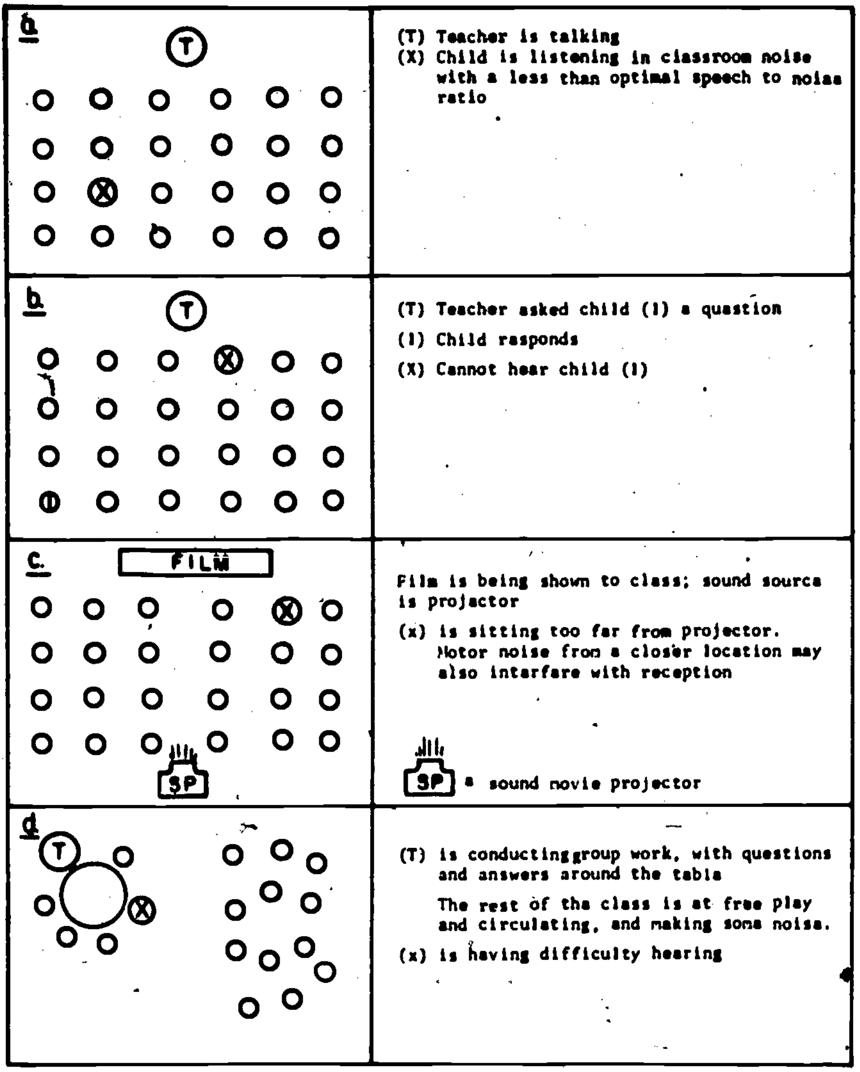


FIGURE 4–20 Examples of difficult listening conditions for hard of hearing children in regular schools when only using personal hearing aids.

to noise ratio of, at best, plus 5 dB because of the distance from the teacher and the noise in the room. In B, the situation gets a little more difficult; the teacher asks child (1) a question, and the hearing-impaired child (X) does not hear the answer, again, because of the distance and noise. In C, a film is being shown; (X) is sitting too far from the sound projector to hear; a closer location may not help that much, because of the motor noise from the projector. A written outline of the salient information would be helpful. In D, the teacher is conducting groupwork around the table with the rest of the class in free play. (X) is having difficulty hearing the questions, answers, and group discussion because of the noise the other children are making. This is a typical situation in many kindergarten rooms.

We have seen many more of these same kinds of adverse listening situations in a regular school. The acoustical and educational circumstances are normally difficult for a hard of hearing child wearing hearing aids.

Inappropriate and Appropriate Use of an FM System In the examples portrayed in Figure 4–21, A to H, we shall give instances of incorrect use of an FM system and suggest some ways to overcome the problems given. All of these examples also have actually been observed in regular classrooms during our project.

In example A, the teacher has the FM microphone/transmitter turned on, while the child is receiving both the teacher's transmission and environmental signals (from the microphones located in the FM receiver unit worn by the child). The teacher calls on several normally hearing children to read and then asks the class a question. Another normally hearing child (1) answers the question, but very softly. The teacher says "correct" and asks the hard of hearing child for the answer, which he does not know because he has not heard it. The teacher (this is not shown in the figure) asks the normally hearing child to repeat the answer, which he does, but again very softly. The teacher says "that's right," and again asks the hard of hearing child for the answer, which again he does not know. This is not an unusual example.

We frequently observe teachers who lack insight into the listening problems experienced by a hard of hearing child. His superficially erratic behavior (sometimes he hears and responds appropriately, and sometimes he appears not to be listening or paying attention) leads many teachers to believe that the child is consciously misbehaving.

The solution in this example is simple; the teacher should have repeated the answer given by the normally hearing child. Also, if possible, and it frequently is, the FM microphone/transmitter should have been passed around to the normally hearing children who were doing the reading. Additionally, the hard of hearing child should have been seated where he can observe the other children (left or right front).

In example B, the teacher is again using the FM microphone while the child is receiving signals through both the FM and the environmental microphones. The teacher is conducting a reading group, and asks the hard of hearing child to continue reading after one of the normally hearing children (1) has finished. He is unable to do so, because he cannot hear the normally hearing child well enough to follow. This is similar in one respect to the example above; that is, the FM microphone should be passed around to the

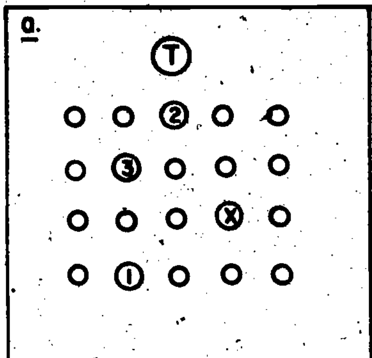
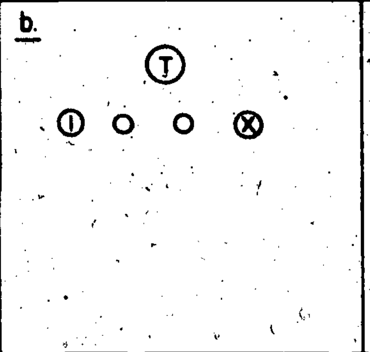
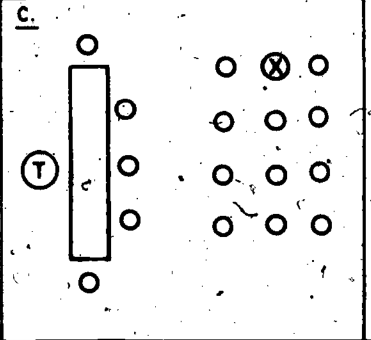
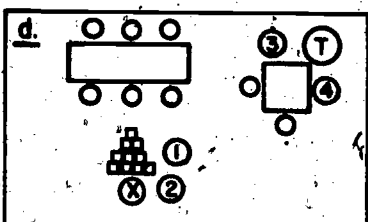
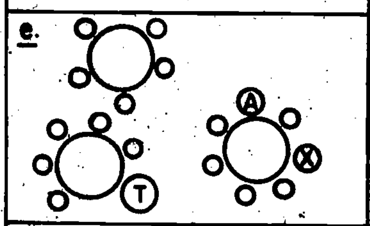
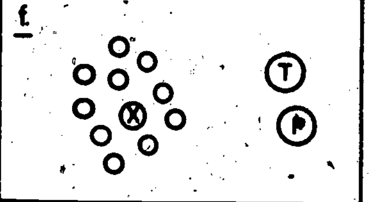
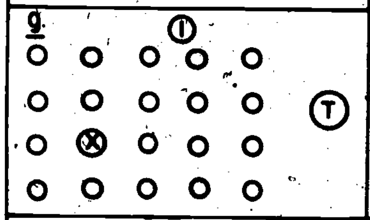
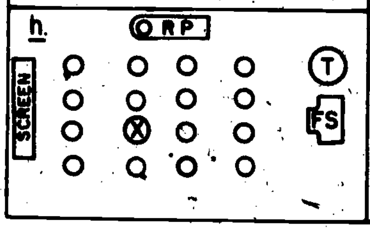
	(T) has microphone/transmitter on (X) is receiving both the FM and environmental signals (T) asks child (2) to read and (3) is asked to read next (T) asks (X) a question on reading (X) does not know answer (1) answers very softly (T) says "correct" (X) is asked same question and still does not know answer Solution: (T) should have repeated (1)'s answer, also (X) should be sitting where he can better observe the other children--if this is possible
	(T) has microphone/transmitter on (X) receiving both FM and environmental signals (T) conducting reading group, asks (1) to read out loud (X) asked to continue where (1) has left off and starts at wrong spot Solution: Pass FM microphone around to the children as they are reading
	(T) has FM microphone on (X) receiving both FM and environmental signals (T) conducting reading group (X) is doing seat work Solution: (T) should shut the transmitter off, or (X) switch her off at the receiver, if the unit has this capability

FIGURE 4–21 Examples of incorrect use of an FM system and remediation measures.

	(T) has FM microphone on (X) receiving both FM and environmental signals; playing blocks with (1) and (2) (T) helping (3) and (4) with alphabet (X) <u>not</u> responding verbally to (1) and (2) Solution: Same as example "C"
	(T) has FM microphone on while teaching her table numbers (X) receiving both FM and environmental signals (A) aide also teaching number concepts Solution: Same as "C" and "D": shut FM transmitter off
	(T) FM microphone on (X) both microphones on (T) has been teaching group (P) principal visits to talk to teacher acout child (X) listening in on conversation Solution: Same as "C," "D," "E"
	(T) FM microphone on (X) both microphones on (1) giving book report on Lincoln (T) makes comments and asks questions (X) unable to answer Solution: Pass FM microphone to (1)
	(T) FM microphone on (X) both microphones on (T) showing filmstrip (FS) coordinated to record player (RP) (X) expected to follow content presented via record player Solution: Use auxiliary input either from FM microphone/transmitter or directly patched to child's receiver

(Figure 4–21 continued)

normally hearing children as they read. It is more feasible than in the previous example because only four children are involved, and all are in close proximity to the teacher. If the classroom noise level is particularly high, it might also be advantageous to use only the teacher transmitter and when (X) is reading have him also speak into the FM microphone.

Examples C, D, E, and F are variations on the same theme. They all have in common the fact that the teacher is transmitting an FM signal during periods when it is not appropriate for the hard of hearing to hear her. In one instance, C, her speech will merely be distracting; in others, D and E, her speech interferes with the child's ability to converse with other persons, and in the last such example, F, the child is listening to a private conversation. When a teacher moves some distance away from a normally hearing child, her voice intensity drops; this does not happen when the teacher is using an FM microphone. The hard of hearing child receives her speech at the same intensity no matter where she is in the room. This problem—the teacher forgetting to shut the FM microphone off at certain times—is the most frequent example of inappropriate use of an FM system and the reason we have used four examples.

Example G is very similar to example B; in both the solution is to pass the microphone to the child who is doing the talking. Such a solution is not possible during rapidly alternating classroom discussions, where first one child is talking, then another, and where occasionally two or three children are talking together. Other than the child positioning himself so that he can see the faces of his classmates and being fit with the best possible electroacoustic adjustments, there is no satisfactory solution to the hearing difficulties he will experience during such conversational exchanges. Minimizing the problems ensuing from a hearing loss by correct auditory management procedures is not the same as saying we can overcome them completely.

In the last example, H, we see an instance where the auxiliary input on either the teacher's transmitter or the child's receiver should be used. Both the teacher's and the child's microphones are too far from the record player for an acceptable acoustic signal to be received. Positioning either the child, or the FM microphone closer to the record player may help a bit, but not if, as we have observed, the teacher simply places the FM microphone next to or on the record player. In this case, the unit will defect and transmit a great deal of motor noise to the child.

The major principle underlying the teacher's use of an FM system is illustrated by examples in Figure 4–21 and that is the microphone should be functioning when the teacher intends to talk to a child, as a member of a group or individually. As soon as her conversation is directed (except for occasional remarks) to other than the hard of hearing child, then the FM microphone/transmitter should be shut off. This is so simple—trivial, really—yet it is constantly violated in practice. Teachers simply forget to shut their microphone off when they should—in consequence the hard of hearing child receives inappropriate high-level speech sounds.

It is not only the teachers who should be encouraged to use the microphone, but the hard of hearing child's classmates as well. It is very often not only feasible, but positively enjoyable, for the normally hearing children to use the FM microphone when they are presenting information. It can also help to improve class discipline, since the children soon learn that "talking-time" requires the microphone. When the normally hearing children are not using the microphone, and respond to a question or make a comment, the skillful teacher will repeat what has been said (example A) for everyone's benefit, not just the hard of hearing child's.

Finally, as with the hearing aids and the FM receiver pack, the FM microphone/transmitter will do no good if it doesn't work. The teacher/clinician ould charge it every night and listen to it every morning. The listening can be done quite simply by snapping the child's FM receiver into a hearing aid stethoscope or an earmold, and have a colleague talk through the FM microphone from across the room. It would be an instructive experience to ask the colleague to gently bump the unit onto her desk or the blackboard, as would normally occur when a teacher is working at her desk or at the blackboard, and listen for the resulting noise explosions. Such an experience can help the teachers realize the sensitivity of the FM microphone/transmitter to vibrations and excessive physical handling.

section summary

In summary, we have presented in this section a model of audiological management of hard of hearing children in schools. We consider this topic the therapeutic "front-line" in their overall management, to be reinforced and supported by any other therapeutic measure necessary to achieve our ultimate objective—a child who is fulfilling his intellectual and psychosocial potential in spite of his handicap. The foundation having been laid, we can now turn to these other therapeutic considerations.

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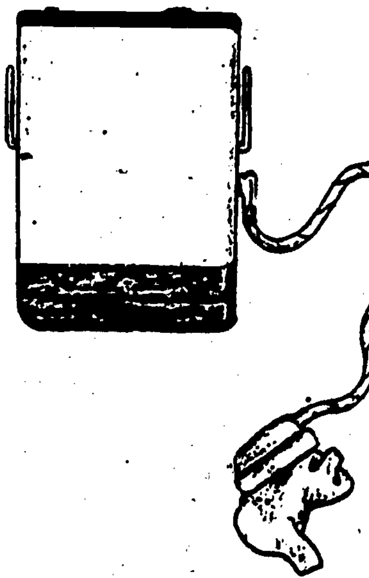
MODEL DEMONSTRATION PROGRAM
THE REHABILITATION CENTER
COLLEGE OF EDUCATION
UNIVERSITY OF ARIZONA
TUCSON, ARIZONA 85721

III-47

CARE AND MAINTENANCE
OF
THE HEARING AID

The care of the hearing aid is the first step towards successful rehabilitation of the hearing impaired person. In fact, without a properly working hearing aid, all further training efforts are wasted. In the case of the severely and profoundly handicapped developmentally disabled person, the need for daily hearing aid monitoring is mandatory, since the client often cannot express himself to inform anyone that the aid is not working.

BODY HEARING AID



There are two general hearing aid categories: body aids or ear level aids.

Body aids, or conventional aids, are often recommended for children because they are more durable and least likely to be broken. They are usually more powerful than ear level aids, and the controls may be larger and easier to adjust. The case of the body aid contains the microphone, amplifier and battery and is worn on the chest. A flexible wire connects the amplifier to an external receiver. The receiver snaps onto the earmold which in turn is fitted securely into the ear canal.

The case may be carried in a pocket, clipped to the clothing, or held in a special hearing aid harness. These harnesses are designed in different sizes to fit different hearing aid models. The harness pocket that holds the aid should have a soft fabric lining. Starched or crisp fabrics create an annoying noise that is easily picked up by the microphone. The shoulder and waist straps of the harness are adjustable for proper fit and comfort.

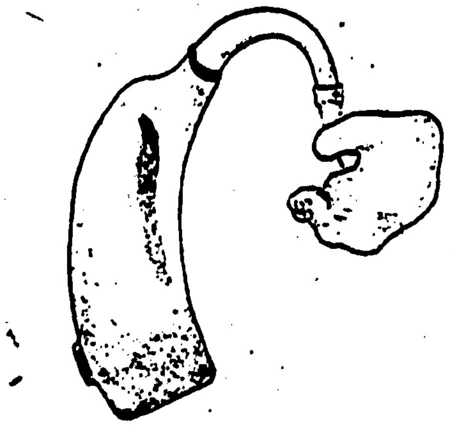
The conventional hearing aid may be worn under a shirt or blouse which will protect it from dust and food spillage. However, the garment fabric should be soft to reduce unwanted noise for the wearer. In many training situations, though, it is more convenient for the child to wear the aid outside the clothing, to allow the teacher or parent to easily check and adjust the controls.

Ear level aids are generally not as powerful as body aids, and all components are housed in one unit. Ear level aids are the most popular type of aid, since the small size makes them less conspicuous, and since the ear level positioning reduces clothing noises and places the microphone at a more natural place on the body (at the ear instead of on the chest). This allows the listener to localize sound on both sides of his body, which he would be unable to do with a body aid. Occasionally, the audiologist may elect to try two ear level aids, one on each side. Binaural amplification, the use of two hearing aids, further increases the auditory information received from all directions, but also doubles the cost of the initial investment and all subsequent repairs.

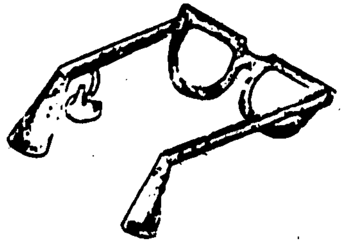
There are three types of ear level aids: behind-the-ear aids, eyeglass aids, and all-in-the-ear aids. Behind-the-ear (B.T.E.) aids have all the components in a curved case that fits behind the earlobe and rests against the mastoid bone. A short plastic tube connects the sound nozzle of the hearing aid to the earmold. The volume control is located on the outside of the case, and is adjusted after the aid is comfortably in place. A behind-the-ear aid may feel bulky until one becomes used to it. In the eyeglass model, the plastic case which encloses the electrical components is concealed in the eyeglass temple piece. In all other respects, it is similar to a B.T.E. aid. The drawback to eyeglass models is that when repairs are necessary to either the eyeglasses or the hearing aid, both are out of service. All-in-the-ear aids fit entirely into the ear canal. These models are extremely small, have no external wires or tubes, and are very lightweight. However, they are not often recommended for young children or handicapped people since the controls are so small and are somewhat difficult to manipulate. All-in-the-ear aids are generally the least powerful type of aid, so are only appropriate for people with very mild hearing losses.

TYPES OF EAR LEVEL HEARING AIDS

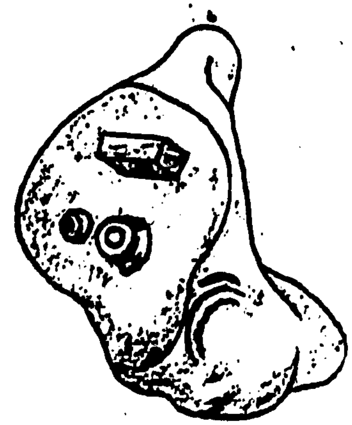
BEHIND-THE-EAR HEARING AID



EYEGLASS HEARING AID



ALL-IN-THE-EAR HEARING AID



Care of The Hearing Aid

It is important to establish good hearing aid habits from the first day. The child should be taught that the hearing aid is not a toy, and he should realize that putting on the aid in the morning is a routine part of getting dressed. It is essential that the child not learn to use the hearing aid as a weapon in a "power struggle" at school or at home. As soon as he is able, he should begin to care for and be responsible for the aid himself, and to notify someone when the aid is not working properly. Hearing aids are expensive to repair or replace, and they are unfortunately all too easy to lose and to break. Be sure to keep a record of all the accessories needed for the particular hearing aid. Sample forms for recording the necessary information for both a conventional body aid and an ear level aid can be found on page 10.

It is advisable to keep spare batteries as well as an extra receiver and an extra cord on hand at all times. Simple repairs and adjustments that can be done at home or at school save time and money for everyone involved. It should be automatic to begin each day with a hearing aid listening check. The steps involved are outlined on pages 7 and 8. One person should be responsible for the listening check every day. This could be the parent, classroom teacher, apartment supervisor, classroom aide, or whoever is in first contact with the hearing impaired client in the morning. Remember, the hearing aid is a delicate instrument. Gentle handling and a few simple precautions will keep the aid in good working order.

- **Temperature**

Avoid high temperatures, such as the blast from a hair dryer or a radiator. Never store the aid in the glove compartment of a car or in direct sunlight.

- **Moisture**

Keep the hearing aid dry at all times. Even excessive perspiration can cause damage. Special care should be taken whenever the hearing impaired child is near water, especially toilets and bathtubs.

- **Earmolds**

Earmolds should be removed from the aid and cleaned often with a mild soap and water. If the opening becomes clogged with wax, it can be cleaned gently with a pipecleaner or a toothpick. Make sure the earmold is completely dry before reconnecting it to the aid. Earmolds have to be replaced periodically as the child grows. This is an inevitable expense for all hearing impaired children. Additionally, the guide on page 9 will help parents and teachers remedy simple malfunctions themselves. All other problems should be brought to the attention of the audiologist or hearing aid dealer as soon as possible.

- **Batteries**

Buy only a few batteries at a time, since they lose strength with age. Store spare batteries in a cool, dry place. Always remove batteries from the hearing aid at night. This will help them last longer, and will reduce the possibility of a battery corroding in the compartment. Make sure that the battery contacts in the aid are dry and dirt free. The contacts can be cleaned with a pencil eraser if needed.

HOW TO GIVE A LISTENING CHECK TO A CONVENTIONAL HEARING AID

1. Insert a new battery making sure its positive and negative surfaces are placed correctly into the battery compartment. If necessary, clean the battery terminals and contacts before inserting the new battery.
2. Set controls:
   - "On/Off" switch in "Off" position.
   - Volume Control at lowest setting.
   - Switch in "M" or mike position.
   - Tone control in setting most frequently used.
3. Place the earphone to your ear. Cover the earphone with the palm of your hand and hold the main part of the hearing aid away from your ear to prevent feedback.
4. Turn the hearing aid "On." Turn the volume control wheel up and down, slowly, listening for scratchiness or dead spots. The volume control should neither be excessively loose, nor bind against the case.
5. Turn the "On/Off" switch back and forth to check for intermittent sound or loose contacts.
6. Change to the other tone positions and listen for appropriate changes in pitch or quality of the sound.
7. Roll the cord back and forth between the fingers to check for "cut-outs."
8. Check the firmness of cord connections.
9. Gently tap the hearing aid on all sides to check for a reduction of power or loose connections. Check for loose screws in the case.
10. With the aid in the "Off" position and the earphone out of your ear, place your thumb firmly over the opening in the earphone. Turn the hearing aid on and turn the volume all the way up. Listen for a soft whistling sound from the hearing aid case or from the earphone. If the whistling comes from the case the aid should be serviced by your dealer.
11. Clean the earmold and allow it to dry thoroughly. Attach it to the earphone. Place your thumb firmly over the hole in the earmold and turn the hearing aid to its loudest position. If you hear a faint whistling at the earphone be sure there is a thin plastic washer between the earphone and earmold or that the "receiver-saver" is in position. Re-check the aid. If whistling persists, return the hearing aid to your dealer for service.

HOW TO GIVE A LISTENING CHECK TO AN EAR-LEVEL HEARING AID

1. Insert a new battery, making sure its positive and negative surfaces are placed correctly into the battery compartment. If necessary, clean the battery terminals and contacts before inserting the new battery.
2. Set Controls:
   - "On/Off" switch in "Off" position. Ear-level aids may not have an "On/Off" switch on the volume control. In such an instance, it is located in the battery compartment of the aid. Open the compartment to the first detent which is the "Off" position for most ear-level instruments.
   - Volume control at lowest setting.
   - Switch in "M" or mike position (not all ear-level aids have a switch to control the microphone pick-up. If your child's instrument doesn't have such a switch, then it is automatically in this position when the aid is operating.)
   - Tone control in setting most frequently used. (Generally ear-level hearing aids do not have tone control adjustments which the user can set. Your child's aid may have such adjustments but they are set by the dealer at the time of purchase.)
3. Check the plastic tubing for possible stiffness, pinholes or cracks.
4. Remove the plastic tubing and earmold from the nozzle of the hearing aid and place your thumb firmly over the nozzle opening. Slowly turn the volume control of the aid to its maximum. If feedback results, the aid should be taken to your dealer for service.
5. Remove the earmold from the tubing and clean it. Re-attach it to the snap connector of the tubing after it has thoroughly dried.
6. Attach the tubing and earmold to the nozzle of the hearing aid. Place your thumb firmly over the opening on the canal portion of the earmold. Turn the volume control to its maximum. If feedback or whistle results, the aid should be sent for service.

From: *Caring for a Child's Hearing Aid*
Zenith Hearing Instrument Corp.
6501 West Grand Ave.
Chicago, IL 60635

PARENT-TEACHER GUIDE FOR HEARING AID TROUBLE-SHOOTING

The following information will help you keep your child's hearing aid in the best working condition. Unfortunately, it has been found that many children (about one-half) are wearing hearing aids that are not working.

Problem	What to do about it
1. Squealing (acoustic feedback) at usual gain levels	a. Check that earmold is seated properly in the ear. b. Check if earmold is loose. (How many months has it been since a new earmold was made?) c. Check, for ear-level aids, that the hollow plastic tube from the earmold fits tightly over receiver opening. d. Check that earmold fits nub of receiver snugly. e. Arrange to get a new earmold made if it is loose or cannot sit properly in the ear.
2. Hearing aid does not work	a. Replace battery. b. Make sure that positive and negative terminals of battery are in proper position in the battery compartment. c. Check corrosion on battery contacts (this can be removed with a pencil eraser). d. Keeping aid on, wiggle cord where it inserts into the receiver and into the aid (body aids only). e. Check that ear wax is not impacted in the opening of earmold. f. Check to see that external switch is not switched to "telephone" or to the "off" position.
3. Intermittent, "scratchy" sound	a. Wiggle cord where it inserts into receiver and aid. If intermittency or quality changes, the cord needs replacing (body aid only). b. Make sure that battery is correctly seated and snug in battery compartment.
4. Distorted sound quality, a motor-boating ("put-put") effect, or weak volume	a. Change battery (even if it reads normal on a battery tester). b. If another receiver is available try replacing old one.

III-51

From: NORTHERN SUBURBAN
SPECIAL EDUCATION DISTRICT
1215 Waukegan Road
Glenview, Illinois

BODY AIDS

Name
Date of Purchase
Make
Model
Serial Number
Battery Type
Receiver Type
Cord Length and Type
Dealer's Name
Address Phone

EAR LEVEL AIDS

Name
Date of Purchase
Make
Model
Serial Number
Battery Type
Tubing Size
Dealer's Name
Address Phone

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HOW TO HELP A PERSON WHO IS HEARING IMPAIRED AND DEVELOPMENTALLY DISABLED BENEFIT FROM A HEARING AID

In order for a person to begin to learn with his or her hearing aid, two prerequisite criteria must be met:

- ✓ The person must be wearing the hearing aid willingly throughout the school day. This is most often a gradual building-up process where the child or adult wears the aid only a few minutes a day in a quiet setting at first; and eventually increases the time to several hours and finally the entire day.
- ✓ The hearing aid must be in good working order. This means fresh batteries, unbroken cords and receivers, and making sure that the aid has passed a "listening check."

Even after these criteria have been accomplished, it is important to stress that putting a hearing aid on a person does not "fix" hearing in the same way that glasses can repair abnormal vision. The hearing aid will help hearing impaired persons, but they will benefit from it only if you are able to teach them to use their residual hearing to their greatest capacity.

Several important points should be noted in determining realistic expectations for a developmentally disabled person who also has a hearing impairment.

- The hearing aid only makes sounds louder, it does not make sounds any clearer for the wearer. In fact, the hearing aid amplifies all sounds equally, even distracting environmental noises like typewriters, footsteps and paper shuffling. The hearing aid does not automatically "fix" a person's hearing the way that eyeglasses often can correct vision.
- In instructional settings where it is crucial to hear the voices of teachers and peers as clearly as possible, a personal hearing aid can be used with an FM auditory trainer to reduce interference from background noises.

- There are many sounds that the hearing impaired person has not heard without a hearing aid, or that were heard before but sound different when heard through the hearing aid. The user must learn to identify these new sounds and to attach meaning to them. This is often a slow and tedious process, especially if the hearing impairment is severe to profound.

- Learning to use a hearing aid will often be limited by the presence of other developmental disabilities. For example, while mentally retarded hearing impaired individuals definitely benefit from the use of a hearing aid, their responses would be commensurate with their level of skill development. Persons with cerebral palsy benefit from appropriate hearing aids, but their responses to amplified speech may be unconventional, reflecting limited motor control of the head, arms, or speech musculature.

- It is not uncommon to find that the combination of two or more disabilities in a single person results in a multitude of problems. The difficulties related to the hearing impairment may aggravate and intensify the difficulties related to the developmental disability. This is especially true in the areas of language and communication skills. The disabilities may have a multiplicative effect on behavior, rather than simply an additive effect.

The following suggestions will help teach new hearing aid wearers to use their residual hearing maximally.

☞ Try to keep environmental noise to a minimum, especially when the person is first learning to use the aid. Many vocational and workshop settings are too noisy for successful hearing aid use.

☞ Always remember to talk to hearing impaired people in a normal tone of voice. Do not exaggerate or distort your facial movements. If total communication is used, keep your signs and speech simple.

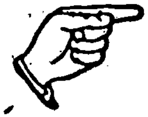
☞ Use incidental opportunities to call the person's attention to sounds in the environment such as:

- Outdoor sounds like an airplane, lawnmower, car horn, barking dogs.

- Indoor sounds such as the vacuum cleaner or telephone, or the dropping of a kitchen utensil, the door bell or alarm clock.

- Sounds made by people, both speech and non-speech.

- Remember to respond to the intent of verbal messages even when speech is imperfect and/or difficult to understand. Timely responses to attempts to communicate through speech will encourage future efforts.



Try to design activities throughout the day which include auditory stimulation. The sophistication of the activity will depend on age, level and nature of setting, but the auditory component should be consciously built into the activity whenever possible.

- Example A When the child is playing with a toy car or airplane, simulate the noise associated with the toy.

___Zoooooooooom___

___Wheeeeeeeeee___

- Example B Try to associate auditory phrases with an activity that the child enjoys.

For a younger child:

___"I'm going to get you" (then tickle him)

___"Peek-a-boo" (then play the game of surprising him.)

For an older child:

___"I'm turning on the mixer. We're making pancakes."

- Example C Make maximal use of naturally occurring transitional signals to foster independent responses.

___When lunch bell rings, wash up and go to lunch.

___When alarm rings, it's time to get up and dress.

Above all, do not become discouraged or impatient with the new hearing aid wearer. The daily progress may appear to be slow or nonexistent, but it is important to structure the circumstances so that the hearing aid is associated with pleasant and reinforcing situations.

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Guidelines for Audiology Programs in Educational Settings for Hearing Impaired Children

GUIDELINES

Many preschool and school-age children have hearing impairment severe enough to affect their ability to function normally in an educational setting. Although each child has a legal, constitutional right to comprehensive quality services in educational settings, fewer than 50% are currently receiving appropriate services (Weintraub, Abeson, and Braddock, 1971). The position taken in these guidelines is that audiology programs should be an integral part of comprehensive services to hearing-impaired children in educational settings. (ASHA, 1973)

These guidelines are not intended to cover identification audiometry programs. Although identification audiometry should be an integral part of a total audiological service for all children within any given school system, these guidelines are for programs in which children have already been identified as having a hearing impairment and requiring special educational and habilitative services. The American Speech and Hearing Association adopted *Guidelines for Identification Audiometry* in November 1974 (ASHA, 1975).

The term *educational settings* refers to organized programs of instruction, in private or public and residential or nonresidential enviroments, for hearing-impaired children who manifest special educational needs as a result of their hearing impairment. The rationale for organizing comprehensive and intensive audiology programs in these settings is based on three interlocking factors.

1. The auditory channel is the route through which speech and language development normally takes place. The human being's development of speech and language appears to be based on innate, biologically programmed factors (Lenneberg, 1967; Fry, 1966) which can be exploited most effectively through an auditory input (Liberman, et al., 1967). The use of other approaches for teaching initial language and speech skills to hearing-impaired children must be considered inadequate, though frequently necessary, substitutes for the "real thing."

2. Most hearing-impaired children possess significant residual hearing capacity (Goodman, 1949; Huizing, 1959; Elliot, 1967; Montgomery, 1967; Boothroyd, 1972; Hirsch, 1973). Interpreted pessimistically, these studies show that from one-half to two-thirds of the children enrolled in schools for the deaf have potentially useful residual hearing. This is precisely the population of hearing-impaired children expected to manifest the most severe hearing losses.

3. Efforts to employ maximally the residual hearing of most hearing-impaired children generally have met with little success. The evidence clearly demonstrates that at any one time, at least half the children's hearing aids can be malfunctioning; that many of the children who possess hearing aids do not routinely wear them; and that children who can potentially benefit from amplified sound do not even own a hearing aid (Gaeth, Lounsberry, 1966; Zink, 1972; Findlay, Winchester, 1972; Coleman, 1972; Northern et al., 1972; Skalka, Moore, 1973; Porter, 1973). Classroom auditory trainers frequently fare little better than personal hearing aids (Matkin, Olsen, 1970a; Matkin, Olsen, 1970b; Wilson, Hoversten, Thies, 1972; Sung, Sung, Angelelli, 1973; Matkin, Olsen, 1973), and the poor acoustic conditions existing in classroom environments limit the effectiveness of even appropriate amplification (Ross, 1972). Finally, the great care needed to ensure individualized electroacoustic packaging to the impaired ear is seldom realized (Ling, 1964; Gengel, 1971; Gengel, Pascoe, Shore, 1971; Sung, Sung, Angelelli, 1971; Danaher, Osberger, Pickett, 1973; Erber, 1973). These problems are understandable in view of the understaffed and ill equipped audiology programs typically found in educational settings, and they are not likely to be remedied without a dedicated effort to strengthen these programs.

These guidelines attempt to describe the audiological conditions necessary for the exploitation of the auditory channel for speech and language development to the degree permitted by the residual hearing capacity of a hearing-impaired child. Schools and society are investing large sums of money in hearing aids, auditory trainers, and other audiological equipment. This investment is a wasteful expenditure unless this equipment is properly used and performing according to specifications. It is unrealistic to expect overburdened administrators and teachers to supervise the full exploitation of residual hearing in addition to their many other responsibilities. In regular and special education programs, the assistance of such resource personnel as psychologists, media specialists, guidance counselors, remedial reading specialists, and learning disability teachers is welcomed. All of these specialists are finding a fruitful field for their endeavors. In educational programs for the hearing impaired, however, the audiologist, a resource person with skills to ensure the maximal exploitation of residual hearing is either absent, in short supply, or inadequately supported. The inclusion of well-trained, well-educated audiologists is necessary to implement the commitment of educators to use optimally the residual hearing most hearing-impaired children possess.

Not all educational settings may be in a financial position to implement the entire program immediately. Possibly some of the suggested functions of audiologists will seem uselessly esoteric while others may need to be added or modified. Nevertheless, unless there is agreement on an eventual goal and informed commitment to high standards, improvement in audiological services is not likely to occur. It is expected that each step in the implementation of these guidelines will justify and support further steps until the entire program can be implemented. Certainly, modifications in the guidelines should be made as experience with their use accumulates. Some educational settings may find it financially desirable and convenient to contract for some or all audiology services with already existing facilities in their communities. In these instances, it is important that the spirit of these guidelines be adhered to, in that such arrangements should result in comprehensive and coordinated services to the child, parents, and educational staff. In any event, community-wide and inter-agency planning is desirable to minimize unnecessary duplication of professional services. It is emphasized that vastly improved audiological services will not be a panacea for speech and language problems. Miraculous cures are not likely to result, but improved performance in a significant number of children should occur. Intensive audiological intervention is deemed appropriate regardless of the "educational method" being used. There is no intent in these guidelines to favor, explicitly or implicitly, any particular education approach.

PERSONNEL

1. One audiologist with a Certificate of Clinical Competence (CCC) in Audiology or its equivalent for approximately every 75 hearing-impaired children receiving special instructional and habilitative services in the educational setting.
2. A Director of Audiology (with either M.A. or Ph.D.) with a CCC in Audiology or its equivalent in any program where there are three or more audiologists. The Ph.D. degree is advisable in settings committed to a program of research.
3. One electronics technician for every 100 to 150 hearing-impaired children.
4. One full-time secretary/clerk for programs with three or more individuals on the staff. Part-time assistance will be needed in programs with one staff audiologist.
5. One or more audiometric assistants.
6. One or more consulting otolaryngologists.

EQUIPMENT

1. One sound-treated double room for programs with one audiologist and two sound-treated double rooms for each three audiologists employed. The dimensions of the test rooms should be sufficiently large to permit pediatric and hearing aid evaluations in the sound field.
2. One two-channel clinical audiometer will be needed for each sound-treated double room, including the associated sound-field speakers and amplifiers.
3. A stock of loaner hearing aids in good working condition, along with extra cords, batteries, and receivers. It is assumed that all children will have their own hearing aids and that classroom auditory training units will be available.
4. Equipment for analyzing the electroacoustic characteristics of hearing aids and auditory training systems.
5. Instrumentation for impedance audiometry.
6. A sound level meter and appropriate equipment for calibration of pure-tone and speech audiometers.
7. Ear impression material kit, instamold kit, stock earmolds, hand grinder, earmold cleaners, and other miscellaneous earmold equipment.

JOB DESCRIPTIONS

Audiologist

1. Conduct comprehensive and periodic audiological assessments for each child. Younger children should be assessed as often as necessary to establish consistent, valid measures. Other children should be tested annually or whenever questions arise. Newly enrolled hearing-impaired students should be given a complete audiologic assessment. Additional audiological assessments may be needed when a new hearing aid is being considered, when otological examination is positive, when impedance audiometry indicates a change in the middle ear status or when teachers or parents notice a change in the child's auditory behavior.

2. Administer specific audiometric measures appropriate to the hearing-impaired child's needs and status. Children with recurring middle ear problems may require only pre- and posttreatment pure-tone and impedance measures. The audiologist should be prepared to administer, when indicated, such assessments as: pure-tone audiometry; carefully graded speech discrimination measures; middle ear impedance tests; tolerance and comfortable listening levels; speechreading tests; combined modality tests; aided and unaided sound-field measures; electroacoustic analysis of hearing aids; comparative hearing aid evaluation; comparative intelligibility functions under different degrees of filtering; binaural versus monaural evaluations; dichotic listening measures, and other psychoacoustic measures that appear appropriate, for example, synthetic formant discriminations, difference limens for frequency, intensity and time, temporal integration, and effects of masking.

3. Advise school administrators and educators regarding the selection and purchase of auditory training equipment, and further be responsible for the electroacoustic evaluation of such equipment once it is placed within the classroom. Subsequent to purchasing such equipment, conduct or provide for periodic electroacoustic evaluations of it at least once per school year.

4. Assess and monitor classroom acoustics and the proper use of amplifying equipment, with consideration of the possible effects upon speech understanding.

5. Conduct auditory training programs for individual students or groups, using or developing appropriate materials for the particular children involved. The auditory training program should be based on the children's auditory status and development, and it should be developed in consultation with classroom teachers. Results of such programs should be evaluated and shared with teachers and others working with the children.

6. Participate in and/or conduct speech and language development programs based on an auditory approach.

7. Conduct inservice workshops for teachers and other staff members on such topics as microphone technique, intensity and articulation of input speech, relevance of language to topic, checking hearing aids daily, trouble-shooting of hearing aids and classroom equipment, significance of audiogram in terms of acoustics of speech, speech perception, and prosodic phenomena. Periodic classroom visits and teacher consultations may be considered inservice training too.

8. Conduct inservice training with electronics technician on the significance of the audiogram in relation to the characteristics and use of amplification equipment. Review electroacoustic data collected by the technician.

9. Make impressions for earmolds and teach earmold care to all staff members and students.

10. Participate in the admission procedures and placement procedures. Help develop criteria for early decisions regarding educational methodology to be employed with each child.

11. Participate in out-patient audiological program as appropriate in terms of community needs and time available.

12. Participate in parent-guidance and instructional counseling programs: Serve as a resource person in such programs to provide information on hearing loss, audiograms, hearing aids, acoustic environment, speech and language activities for home programs.

13. Conduct audiological research when possible and discuss its significance with staff and community leaders.

14. Evaluate quality and effectiveness of all aspects of audiology program.

Electronics Technician

1. Assess the status of hearing aids and classroom auditory training equipment at least three times during each school year.
2. Repair and maintain all auditory amplification and the speech or language training devices being used with the hearing-impaired children
3. Assist with audiovisual equipment and videotape equipment as skills and experience permit.
4. Conduct or assist in the calibration and repair of audiometers.
5. Develop instrumentation required for research projects and programs of auditory training.

Secretary/Clerk

1. Maintain the records of the audiology program.
2. Answer telephone, make appointments, and maintain a schedule for each staff member.
3. Complete correspondence tasks required for the staff members.
4. Perform other tasks required for the operation of the audiology department under the direction of the staff members.

Audiometric Assistant

1. Perform specific tasks for which they are trained and supervised on the job by the audiologist in accordance with the American Speech and Hearing Association *Guidelines on the Role, Training, and Supervision of Communication Aides* adopted in November 1969 (ASHA, 1970).
2. Such tasks might include the administration of routine audiometric assessments, first-echelon hearing aid maintenance, and acting as a test assistant for assessing preschool children or children who have behavior that makes them difficult to test.

Director of Audiology

1. Supervise and administer complete audiology program under the general direction of the school's chief administrator and on a coordinate basis with other department heads in the school.
2. Assign or conduct any portion of the program described above.
3. Participate in community public relations in terms of the audiology program.
4. Serve as a liaison with personnel in clinics, colleges, and universities or in the public school setting, using audiological programs. Act as audiology coordinator for any program that feeds children into the educational setting or into which children are assigned.
5. Supervise audiology practicum when school is affiliated with a college or university training program. May teach course work related to audiology services in an educational setting in the event of such an affiliation.
6. Direct or delegate research projects relative to use of amplification, effects of auditory training, and communication skills development.

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CHAPTER SEVEN

Policy Implications of the Research Findings

IN the preceding chapters, a sustained effort has been made to present research findings as objectively as possible. Facts rather than opinions have been collected, and social-science findings rather than anecdotal evidence have been offered for the reader's consideration. The time must come, however, when every individual involved with deaf children must make some hard decisions. Policy questions influencing the treatment of individual deaf children, their families, and their teachers; school systems; social institutions; legislation—all may hinge on the interpretation of research findings. These interpretations, in turn, must be colored by personal experiences, by theoretical orientations, and by individual value systems. In these final pages, I propose to offer my own assessment of the contemporary issues that I consider central to the education and habilitation of deaf children. My selection of these issues, as well as my approach to their resolution, is based not only on my interpretation of the research findings presented in the preceding chapters, but on my experience, orientation, and value system as well.

Choice of Communication Mode

Despite the thousands of pages that have been written, the hundreds of arguments that have been joined, the dozens of research studies that have been conducted, the central issue in the treatment of deafness continues to be

the selection of the preferred mode of communication. Should the communication mode be oral, manual, or some combination of both? Depending on the response to this central question, there is a whole series of sub-questions that can be listed as flowing from the initial response. Those of us who work in some way with deaf children or adults tend to believe that the question has been resolved—in the direction of our preference—until we are caught up abruptly, time and again, with the realization that indeed the argument rages on in both new and recurring forms.

My own conviction is that deaf children with hearing parents* should be exposed, as soon as their hearing deficit is discovered, to the combined (simultaneous) usage of spoken and signed English (often referred to as Total Communication). This would seem to be a simple statement, but it has innumerable ramifications, and needs a good deal of explanation in order to cover the many questions and reservations raised by it.

My reading of the literature on deafness and child development leads me to the conclusion that almost all the deficits related to deafness are created by deficiencies related to language and communication. For the deaf child with normal intellectual potential, educational achievement should be at grade level if communication or language are adequate. There is nothing inherent in a hearing deficit that should create additional social or psychological problems. Deficiencies in communication that create lowered understanding of social norms *and* lowered expectations of significant others lead to additional problems in these areas as well.

The major argument against the early addition of signed language to the oral-language input that has been traditionally prescribed by educators has been the notion that

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*The treatment of deaf children with deaf parents should be considered as a separate issue, for reasons that I will give later.

deaf children would fail to expend the effort to acquire the more difficult skills of speech and speechreading if they were allowed to rely on the easier language of signs. This is a powerful argument for parents who are anxious that their hearing-impaired children be given every opportunity for normal adult participation in a world that relies on spoken communication for most interpersonal exchanges.

It was this question about the possible interference of the early use of sign language in the acquisition of spoken language that led to my own initial research into the development of deaf children (Meadow, 1967, 1968). A decade ago, when that research was conceived and executed, there were no educational programs using signs with young deaf children. Thus, no experimental design was possible in the comparison of the effects of oral-only and oral-plus methods. The best design that could be devised was one where deaf children with deaf parents (exposed to manual language alone or in combination with spoken language) were compared in terms of educational achievement and social and language development to deaf children with hearing parents (exposed to oral language only in the early years). This research, along with similar research by others (Quigley and Frisina, 1961; Quigley, 1968; Stuckless and Birch, 1966; Vernon and Koh, 1970), demonstrated that deaf children with deaf parents performed at least on the same level as deaf children of hearing parents. While these findings do *not* demonstrate the positive value of the addition of the visual mode, they do indicate that the use of sign language does not have a negative effect on the development of linguistic, social, and educational skills.

As these various studies became more widely known in the field of deaf education, many professionals relaxed their formal strictures against any use of sign language. Some began to prescribe sign language for deaf children who had handicaps in addition to a hearing impairment, or to reserve sign language for children who had not successfully acquired oral skills by the time they were six or eight or ten years old, or to set some limit on the decibel loss for which the addition of sign language would be seen as appropriate. These approaches have some built-in dangers and pitfalls. They define oral language—speech and speechreading—as always superior and preferred to the use of signed language. Thus, any child who is shifted from an "oral track" to a "combined" or "simultaneous" track is defined as an "oral failure." If the parents have been oriented and are committed to the idea that oral language is both preferred and seen as being in opposition to signed language rather than as complementary to it, then the parents, too, see both themselves and their child as failures. No matter how early the decision to make a "shift" in educational program comes, parents and child see or feel the change as a reflection of their inability to perform in the optimum modality. The definition of signed language as reserved for the less adequate deaf child has profound and far-reaching effects.

Thus far, I have addressed only the question of answering criticisms of the early use of sign language—of eliminating the stigma against sign language for young deaf children. This, however, is not sufficient. There are positive reasons for the early introduction of the visual mode. The most important, perhaps, is that children who must rely primarily on their vision for learning language will obviously respond more quickly to language in the visual mode. They will understand their parents more quickly *and* will be able to respond appropriately to the messages their parents are transmitting. The early parent-child bond, increasingly seen as essential for optimal development of social and psychological skills, can grow and develop in the absence of spoken communication. Even deaf children who are eventually defined as "oral successes" lag in their acquisition of language. They and their parents experience frustration stemming from decreased communication until the speech skills are developed. If a child does not receive normal auditory contact with his environment, either naturally or through the use of amplification, this lag *must* be present. Otherwise, we would be considering a child who is neither deaf nor hard-of-hearing. The younger the child at the time of diagnosis the less likely it is that parents will have felt the press of the communication deficit. If the basis for communication is not established early, during this period when messages can easily be transmitted with ordinary gestures or simple, idiosyncratic codes, the family cannot hope to continue to communicate adequately for very long. Soon parents and child need to refer to absent objects, to past or future events, to feelings and emotions that cannot be referenced concretely.

Parents and children who are introduced to sign language initially, at the time of diagnosis, as a means of coping with a hearing handicap (just as a hearing aid is introduced as a means of coping with a hearing deficit) seem to take it as a matter of course. If there is some question—or some withholding by professionals—sign language becomes a dreaded symbol of lack of success, rather than a potential avenue to mutual understanding, pragmatic coping, and aid to future development of spoken language. This approach answers two questions that are frequently voiced in terms of the introduction of sign language: when should it be introduced, and for which hearing-impaired children? If sign language is viewed as a support to parent-child interaction, and as an additional means to the acquisition of inner language, it will be introduced to any child with a hearing impairment that requires remediation, and as early as possible.

THE RECOMMENDED FORM OF VISUAL LANGUAGE. Since sign language has begun to be more accepted in some quarters of deaf education, new arenas for controversy

have appeared in the varieties of sign that have developed. My preference—and again, I am thinking of children from families where spoken English is the norm for communication—is one of the several forms of sign that make possible a precise gloss of English. With the basic assumption that the child's exposure or input determines the forms that his expressive language will eventually take, it seems logical that we should expose children to the linguistic form that will make English their native language. There are many ramifications to this issue, however. Strictly speaking, there are two systems that give the most precise gloss for English. One is the Rochester Method, which consists of fingerspelling each and every word that is spoken. The other is Cued Speech, where each syllable or phoneme is represented by a discrete hand movement. Some parents and children have used each of these methods successfully, and I have no real theoretical objection to either of them. However, in dealing with very young children, their ability to make the small and precise distinctions in hand and finger movements that are necessary for differentiating between many similar hand configurations that have differing meanings is limited. This difficulty in expressive formulations (and perhaps in receptive differentiation as well) make these two approaches seem to me to be less useful in providing initial linguistic input for the very young deaf child first acquiring language. Again, this means a delay for parents in receiving feedback from the child that serves as reinforcement for their further linguistic productions.

It is true that this objection (that the complexity of the systems creates difficulties for users) can also be raised to some of the systems of signed English. A very long array of signs denoting different tenses, endings, possessives, and so forth, can become a burden for both parents and children in the process of learning.

Another thing to consider in the selection of a system of signed English is the attitudes of deaf adults. Again, this can become a ticklish business—one of balancing the needs of deaf children, their parents, and the deaf community. Some deaf adults feel that a system that tampers with "their" language, that distorts the basic rationale that American Sign Language follows, poses an insult and a threat to their identity as expressed in their language. While I do not believe that deaf adults should ultimately be the ones to decide upon the language form to which deaf children are exposed (that decision is, in the final analysis, one for the children's parents to make), they have a feel for visual language that should be tapped. Congruence between artificial and natural sign languages will help the deaf child to move back and forth between the deaf and the hearing communities when he grows older.

One of the determining factors in the selection of a sign language system by the parents of deaf children is, simply, the availability of classes for teaching sign language. Many educational programs provide teachers of sign language, and the form of sign language taught is that selected for use in the educational program. It makes good sense for parents to learn the sign language form that has been selected by the school system their child will attend. Some of these comments regarding optimal visual language are certainly relevant for teachers and administrators responsible for making this decision for an entire system.

Other questions can be raised about the form of sign language to be used with deaf children. There are a number of professionals who have suggested that Ameslan may be the best form, and that hearing parents should be taught Ameslan at the time of diagnosis. Their arguments in some cases are an extension of the points that I made when I compared the use of the Rochester Method or Cued Speech to the use of signed English. That is, Ameslan is a shorter, more compact, and more easily expressed and understood form of language. Ideas can be expressed more quickly and less laboriously, the argument goes. Facial expression and body language are more likely to be incorporated into communication with Ameslan. My response to these suggestions is again based on my essential or core idea that the "best" form of sign language is the one that hearing parents can learn most quickly and easily and feel most comfortable in using with their children. Thus, I would suggest that the sign language that conforms best to their own native language (signed English) will conform to those specifications most easily.

Proponents of Ameslan would be most vocal in insisting that it is truly a language, with all the components that other languages have. I am convinced of this also, but I believe that we are only at the threshold of understanding what these linguistic features are. Although there have been a number of advances in the analysis of Ameslan in recent years, the ability to systematize all the features and teach parents to incorporate them into their language productions with their young children is a very complex task. Thus, we could predict that the hearing parents, learning Ameslan as a second language themselves, might well be using a pidgin sign that was quite idiosyncratic. In contrast, the "rules" for some of the artificial signed English systems are quite simple. Once they are internalized, it is a question of practice. Compared to learning an entirely different language, this is a much simpler process.

There is no reason why some of the desirable features of Ameslan related to facial and body expressiveness could not be encouraged in the use of artificial sign language. Another notion that seems to me to be important is that when hearing parents are just beginning to learn sign, they will have incomplete vocabularies and an incomplete grasp of the "rules" of the artificial system. Thus, when "telescopic" or incomplete sentences and language are most appropriate—that is, during the early months or years of the child's language learning—the parents will, by necessity, be using a telescopic kind of communication. However, by the time the child "needs" more complete sentence input, the parents could be equipped to provide it.

THE IMPORTANCE OF EARLY LANGUAGE INTERVENTION. There are a number of reasons for my emphasis on the importance of early language acquisition. Arguments over the "critical age" for the acquisition of language, in terms of biological development, have waxed and waned over the past ten years. Deaf children who have been exposed to consistent language after the age of three years and have successfully acquired fluency would tend to provide negative evidence for the biological theory. However, even if we assume that children who acquire language late *can* "catch up," both linguistically and cognitively, there is still the question of their need to "catch up" on the social and emotional tasks that are gained through symbolic interaction (the use of language) with their parents.

Even if deaf children could be given those social and emotional skills in the absence of language (and there are those who argue that they could not), we must still deal with the question of parental expectations and orientations toward ways of dealing with their young children. If parents are accustomed to dealing with young children verbally, and expect language to be a major channel for play and enjoyment, for socialization and the setting of limits, and for the expression of affection and pleasure, the parents may be less able than the children to shift to nonverbal communication. Just as there may be an optimum age or stage for a child to acquire language, there may be an optimum age or stage of parenthood for language to be transmitted to a child. Obviously this is in terms of emotional expectations about parenthood, and expectations about a child's response to the parents.

Another reason for emphasizing the importance of early language here is that parents are more likely to be motivated to learn sign if they begin when their children are still very young. Sign language skills do not develop overnight. While it is probably easier to learn sign language that is based on English than it is to learn a completely different second language, it usually takes several years for an individual to become highly fluent, unless he or she has daily contact with adult signers. Thus, if parents begin to learn after their children are fluent, they may feel inadequate and lose their motivation for learning.

THE NEED FOR EARLY PARENT COUNSELING. At various places in the preceding chapters, we have referred to the emotional impact on parents of having their child diagnosed as deaf. Grief, anger, guilt, sorrow, and despair are emotions that parents often experience in the early stages of their encounters with a handicap. People who are suffering from these kinds of emotions frequently are unable to function at top efficiency. Professionals who are attempting to orient parents to the need for learning sign language, as well as fitting hearing aids, providing speech training, and other needed habilitation efforts, must be prepared to deal with parents' feelings about the child's handicap. Perhaps one of the major ingredients of a successful early education program is a staff of people trained in coping with the emotional responses of parents. Some parents are unable to "hear" the educational prescriptions of teachers for weeks or even months, until they have begun to sort out their thoughts and emotions about the diagnosis. Unless teachers are trained to expect this reaction and are prepared to deal with it (often by waiting until parents are really ready to hear what is being said about language), both parents and teachers will be frustrated in their efforts to establish an optimum environment for the deaf child's development. Some of the most successful preschool teachers of deaf children are those who are willing to listen week after week to parents expressing their disappointment, anger, and sadness. Only then can the speech and language lessons proceed. Some educators feel that this listening process should be fulfilled by a trained counselor. Even if the supply of counselors were great enough to meet the needs of parents, there would still be some question in my mind about the desirability of splitting completely the functions of preschool teaching and parent counseling. I would prefer to see mental health professionals available to teachers to help them in handling situations in the best possible way, and also to provide the teachers with needed relief for their own emotions after dealing with the pain and sorrow of parents.

TOTAL COMMUNICATION: WHAT IS IT, WHAT SHOULD IT BE? Total Communication means many different things to different people. To some, it appears to be the old "simultaneous method" in a new guise. To others, it promises the dawning of a new day in deaf education, which will result in miraculous language and educational achievement for all deaf children. Some prefer to call it a "philosophy" rather than a "method." In recommending Total Communication as the preferred approach to the education of deaf children, I consider it to mean the early, consistent, simultaneous use of spoken and signed English by all significant others in the deaf child's environment. This definition sets Total Communication apart from the old "simultaneous approach" because it uses one of the newer sign language systems with English grammatical and syntactical markers, it is introduced during the early months or years of the deaf child's life (rather than at age six or age thirteen, as in residential schools); and because it assumes that parents and siblings as well as teachers will use this means of communication with the deaf child. The inclusion of "consistent" in this definition implies that *all* communication addressed to the child,

or made in his or her presence, will be bimodal. The communication can be simplified, but not by dropping one or the other modality. Simplified language might take the form of shortened phrases or "baby talk," but at all times, and for every message, the child must be given the opportunity to respond to either speech or sign or both. This approach does not rule out the addition of gesture, or pantomime, or writing if these are useful in stimulating understanding and communication. However, the major thrust is toward providing a systematic language model that will enable and encourage the deaf child to use any and all of his or her capabilities in acquiring language and meaning.

This approach and recommendation have developed from observing children at the University of California, San Francisco (as described in Chapter Two). The children who were exposed to this "optimum" language environment—which included the introduction of signs with spoken language no later than three years of age, and as early as eighteen months of age, consistent and careful amplification, a program of counseling for parents, and intensive support services—acquired language in much the same way as hearing children do, and at very similar rates. Parent-child interaction was marked by enjoyment and by the communication of meaning. It must be noted that these children had varying degrees of residual hearing (from moderate to profound hearing loss) but that none had handicapping conditions in addition to deafness. All had received adequate medical attention and were fortunate in having parents who were very much involved in their development and committed to working closely with them and with the helping professionals.

In contrast, deaf children who enter kindergarten or first grade with no meaningful linguistic system, with additional handicapping problems, with busy or non-involved parents, present a picture which already calls for remediation—for rehabilitation rather than habilitation. Whether this same kind of language approach is optimum for these children is an open question. If they are bright and aware of their environment, they may well have developed their own esoteric language or gestural system. They may have focused on a "set" modality that makes bimodal communication distracting rather than helpful for them. Or they may be so far past the optimal age for language learning that grossly reduced goals must be accepted for them. These are researchable questions, and should receive attention by professionals interested in the welfare of deaf children.

Language for Deaf Children of Deaf Parents. Earlier, it was suggested that signed English rather than American Sign Language was the preferred approach for deaf children with hearing parents. One reason for this was the greater ease with which English-speaking parents could be expected to learn signed English. Another reason is that parents should not be asked or expected to socialize their children in a language that is "foreign" to them. One's language is very much a part of one's identity. If we ask parents to communicate an identity different from their own, it is tantamount to suggesting that their identities are inferior, or that their children are destined to be foreign to them. The same kind of reasoning holds for deaf parents. If they normally use American Sign Language at home in communicating with each other and with other family members, they should not be asked or expected to use a different language form—that is, signed English—with a deaf son or daughter. The ease of parent-child communication, the increased possibilities for pleasure in parent-child interaction, should take precedence over any possible suggestion of the value of signed English for later educational achievement.

Some deaf parents will be interested in adding signed English to their family's repertoire in the interest of giving their child a "head start" in the language that will probably be used in the classroom. Teachers need to handle requests to and from deaf families with care. Probably the most beneficial advice that can be given to deaf families is to encourage them to communicate *more* with their deaf child, rather than "differently." It is my impression ~~that old~~ attitudes about American Sign Language will continue to plague deaf adults for many years to come. American Sign Language (Ameslan) has come into its own in the recent past. Attention from linguists has given it a mantle of respectability as a complex and subtle language with a grammar and syntax appropriate for the visual modality. The growing sense of pride within the deaf community has increased the official respect that Ameslan commands. However, for many deaf adults who grew up with a deep sense of inferiority about their communication mode, old attitudes and values die hard. They continue to apologize for their linguistic system, and to feel that the use of Ameslan will damage the future ability of their deaf children to acquire English and to succeed academically.

Erting (1978) suggests that the presence of a deaf adult in the educational setting gives deaf children "an opportunity to learn and use a variety of communicative skills that will be important to them in settings outside the classroom, especially those that involve members of the deaf ethnolinguistic group" (p. 147). She emphasizes that this is particularly important for deaf children of deaf parents, who are accustomed to the use of Ameslan at home. Observations in a preschool classroom indicated that both the children and the deaf teacher's aide used code-switching, from Ameslan to signed English, depending on the formality or informality of the situation. Erting suggests the use of a bilingual model in approaching the education of deaf children. The presence of the native signer in the classroom enabled more accurate interpretations of the children's signed language productions.

> While the hearing teacher supplied information in signed English during the structured lessons, the deaf children whose native language was Ameslan were able to conduct extended interchanges with the deaf aide, providing them with a clarification of the subject matter, with language experience and practice, and with the possibility of a greater satisfaction in terms of the interpersonal functions of communication. At the same time, all of the children were being exposed to an adult model who identified herself as deaf too and functioned as a member of the deaf ethnolinguistic group—as well as functioning, with the hearing teacher, as a member of the wider society through her use of signed English (Erting, 1978, p. 148).

It is my guess that we neither understand nor appreciate the extreme influence that linguistic attitudes play in creating the linguistic environments of the deaf children of deaf parents, because of the way their parents have learned to devalue their own language. That the systematic comparisons of groups of deaf children with deaf and with hearing parents have continually favored those with deaf parents probably represents a much greater achievement than we realize. Many of these parents did not themselves experience a rich linguistic environment when they were small, and therefore may well be blocked in establishing this with their own children because they do not have the experience—either conscious or unconscious—on which to draw in their interaction with their own children.

Finally, for all deaf children, whether their parents be hearing or deaf, my interpretation of the research findings on linguistic development suggests that the best applied language approach is the one that creates the greatest possibilities for early, relaxed, meaningful communication between the children and their parents. Furthermore, it seems to me that for hearing parents, this goal can best be achieved through Total Communication. For deaf parents, more individualized recommendations are needed, depending on families' most comfortable linguistic style. In this way, I believe that optimal cognitive, social, and psychological development are more likely to be achieved.

Deaf Education and Social Change

Change seems to come very slowly to deaf education. The same might be said of the field of education generally, but what is true for the general field is doubly true where hearing-impaired children are concerned. Many changes that are seen in the general field may appear ten years later in deaf education. This could be beneficial if educators of deaf children learned from the mistakes made in earlier developments among the general population, but, sadly, this does not seem to be the case. What are some of the reasons for this state of affairs? The oral-manual controversy in deaf education has been called the Two Hundred Years War. In my opinion, the bitterness with which this battle has raged (and it still continues) has sapped the energies of deaf educators. If teachers must continue to justify their methods, if administrators are constantly on the defensive with each new generation of students and parents, there is that much less energy available to go toward the investigation of new educational developments, to the consideration of new research findings, and to creative thinking for the improvement of current programs.

THE HISTORICAL ISOLATION AND INBREEDING OF RESIDENTIAL SCHOOLS. For many years, the state residential schools for the deaf exerted great influence on the field of deaf education. A small clique controlled the selection of new school superintendents, who wielded great power.

Sometimes these administrative offices were even passed from father to son. Change does not come easily in this kind of traditional situation, where a very small group makes many major decisions. The major center for the training of teachers (who eventually become administrators) was for many years Gallaudet College. Graduation from the college was an acknowledged prerequisite for advancing in the field of deaf education, and many hiring decisions were influenced by officials in the college.

Slowly, this situation is changing, and with the changes come new developments in deaf education generally. The picture is instructive both for understanding deaf education and for gaining insight to the nature of social change as well.

In the early days, very few hearing people knew sign language. Most of those who did were the children or siblings of deaf people. Knowledge of sign language was necessary for a teacher or administrator of a residential school, and therefore the pool from which these officials could be selected was very small. Great power was held in the hands of a few. Today, sign language is becoming more and more popular. Classes are taught in metropolitan areas, and in many smaller urban and even rural settings as well. The pool for possible administrators has expanded, and no longer does a very small group control the business of deaf education.

In earlier times, residential schools, and even Gallaudet College, were organized as systems of benevolent paternalism. Decisions were made about the education of deaf children by hearing adults rather than by deaf adults. To some extent, this situation has been self-perpetuating: those who are not allowed to make decisions become deficient in that ability. Thus the situation in deaf education was a reflection of the sheltered position of deaf people generally. The general situation of the deaf community has improved in recent years. The quality of education has

increased; more deaf persons have become qualified as professionals in all fields, including education. Each small improvement in the general position of the deaf community has lessened the isolation of the residential schools and of deaf education generally.

As deaf people have become their own spokesmen for social change, the speed of legislative change has increased. Gallaudet College is no longer the only place where deaf students can acquire higher education. They may now attend the National Technical Institute for the Deaf in Rochester, New York, programs at California State University, Northridge, or numerous smaller programs scattered across the country. This dispersion of resources would seem to be a healthy development.

THE "BENEVOLENT MOTIVATION" OF DEAF EDUCATORS. Historically, work with handicapped people has been viewed as spiritual service. It is no accident that the early teachers of the deaf (such as Abbé de l'Epée) were priests who saw their ministry as an attempt to shepherd the "heathen" into the fold of the Lord. Many churches today see their deaf parishes as "missions." The social work with the deaf in Britain is primarily accomplished by Missioners through the Church of England. This service orientation has negative as well as positive effects on the educational scene. Among the positive aspects are, obviously, the selfless dedication that many teachers and administrators have to their work. Traditionally, salaries for teachers in special education have been lower than for teachers in ordinary classrooms, and deaf children have gained the benefit of the dedication that their teachers have been willing to exert for lower than average pay. However, in the long run, this orientation can result in less obvious disadvantages. After a certain period of time, people who are underpaid, even if their initial choice was made with the full knowledge and understanding of the relative compensation scale, may feel slighted or even exploited. The most ambitious (and possibly most highly qualified) professionals may move to positions where the work is less frustrating, more highly paid, and less difficult. There is a tendency for everyone in the field to have at least a covert attitude that work with handicapped children should involve a higher level of commitment than other kinds of work. Eventually these higher expectations can lead to bitterness and lack of job satisfaction.

CONTINUING LOW EDUCATIONAL ACHIEVEMENT OF DEAF CHILDREN. One of the most frequently cited facts about deaf students is their persistent achievement far below the levels of age mates without hearing impairments. Language deprivation with attendant social and emotional (experiential) handicapping is recognized as the basis for the lower achievement. However, for teachers who work daily with children, with the purpose of helping them to become academically equipped to take their places in a career world that is geared to high educational achievement, the situation of low achievement becomes frustrating, discouraging, and depressing. It is my belief that this low achievement level can lead to "professional depression" for teachers, and to a climate where change is less welcome because so many things have been tried "to no avail." Thus there is a circular effect: low achievement leads to low expectations that lead to lowered acceptance of new ideas. In spite of this pessimistic analysis, I feel that many recent developments have begun to break this self-defeating cycle. Movements toward community action led by deaf persons, increasing opportunities for deaf persons in high-status positions, greater attention to the deaf community by federal agencies—any and all of these developments can break into the cycle and help to turn deaf education into a new and more promising direction.

MAINSTREAMING FOR DEAF CHILDREN: THE PROS AND CONS. Mainstreaming, which means the inclusion of deaf children (and children with other handicapping conditions) in classrooms with non-handicapped peers, has been called the most important issue in deaf education today. The passage of Public Law 94-142 has brought much attention to it recently, but in deaf education the issue was raised long ago, and today's arguments have been discussed for many years in relation to day schools versus residential schools and "segregated settings" versus "integrated settings." There are many versions of mainstreaming policies, and it is important to separate them in any consideration of pros and cons of the question.

There are two extremes, in contrasting educational settings: one consists of full-time placement in a residential school for deaf children where all students are deaf, and where the deaf child lives in a dormitory and attends classes with other deaf students, seeing hearing family members and peers no more frequently than during weekend visits home. The other extreme is full-time placement in the neighborhood school closest to the deaf child's home, where he or she may be the only child with a hearing impairment in his or her classroom, or indeed in the entire school. Some variations of this arrangement might include visits from itinerant specialists for tutoring or speech therapy, and the provision of a full-time interpreter if the deaf child depends on Total Communication. An older variant of "integration" for deaf children is the provision of a trained teacher of the deaf for a small group of deaf children in a special classroom within an ordinary school. This "day class" arrangement is a model that has been extant for many years. Deaf children would often participate with hearing peers in non-academic classes such as home economics, physical education, and art. They would have opportunities to interact with non-deaf students at lunchtime and during recess. Small class size and individualized attention were possible. However, the age range in these classrooms, as well as the range in ability or academic achievement level, is often very wide. This can mean that the deaf child has no true peers against whom to measure or pit his skills or to look for intellectual stimulation or companionship. In the larger age pools of day schools *or* residential schools, it is possible to group students on the basis of age or ability or both, thus using teaching time and student self-help models more successfully than in settings where numbers of deaf students are very small.

There is still another kind of educational prescription available to some deaf children. This is found in the experience of the deaf child who is mainstreamed and who is the only handicapped child in his neighborhood school. For some parents and educators, this model is the ideal—the goal toward which early education and training are directed from infancy onward. It is true that this situation most nearly approximates the appearance of normalization. The deaf child can live at home rather than traveling to a residential school, where he must live in a dormitory rather than growing up in a full-time family setting. He does not have the tiring experience of traveling long distances on a schoolbus in order to get to the special school. Classmates live nearby rather than being scattered throughout an urban or a metropolitan area. This means that after-school playmates are more readily at hand. Neighborhood children of the same age are known through the classroom and supposedly are more available for after-school play. The deaf child has the positive experience of sharing school and teachers with older and younger siblings. Parents can devote all their energies to one school rather than dividing time and effort between schools where deaf and hearing brothers and sisters attend. The deaf child is not singled out for special treatment and made to

feel different from neighborhood friends and siblings. These are some of the advantages of mainstreaming or integration, if it works in the ideal manner envisaged by its proponents. Unfortunately, however, reality is frequently very different from the ideal.

In the real situation, the deaf child is often overwhelmed in a large group of classmates. For many years, educators of deaf children have been working to reduce the size of classes in which deaf youngsters are taught. A class size of ten was once considered to be a goal toward which to work; then seven became the norm in most states. Now six or even five deaf children are considered to be the most that a special education teacher can handle comfortably. The mainstreamed deaf child is deposited in a classroom with 25 or 30 other children. Instead of a teacher who has been specifically trained to work with children with hearing handicaps, the teacher in the mainstreamed child's classroom may never have seen a deaf child before, and may have had absolutely no orientation in what to expect or how to respond. Integration of any kind requires communication. Acceptance is based on more than good will. It comes from comfortable interaction. Too often, this easy interaction between a deaf child and hearing classmates is a difficult and perhaps unrealized dream. For younger deaf children, this interaction may come more easily, especially if the deaf child is outgoing. The games and activities of younger children are less likely to be based on language. As children become older, their activities are less physical, and deaf children have a more difficult time keeping up. Interaction becomes more and more difficult, communication more and more strained. The difficulties that deaf children feel in a situation where there is only one child who is "different"—because he wears a hearing aid, has unusual speech, and does not understand spoken messages as quickly as others—can create extreme difficulties of self-image and social development.

The thrust toward mainstreaming has come primarily from the effort to provide mildly mentally retarded children with needed opportunities for placement in regular classes. This thrust, in turn, came to some extent from persons who were concerned (and rightly so) with the large numbers of ethnic and racial minority children who were labeled retarded because they were culturally different and because they received low scores on intelligence tests that were designed for children from the middle-class majority culture. The efforts to encourage greater opportunities for these children should not have the unintended consequences of forcing deaf children into classrooms where they cannot get the special help they need from teachers who have been trained in special methods to help them to overcome their handicap. It should not be assumed automatically that the classroom in the neighborhood school with a single handicapped youngster is the "least restrictive environment." For some handicapped children this is in fact the "most restrictive environment."

BUILDING SOCIAL SKILLS IN DEAF CHILDREN. One of the most encouraging developments on the contemporary scene of deaf education is the growing realization by teachers and administrators that one of the major needs of deaf children is help in making up their experiential deficiencies, and the provision of opportunities for developing social skills that are necessary for happy and productive lives. For many years this area was neglected, at the expense of "pouring in" language in a structured way. There is some movement away from this heavily structured approach today, and some additional possibilities for creative work in classrooms are being offered to deaf children. Perhaps as much as anything else, these developments show promise of helping to close the gap between deaf and hearing children in adjustment to modern living. Although there are exciting programs being offered in many schools across the country, I am most familiar with those at the Kendall Demonstration Elementary School of Gallaudet College, and will use them to illustrate briefly some of the concepts that show great promise for the future.

One program that has created a great deal of positive comment is based on group counseling for young deaf children. Often, the youngsters have had few opportunities to interact in a structured give-and-take discussion outside the classroom. Counselors have experimented with the development of group skills, stressing constructive discussions that encourage the expression of feelings (Gawlick, McAleer, and Ozer, 1976). Based on a series of materials created by Dinkmeyer called Developing Understanding of Self and Others (DUSO), one theme that is stressed is an appreciation of differences and positive feelings about the self. The growing abilities of six- to ten-year-old students to use the group sessions, to ask for more exposure to "DUSO" the talking dolphin, and to sign up for individual counseling sessions, attests to the success of this kind of program.

Another approach to the development of social skills is the use of Career Education materials. While in older age groups these materials are vocational or pre-vocational, for younger children they are geared toward teaching children they can exert an influence on their own lives by consciously choosing between alternatives and working toward a goal. These materials have been developed and tried in the classroom by groups of Kendall teachers in conjunction with staff members at Ohio State University.

A third project that has exciting possibilities for increasing social development has been labeled "survival skills" and emphasizes helping deaf children to manage well in the community by giving them practice in interaction with strangers.

Projects encouraging deaf students to take responsibility for others less fortunate than themselves, to participate in community affairs, and to take responsibility for providing some of their own funds for class trips through money-raising projects are other examples of ways in which teachers and schools can help to establish a sense of social responsibility that comes from experience.

SOME FORGOTTEN SUB-GROUPS OF DEAF CHILDREN. The language and educational problems of the majority of deaf children are so great, and have remained unsolved for so long, that there is a tendency among those involved with deaf education and rehabilitation to be less concerned with more difficult sub-groups than might otherwise be the case. Another reason for this lack of concern is the smallness of the total numbers of children involved. When the total number of deaf children is only 1 percent of the school-age population, providing specialized services for smaller numbers of special groups *within* the total deaf group becomes even more difficult.

I am thinking of deaf children who come from homes where the language spoken is Spanish, Chinese, or some other non-English spoken system. I am thinking of deaf children who have some other physical handicap, such as blindness or cerebral palsy, in addition to their auditory handicap—or who are mentally retarded or emotionally disturbed. I am thinking of children whose families do not belong to the majority white middle-class culture, or who come from isolated rural areas, or from families whose resources are extremely limited. It is these families who are most likely to be excluded from the advantages of adequate medical care, and their children who are least likely to be diagnosed for congenital handicapping conditions. Thus, the first and most helpful program for these children would be a truly effective "child find" to identify babies with auditory handicaps in the first months of life. Public Law 94-142 was aimed primarily at these kinds of children, and we hope that they will begin to get the additional attention they need as a result of its provisions.

Another group of deaf children that is neglected consists of the gifted. Gifted deaf children are those who perform at or above the level of their hearing peers. They may be [illegible] of these elevated performances because of superior

intelligence, or because they were exposed to language very early (either because their parents are deaf or because their hearing parents provided input in a visual mode). At the present time, these children are so few in numbers that they do not fit into existing programs for hearing-handicapped children. Thus, another discouraging and frustrating experience that parents have is that of trying to find an appropriate school program for a deaf child who does *too* well. Hopefully, we will begin to see new ways of dealing with these kinds of sub-groups in the future.

THE INFLUENCE OF DEAF ADULTS AS ROLE MODELS. It is my bias that life is richer for people who are capable and comfortable in interacting with many different kinds of groups, for people who can move easily from one community or subculture to another. This is true for deaf persons as well as for hearing persons. It is my impression that the most effective leaders in the deaf community—those who have the most influence and have been the most successful in promoting change that leads to greater opportunities for deaf persons—are those deaf persons who have fluent command of spoken and signed English and Ameslan. Many of these talented persons have achieved positions of great influence, and deaf leaders are increasingly taking precedence over hearing persons in affairs that are important to the deaf community. This is a sign of the coming of age of the deaf community and has all kinds of positive reverberations. As more and more deaf persons achieve eminence through their own efforts and through increasing opportunities for participation in the majority culture, there are more and more deaf adults who are available to young deaf students as role models. And so, in spite of the many discouraging obstacles to the linguistic, cognitive, social, and psychological development of deaf children, the future of these children begins to look brighter.

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Serving the Communicatively Handicapped Mentally Retarded Individual

Position Statement

The following position statement, drafted by the Committee on Mental Retardation/Developmental Disabilities, was adopted as an official statement of the American Speech-Language-Hearing Association by its Legislative Council in November 1981 (LC 25-81). Members of the Committee responsible for the development of the paper include: Christie P. Barkost; Regina Carpenter; Charles Diggs (ex officio); Marilyn Kramer; Corinne C. Lee; Joseph G. McLaughlin; Carl Parsons; Alen Sietel; Eugene Sheeley; and Carol Lynn Weryas (Chair, 1979-1981). Contributions of David Yoder, Vice President for Clinical Affairs, 1979-1981; James Caccamo, former ASHA Liaison to the American Association on Mental Deficiency; and Lorraine Cole and Stan Dublinske, former *ex officio* members of the Committee, are also acknowledged.

WHEREAS, communicatively handicapped mentally retarded persons have been largely underserved in the areas of speech, language, and hearing evaluation and intervention, and

WHEREAS, current legislation, as well as ethical and moral considerations, mandate the provision of needed communication services to all handicapped individuals, and

WHEREAS, technologic and methodologic advances have been made which support the extension of communication services to this population, and

WHEREAS, appropriately certified speech-language pathologists and audiologists should have the primary responsibility for meeting the communication needs of mentally retarded individuals; therefore

RESOLVED, That the American Speech-Language-Hearing Association adopt "Serving the Communicatively Handicapped Mentally Retarded Individual" as the recognized position of the Association.

Recognizing the unique needs of individuals who are mentally retarded, the American Speech-Language-Hearing Association (ASHA) established the Committee on Mental Retardation/Developmental Disabilities. The committee's charge is to "study, explore, collect, and disseminate information about mental retardation pertinent to the interests of speech-language pathology and audiology" (*Asha*, 1981, p. 38). The committee has formulated and presents herein a position statement concerning the communication of mentally retarded persons and speech, language, and hearing professionals. This statement primarily concerns mentally retarded persons, but it also has relevance to developmentally disabled persons not encompassed in the definitions of mental retardation (See Definitions and General Information).

The majority of persons labeled as mentally retarded have significant communication handicaps (Bensberg and Sigelmen, 1976). Historically, this population has been underserved (Schifani, Anderson, and Odle, 1980), but service expansion is evident as a result of legislation, litigation and ethical and moral considerations. Services must now be provided to mentally retarded persons regardless of age, handicapping condition(s), or functioning level within a variety of settings consonant with the individual's need for the least restrictive environment. These settings include public and private institutions, day and home-care facilities, rehabilitation centers, sheltered workshops and educational agencies. The mentally retarded should receive extensive speech, language, and hearing services provided by qualified specialists who can use a variety of service delivery models within an interdisciplinary environment.

Historical Perspective

Prior to the 1960s, private groups and federal and state governments showed little interest in services for the mentally retarded. Few professions were employed to provide speech, language, and hearing services to mentally retarded people. The prevailing attitude was that mentally retarded people did not benefit from such services (Matthews, 1957, 1971; Perkins, 1971; West, Kennedy, and Carr, 1946).

During the 1960s, programs for the mentally retarded received considerable impetus. The New Frontier and Great Society programs of Presidents Kennedy and Johnson, as well as the growing "community conscience" of the American people, fostered the notion that mentally retarded people should receive more services.

Legislation and philanthropic foundations provided funds to explore the needs, nature, and suitability of services for this population. In 1967, Congress authorized funds for the Bureau of Education for the Handicapped (BEH) within the Department of Health, Education and Welfare. Through BEH, funds were allocated to the states to develop and provide educational programs for the handicapped. During the 1960s and 1970s, professionals in speech-language pathology and audiology investigated the incidence, nature, type, and severity of communication disorders of the mentally retarded and explored methods of assessment and developed intervention programs that could be utilized with these individuals.

The legislation of the 1970s focused on delivery of services to handicapped individuals. Public Law (PL) 93-380 (Education Amendments of 1974), PL 94-142 (The Education for All Handicapped Children Act of 1975), and Section 504 of PL 93-112 (Rehabilitation Act of 1973) mandated far-reaching changes in services to the mentally retarded population. Collectively, these laws required the provision of needed services to *all* handicapped persons in the least restrictive environment. As a result, multiply handicapped and mentally retarded persons of all ages have now been targeted for speech, language, and hearing services in nontraditional facilities where such services were not previously available.

Matthews (1971) stated that, "The literature does contain studies showing the effectiveness of speech and language therapy with the mentally retarded. . . . (p. 814)" Although more recent research efforts have demonstrated even greater promises for improving the quality of speech, language, and hearing services for the mentally retarded, a substantial information gap still exists. In a survey completed in 1974, Parsons and Keane (1977), found that only 24% of 197 training programs offered coursework dealing with the communication problems of the mentally retarded.

ASHA's awareness of the changing scope of professional services and the educational information gap that exists has been reflected in position statements on language disorders (*Asha*, 1975), learning disabilities (*Asha*, 1976), and nonspeech communication (*Asha*, 1981). The proposals set forth in these documents will improve the quality of services to the mentally retarded but are not sufficient by themselves. Therefore, the following position statement reflects the position of ASHA in relation to the communicatively handicapped mentally retarded population.

Definitions and General Information

Mental Retardation. The American Association on Mental Deficiency (AAMD) defines mental retardation as:

> . . . significantly subaverage general intellectual functioning existing concurrently with deficits in adaptive behavior, and manifested during the developmental period (Grossman, 1977, p. 11).

Mental retardation, as defined, denotes a level of behavioral performance without reference to etiology; thus, an attempt is made to describe current behavior without implying a prognosis.

Incidence. About six and one-half million people in the United States, or 3% of the population, are estimated to be mentally retarded (Bensberg and Sigelman, 1976). The majority of them exhibit speech, language, and/or hearing handicaps (Keane, 1972; Matthews, 1971; Spradlin, 1963). The severity of the speech and/or language problem is highly correlated with cognitive function and measured intelligence, but the correlation does not show a cause and effect relation (Bangs, 1942; Matthews, 1957, 1971; Perkins, 1971; Schlanger, 1953).

Levels of Mental Retardation. Categories of intellectual functioning or measured intelligence frequently cited in connection with speech and language deficits appear in Table 1.

Speech and Language Deficits. Deficits in speech and language are an integral part of the composite disabilities of the mentally retarded person. Nevertheless, the literature is replete with evidence of communication behavior being taught and remediated at all levels of mental retardation (Barton, 1970; Bricker, 1972; Bricker and Bricker, 1970a, 1970b, 1972, 1978; Carrier, 1974; Guess, Sailor, Rutherford, and Baer, 1970; Harris-Vanderheiden, Brown, Mackenzie, Reimen, and Scheibel, 1975; Hartung, 1970; Kent, 1972; Longhurst, 1972; Marshall and Hegrenes, 1972; McLean, 1976; McLean and McLean, 1974; McLean, Yoder, and Schiefelbusch, 1979; Miller and Yoder, 1972; Odom, Longhurst, and Boatman, 1973; Sailor, Guess, and Baer, 1973; Schiefelbusch, 1978; Schumaker and Sherman, 1970; Stremel, 1972; Stremel and Waryas, 1974; Striefel and Wetherby, 1973; Waryas and Stremel-Campbell, 1978). Types of speech and language problems found in the retarded population are similar to those in nonretarded populations, that is, disorders of voice, fluency, articulation, comprehension and production of language, etc.

Hearing Deficits. Hearing loss is among the large number of concomitant problems, such as perceptual, motor, and other sensory disabilities, which further interfere

Table 1.
Levels of Mental Retardation and Associated Ranges of Intelligence Quotients.

Level of Mental Retardation	Obtained Intelligence Quotient Stanford-Binet and Cattell	Wechsler Scales
Mild	67-52	69-55
Moderate	51-36	54-40
Severe	35-20	39-25*
Profound	19 and below	24 and below*

*Extrapolated

Adapted from Grossman (1977), p. 19

with the communication of mentally retarded persons. The high incidence of hearing loss among retarded people (Lloyd, 1970, 1973, 1976; Lloyd and Moore, 1972) is often related etiologically to specific medical classifications and chromosomal deficits (Bensberg and Sigelman, 1976; Carter, 1970). Early identification through consistent audiological and medical attention shows positive results for communication acquisition, function, and health care (Schiefelbusch and Lloyd, 1974).

Adaptive Behavior. The AAMD defines adaptive behavior as:

> . . . the effectiveness or degree with which an individual meets the standards of personal independence and social responsibility expected for age and cultural group (Grossman, 1977, p. 11).

Aspects of adaptive behavior include 1) maturation (for example, the development of sensorimotor, communication, and self-help skills), 2) learning (for example, the use of basic academic skills, reasoning, and judgment), 3) social adjustment, and 4) vocational performance. The speech, language and hearing professional must recognize the communication needs within the context of the mentally retarded person's adaptive behavior deficits. Our most significant contribution to habilitation will be in the areas of adaptive behavior.

Current Perspectives

As previously indicated, the combined result of legal mandates regarding the retarded individual's right to education and of technological advances within those professions involved in the provision of educational and related services has been a fundamental reorganization in both the view of our obligation to integrate the retarded individual into the mainstream of society and the potential efficacy of educational/remedial procedures required to accomplish this. The implications of these factors for our profession are twofold. First, there is an expanded arena for service delivery which focuses new light on the traditional primary setting of speech, language and hearing services—the public schools. It is no longer possible to think of the retarded as separate from other students either in the kinds of educational opportunities that must be afforded in the settings in which they must be provided. The issue of "free and appropriate public education" has fostered concerns such as the development of curricular domains including prevocational training, leisure time activities, self-help skills, and community living, all of which require the development of communication skills which extend far beyond the traditional treatment room. Communication skills are not viewed as merely a component of the curriculum, but rather the underlying, unifying structure of all curricular efforts. The process of deinstitutionalization has engendered a concern for preparing the retarded individual for "next environments." This preparation requires the collaboration of educational and service personnel with vocational counselors, group home managers, and the community-at-large in order to develop the prerequisite skills for new placement and to continue provision of services within new settings.

Hand-in-hand with such efforts are the parallel concerns for the provision of "least restrictive environments," and age-appropriate activities and materials in the educational and remedial process to maximize the retarded individual's capacity for independent, appropriate functioning within the environment. All of the aforementioned issues represent a radical departure from the provision of life-long custodial care for the retarded individual which militates against the need for communication development.

Second, the provision of educational and remedial services for the retarded have not simply been legally mandated without regard for current technology to meet these challenges, but rather there have been concomitant technological advances. Significant advances in the area of assessment have merged from the following perspectives:

1. Sensory assessment procedures, especially the development of operant audiometry procedures (Cox and Lloyd, 1976; Fulton, 1974).
2. Cognitive assessment procedures (Dunst, 1980; Minifie and Lloyd, 1978; Muma, 1979; Uzgiris and Hunt, 1975).
3. Evaluation procedures for motor functioning prerequisite to speech development, including feeding skills, positioning, etc. (Comparetti and Gidoni, 1967).
4. Evaluation of prelinguistic communicative functioning (Bates, 1976; Snyder 1976).
5. Alternatives to standardized speech and language testing instruments, specifically language sampling and analysis procedures focusing on evaluation of skills that are present rather than absent (Bloom and Lahey, 1978; Tyack and Gottsleben, 1974),
6. An ecological perspective of communicative development and interaction (Brown et al., 1978; Hart and Rogers-Warren, 1978; Mahoney, 1975; Rogers-Warren, & Warren, 1977; Gruenewald, Schrader, and Yoder, in press).

Significant changes in communicative functioning have been demonstrated in the areas of articulation (McLean, 1976), voice (Daly and Johnson, 1974), and especially language as evidenced by Fristoe's (1974) massive compilation of available programs as well as specific programs such as those by Guess, Baer, and Sailor (1974); Kent (1974); MacDonald (1976); McLean and Snyder-McLean (1978); Miller and Yoder (1974), and Waryas and Stremel-Campbell (1978). The unifying motif of programming is that the same communication goals exist for the retarded individual as for any other individual since the language system itself does not change because an individual has been labeled MR, although procedures for achieving the goals may vary.

In summary, mental retardation no longer can be viewed as the "vast wasteland to be avoided" (Perkins, 1971). Effective communication assessment and intervention procedures have been developed in the span of the last 20 years. Not only do we in the profession of speech-language pathology and audiology have the mandate to provide services, but we also have the basic tools necessary to fulfill it.

Role of Speech-Language Pathologists and Audiologists

In the most general terms, the speech-language pathologist and audiologist who serve the mentally retarded individual work within the total framework of educational and remedial services. The variety of educational and living settings necessitates the development of communication skills to meet changing environmental demands.

As a result of the multiple problems presented, speech, language and hearing services are best delivered through an interdisciplinary team process. In addition to the speech-language pathologist and audiologist, the team may include any or all of the following professionals, depending upon individual client needs: educator, engineer, family, advocate, primary caregiver, medical specialist, psychologist, physical therapist, occupational therapist, social worker, vocational counselor and, whenever possible, the client.

As a member of this team, the role of the speech-language pathologist and audiologist in providing services includes:

1. Assessing, describing, and documenting the communicative behaviors and needs of each client and interpreting and integrating the communicative needs with educational and vocational programming.
2. Evaluating various modes of communication with reference to the individual's abilities, disabilities, and communicative environment, in order to develop the most effective means of communication possible, vocal and otherwise.
3. Developing speech and vocal communication to the fullest extent possible, while placing preeminence on the development of language rather than just speech.
4. Developing intervention procedures and evaluating their effectiveness in producing systems of communication which meet the communication demands of the environment, interface with other programming, and are appropriate to educational, vocational, and social settings.
5. Incorporating within assessment and intervention program procedures "significant others" in the life of the mentally retarded individual including: direct caregivers, family members, employers and other professional team members.
6. Where necessary, training persons to interact with the mentally retarded person who uses an augmentative system of communication.

In addition to the above, another primary role of the speech-language pathologist and audiologist is that of client advocacy (Hannah and Sheeley, 1975). Although significant inroads have been made, many communicatively handicapped mentally retarded people are not referred for services because administrators and other professionals are not aware of the appropriateness of speech and language therapy and aural (re)habilitation for this population. This is particularly true when the mentally retarded person is nonspeaking. Speech-language pathologists and audiologists should continue to assume an active role in national, state, and local associations involved in providing services for the mentally retarded (i.e., American Association on Mental Deficiency, National Association of Retarded Citizens, The Association for the Severely Handicapped, Council on Exceptional Children, and local associations for retarded citizens). Through such organizations speech, language, and hearing professionals can help educate other professionals and the families of the retarded concerning the rules that speech-language pathologists and audiologists can play in service delivery. Many retarded people have missed the impact of PL-94-142 simply because they are too old. Therefore, there is a need to advocate a minimum number of years of habilitation services for all communicatively handicapped mentally retarded people (as is currently done in some states).

Professional Ethics

The Code of Ethics of the American Speech-Language-Hearing Association stresses the professional responsibilities of speech-language pathologists and audiologists in providing services. Individuals who provide services to the mentally retarded must adhere to several principles of ethical conduct.

> Principle of Ethics I: Individuals shall hold paramount the welfare of persons served professionally. A. Individuals shall use every resource available, including referral to other specialists as needed, to provide the best service possible. (p. 41)

If the speech-language pathologist or audiologist is unable to provide appropriate services for the mentally retarded, the client must be referred to the professional who can provide "the best service possible."

> Principle of Ethics II: Individuals shall maintain high standards of professional competence. . . . Ethical Proscriptions: 1. Individuals must neither provide services nor supervision of services for which they have not been properly prepared, nor permit services to be provided by any of their staff who are not properly prepared. (p. 42)

Speech-language pathologists and audiologists should receive academic training and clinical experiences related to mentally retarded populations before providing services. When this option is not available, individuals should assume responsibility for continuing their education to increase their clinical competence. These methods could include attending workshops and meetings, studying relevant literature, and consulting others.

> Principle of Ethics V: . . . Matters of Professional Propriety. 1. Individuals should seek to provide and expand services to persons with speech, language, and hearing handicaps as well as to assist in establishing high professional standards for such programs. 2. Individuals should educate the public about speech, language and hearing processes, speech, language and hearing problems, and matters related to professional competence. 3. Individuals should strive to increase knowledge within the profession and share research with colleagues. (p. 43)

Speech-language pathologists and audiologists should make attempts to extend their services to communicatively handicapped individuals whose primary handicapping condition may be something other than a disorder of speech, language, and hearing and thus are often excluded from speech and hearing services. No individual should be excluded from services because of age, functioning level, or similar reasons. Speech-language pathologists and audiologists who are knowledgeable about mental retardation have a professional responsibility to share information which will benefit communicatively handicapped individuals. Furthermore, it is critical that all persons involved in providing services to the mentally retarded share relevant information.

In order to meet the standards established by the Code of Ethics, the speech-language pathologist and the audiologist who provide communication services to mentally retarded individuals should possess the following:

1. Knowledge concerning mentally retarded individuals, including information about a) factors that contribute to communicative disorders and methods of prevention, b) preverbal development, c) augmentative communication systems, d) prognosis and e) therapeutic techniques.
2. The ability to deal with a variety of handicapping conditions (i.e., aberrant behaviors, seizures, feeding problems, etc.) that are evidenced by mentally retarded individuals in addition to the communication disorder.
3. Expertise in ongoing diagnosis and assessment (through formal and informal, standardized and nonstandardized procedures) of the type, nature, and severity of the communication disorder evidenced by a mentally retarded person.
4. The knowledge required to plan and implement an intervention program that will allow the mentally retarded individual to develop communication skills, vocal or otherwise, that are appropriate to the individual's living environment and potential.
5. Skill in cooperating in an interdisciplinary team approach to provide services in the clinical, educational, or living milieu of the retarded person.
6. The ability to educate colleagues, administrators, parents, direct care staff, and the community about mentally retarded individuals and their communication needs. This includes the ability to conduct staff training, establish home programs, and utilize paraprofessionals to meet the needs of mentally retarded individuals.
7. Insight into knowledge and techniques of other professions that deal with mentally retarded people.

The preparation of specialized personnel providing services for the mentally retarded individual involves multiple disciplines. Just as it is important for the speech-language pathologist and audiologist to be knowledgeable concerning the constellation of behaviors which comprise mental retardation, so it is necessary for all persons in the education and remediation of these individuals to be cognizant of related communication disorders and remediation processes.

Role of ASHA

1. The American Speech-Language-Hearing Association will continue to lead in improving delivery and quality of services in speech, language, and hearing to mentally retarded individuals.
   ASHA should play an advocacy role along with other concerned associations in suppporting legislation that would benefit the welfare of retarded persons.
2. ASHA will encourage training programs to develop coursework and practicum experiences that deal with a) communication behavior of mentally retarded populations and b) multidisciplinary treatment, training, and education. Students should obtain clinical experiences with mentally retarded individuals of different ages and functioning levels who exhibit a wide range of communication disabilities, as well as experience with members of interdisciplinary teams. Academic and supervisory personnel who train students should have experience and currency in mental retardation. Departments of Speech-Language Pathology and Audiology should be encouraged to hire individuals with interests and expertise in mental retardation.
3. ASHA will continue to support ongoing Continuing Education programs concerning mentally retarded individuals. These programs should consist of workshops, telecommunications, short courses, and other appropriate forms that agree with ASHA's continuing education policy.
4. ASHA will continue to seek input from its membership through the Committee on Mental Retardation/Developmental Disabilities and committees on the delivery of services.
5. ASHA will aid in disseminating information to professionals, parents, direct-care staff, and the general public concerning the mentally retarded and the role of speech-language pathologists and audiologists with this population.
6. ASHA will continue to encourage research and provide journal space for topics related to mental retardation.

Research and Professional Needs

Since the enactment of the federal legislation cited above, there has been an increase in services to the mentally retarded. This increase has not yet been reflected by a sufficient increase in published research. Some critical questions that need to be answered by research are:

1. What is the relationship between communication abilities and employability of the mentally retarded?
2. What are the criteria for determining the type of speech and language training that is appropriate?
3. What factors contribute to communication prognosis?
4. What are the best intervention methods for various mentally retarded groups, such as infants, the aging, and the profoundly retarded?
5. What procedures should be used

in choosing, employing, and modifying augmentative communication systems?

6. What is the relation between cognitive deficits and communicative behaviors?
7. What is the relation of specific neurological and biological disorders to communicative disorders?
8. What factors must be taken into account in the assessment of hearing, cognitive, and communicative functioning?

Professional needs can be summarized under three main categories—manpower, competency, and extension of involvement. There is a need for increasing numbers of speech-language pathologists and audiologists to work on interdisciplinary diagnostic and service delivery teams, in a variety of settings. Such teamwork requires that communication specialists achieve even greater proficiency to provide the highest level of services consistent with our present knowledge, as well as to advance the state of this knowledge. Changing social and educational demands challenge us to extend our involvement with those who are mentally retarded in order to improve their communication skills, and thus their quality of life.

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Some Perspectives on Intervention Strategies for Persons with Developmental Disorders

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We present a view of language that crosses modal considerations (e.g., speech vs. augmentative systems) and places language within an interaction framework. We emphasize the need to consider normal social, cognitive, and linguistic development in selecting program guidelines for developmentally delayed persons. We address the child's linguistic code not as a set of phonetic, syntactic, and semantic features that can be trained in isolation, but as a means by which he can exercise the various pragmatic uses of communication. In effect, our interest has thus expanded from the child alone to the child as one member of a communicating dyad. Programming in the areas of mother's verbal input, expanding children's language skills, training in augmentative systems—all reflect an overriding objective of optimizing the language-user's ability to successfully participate in interactions with other persons in his/her environment.

THE RATIONALE

The language behavior of persons with severe developmental disorders is currently viewed as a problem of communication rather than as a specific language deficit. The use of language, whether spoken or expressed through an augmentative system (such as communication boards, facial gestures, and signs), is not a simple act that can be discussed in terms of receptive (input) and expressive (output) processes, but rather is a mode of interaction that can be realized on varying levels of complexity.

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The objective of communication intervention is seen as maximizing the child's independence in communicating with others or, conversely, minimizing the extent to which the child must depend upon others' ingenuity in interpreting and responding to his/her messages. Toward this end, Shane (1979) advocates vertical programming in the direction of increasing knowledge of symbolic systems of communication, and horizontal programming in terms of the range of situations in which a child's communicative attempts are relevant and effective. This latter aspect of programming is characterized by such things as training persons in the child's environment to be more responsive to the child's communicative attempts, and placing words with pictures, Blissymbols, and refuses to allow message receivers who are not familiar with the symbol set to communicate with symbol users.

Transactional-Developmental Approach

Applying a communication orientation enables us to look beyond children's approximations of adult phonetic, syntactic, and semantic language usage to the actual effects the child has upon others, while using language functionally. As such, language development is viewed as inextricably intertwined with social and cognitive development, all representing the outgrowth of a child's general interactions with his environment. While going by various names, e.g., Unified Model (Lewis & Cherry, 1977), Transactional Model (McLean & Snyder-McLean, 1978), and the Homologue Model (Bates, Benigni, Bretherton, Camaioni, & Volterra, 1977), we are advocating an approach that perceives language not as an isolated repertoire of sounds that can be trained, then combined into words, then recombined to produce grammatical strings. Instead, language is viewed as a medium of interaction between persons, which is conditioned by the various contexts in which persons operate. From a communication standpoint, social interaction provides the child with a reason to communicate, cognitive interaction assures that the child will have something to say, and linguistic interaction provides the child with a means of saying it (Yoder & Miller, 1972; Waryas & Crowe, in press; McLean & Snyder-McLean, 1978).

Our interest in social aspects of language acquisition is typified by Hymes (1972a, 1972b), who defines communicative competence as knowledge of "when to speak, when not, and as to what to talk about with whom, when, where, in what manner." Language is thus studied in terms of its organization to serve social ends. This has prompted a shifting of our focus from syntax and semantics to pragmatics, defined by Bates (1976) as the rules governing the use of language in context.

For several years we have recommended that language training of developmentally delayed children must consider the role of context in shaping children's use of language. Miller and Yoder's (1974) Ontogenetic Language Teaching Strategy stressed the teaching of relevant communication behaviors in naturally occurring contexts that are familiar to the child. Children are trained to linguistically mark those environmental experiences with which they are already familiar. The sequence of programming is to (1) select a single frequently occurring experience that demonstrates a particular semantic function, (2) pair the experience with an appropriate lexical marker, and (3) after the child demonstrates mastery, move on to other experiences expressing the same function.

Semantic markers are thus taught in conjunction with their experiential referents. The child is not expected to produce a concept until he first acquires its underlying meaning through interaction with the object, observing the consequences of his and others' actions upon the object, etc. This conforms to our current knowledge regarding the influence of experience on children's semantic usage, or, in a broader realm, the relation between cognition and language. The reader is referred to Bowerman (1978) for a review of work in this area.

We agree with Schlesinger's (1977) notion that a modicum of cognitive development must precede any learning of language, since language is initially used to refer to familiar environmental aspects. When coupled with linguistic input from persons in his surrounding environment, cognitive development (viewed in relation to its role in priming the child's perception of consistencies and cognitive distinctions) provides the child with the necessary inventory of underlying concepts to give rise to meaningful uses of language. Stated differently, the linguistic expression of a concept requires a minimal level of cognitive acquisition and linguistic knowledge (Slobin, 1973). This conception of cognition as a necessary but not sufficient component of language development is frequently associated with Cromer's (1976) weak form of the cognition hypothesis.

Evidence has been reported indicating that cognitive level is the best single criterion for assessing and/or predicting communication delays (Leonard, 1978; Waryas & Crowe, in press). Furthermore, it has been found that communication functioning can not be inferred from production or comprehension data alone, since great variability exists in these two measures relative to one another in relation to developmentally delayed children (Miller, Chapman, & Bedrosian, 1978). Extending this one step further, a child is not viewed as possessing a language problem unless his language level is significantly below what is expected, given his cognitive level (Chapman & Miller, 1979). This view correlates with Johnston's (in press) notions that language delays may be symptomatic of general representational deficits.

To recapitulate our position, we have stated a belief in treating communication disorders with respect to their social, cognitive, and linguistic contributions. This philosophy reflects our present knowledge regarding the reciprocal nature of interactions that provide a background within which children acquire language (e.g., Bruner, 1974, 1975; Freedle & Lewis, 1977). In applying these principles, we have adapted a normal model of development, since it is increasingly apparent that developmentally delayed children acquire language in the same sequence as normal children, but at a slower rate (Yoder & Miller, 1972; Leonard, 1972; Miller et al., 1978; Coggins, 1979; Waryas & Crowe, in press; Johnston, in press).

Behavioral Programs

The transactional-developmental approach taken by us is not supportive of those behavioral approaches that theorize that language is a learned behavior, developed through stimulus-response connections. These latter approaches view the environment as exercising the predominant effect upon the organism through manipulating the consequences following the child's vocal behaviors. No association between the development of language and cognitive or social skills is posited. Behaviorally oriented programs do not deal with a hierarchy of language skills or cognitive prerequisites. Instead, the child is trained to produce those forms deemed most important in controlling the environment (Graham, 1976). The rationale applied here is that since children have not acquired language normally, they should be managed in ways that differ from the usual developmental sequence. For example, Brown, Branston, Hamre-Nietupski, Pumpian, Certo, & Gruenewald (1979) presented a program applicable to profoundly mentally retarded adolescents and adults. Rather than following a developmental model, functional skills necessary for these persons to operate independently in their respective environments are trained directly.

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McLean and Snyder-McLean (1978) criticized some behavioral programs in light of their failure to recognize the interrelatedness of syntax, semantics, and pragmatics. Instead, these programs frequently address one of these areas in isolation. Contrast this with the developmental approach that targets a structure (e.g., noun-verb) concurrently with a semantic function (e.g., agent-action) and a function (e.g., to request a listener to carry out a desired action).

As suggested by Yoder and Reichle (1978), the frequently encountered problem of behavioral interventionists was not in teaching their developmentally delayed children to produce the various forms they trained. Rather, the children were not observed to use the forms they were taught at appropriate times, in an appropriate setting, with appropriate individuals. We might attribute this to a problem of generalizing. However, we might also question whether the forms as emitted were learned in a conceptual or a communicative sense by the children. We concur with Graham (1976), who stated that while these programs assume that training a set of language skills will result in the spontaneous acquisition of other skills not specifically trained, this has not been demonstrated to any significant extent. The problem of generalizing language to functional usage in real-life interactions is highlighted by Rees (1978), who discussed the necessity of training children, not only in linguistic content and form but also the use of language. She illustrated this with a developmentally delayed girl, who, upon exiting from her therapy room was handed a cup. She responded with, "It's a cup . . . . It's pink . . . . It's plastic . . . . You drink out of it." This girl had undoubtedly learned some language strategies, yet her communication skills were suspect. She was living evidence of Yoder and Reichle's (1978) claim that "if the target behavior is functional communication, then the content of the program should be focused on the functions of communication."

Operant Programs

Many operant programs for severe and profoundly mentally retarded children continue to use a respondent training program in which the child is taught a number of words, syntactic rules, and possibly semantic relations, but not communication (Kent, 1972; Marshall & Hegrenes, 1972; Guess, Sailor, & Baer, 1976; Carrier, 1976). Other programs have acknowledged a need to integrate the teaching of underlying concepts and functional aspects of communication into their protocols. Sailor, Goetz, Schuler, Utley, & Baldwin (1980) review evidence suggesting that children's frequency of correctly responding in two-choice discrimination problems can be facilitated by providing functional responses following the child's behavior. Functional responses are those that (1) produce an immediate consequence for the child, (2) are potentially reinforcing, (3) are specific to the child's behavior, and (4) are natural for the child in interacting with his environment. In other words, the child, having been provided with a *reason* to communicate, should then be placed in a position in which he/she can observe the natural consequences of his/her actions upon others in the securing of goods, the manipulation of objects, the gaining of a desired adult's attention, etc.

The use of natural reinforcers has been questioned in operant programs that train skills such as verbal imitation and match to sample. Tangible reinforcers have been found to be more effective in developing these types of repertoires in children (Bricker & Bricker, 1974). We would suggest that the problem might lie beyond the choice of a reinforcer to the nature of the program itself. Communication should, in itself, be naturally reinforcing if we are to expect a child to bother engaging in those behaviors that we deem so important. This can be greatly facilitated by designing programs that approximate the subsequent communicative situations in which the child will be expected to use those skills postprogramming.

Contrast this approach with that suggested by Carrier (1976). He presented a nonspeech language initiation program (NONSLIP) designed for severely handicapped persons, which purported to train "conceptual skills." This is supposedly accomplished by isolating syntactic from semantic learning; e.g., the child is expected to produce sentences such as "The cow is sitting on the car." In doing so, we are assured that the child is demonstrating a knowledge of the rules of syntax, rather than using semantic constraints (e.g., context) in his word ordering. The terminal objective of this program is for the child to produce seven-word, grammatically correct sentences in response to picture stimuli.

While this is structurally appropriate, one might question the need for a child to ever produce such a sentence as given above, and question what the utterance of such a string of words could accomplish for a child in interacting with his/her environment, beyond receiving a contingent reinforcer bearing no relation to the utterance itself. One is hard pressed to find a relationship between a misplaced cow and a Froot Loop.

FUNCTIONAL ASPECTS OF COMMUNICATION

Unlike Carrier, we believe syntax must be addressed concurrently with semantics and pragmatics in developing communication skills in developmentally delayed children. Examining children's first utterances and word combinations, we have concluded that syntax and semantics are inseparable. The child systematically combines words to express a wide range of meanings (Bloom, 1970; S[illegible]esinger, 1971; Brown, 1973). Severely retarded Down's syndrome children have been found to express the same set of semantic relations in their speech as that reported for normal children (Coggins, 1979). These relations can be used as guidelines to what we might expect in the spontaneous speech of these children. More importantly, they can be used as a basis for determining the content of our communication programming. Further, there is similarity in relations expressed in the one-word and two-word stages of development. This has been stated as the child's expressing old meanings through new forms. Again we see the fine interplay between semantic and syntactic aspects of language in children's communicative development.

In addition to the relation between children's early syntax/semantic usages, one must consider their reasons for talking, i.e., communicative intents (Chapman, 1981). Dore (1974, 1975) offers the notion of *Primitive Speech Acts* to describe children's one-word utterances with different intonational contours. "Mama," uttered with a falling terminal intonation contour would be used for *labeling;* when uttered with a rising terminal intonation, it could be interpreted as the child's *requesting information;* and when uttered with an abrupt rising-falling intonation, it signifies *calling*. Dore's remaining speech acts include *repeating, requesting action, greeting, protesting*, and *practicing*. Primitive speech acts can be assessed (defined) upon joint examination of (1) the child's utterance, (2) the child's nonlinguistic behavior, (3) the adult's response, (4) environment (contextual features). The foregoing scheme has been revised by Coggins and Carpenter (Note 1) and Chapman (1981) to reflect communicative intents observed in the communicative behavior of preverbal (or nonverbal) children.

Before we leave this discussion of functional aspects of communication to be focused on in training children's early utterances, the work of Halliday (1973, 1975) merits discussion. Table I summarizes those functions identified by Halliday in children's preverbal and verbal communication. The child between 9 and 16 months of age demonstrates the *instrumental, regulatory, interactional*, and *personal* uses of language, not necessarily in that order. Toward the end of this period the *heuristic* function appears. Soon after, the child uses language as a tool of *imagination* (Note, this use

Table I. Functions of Children's Language in the First 2 Years of Life[a]

Function	Description	Example
Instrumental	Use of language to get things done, i.e., requesting goods and services.	/ᑎə/ = Give me that. "off" = I want my bib taken off.
Regulatory	The "do as I tell you" function of rules and instructions; using language to regulate others' behavior, e.g., by requestion actions.	/E/ = Pick me up. "Come" = Follow me. /mŋ/ = Do that right now.
Interactional	The "me and you" function used in the maintenance of permanent relationships; used for purposes of interaction, e.g., greeting, calling, persuading others.	/də/ = Nice to see you. "Hullo." "Where Daddy?" = I'm looking for Daddy.
Personal	Used for the expression of feelings and attitudes; the child expresses his identity.	/o/ = That's funny. /əyi:/ = That's nice.
Heuristic	The "tell me why" function of language; questioning for facts and explanations of facts; a way of learning about things.	/3ədydə/ = What's that called?
Imaginative	The "let's pretend" function; uses language to create his own environment, e.g., rhymes, riddles, stories.	/ja::o/ = Let's pretend to be a lion.
Informative	The "I've got something to tell you" function; child communicates information he feels is new to the listener concerning persons, objects, qualities, relations, etc., in the world around him.	"baby cry" = The baby is upset in the other room.

[a] Based upon Halliday (1973; 1975).

of language appears to await the child's attainment of representational thought). The final function to emerge is the *informative*. With time, the child learns to combine functions within a single utterance, aided by his developing syntactic and semantic repertoires.

It is of interest to note that the Guess et al. (1976) program addressed the use of language to *label* (Halliday's *personal function*) and *request objects and actions* (Halliday's *instrumental* and *regulatory* functions). In a later stage the heuristic function is addressed in what they refer to as self-extended control. Here, the child is taught how to request further information. We agree with the sequencing of these uses of language, yet we question the introduction of the heuristic function in a program attempting to shape language in a preverbal child. Secondly, the heuristic function is contingent upon the child's desiring the information he/she seeks, thus motivating his/her request. The training of such a form in response to externally presented objects of the clinician's choosing seems precarious at best. Similarly, we would hope the teaching of the previously mentioned functions would place paramount importance on structuring the context to ensure that the requests elicited from the child are self-motivated.

Halliday's data suggest that the imaginative and informative uses of language are relatively late in appearing. Teaching of these functions might be wisely withheld until the child has demonstrated late sensorimotor or early preoperational problem-solving abilities.

Leonard, Cole, and Steckol (1979) criticize the majority of available imitative and nonimitative programs, due to their lack of making use of the informative function of language. Such approaches involve the immediate re-presentation of words the child fails to produce, the subsequent trials involving an unchanging, redundant element (noninformative). They report that the mentally retarded children in their study, all at the one-word production stage, were significantly more likely to imitate lexical items when the exemplar serving as a referent was unfamiliar (first-time seen) and informative (involved a changing referent from the preceding presentation). Familiar/informative exemplars were imitated by these children significantly more often than redundant exemplars. These findings suggest we should capitalize on exemplar novelty in facilitating word imitation or labeling by children (i.e., we might want to use several nonidentical exemplars for each lexical item being taught).

STAGE-APPROPRIATE PROGRAMMING

Preverbal Development of Communicative Behaviors

If we follow the communicative model advocated in this paper, communication teaching becomes an appropriate component of children's programming from the moment they are capable of engaging their caregivers in interaction, i.e., at birth. When dealing with children demonstrating cognitive development that is characteristic of Piaget's sensorimotor stages I, II, and III (MA approximately 0-6 mos.), we are speaking of children in whom intentional behavior has not yet emerged (Piaget & Inhelder, 1969). An analysis of their motor and vocal behavior would lead us to conclude that there is an absence of those communicative functions (intents) discussed previously. These children neither understand nor use words, and as suggested by Chapman and Miller (1979), we would not predict that they could use or understand nonvocal symbols, except as "refreshing teething rings." Chapman and Miller (1979) advocate that communication programming for such children should focus upon child-caregiver interaction (e.g., social bonding) in endeavors such as increasing the caregiver's responsiveness to children's cries, encouraging turn-taking, and providing a cognitively enriched environment.

Examining the input of mothers (and adults in general) to infants and young children, we find systematic modifications in the direction of simpler, more fluent, more repetitious, shorter-length utterances that express a greater proportion of questions and imperatives than is found in normal adult-adult discourse and is primarily concerned with topics in the here and now (Snow, 1972, 1977; Phillips, 1973; Newport, Gleitman, & Gleitman, 1977). These same modifications in input have been noted in the speech of adults to mentally retarded infants (e.g., Buckhalt, Rutherford, & Goldberg, 1978; Buium, Rynders, & Turnure, 1974) and mentally retarded young adults (Siegel, 1963; Siegel & Harkins, 1963). Attempts to relate adult input (the types of modifications present) to subsequent language skills demonstrated by the children receiving this input have yielded little more than questionable correlations between structural/functional aspects of the speech of mothers and their respective children (e.g., Cross, 1977; Newport et al., 1977). The single feature of adults' behavior that appears to exercise the most profound effect upon the child's development of communication skills is their responsiveness to the child. Bell and Ainsworth (1972) and Ainsworth, Bell, and Stayton (1974) report that the promptness of maternal responsiveness to infant's crying, in the context of a generally accepting and sensitive relationship between the mother and her baby, is associated with a decrease in crying during the 1st year of life and a concurrent increase in other more selective communication modes, e.g., facial expression, gesture, and vocalization. Other changes were noted in the infant's increased exploration of novel environments, decreased anxiety upon separation from his/her mother, and increased compliance to the mother's commands.

Freedle and Lewis (1977) provide additional findings of contingency between the mothers' communicative behavior and subsequent rates of communicative development in their respective children. Mothers who began and closed more conversational sequences with their 3-month-olds (i.e., rather than having the infant begin or close the "conversation" with a vocalization) had children with higher mean length utterances at age 2.

Recent findings reported by Cheseldine and McConkey (1979) indicate that some parents can initiate their own changes in linguistic style (e.g., they ask fewer questions, use shorter mean length of utterances, allow the child a greater share of the speaking time, and use more statements) when given a language objective to work toward with their Down's syndrome children (i.e., increase their children's use of two-word utterances). Of equal, or perhaps greater significance, is their finding that these modifications could be successfully taught to one mother who was unable to generate these changes spontaneously. The children of mothers who modified their input were producing more verbs and two-word utterances at the conclusion of the study than were those children whose mothers did not modify their input styles.

Recent findings by Calculator (Note 2) suggested that programming designed to facilitate preverbal children's development of communicative behaviors should not be limited to instituting changes in the mother's (or caregiver's) speech. Rather, an equally important concern is that of maximizing the degree of reciprocation these children provide to their caregivers during daily interactions. Briefly, the speech of caregivers to severe and profoundly retarded preverbal infants, 1-3 years of age, was examined in order to assess differences in the ways caregivers interact with these children, as determined by the responsiveness and existing communicative repertoires of the children. The infants were grouped in categories as *high* versus *low* in communicative affective behavior based upon the independent reports of a second caregiver, who did not participate in the study, and an independent rater. Caregivers interacting with the high communicative infants displayed greater responsiveness to their respective children's vocalizations, as measured by their significantly greater tendency to shift the topics of their conversation to activities directly related to the child's ongoing actions, rather than their own. This behavior occurred only after child vocalizations, rather than constituting a constant variable of the caregiver's speech. Also, caregivers addressing the high communicative infants emitted more utterances that were related to the immediate context (here and now). Finally, they displayed a stronger tendency to seek conversational closure in their questions directed to the high language infants, i.e., they displayed a greater use of repair mechanism following the absence of child vocalizations subsequent to their questions).

The Calculator (Note 2) findings suggested that caregivers differentially modify their input to children based upon the latter's ability to contribute to the communicative exchange. The high-level infants appear to be receiving a more optimal model for communication development than their low-level counterparts. These differences occur despite the prelinguistic preintentional status of the infant listeners. Since the children's vocalizations appear to have a differential impact upon the caregiver's verbal input, it is necessary to provide language stimulation to preverbal children concurrently with efforts to expand their communicative repertoires. Reichle and Yoder (1979) discuss advantages and considerations in involving caregivers in assessment and intervention, suggesting they can be an invaluable resource for obtaining data and instituting communication objectives into their caregiving routines.

Reichle and Yoder (1979) presented a program that conformed to our present understanding of children's preverbal development. The child is taken through a series of programs that include training in *awareness, localization and tracking* (e.g., search strategies), early means of requesting actions and attention (Bates, 1976, refers to these, respectively, as protoimperatives and protodeclaratives). Bruner (1974, 1975) attributes great importance to the child's ability to regulate joint attention and joint activity with his caregiver, viewing language as an extension of earlier cooperative activity. Bruner traces the development of these behaviors in relation to the highly conventionalized contexts mothers provide to their language-learning infants. The applicability of these training contents for work with preverbal, developmentally delayed children has been attested to by the work of Greenwald and Leonard (1979). They report that mentally retarded children (all Down's syndrome) display communicative behaviors that are consistent with their sensorimotor stages (IV and V). Other than exhibiting a tendency to rely more on gestures than on gestures plus vocalizations, these children were similar to their cognitively normal counterparts.

Intentional Communication

It is not until the child demonstrates cognitive functioning, which is characteristic of sensorimotor stage V (attained by normal children in the 12- to 18-month age range), that the comprehension and use of symbols become appropriate goals. The child is still restricted in that his/her comprehension is limited to topics concerning events in his/her immediate environmental context. It is not until the emergence of true representational thought in sensorimotor stage VI (achieved in normal children between the ages of 18 and 24 mos.) that the child is capable of combining symbols while expressing concepts that transcend the immediate context.

In selecting an appropriate communication program for the child, the checklist in Table II may be helpful. For a complete discussion of terminology included in this chart and an overview of augmentative communications in general (e.g., their design and their programming decisions), the reader is

Table II. Checklist of Considerations in Designing an Appropriate Communication Program

- I. Pursue standard speech and language teaching strategies?
- II. What augmentative communication techniques are available?
  - A. Unaided
    - 1. Manual
      - a. Gesture
      - b. Sign
    - 2. Facial and body
  - B. Aided
    - 1. Physical
    - 2. Mechanical
    - 3. Electronic
- III. Which communication technique do we recommend?
  - A. Scanner
  - B. Coded select
  - C. Direct select
- IV. Which symbol system do we recommend?
  - A. Pictures
  - B. Rebus
  - C. Blissymbolics
  - D. Letter/word
  - E. Voice output
  - F. Signs of ASL/SEE
- V. What modifications are needed for maximum benefit?
  - A. Seating
  - B. Auxiliary switches
- VI. What training techniques do we employ?
- VII. Whom do we train in conjunction with the system user for communicative interaction?

referred to several sources (Vicker, 1974; Vanderheiden & Harris-Vanderheiden, 1976; Vanderheiden & Grilley, 1976; McDonald & Schultz, 1973; Calculator, Note 2). Calculator (Note 3) presents a review of literature pertinent to this area, from the perspective of a case study involving the actual designing and subsequent intervention program that was implemented with one nonspeaking adult.

Chapman and Miller (1979) summarize the communication characteristics of nonvocal systems, including cognitive and linguistic prerequisites for their usage. The choice of an augmentative means of communication must consider not only the cognitive and linguistic skills of the nonspeaking person but also the effectiveness of the system itself to provide a means by which the child can express an unlimited range of meanings and communicative intents to a maximal potential audience.

Chapman and Miller's review of nonvocal systems includes symbol systems on Shane's (1980) representational level (e.g., photographs) as well as his higher (i.e., more independent) graphic systems level (e.g., Blis-symbols, and English Orthography). In addition to the previously cited research concerning augmentative systems of communication, Clark and Woodcock (1976) have compiled a thorough review of graphic systems of communication. In addition, they present research related to the relative ease in learning each of these symbol systems when compared to learning traditional English orthography. While inconclusive, these findings indicate that graphic systems can often be readily learned by children who have experienced repeated failures while attempting to learn traditional orthography. Still, the relative ease with which various graphic systems can be learned by developmentally delayed children, and the corresponding functionality in communication using the respective symbol systems, has only just begun.

Harris, Lippert, Yoder, and Vanderheiden (1979) have pursued this latter line of research in their longitudinal investigation of developmentally delayed nonspeaking children's acquisition and usage of Blissymbols. Their results demonstrate not only the children's acquisition of symbols, as reflected in increased lexicons, but also their growing range of meanings expressed across environments and interactants. Additionally, the study shows that while symbols were initially being used in an exclusively respondent manner, within 2 years all the symbol-users were also initiating and interacting spontaneously. These changes occurred in spite of modest gains in utterance lengths (symbol strings), reinforcing the notion that communication goes far beyond isolated considerations of syntactic correctness.

An ongoing study by Calculator and Dollaghan (Note 4) confirms Harris's findings in relation to institutionalized nonspeaking children, using fundamental communication boards in classroom and ward interactions with staff. We are currently examining the communication skills of these children in relation to such variables as the spatial proximity of listeners, the influence of listeners on the child's choice of modes, and the relative success/lack of success with which children can change topics of conversation and request clarification of others' messages. A concurrent motivation underlying this investigation was to design a tool by which the nonspeaking child's communication abilities could be assessed, while he/she used a communication board in his/her natural setting, e.g., in the classroom (Calculator & Dollaghan, note 4).

CONCLUSIONS

Evidence is beginning to accumulate that supports the notion that speech is facilitated for many by the use of augmentative communication systems. The reasons for this are still speculative. For many persons who are developmentally delayed, speech and language have been extremely difficult behaviors to learn. At best, the behavior acquired has been not only very limited but usually unintelligible. Emphasis on a system that allows for immediate success and social interaction provides for an experience of communicative value. In other words, by giving the person a system through which there is some immediate control of the environment, with a probability of an interaction that has long-term consequence, one can expect a successful individual who is being intrinsically reinforced for communicative attempts. Using an augmentative system successfully is to communicate successfully. Pairing speech with the augmentative system allows for a positive experience with speech and the augmentative system. The rest of it falls into place.

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COMMUNICATIVE COMPETENCE

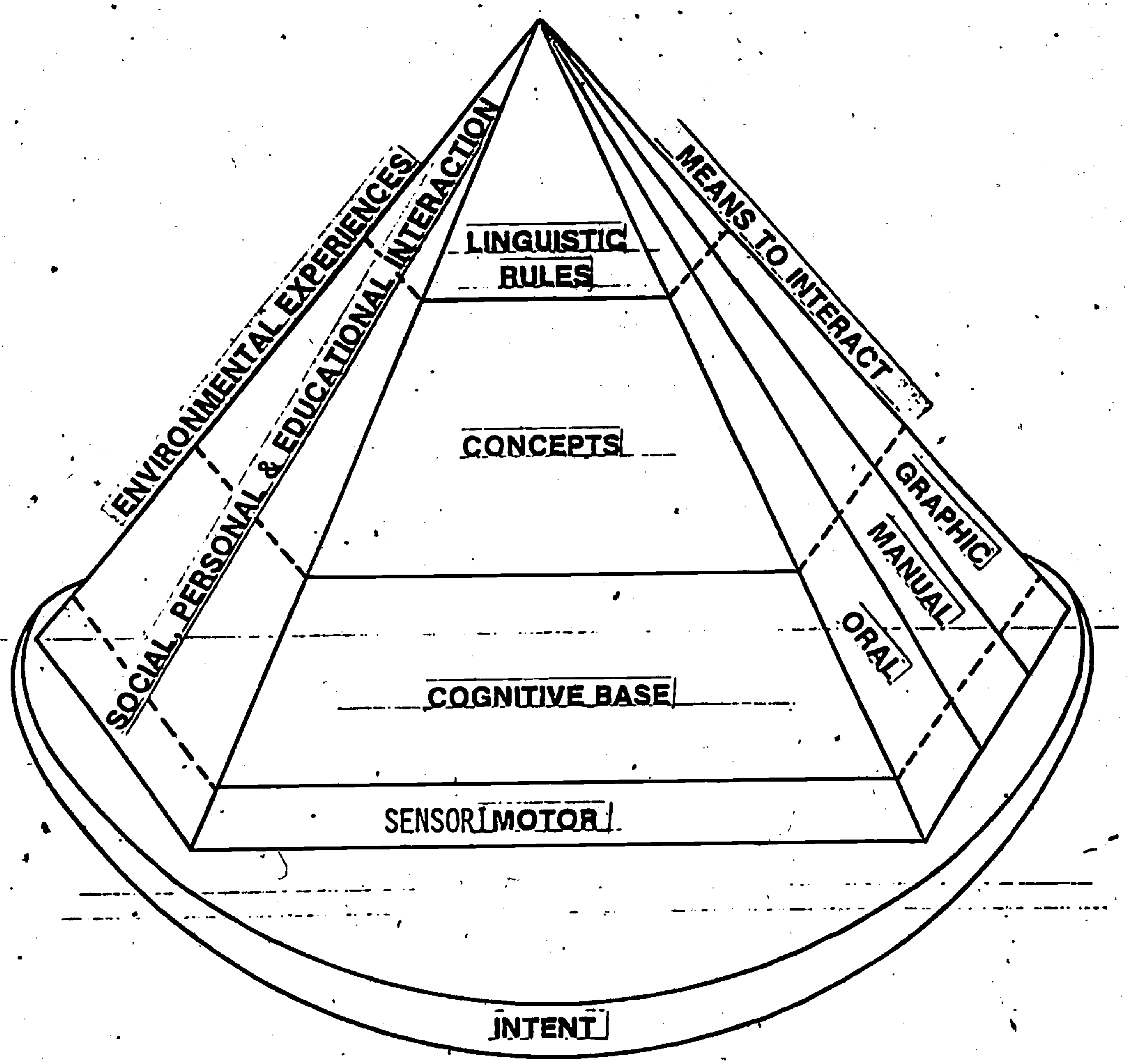

FIGURE 1: REQUISITES FOR COMMUNICATIVE COMPETENCE.

YODER, '82

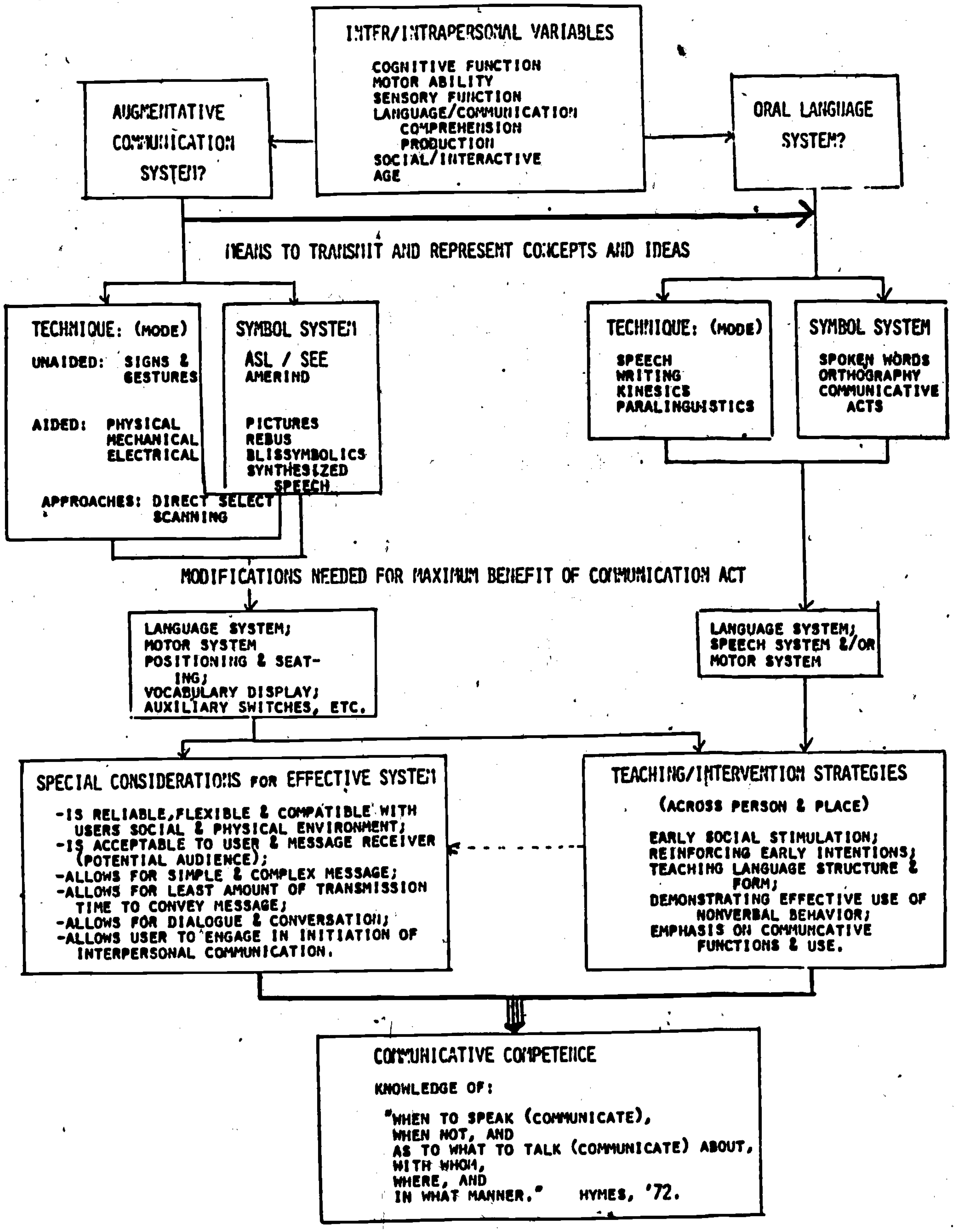

FIGURE 2: PROCESS IN PURSUIT OF COMMUNICATIVE COMPETENCE.

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CHAPTER 6

TEACHING PROCEDURES WITH HEARING IMPAIRED CHILDREN

The Wing Symbols
The Barry Five Slates
The Fitzgerald Key
The Natural Approach
The Patterning Approach
The Programmed Language Instructional Approach
Behavior Modification
Linguistically Based Approaches
Alternative Expression Systems

Education of the hearing impaired has a long tradition of concern about improving linguistic performance of children with severe hearing loss. Professional writing or educational strategies that appeared before the current explosion of information in developmental psycholinguistics have tended to focus on the development of surface structure forms. The mergence of knowledge in linguistics, child development, and developmental psycholinguistics has suggested the need for a shift away from a sole concern with surface structure matters toward consideration of deep structure issues to include semantic and communicative performance. The need for departure from more traditional concerns to focus on development of understanding of the meaning of linguistic principles is clear. Rather than being concerned solely with word order, word choice, and application of surface structure forms such as word endings, practice in understanding and generating language rules should be stressed.

This difference in instructional approach can best be exemplified by comparing traditional and contemporary literature on the issue of how each treats the verb *have* and *be*. J. Bennett (1939) suggested that children must understand the difference between *is*, *have*, and *has on*, which she thought could best be achieved through the use of the Fitzgerald Key and *be*, *have*, and *has on* charts. Children were provided with drills in which they were encouraged to formulate *be*, *have*, and *has on* sentences by referring to the charts they had previously developed. The emphasis in such an approach is on "artificial" or externally generated communication, on the development of surface structures. Attention was not paid to the underlying deep structures implicit for each of the three verbs under consideration.

In contrast, Hargis and Lamm (1974) suggested instructional strategies for the verbs *have* and *be* from the point of view of contemporary linguistic theory. They identified 31 individual meaningful uses to which the verbs *have* and *be* can be applied. For instance, *have* can be used to indicate an entity to part relationship (*The spider has legs.*), immediate ownership (*I have a pencil.*), temporary possession (*I have Robert's book.*), and remote ownership (*I have some money in the bank.*). Hargis and Lamm contend that the deaf child's confusion of *have* and *be* in sentences such as *John is flu.* or *Jonathan have a boy.* occurs because of the surface structure similarity of such sentences. Both *have* and *be* can appear within the same type of sentence frame, so that the deaf child supposes that the two forms have identical meanings in English. It is suggested that instead of focusing on surface structure patterning, the teacher needs to focus on the variety of meanings that can be encoded by surface structure. This should add immeasurably to the deaf child's mastery of these two forms. One can conclude from the article that the entire range of possible meanings of *have* and *be* should be explored. Deaf children need to learn that the same surface structure can convey varied deep structures.

These two summaries serve to point out the contrast between a surface structure orientation and deep structure approaches. The study of meaning is less well explored because focus on deep structure is an enormous task. Focus on surface structure is easier because forms may be constant from construction to construction, but meaning can shift subtly from sentence to sentence. Without an understanding of deep structure, of course, language forms are essentially meaningless for deaf children—or for any child, for that matter.

Instructional focus in this book with regard to hearing-impaired children is on mastery of standard English forms. Although intervention issues are approached as first language learning tasks, it has been emphasized repeatedly that for children who have been exposed to and are using American Sign Language, school English is probably a second language. American Sign Language is organized along lines that emphasize different semantic deep structures and syntactic ordering than those in many, if not all, spoken languages, especially English (Friedman, 1977). If the deaf child is ASL dominant, then standard English will have to be approached in a second language context insofar as reading and writing are concerned. If manual or total communication instruction is utilized in the school setting, then efforts at creating a system congruent with English forms and function would be necessary.

Although emphasis in this chapter is on educational procedures for hearing-impaired students, considerable information exists in other disciplines such as special education, applied linguistics, communication disorders, and developmental psycholinguistics concerning language development programs. Accordingly, contributions may be drawn from these areas in suggesting instructional strategies for deaf children.

TEACHING PROCEDURES WITH HEARING-IMPAIRED CHILDREN

Over the years many language teaching methods have been suggested for use with hearing-impaired children. The more prominent systems that apparently have some grass-roots support in United States programs for the hearing-impaired are considered in the next sections: the Wing symbols, the Barry Five Slates, the Fitzgerald Key, the Natural Approach, the Patterning Approach, the Programmed Language Instructional Approach, and Behavior Modification and Linguistically Based Approaches.

The Wing Symbols

Developed in 1833 by George Wing (1887), the Wing Symbols system uses letters and numbers to represent the functions of different parts of speech in a sentence. The symbols are placed over a word, phrase, or clause to cue the syntactic form, function, and position of the various parts of the sentence. The symbols are grouped into four basic categories: (1) the essentials such as subject (S), verb (V), or intransitive verb (Vi); (2) modifiers such as noun or pronoun in apposition or possessive; (3) connectives such as coordinating conjunction or subordinate conjunction; and (4) special symbols to include auxiliary verbs and tense.

As soon as the child produced a simple sentence, the symbols were to be used. Within a particular lesson, after a number of sentences had been produced, each aspect of each sentence was coded to teach the child the reference of the symbols. Sentences were treated whenever possible in the context of paragraphs with Wing Symbols used to cue syntactic organization. Unfortunately, as indicated in the introduction to this chapter, the Wing Symbol procedure emphasizes syntactic performance rather than sentence meaning or communicative competence. For instance, the subject symbol was used only to cue the syntactic subject. Linguistic theory provides considerable evidence that there must be a differentiation between the syntactical subject and the actual or logical subject in English (Fillmore, 1968; Katz, 1972). An example can be seen in the sentence *Mary received a ball from John.* In this sentence, *Mary* is the syntactic subject as in the Wing system, while by logic the subject of the sentence is actually *John*, the actor. Another example of difficulty with

the Wing Symbol system can be seen with use of symbols for coordinating or subordinating conjunctions. There is no cue within either category to the underlying differences among the conjunctions because there are only two symbols for the whole category. In addition, the position of the subordinate conjunction within the sentence is related to its informational status. If the information contained within a subordinate clause is old information, the clause generally is placed at the beginning of the sentence. If the clause represents new information, it is normally placed at the end of the sentence. Thus, simply identifying the single conjunction does not provide a cue to aspects such as informational coding.

The Barry Five Slates

The Barry Five Slates developed by Katharine Barry (1899) was a method to teach deaf children an understanding of classes of words and their interrelations within sentences. It was contended that the relations of words must be made visible in order to teach language to deaf children. The slates were thought to provide sight rules on which a child could rely in the same way that a hearing child relies on sound rules in language acquisition.

In the Barry system, five large slates were placed on the walls of the schoolroom to provide structure for language explanations. The first slate was for the subject of the sentence, the second for the verb, the third for the direct object, the fourth for the preposition, and the fifth for the object of the preposition. The slates were first used when the children were able to recognize their names and knew how to produce the names of a few objects. Initial emphasis was placed on the development of action-intransitive verb sentences that the teacher associated with a heading from each slate: *who* and *what* for the subject, *what doing* for the verb, *whom* and *what* for the direct object, *where* for the preposition, and *whom* and *what* for the object of the preposition. Once knowledge of the appropriate headings was axiomatic for the child, numbers were substituted for slate writing so that the sentence *John was hitting the ball in the park.* would be analyzed as 1 above *John*, 2 above *was hitting*, 3 above *ball*, 4 above *in*, and 5 above *park*.

McAloney (1931) demonstrated that the Barry system could be used to analyze complex syntactic patterns. For instance, embedded sentences could be seen as a recurrence of a pattern within a pattern. The sentence *Gabrielle kissed Martin while they were in the kitchen.* could be analyzed using the following pattern: 1,2,3,1,2,4,5, with no number placed above the word *while*. Even with this coding of so-called complex sentences, it is obvious that the Barry system was designed for describing syntactic organization rather than providing insight into meaning and pragmatic use of constructions.

The Fitzgerald Key

Edith Fitzgerald (1949) described a sentence pattern guide in her book *Straight Language for the Deaf.* The Fitzgerald Key consists of six columns headed by interrogative words and some symbols indicating parts of speech and sentence functions, similar to Barry's categories. The headings were: (1) subject (who, what), (2) verb and predicate words (=, ⇉, and ¬ for verb, infinitive, and adjective, respectively), (3) indirect and direct objects (what, whom), (4) phrases and words telling where, (5) other phrases and word modifiers of the main verb (for, from, how, how oft[illegible], how much, etc.), and (6) words and phrases telling when. The use of connective symbols allowed for compound sentences to be classified. Young deaf children were to begin language learning by classifying words according to the more basic headings, such as subject and verb. The child's first few years in school were to be spent "building the Key." New language patterns and principles were explained in terms of the Key, which served as a reference and self-correction device for language work.

Fitzgerald (1943) herself emphasized two aspects of her system that made it different from systems developed previously. First, she stressed that it was to be used to assist children in visualizing language from a syntactic viewpoint. Second, she stressed that the Key should be used in a language learning atmosphere, allowing for constant exposure to language experiences like those encountered by normally hearing children who were learning language. She urged that language instruction be tied to reality and experience, which would help to establish notions of the underlying relationships within language. It is unfortunate that in practice the deep association with experience that Fitzgerald thought so important has too frequently not occurred. Too often the Key is used as the primary language input system for deaf children, a function for which it was never intended.

Thomas (1958) presented an updated version of the Fitzgerald Key that emphasized phrase understanding. Eight different patterns, considered to be ones that children frequently encounter in reading, were outlined. The patterns included: intransitive verb, transitive verb, predicate adjective, predicate adverbial, transitive verb plus adverbial construction, indirect object, intransitive verb plus adverbial construction, and predicate adjective plus adverbial construction sentences. The eight patterns were introduced first to establish a basic understanding of language. Later, instruction focused on subtle variations and deviations from these basic sentence patterns. These later variations are generally semantically derived, of course, which would not be learned through purely syntactic emphasis.

Walter (1959) presented another variation on the Key that involved a rotating Key chart the students could use at their desks rather than headings from the blackboard. This adaptation demonstrates the range of modifications that have been made to ensure maximum use of the Key in the classroom.

The Natural Approach

In 1958, Mildred Groht wrote of an approach to language instruction that emphasized a more naturalistic view of language development as opposed to simply employing syntactic ordering devices such as the Fitzgerald Key, predetermined word lists such as the Central Institute for the Deaf Language Outline (1950), or workbooks as exemplified by the Croker-Jones-Pratt language drill workbooks (1920, 1922, 1928). The primary tenet of the Natural Approach is that concepts are to be developed through language. Language is seen as a means to an end rather than an end of instruction itself. From this position, Groht evolved certain operating principles: (1) language and vocabulary must be supplied according to the child's needs rather than according to rigid word and language principle lists; (2) natural language is acquired by repetition in meaningful communication settings rather than by drill or textbook exercises apart from meaning; (3) language usage is best taught through conversation and discussion, written compositions of all kinds, and through academic and skill areas of the curriculum; (4) when language principles need to be taught, they should be introduced incidentally in natural language learning situations, then explained by the teacher in real situations, then practiced by the children through the use of games, questions, stories, pictures, and conversations. Upper grade language requires exactness in planning, organization, and self-criticism on the part of the pupils.

Accordingly, the deaf child is seen as having the same need for a naturalistic language-learning environment as normally hearing children do. Groht clearly expected teachers to have understanding of the linguistic principles they were striving to have the child learn, rather than presenting language in a haphazard fashion. This latter point is critical, because many proponents of the so-called Natural Method have interpreted the natural part to mean talk, talk, talk, but in an incidental fashion, depending on what comes up. Groht did not intend this to be the case. She stressed that the teacher should be preparing natural experiences for each of the linguistic principles she feels the child should be acquiring in light of his conversational, intellectual, and cognitive status. Thus, unlike other language instruction systems, the emphasis of the Natural Approach is on development of deep structure and communication competence at a rate commensurate with the child's ability to assimilate information. The only weakness of the system was that Groht provided no clearly outlined developmental stages by which to judge children's linguistic and/or cognitive needs, which linguistic principles would best be learned before others. This is a particularly important issue for older deaf children who may lack even the rudiments of English. In addition, Groht makes no provision for developmental responses by children. Children do not begin with mature language productions or even approximations of these productions. Instead, as per Chapter 3, children proceed through stages of learning the adult model before finally achieving mature expression. With guidelines relative to developmental needs of children and indications of child language behavior, the Natural Approach offers a framework for development of linguistic and communication competence rather than strict concern with surface structure patterns.

The Patterning Approach

Sr. Jeanne d'Arc (1958) presented the view that there was instructional need for linguistic patterning to aid many deaf children in learning language. She suggested that systematic exposure to a limited variety of linguistic units in order to facilitate linguistic understanding and usage was a necessary requirement to any language instructional program. The focal point of the procedure is employment of command forms that vary according to the constructions that follow the core command verb. The first pattern to be emphasized is the verb-what relationship, which is followed by verb-where, verb-what-where, verb-adjective, verb-whom, and verb-whom-what. Language exposure is achieved in natural situations that emphasize a conversational format between teacher and the deaf child.

In a subsequent report on patterning, Buckler (1968) indicated that the seven basic sentence patterns outlined by d'Arc should continue to serve as the basis for any further patterning efforts. To increase linguistic sophistication, it was suggested that these seven sentence patterns also be used in conjunction with stems that cued more complex sentences. For instance, it would be possible to cue or pattern with sentence stems such as *I know how to* . . . or *It's fun to* . . . , which would allow use of the seven patterns already developed through command training. Buckler contended that question forms and indirect discourse forms particularly difficult for hearing-impaired children can easily be handled through patterning as well, using stems such as *When will* . . . or *Mary told me to*. . . . This approach draws upon the strength of structured language approaches; it argues for structure in language learning in linguistically sound terms, while encouraging natural experiences by keeping the content of patterns in line with the developmental needs of the child. The problem of an apparent lack of stress on deep structure understanding or overt consideration of communication competence could leave one uncertain as to how to achieve fluent language performance at all levels. It should be noted, however, that the functional realization of a patterning approach has been impressively demonstrated by the students of St. Joseph's School for the Deaf in St. Louis.

The Programmed Language Instructional Approach

In the 1960s, as part of the general trend in education to employ teaching machines and computer technology, programmed language instruction was developed for hearing-impaired children. Falconer (1962), Stuckless and Birch (1962), Fehr (1962), and Rush (1964) developed programs to teach specific linguistic knowledge such as noun vocabulary, articles, or following written directions. Initial results from these approaches seemed to be promising. However, later there were indications that English drill programs such as those developed by Stanford University had not proved to be entirely successful (Fletcher and Suppes, 1973).

In a recent report by Bochner (1976) on a verb drill program designed for deaf young adults, it was concluded that programmed approaches lacked instructional power. An effective drill and practice program should elicit and reinforce acceptable responses from the student on a consistent basis. Bochner's subjects' responses deviated so substantially from expected behavior that the program was unable to shape or reinforce responses. In many instances the responses that the students produced were grammatically appropriate, but the computer program was forced to reject them as unacceptable because they did not conform to the predicted response.

These difficulties are not particularly surprising for many reasons. Children who truly generate language show preference for paraphrasing rather than for direct imitation. It has also been shown that language drills are only meaningful if placed into experiential context which is not possible with most computer-based programs. Studies by Ruder, Hermann, and Schiefelbusch (1977) indicate that drill activities do not result in generative language behavior. Comprehension work coupled with imitative or drill responses was found to produce changes in expressive language, however, strengthening the arguments for experiential learning.

This should not be taken to mean that teaching machines and computerized instruction have no educational role. However, such approaches should not be expected to lead to the establishment of deep structure understanding if they merely provide surface structure monitoring or practice.

Behavior Modification

Learning theory from the psychological point of view has been and continues to be concerned with stimulus-response relationships and operant learning as related to language acquisition. Although external motivation and manipulation are not seen by developmental psycholinguists as primarily responsible for language acquisition in normal children, the application of learning theory to establishing speech and/or language in children who demonstrate severe language disability has been promising. Children who fall under the rubric of severely retarded, autistic-like, or multihandicapped have been the focus of operant conditioning paradigms, and in recent years there have been attempts to apply these principles to the instruction of multihandicapped, hearing-impaired children as well.

The reports on hard-to-teach children generally report results in four areas (Snyder, Lovitt, and Smith, 1975; Yule, Berger, and Howlin, 1975) (1) identification of target behaviors, (2) establishment of baseline behaviors, (3) implementation of therapeutic procedures, and (4) evaluation of the results by comparing the final results with the baseline data.

Identification of target behaviors requires description of how behavior change will be quantified, as well as decisions about what terminal behaviors will be sought. When behavior targets, or reduction in particular behaviors, have been decided on, charting or description of the naturally occurring rate or duration of the desirable, or undesirable, behavior is done. This charting establishes a pre-intervention baseline for evaluating the effects of treatment. Because children's behavior can vary considerably over time even in a structured situation, it is often necessary to continue observations until a representative sample of behavior is thought to have been obtained, which may involve a number of observations in the child's environment.

Having obtained baseline observations of the relationship between target behaviors and the environment, the treatment manipulations are introduced. Most techniques employ some reinforcement procedure, either of a social (secondary) or consumable-token (primary) nature. Modeling, shaping/fading, or other imitative variations are the specific types of procedures employed. Modeling consists of providing the subject with examples of the target behavior with the expectation that the child will approximate through direct imitation the established model. Shaping/fading techniques require differential reinforcement of stimulated productions by the child. Differential reinforcement leads the child to produce behaviors that come closer and closer to a predetermined standard established by the examiner.

Regardless of the choice of procedures to change behavior, the observations started during the baseline periods are continued. This ongoing monitoring of behavior should provide indications of the efficacy of the modification techniques selected. If the strategy is working, there should be a decrease of those behaviors one wishes to eliminate, or an increase in behaviors that are desirable. It is not always possible, of course, to establish this cause and effect relationship, because teaching a preliminary behavior may simply trigger or facilitate expression of the behavior or linguistic principle that is actually already known to the child (Yule, Berger, and Howlin, 1975).

In language acquisition, application of behavior modification has emphasized the establishment of expressive skills by and large, although development of receptive abilities using picture identification techniques has also been reported in the literature. Specific areas of expressive behavior focused on have included establishing noun vocabulary items (Sailor et al., 1973; Salzinger et al., 1965); use of plurality (Baer and Guess, 1973; Garcia, Guess, and Byrnes, 1973; Guess et al., 1968; Sailor, 1971); use of articles and auxiliary verbs (Wheeler and Sulzer, 1970); use of verb inflections (Schumaker and Sherman, 1970); decreasing verbal behaviors (Barton, 1970); use of prepositions (Sailor and Taman, 1972); use of question forms (Twardosz and Baer, 1973); encouraging two-word combination production (Jeffree, Wheldall, and Mittler, 1973); and use of noun and verb phrases (McReynolds and Engmann, 1974; Whitehurst and Novak, 1973). Lawrence (1971) described techniques for establishing prelinguistic behaviors in children such as attending to speech or learning to provide feedback to caregivers. These factors have been identified as crucial to the development of spontaneous language forms (Snyder and McLean, 1976). Fygetakis and Ingram (1973), on the other hand, emphasize the use of reinforcement principles to increase mean length of utterance and syntactic complexity in children.

Although receptive development has been studied, as suggested, the range of behavior explored is more limited. Bricker (1972) and Bricker, Vincent-Smith, and Bricker (1973) have reported on attempts to develop receptive comprehension of a simple noun category in severely retarded older children and in language-delayed toddlers, respectively. Baer and Guess (1971) focused on the development of adjectival inflections and superlative and comparative forms in mentally retarded children. Guess (1969) also investigated the understanding of plurality in retarded children. In a subsequent study, Guess and Baer (1973) attempted to develop plurality both receptively and expressively. They found that it was possible to teach comprehension and production of plurality, but there proved to be little or no generalization from one modality to the other.

Hartung (1972) outlined a tentative series of targets that should be achieved in order to guarantee minimal linguistic functioning in autistic-like children, including: (1) elimination of disruptive behaviors before initiating actual communication/linguistic programming efforts, (2) conditioning attention and eye contact, (3) establishing motor imitative behavior, (4) establishing a transition from motor imitative behavior to verbal imitative behavior, (5) establishing control over predetermined spoken vocabulary usually beginning with nouns, (6) establishing transition from imitation to naming, (7) establishing ability to answer questions, (8) establishing spoken phrases, (9) conditioning functional speech, and (10) generalizing imitative speech appropriately to new situations.

The cornerstones of this approach are the notions that imitation serves as the basis for establishing linguistic behavior; that there is a transition from motor imitative behavior to verbal imitative behavior; that vocal targets should be selected so that they can be easily produced with manipulative help from the teacher, contain sounds visually apparent to the child, and contain sounds already within the production repertoire of the child; and finally, that targets should proceed from single-word responses to phrases to functional sentences such as *open the door* or *get your shoes*.

Employment of similar types of linguistic developmental outlines have been described by Bricker and Bricker (1974), Guess, Sailor, and Baer (1974), Kent et al. (1972), and Risely, Hart, and Doke (1972). All presented programs emphasized the importance of imitation, early motor imitative training, and a progression from single words to complete sentences. If Snyder and McLean's (1976) contention that certain prelinguistic behaviors are important for children to possess before they are able to process linguistic information is correct, it would seem that the goal of eliminating disruptive behaviors and establishing eye contact would be worthwhile. The need to establish appropriate feedback mechanisms in children, such as smiling or selectively attending to speech, should be added. Joint activities are important to the establishment of a common topic of conversation between normally developing child and mother (Bruner, 1977). Establishment of motor imitative behavior also seems reasonable for children who do not spontaneously develop ability to imitate or process the communication of others.

Application of behavior modification procedures to teaching hearing-impaired children has been reported (Bennett and Ling, 1972; Berger, 1972). In Bennett and Ling's study, a 3-year-old hearing-impaired girl who used neither the article *the* nor the auxiliary verb *is* was taught to use these words in describing a picture, initially through imitation and then in response to the command *Tell me about this*. She was also able to use the present progressive form to describe a number of pictures on which she had received no training. To test its generative status, the newly acquired behavior was subsequently extinguished and then reinstated.

The question one might ask about this study is whether the *is—the* knowledge is generalized to situations other than picture description. The semantic role of the auxiliary verb *be* in English is limited, and could be generalized to other present progressive environments without a need for knowledge of its meaning. *The*, on the other hand, serves as an important cue to the listener about information in conversational noun phrases, a form that would not be expected to be learned by imitation alone.

Berger (1972) used a program similar to Hartung's to teach severely retarded deaf children. Manual communication was substituted for vocal behavior. The report lacks specific details about procedures employed and success rate with specific target behaviors.

The role of imitation in language learning has been shown to be a rather specific one, as discussed in Chapter 3. Behavior modification programs depend heavily upon imitation to shape behavior, but that dependence presents a problem when the question of language learning is considered.

Rees (1975), for one, examined the clinical use of imitation in the enhancement of linguistic performance in language-disordered children. She concluded that although imitation may have only a limited role in the development of linguistic competence in the normal child, or in increasing or modifying the language-disordered child's linguistic competence, clinical procedures involving imitation may be important in the development of the communicative process. In the case of nonverbal children, the establishment of a tendency to imitate and an initial vocal or verbal repertoire might be the first step in production of communication, if not symbolic behavior. In fact, the attempt to establish language performance in the child who has no notion of communicative behavior is likely to be unsuccessful. Imitation could be used to establish communication between the language disordered child and his mother, and different techniques could be employed to develop his linguistic competence.

The usefulness of imitation in developing verbal behavior in children with language-learning problems was also discussed by Ruder, Hermann, and Schiefelbusch (1977). Their study was designed to determine whether imitation or comprehension training alone, or some combination of imitation and comprehension training, would facilitate verbal production in children with language disorders. Comprehension training alone resulted in some verbal production, but imitation training alone did not. A marked improvement in verbal production was observed when comprehension training was followed by imitative training. When initial imitative training was followed by comprehension training, verbal production increased, but not to the degree or with the consistency that marked the comprehension-imitation training sequence. Furthermore, children in comprehension training required more trials to reach a similar level of proficiency after imitation than they did when comprehension work preceded imitation. Beginning with imitative training apparently interferes with acquisition of subsequent comprehension and production skills.

Courtright and Courtright (1976) compared the effectiveness of a modeling procedure and direct imitation in teaching certain syntactic patterns. Modeling in this context involved repeating the test sentence several times in the presence of a picture cue. In direct imitation, the subject was required to produce the examiner's sentence immediately and exactly. The results were thought to support the conclusion that modeling was more effective than imitation in teaching a syntactic pattern, initially lacking in the subject. Greater retention of the pattern and a more successful generalization to novel contexts were noted with modeling more than with direct imitation.

These findings are not too startling if Bloom, Hood, and Lightbown's (1975) observation that children imitate only language that they have some knowledge about is accurate. One could argue that comprehension training establishes tentative knowledge about a language form, which would encourage imitation of that form in subsequent instruction.

Another problem with behavior modification has been the criticism that violations of developmental patterns in working with children are made regularly. Teaching targets are established with no regard to the cognitive and/or developmental trends expected in children, even developmentally delayed ones. Lynch and Bricker (1972), to counteract such a charge, suggested that developmental psycholinguistic data could be used as the content for behavior modification programs, while conditioning or operant procedures could become the mechanisms by which these developmental expectations are realized. Stremel (1972), Stark et al. (1973), Jeffree, Wheldall, and Mittler (1973), and Garber and David (1975) have reported on applications of this suggestion. Each has appealed to various aspects of linguistic theorizing and/or language developmental knowledge to establish meaningful language targets in children. Stremel (1972) stressed agent-action-patient (subject-verb-object) relationships; Stark et al. (1973) used Bloom's functional and grammatical categories to teach behavior; Jeffree, Wheldall, and Mittler (1973) studied the pivot-open class relationship; and Garber and David (1975) used the semantic demands of questioning to eliminate echolalia in children. These programs were successful to varying degrees, so the strategies of combining developmental targets with behavior modification techniques shows promise, particularly with children demonstrating difficulties in language learning.

Linguistically Based Approaches

Increased interest in linguistic theory and descriptions of children's language has resulted in efforts to apply such theories to helping communicatively handicapped children acquire language. Programs based primarily on linguistic theory and programs based on developmental findings have become the most popular. Linguistic theory approaches use information gained by appealing to the adult model. Difficulty and complexity of language is defined by what the adult finds difficult and complex. Approaches classified as developmental use information derived from observations of normally speaking children. Difficulty and complexity level are defined from the point of view of the child, not the adult. The former type of program may be referred to as clinician oriented, whereas the latter would be considered child oriented. In either case, as indicated by Leonard (1973), developing rule-governed behavior should be the goal of the therapeutic or educational program, building in the child some sense of the rules governing the understanding and production of English sentences.

Detailed examples of each category of instructional program are considered in the next two sections. The first emphasizes linguistic approaches, and the second emphasizes developmentally based approaches.

Instructional Programs Based on Linguistic Theory Blackwell and Engen (1976) presented an entire curriculum (Rhode Island School for the Deaf Language Curriculum) geared to the development of linguistic rule knowledge in hearing-impaired children. Although much of the curriculum is geared to syntactic mastery, attention is also paid to semantic development and to consideration of the relation of language and cognitive growth. The basic premises of the curriculum are twofold:

1. Language is not taught to children using vocabulary as its base of operation. Instead, the immediate goal of the educational process

must be the development of underlying linguistic knowledge for sentence generation.

2. Language cannot be taught in isolation. It must be an integral part of the school curriculum, which in turn is geared toward the child's needs and intellectual/emotional interests.

As stated previously, there is intense focus on the syntactic component of language. Initial work begins with what Streng (1972) and others have called the basic sentences of English: the transitive sentence (*John hit the dog.*), the intransitive sentence (*John ran.*), the predicate nominative sentence (*John is his son.*), the predicate adjective sentence (*John is big.*), and the predicate adverbial sentence (*John is in the park.*)

Control of linguistic input is advocated by using events, stories, personal identification, or social relationships that the child has already experienced. These concepts are expressed consistently in the five simple sentence patterns that must be mastered before the introduction of more complex forms. Complex sentences are seen as the interface of two or more simple sentence relationships. Thus, complexity is introduced through consideration of those changes that operate to change the simple sentence pattern, but not its semantic complexity such as negation, question forms, and imperative operations. Later, complex forms that change the semantic organization of the sentence are introduced, such as nominalization, relativization, coordination, and complementation.

The five basic sentence types are described to the children and then contrasted over a period of time by emphasizing the distinction between transitive and intransitive sentences, and the difference between these two types and the remaining three. This description process is unhurried and is applied only to those sentences that have some meaning for the children. The goal is not the memorization of the syntax of simple sentences, but the internalization of simple relationships through which the child will be able to produce and comprehend an infinite number of sentences. Thus, opportunities for spontaneous generation of sentences are emphasized as an integral part of the instructional process from the earliest stages of exposure to the system.

At the point of spontaneous generation of language, Blackwell and his colleagues advocate the initiation of formal analysis techniques, using generative-transformational diagrams. It is argued that such diagramming assists the child in identifying the major sentence components and the major groupings of those components. It is also thought to aid the child in constituent development, a significant aid to reading, in opposition to word-by-word decoding techniques, which are highly damaging to reading comprehension. Diagramming is further defended as a way of

helping children to develop a grasp of the underlying relationships that exist for more complex sentence patterns. For instance, by combining visual diagramming skills and intonational practice, it seems possible to prevent the deaf child from assuming that the end of a medially embedded relative clause is the end of the main sentence; thus sentences such as *John who is my friend* are avoided.

Blackwell and his colleagues made a monumental contribution in demonstrating how linguistic theory could be applied to educational instruction with hearing-impaired children. Still, two shortcomings must be pointed out. First, because of their predominant reliance upon adult models from linguistic theory, it is the authors' feeling that some of their decisions are contradictory to the developmental literature. For example, mastery of basic sentences is advocated before consideration of the syntactic forms that change the semantic organization of the sentence, such as coordination and complementation. The child language literature shows that *and* forms and early infinitives appear quite early in children's utterances (Limber, 1973). Therefore, not encouraging their growth would work against the natural developmental processes of children.

Second, the use of diagramming with young children is thought to aid in their conceptualization of language. This technique may be helpful for those children who have substantial language mastery, but the authors have serious reservations concerning its use with children in the initial stages of learning language. Employment of diagrams could encourage children in the early language learning stage to focus on external surface structure manifestations of language rather than encouraging internal semantic manipulation of language. It has been demonstrated repeatedly that the focus of children's earliest attempts to master language are semantically, not syntactically, motivated. It is only after the child has mastered the basic components of the underlying semantic relationships that he pays attention to syntactic matters such as word order and constituent grouping. Consequently, a more natural approach in which basic sentences are controlled semantically, not syntactically, and patterned so that the child has an opportunity to induce the underlying meaning relationships of language is advocated. In this process, children will produce utterances that are developmentally approximations of the adult model. Only when a child has a clear understanding of word order constraints and constituent groupings would introduction of sentence diagramming be reasonable.

In summary, the curriculum outlined by Blackwell and Engen is unique in the effort to develop an entire language program based on contemporary linguistic theory, an effort that must be applauded in its innovation. The design of the curriculum is a dynamic one that is continuing to undergo revision and modification; changes in the Rhode Island curriculum will be awaited with interest. It is hoped that it will steer toward a developmental model rather than being confined to a purely linguistic one.

Another example of a linguistically based program for deaf children was outlined by Peck (1972). The Patterned Language system is organized into three units. Unit 1 is geared toward the development of single-word productions from hearing-impaired children who, regardless of age, have not achieved this stage. The basic premise is that deaf children should start in the stage of production in the normal developmental process that they have not mastered. Success in each stage, even in the single-word stage, should be assured even for older children through the use of socially appropriate but linguistically controlled experience. Items in the one-word stage include introduction of negation, confirmation (yes), names of people and pets, names of objects, *where* concepts, and *time* concepts. Use of these items should be practiced in two sociolinguistic contexts—asking (requesting) and telling. Interestingly, although presented in 1972, Peck's concepts are sound, but they failed to go far enough. Basic semantic categorization such as agent, action, or patient is lacking.

Unit 2 involves productions of word strings from two to five words. It is suggested that expansion techniques be used to help children achieve this level of proficiency. Unfortunately, Peck provides few guidelines concerning the focus of these expansions other than to work on basic sentence patterns or syntax. Unit 3 involves verbal descriptions that utilize a slot organization similar to the Fitzgerald Key. Eight slots are listed, including sentence transforms, subject + modifiers, verb + direct object, object + modifiers, where, when, conjunction, and end of sentence punctuation. Children are provided with these categories in slot form to assist them in generating sentences. This suggestion suffers from the same criticisms leveled against the Key earlier in this chapter.

Muma (1974) outlined 10 instructional procedures derived from linguistic theory that he recommended for use in developing rule understanding in language disordered individuals. He suggested for example that the teacher or clinician point out the child's error to him and then provide the appropriate form. For instance, if the child utters *I is going.*, the teacher can reply, "No, it's not *I is going*; it's *I am going*. Say *I am*. Mellon (1967) and Cazden (1965) indicate, however, that this correction technique is not an efficient way to help children learn basic language rules. The correction technique is not a positive one for language learning and may even be destructive from the standpoint of language usage, particularly when it is used too frequently.

The second, or expansion, technique, as outlined in studies of the parental input to normal children (Brown and Bellugi, 1964), has also been suggested for use with hearing-impaired children (Scroggs, 1975). Linguistic expansion occurs when a child's utterance is expanded into an adult version of the forms he produced. For instance if the child says *me go*, the adult might say *Yes, you are going*. As reported previously, Scroggs (1975) found that teachers' systematic application of expansion techniques increased oral and non-oral communication attempts by hearing-impaired children significantly.

In the third, or simple expatiation, technique, the teacher makes comments about children's utterances. The comments are confined to a single propositional sentence, keeping the syntactic and semantic demands at a low level. For instance, if the child says *Birdie fly.*, the teacher might say *Yes, the birdie is pretty too.* Expansion with simple expatiation might result in a response such as *Yes, the birdie is flying*, with the comment *The birdie is pretty*. Cazden (1965) found this particular technique effective in stimulating language growth in disadvantaged nursery school children because it broadened the communication context for the child, but allowed his utterances to serve as the focus of the communication exchange.

The fourth, or complex expatiation, technique is merely a syntactic variation of simple expatiation. The semantic aspects are featured and extended, but only in more complicated syntactic structures. It was suggested that complex expatiation be reserved for children in more advanced stages of language development, such as children who demonstrate knowledge of various transformational operations but need to learn fluent use of these transformations.

The fifth technique, designated the alternative model, was thought by Blank and Solomon (1968) to be effective for developing abstract thinking. Operationally, a teacher inquires either directly or indirectly about the underlying logic of a particular utterance. Such probes should serve to make the speaker aware of the logical power of language and to consider alternative ways in which a given thought can be expressed. For instance, the child might say *Daddy go.*, to which the teacher replies *Yes, is daddy going? Why is daddy going?* Because the critical characteristic of this technique is the use of a question format, there are additional studies that comment on its effectiveness. Turnure, Buium, and Thurlow (1976) tested educable mentally retarded children to determine whether interrogatives would induce verbal elaboration. The results indicated that children in question conditions elaborated more than children in nonquestion conditions. The question conditions also induced greater semantic analysis by children than the nonquestion conditions, which can be taken as an affirmation of the alternative technique's basic purpose.

The questions of young children themselves in educational settings may be most informative about the child's point of view. Examples of children's questions from Chukovsky (1968) include: *Do chickens go without rubbers?* or *Mothers give birth to boys, too. Then what are fathers for?* Adults could employ these types of child questions in order to assist children to develop understanding of the world through the use of language. Guidelines for the production of child-like questions include pairing unrelated categories, such as *rubbers* and *chicken*; posing incorrect hypotheses, such as *What is a knife, a fork's husband?*; and postulating discrepancies that need to be resolved, such as *Why don't we see two things with two eyes?* Presentation of these types of alternatives is a novel way to assist the child in understanding the underlying cognitive relations between objects and events. Chukovsky points to two important constraints on the use of such questions. First, they should not be used to initiate conversations with children, but should proceed out of prior discussions with the child. A second constraint is the assurance that questions are asked in the presence of relevant materials or in proper context. Unless children are presented with the tools necessary to solve the problems posed by the question, learning will not occur.

Muma's sixth technique is completion, a procedure in which children are encouraged to complete items presented to them. The child may be provided with a word to be used in a new sentence, or the adult may provide the child with a stem for completion. The patterning methods already described (Buckler, 1968; d'Arc, 1958) represent a sort of elaborated completion strategy. If properly used, the completion technique can provide a child with syntactic experience, such as constituent analysis and observation of word order constraints, as well as semantic interaction, such as concept or lexical boundaries and selectional restrictions. It should also be recalled from Chapter 3 that mothers often employ completion strategies to encourage linguistic productions in normally developing children.

Muma's three remaining techniques are applicable only for those children or adolescents who possess linguistic sophistication. In the replacement technique, the teacher presents a sentence and instructs the child to replace one element once, or several times, or to delete an element. A replacement exchange might be:

Teacher: The chair is big.
Child: The chair is old.
Teacher: The chair is rocking.
Child: The old lady is rocking.

The advantage of the replacement strategy is that each child can be helped to practice on constructions that pose particular problems for him. Replacement encourages syntactic and semantic flexibility, which is of benefit to any child with language performance problems. Replacement is a common strategy of young children who are learning to engage adults in conversations (Bloom, Rocissano, and Hood, 1976). The child under this condition will replace an expanded element or another construction for an aspect of the adult's utterance.

The alternative replacement strategy involves the principle that exemplars of one form class or construction are available for alternative replacement with exemplars from another form class or construction. For instance the teacher could ask for *I, he, we, they read.*, to which the child replies *He reads, I read, we read, they read.* In some instances the exemplars were anachronisms, which will provide the student with an opportunity to decide about the semantic accuracy of syntactic patterns.

The final technique is termed "revision," which consists of presenting sentences that must be combined into new units. For instance the teacher might say *Put these sentences together: I have some oranges., I have some apples., I have some bananas.* The child might respond with *I have some oranges, apples, and bananas.* The reverse of this option would be to ask the child to derive the underlying propositions when given instances of complex sentences.

McCarr (1972) details application of Muma's 10 techniques to the teaching of complex language forms to high school age hearing-impaired students. In teaching relative clauses it was suggested that children be presented with two sentences. The teacher demonstrates how the insert sentence is changed by modifying the concurrent noun phrase with a wh-word and shifting it to the beginning of the clause before inserting it into the main sentence following the noun phrase it modifies. This would be an example of the revision technique. Explanations for teaching hearing-impaired children yes-no questions, do-support, wh-question forms, relative clauses, participle phrases, indirect discourse, and passive are provided. Plainly, the emphasis is on the manipulation of surface structure forms, not semantic or conversational understanding.

The implication of techniques such as those suggested by Muma (1974) is that the primary language of all deaf children is some form of standard English. This assumption has been repeatedly challenged, particularly for children with ASL environments. Goldberg and Bordman (1975) have suggested that English-as-a-second language (ESL) techniques might be used in language improvement programs for manually oriented hearing-impaired children. In regular ESL classrooms students who cannot yet express themselves adequately in English do not attempt to study grammar, learn rules for effective writing, or gain knowledge of subject matter in English. Instead they spend time comprehending and producing language in the context of reliable models provided by the teacher. Adults learning a second language in a total immersion program proceed through many of the same developmental patterns shown by normally hearing children who are acquiring a first language (Larsen-Freeman, 1976). Contextual cuing is a crucial variable in second language learning just as in first language learning. Interference between languages in the syntactic area is known to be less than interference in the semantic/communicative aspects. If this is so, then it would seem reasonable to suspect that the ESL method would be most effective with those hearing-impaired children familiar with standard English forms, a prerequisite not often met with many deaf children enrolled in formal school programs.

Developmentally Based Language Instruction Programs Programs for children with language development difficulties can also be based on principles derived from descriptions of child language. Leonard (1975a,b,c) exemplifies such an approach. He argues, for example, that if children normally acquire information about semantic aspects of language first, then this must represent some important perception about language that should be considered in planning language remediation programs. These authors would argue that if this is true for normally developing children, it should also be true for hearing-impaired children, whose language learning capacities at preschool ages have been found to be normalized if appropriate educational experiences are provided (Collins-Ahlgren, 1974, 1975; Hess, 1972).

A comprehensive effort to incorporate semantic considerations into language development programming for children with limited linguistic performance was reported by MacDonald and Blott (1974). Their approach, identified as the Environmental Language Intervention Strategy (ELIS), places the semantic findings of Bloom (1970), Schlesinger (1971), and Brown (1973) in a therapeutic framework by selecting as the content for diagnosis and training those eight rules underlying the early semantic functions of two-word utterances. Rule knowledge is evaluated and described in terms of all the linguistic and nonlinguistic cues available as context for children's utterances. The ELIS also samples a child's language abilities in imitation, conversation, and play from the beginning of training experiences to aid in generalization of newly learned language to spontaneous situations.

In subsequent articles, MacDonald and his associates (MacDonald, 1976; MacDonald et al., 1974) presented additional ideas about the role of parents in diagnosing and implementing many of the training procedures with their own children. The home is viewed as providing maximum context for mastery of language, a concept that has found considerable support in education of the hearing-impaired by such educators as Horton (1974), Northcutt (1977), and Simmons-Martin (1976).

Miller and Yoder (1972; 1974) outlined language development programs that emphasize the development of 13 semantic categories at the single-word level. The categories derived from research on normally developing children include: recurrence, non-existence, disappearance, rejection, cessation, existence, comments, greetings, vocatives, agent, object, action, and possession. As can be recalled from Chapter 3, these constitute the relational and substantive functions that have been identified at the single-word stage. With these categories, the child can be aided in developing two-word combinations, primarily; functional relations (existence, recurrence, non-existence, rejection, and denial); and grammatical relations (agent-action, action-object, agent-object, possessive, locative, attributive, experiencer-stative, dative, commitatives, and instrumentals). The three-word combinations and expansions as described by Brown (1973) in Chapter 3 serve as the focus for the next stage of the program.

In use of these categories with severely developmentally disabled children, Miller and Yoder suggest the following principles:

1. Semantic concepts should be ordered for teaching on the basis of frequency of occurrence of those concepts and expression by normal children, and selection of the utterance form for expression should be determined by the sequence of forms acquired by normal children as well.
2. A single frequently occurring experience demonstrating a particular semantic function should be selected and paired with appropriate lexical items. After the child demonstrates mastery of the item one might move to multiple experiences expressing the same function. For instance, one can demonstrate disappearance by removal of objects from a table. Once the child has mastered this concept, other instances of disappearance could be used.
3. Once a child begins to produce single words consistently, these first expressions should be tied to relational functions about which the child has already demonstrated knowledge.

Miller and Yoder stress that this technique should be employed only with low functioning (severely retarded) children. However, it could also be considered for use with multihandicapped hearing-impaired children who are of elementary or junior high school age, but have not been in a formal educational program, or have had limited success in more traditionally oriented programs.

Lee, Koenigsknecht, and Mulhern (1975) presented a technique based on the DSS scoring procedure that they called Interactive Language Development Teaching. This procedure should be used primarily with children having a sufficient amount of language that it could be analyzed using the DSS procedure, such as those hearing-impaired children being considered for mainstreaming. The system involves writing stories that contain a target language principle. Each story concludes with a probe to initiate appropriate responses from each child. The techniques that can be used as probes are completion, reduction, expansion, repetition, repetition of error, self-correction, or rephrased questions.

Each of the programs outlined above are developmentally based, but have only been employed with normally hearing children. Most seem to hold some promise for use with some hearing-impaired children, but further research as to their range of usefulness is required.

Alternative Expression Systems

The discussion to this point has assumed employment of traditional communication modes with normally hearing or hearing-impaired children: spoken language and manual communication. For some hearing-impaired children even these traditional systems for expression are unrealistic, as for example children who lack all but minimum motor control.

Vicker (1974) suggested communication board formats that could be used effectively with developmental psycholinguistic information as the basis for organization. Such a communication mode coupled with appropriate suggestions on communication/language development might be beneficial for hearing- and motorically-impaired children.

Vanderheiden et al. (1975) suggested that even written symbols may be inappropriate with communication boards. They outlined the use of another symbolic system less dependent upon phonemic constraints · the Bliss symbol system. The Bliss symbols represent basic vocabulary, with sentences constructed by arranging these symbols appropriately.

Premack and Premack (1974) suggested that instead of conventional symbol personal communication systems, other nonverbal symbols could be used to convey the basic operations underlying language use. Use of such symbols have been reported by Carrier (1976), Hughes (1974), and McLean and McLean (1974) with reasonable success for nonverbal, autistic, and severely retarded children. Application of these procedures with hearing-impaired, severely behaviorally disturbed children might also be considered. Such procedures do not lend themselves to presentation from a developmental or sociolinguistic point of view, but given the lack of communication abilities of most of the children with whom these systems are used, such a violation of instructional principles is clearly permissible.

It is important not to think exclusively in terms of conventional communication systems when working with severely multihandicapped hearing-impaired children. Teachers should be flexible in their consideration of modes for performance in order to establish communication with every hearing-impaired child who is capable of meaningful interaction.

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Sign Programs with Nonverbal Hearing Children

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Abstract: Recent work has focused on the use of signs as an alternative communicative mode for severely language delayed children. The decision to implement signs should depend on the child's developmental, cognitive, and communicative abilities as well as the support and skill level of the classroom and family. Assessment and programming which incorporate normal language constructs and strategies will more favorably influence a productive, communicative sign language system. Included is a framework for determining if the child is an appropriate candidate for sign programs; a discussion of specific sign objectives; and guidelines for classroom implementation and family intervention.

■ The use of signing programs has been a recent focus in educational strategies for handicapped children (Bricker, 1972; Grimmel, Detamore, & Lippke, 1976; Lebeis & Lebeis, 1975; Stremmel-Campbell, Cantrell, & Halle, 1977). These studies have demonstrated the feasibility of shaping manual communicative behaviors with nonverbal children. A signing approach has also proven effective as a facilitator for speech production, particularly with the autistic and the developmentally apraxic populations (Bonvillian & Nelson, 1976; Creedon, 1973; Mayberry, 1976; Schaeffer, Kollinzas, Musil, & McDowell, 1977). However, as seen in special education classrooms and in clinical settings, signing may be becoming a panacea for nonverbal children. The decision to implement a signing program is complex and may too often be based on superficial data. Factors insufficiently considered are: the impact on the child, the family, and the classroom; a systematic process to determine individual objectives; and the necessary support staff to make the sign program productive. To address these concerns, we present a framework for selecting appropriate candidates for signs and describe guidelines for planning long-term objectives as well as strategies for sign teaching, for classroom implementation, and for family intervention.

DECISION-MAKING PROCESS

The child for whom signing is considered often becomes a focus of concern because his or her verbal language acquisition is delayed far beyond the age at which most children begin speaking. It is usually the teacher or a communication disorders specialist (CDS) who first proposes a sign program with a nonverbal hearing child. Too often a "let's try it and see what happens" attitude prevails with no apparent system used to determine if the decision is right for that child. Sequential steps must be followed to determine strong candidates for sign acquisition and the critical factors that will influence the statement of objectives and classroom/family implementation.

As seen in Table 1, the decision to teach sign language to a child does not depend on any single factor. The decision needs to be supported by data unique to that child's needs. The

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assessment process must consider the child's developmental status, the response from the different people involved, and the skill level of the training staff. The more criteria applicable to the child, the greater the probability that signing is an appropriate choice as an alternative communicative system.

Prerequisite Behaviors

Of the possible factors to consider, the child's functional level, rather than chronological age, is an overriding issue. Signing, like any other language, is a representational system using symbols to represent an object or event. It needs syntactical or structural rules to convey consistent meaning and the use of intonation, facial expression, and hand and body movements to express meaning and intent. Chapman and Miller (1977) stress that the prerequisite behaviors for a child learning a sign language system are comparable to those needed in normal children's verbal language acquisition. Thus, the same developmental skills seen in normal 18- to 24-month-olds in early language stages would also be prerequisites for signing acquisition. Observations of an appropriate candidate for sign programs indicate that the child is at least in Piaget's Stage VI of sensori-motor development (Uzgiris & Hunt, 1975) and demonstrates the following:

- *Play:* Child's object manipulation indicates knowledge of functions, interrelationships, person associations, and early classifications based on common properties.
- *Means-End:* Child uses a variety of means (vocalization, direct manipulation, use of adults, use of instruments) to achieve a certain end.
- *Object-permanence:* Child systematically searches for objects out of sight, knows usual locations, asks for absent persons, knows salient aspects of object form and function.
- *Imitation:* Child can directly imitate an event (sign) and can recall and reproduce it at a later time in a consistent and recognizable form.
- *Intentional Communication:* Child uses a variety of direct means to communicate intent, including protests; requests for actions or objects; comments while showing or giving objects; labeling, pointing, or asking; early turn-taking with answering, social games, and topic maintenance.
- *Comprehension Strategies:* Child responds to meaning of spoken words and word relationships, responds to intonation and intent of speaker, can focus on adult reference, and can pay attention to events with another person.

Why are these behaviors so crucial to signing? Through them, children demonstrate beginning representational thought; that is, internal representation of an event without having to directly act upon it. Signs, then, can be used to represent the event itself. Signs are but a means to code what the child already knows about the world and wants to communicate to another person. Without the above listed prerequisites, there is no basis for content or function of the signs. A child can be shaped into producing a sign such as "giraffe" ("C" on side of neck, raise up indicating long neck). However, unless the child "knows" or wants to comment about a giraffe, the sign will not be productive.

Focus of Intervention for Low-Functioning Children

For low-functioning children, the focus needs to be on developing these prerequisite behaviors rather than on imitative use of signs. The signing input needs to be as rich and natural as that of a normal 2-year-old's verbal environment. The intervention plan should deemphasize the expressive component per se and be multifaceted in terms of normal language acquisition. An example is the case of Tommy, a 6-year-old, autistic, mentally retarded boy whose general functional level is at Piaget's Stage V (12–18 months). Instructional objectives are as follows:

1. Comprehension Strategies
    (a) Increase focus on speaker's body through sign (signs presented between his body and the object on which he is focused). Progressive shaping of sign towards speaker's body with exaggerated facial and body cues.
    (b) Increase lexical comprehension through sign (signing paired with all of Tommy's actions throughout a structured daily routine: "leg in," "pant up," "Tommy drink," "on swing").
2. Developing Pragmatic Repertoire
    (a) Increase early performatives by shaping pointing, showing, giving, requesting, with facial expressions and gestures.
    (b) Increase affective responses through social games.
3. Developing Content Basis
    (a) Increase knowledge of objects by direct modeling, imitation, and sorting tasks.
    (b) Direct Tommy into a variety of novel experiences daily.
4. Expressive Lexicon
    Increase single word signs through shaping procedures (with lexicon directly matching

Tommy's desired objects, preferred actions, predominant feelings expressed).

With low-functioning children, evaluation must also determine if signs or any nonverbal system are actually needed. As outlined in Chapman and Miller (1977), there is a strong probability that the child will progress through the same sequence as other children acquiring verbal language if (a) the child's cognitive, comprehension, and communicative abilities are developmentally consistent with speech production and expressive skills and/or (b) the child is already producing single words or above. For any child delayed in verbal language development, the first choice should be intensive verbal language intervention for at least 6 months before signs are considered.

Focus of Intervention for Higher-Functioning Children

The communicative needs of the preoperational (above 2½-year functional level) child are quite different than those of the sensorimotor level nonverbal child. The preoperational child mentally processes considerable information about his or her world and has probably acquired basic information about the spoken language in the natural environment. This is a hearing but nonverbal child with knowledge of syntactical and grammatical components of the (English) language. Quite often the preoperational child has an extensive pragmatic repertoire and tries every means to communicate needs and perceptions. Some basic questions to consider include the following:

1. As this child develops sign language, will the same etiology preventing verbal acquisition interfere in motor and linguistic structures of sign? For example, will the child be as apraxic in hand movements as in oral production? Will the same recall problems occur in sign as in language? Will sign syntax be any easier than verbal syntax?
2. Can the child develop sign language at a rate fast enough to match cognitive, comprehension, and communicative skills? Who is available to provide a total communication (paired sign/speech) environment? Even more crucial, who in this child's world will understand and communicate through sign?

For the preoperational child, signs are a viable alternative to speech only if intensive traditional speech therapy has been ineffective. In addition, one must consider whether the range and rate of other nonverbal systems such as electronic procedures more appropriately match the environmental and developmental concerns (Harris-Vanderheiden & Vanderheiden, 1977).

Long-range Planning

Another issue in decision-making concerns long-term objectives. Although the child may be a good candidate for signs (Table 1), the staff needs to clearly state what they hope to achieve in the long run through signs, and a plan for achieving these objectives. Too often the lack of clear expectations and plans results in haphazard, highly restrictive use of signs in the classroom and home.

The long-term sign objectives may include the following:

1. The child will use single or combined signs to express basic needs and perceptions.
2. The child will focus on, respond to, and comprehend paired speech/signed input to include designated lexicon, directions, questions, and descriptions.
3. The child will respond to signed cues to facilitate word recall.
4. The child will develop syntactical rules through signs and express diverse ideas through signed sentences.
5. Signs will be used as an interim process to facilitate verbal comprehension and/or production.

The objectives must accommodate the child's and the adults' abilities. More restricted staff and family signing skills and sensitivity to normal communication development would suggest more limited expectations. For example, will the classroom staff have the fluency to present signed cues whenever word retrieval problems occur? Can concurrent speech therapy programs be provided?

Team Input

A final issue in decision making concerns the people involved. All too often the decision to use signs is made by a single professional in a classroom or clinic. This results in unfortunate situations: parents may be confused or uninvolved; teachers may be assigned a child for whom signs are recommended without consideration of their abilities or interest; other children in the class may not be considered; or the communication disorder specialist may be unsure of his or her role. One must ask: Is there support for a sign program from all concerned? Once the idea of signs is initiated, a "team" decision should be made by all persons who will be directly affected by it: the classroom staff, the therapists, the family, the school administrator, and other primary persons who interact with the child. Basic issues need to be examined, such as the actual skill level of different team members, the training options for nonsigners, the feasibility of achieving the stated signing objectives for the child, the classrooms available, the available time for learning the language of signs and teaching signs to others. If there will not be team interaction to train, support, and teach signs to the child and each other, the program is in jeopardy.

DESIGNING A TEACHING PROGRAM

Who Does What?

A master plan for implementing signs in the classroom and at home needs to be as carefully and systematically developed by the team as was the initial decision. The master plan for implementation provides a general framework—who will be involved and how the signing will work. Clinical observation suggests that it is most effective to assign primary responsibility for implementation to the teacher and the family. However, the structure of the program might best be planned by the CDS, whose role is varied but leans more towards consulting with the teacher and/or parents rather than actually teaching signs to the child. The CDS might first gather data from formal language assessments, classroom observation, and family reports on the child's predominant communication patterns. Data would describe the child's cognitive and comprehension abilities, communicative functions expressed, phonetic patterns, hand motor skills, response to previous speech intervention, social interaction, and play and attending behaviors.

From these data one can design sign programs unique to the child. Observations of several children illustrate the point:

TABLE 1
Possible Candidates for Signing

Needs Assessment	*Strong Candidate*	*Questionable Candidate*
Cognitive Level	Early Preoperational (Above 2½ years)	Late sensori-motor (s/m) Stage VI (18–24 months) (Poor) Below s/m Stage VI (Below 18-month level)
Chronological Age	Generally above 2½ years Decision not dependent on C.A.	(same)
Verbal Comprehension	At least 1 year above production	Less than 6-month discrepancy with expressive skills (Poor) Limited meaning associated with words
Intentional Communication	Varied, consistent means to express intent, needs, perceptions	Highly restricted gestural, vocal performatives (share/request/comment/inform/ask/protest)
Manual Dexterity	Independent, controlled finger, hand, arm movements	Labored, inconsistent, imprecise movements
Imitation/Retention of Signs	Attends well to model, self-corrects, consistent production, deferred imitation	Needs numerous presentations/prompts. Cannot produce after time delay
Interest in Signing	Seeks out new signs/prefers sign versus other mode	Does not focus on signer/resistive to sign training/learning rate better in alternative system
Speech Production	Unintelligible or highly restricted phonetic repertoire	Articulation patterns consistent with developmental level
Speech Intervention	Minimal vocal/verbal changes after 6 months therapy	Steady increase in vocal/verbal behaviors with therapy
Family Support/Training	Family wants sign program family training available on weekly basis	Signs restricted to classroom/no family training commitment
Staff Knowledge of Language Development	Information recent in structural/content/pragmatic (functional) areas	Limited understanding of signing as a language system
Staff Support/Training	Staff committed to sign program/provides for regular training sessions	Responsibility for sign program assumed by single staff person
Staff Signing Ability	Fluency can meet child's signing objectives	Limited knowledge of sign systems or sign production

Micah, 5½ years, severe apraxic. He tries to ask many questions and share perceptions with others. His sign program needs to include diverse sign vocabulary, teach syntactical rules including interrogatives, and include family intervention so that Micah is understood.

Zachary, 4½ years, verbal processing deficit. He has difficulty understanding verbal input without cueing and has word recall problems. His sign program needs to stress bimodal comprehension skills. Teachers and family need training in cueing with signs on recall problems.

Jim, 3 years, expressive language delay. Jim has begun to approximate single words, imitates signs in rote manner, and uses three food-related signs. His sign vocabulary needs to match his communicative attempts. Concurrent speech intervention with regular monitoring by CDS to determine need for signs is needed.

Information Needed

The sign program for each child should also be based on the following information:

1. *The signing fluency of the teachers, CDS and parents.* Diversity of sign input, natural intonation in sign dialogue, and use of grammatical markers can be expected in the child's program only when the adults involved manage to acquire these skills.
2. *The child's rate of learning.* If the child has no more interest in signs than in verbal input, needs many models and prompts per sign, and is not using the sign except in a stimulus/response pattern, the objectives in program planning need to be limited. By comparison, the child who rapidly learns new signs and spontaneously combines signs needs teachers and family who will invest time in developing their own fluency. Programs for rapid learners need to include varied educational materials related to sign (such as children's sign dictionaries) and planned interaction with children who sign.
3. *The child's motor skills.* One major consideration in vocabulary selection is the motor complexity of the sign or sequence of signs. For each sign, the following motor components need to be considered: (a) placement in relationship to body (e.g., "see/watch/look," hand placed near eye; "happy/afraid/love," hand placed near chest); (b) relation of hands to each other; (e.g., two hands together, "with/shoe"; one hand on other hand, "wash/in"); (c) type of movement, (e.g., circular (wash), arc (us), flicking (bubbles), wiggle (fire), twisting (apple)); (d) direction (e.g., out from body (go), towards body (want), alternate directions (people)); (e) hand configurations (e.g., different fingers (play), finger/thumb opposition (pick), open hand (mother), closed hand (yes)).
4. *The child's representational level.* For the child functioning below the 18-month level, the signs chosen must be "iconic" or closely representing the object itself. Strammel-Campbell et al. (1975) even recommend placing the iconic object (such as a ball) in the child's hands, removing the object and keeping the hand shape the same. For the child above the Stage VI level, the relationship needs to be clear but the child might be able to associate a previously seen object with the hand movement, such as "fish" (flutter right hand as it moves forward to resemble fish swimming). By comparison, the child in the early preoperational stage (above 2½) can probably learn and retain the signs without or perhaps with only one association with the actual reference. The child at this level can associate the verbal meaning with the sign; thus the rate of learning will increase markedly.
5. *The syntactical information needed.* As with verbal children, one might want to plan signing input within the realm of the child's verbal comprehension skills. For children functioning below 2½, signs should be presented in two-to-four-term semantically related utterances such as "fat pig got dirty," or "boys in the box." At this level, signs should be repetitive, associated in multiple ways (pig is fat, really big, fat tummy). The low-level child needs to learn to focus on the speaker's hands and then back to the reference. An imitative response is not necessary. For the child functioning above the 3-year level, more emphasis should be placed on syntactical and grammatical relationships; it is crucial to stay within one sign system. For hearing children, it might be less confusing to consider an English syntax system such as Signing Exact English (Gustason, Pfetzing, & Zawolkow, 1975).
6. *The normal acquisition of sign language.* How children acquire sign language has become a focus of interest (Newport & Ashbrook, 1977; Prinz & Prinz, 1979). From limited descriptions available, basic patterns are emerging. Children seem to acquire signs in the same way they acquire verbal language. The semantic notions in early signs, the two and three term relationships, and early grammatical markers are similar to those of speaking children. The simplification process in motor production is similar to early phonological simplification. It would appear that sign

programs based on English syntax can thus be structured in terms of normal language acquisition. Differences occur primarily in acquisition of Ameslan (ASL), which places considerable focus on facial and body movements to express meaning and uses different syntactic rules (Fant, 1972).

7. *Signs to augment or substitute for speech.* Unless the child has a major structural or functional problem with the peripheral speech structures, one has to consider signs as a possible means to facilitate speech. Studies (Prinz & Prinz, 1979; Schaeffer et al., 1977) indicate that children may either develop separate lexical items in spoken language and sign or concentrate entirely on sign initially with speech occurring in later stages. However, from our personal clinical experience, supported by Schaeffer, shaping sign production should be considered concurrently with direct speech production training and probes to determine possible verbal word approximations. We recommend that adults (a) avoid pressuring the child to verbally approximate the spoken word while the child is signing until the child starts to produce simultaneous sign/speech spontaneously, (b) always pair signing input with speech to provide a continuous spoken model, and (c) once the child is producing speech, probe to see if he or she can consistently produce certain words.

8. *Selection of vocabulary.* Apart from considerations of motor complexity, the vocabulary needs to be unique to the child's predominant activities, communicative needs, daily routine, and family needs. In many classrooms, restrictions are placed on content taught to the child. However, teachers need to match the signs to the child's behaviors and intentions. One should try to avoid trying to predetermine which signs the child should learn; let the child attach meaning and use the vocabulary he or she selects. For example, a teacher might repeatedly "teach" a child the signs for *cracker*, *pour*, and *juice*. On the other hand if the input were varied to include, "These crackers are good. I'm hungry. There's no more juice," the child could select vocabulary and respond naturally. Sign vocabulary selection must be based on a broad spectrum of ideas including locations, labels, actions, feelings, descriptors, concepts, comparisons, and associations to allow the child to develop the richness of ideas heard in verbal language.

9. *Language: Staff perspective.* Language research has recently focused on the integrative aspect of language acquisition (Bloom & Lahey, 1978), including three components: the structural form (syntactical rules, grammatical forms and inflections, sound units, use of intonation and stress); the content (related to cognitive perceptions, ability to represent ideas, information acquired); and the function (a means to express intentions, obtain needs, maintain social interaction, and acquire new information). Concentrating primarily on form—for example, frequent imitations, increasing length of word combinations, teaching word endings—will result in a nonproductive language system. The classroom staff need to agree on their philosophy of language: what it is and how children acquire it. The CDS might assist the parents and educational team in planning a broad-based program to insure a rich, varied, and naturalistic sign language environment. Consider these elements: Will the child be able, with signs, to describe events? Ask questions? Maintain dialogue? Understand another signer? Elaborate on topics?

10. *Programming for signing.* In keeping with the three language components discussed above, Table 2 provides an outline for the sign program's structure. All three sections can be addressed concurrently: highly structured teaching tasks; teacher structured activities; and natural interactions with sign throughout the day. Specific short-term objectives can be discussed during staff/parent planning sessions. For example:

    Acquisition: John will demonstrate self-monitoring of sign production by looking at speaker's sign, looking at his own hands, comparing and modifying his form in at least 60% of new signs presented for 10 consecutive sessions.

    Transfer: Compared to 3% baseline data, John will use recognizable approximation of signs in at least 40% of initiations directed towards peers.

    Generalization: In an activity outside the classroom, John will maintain a naturalistic interaction through sign utilizing at least 10 recognizable signs.

11. *Who should learn signs?* The staff needs to know who makes up the child's total communicative environment at home and at school. The child may communicate more with the lunchroom aide or bus driver than with his or her grandmother. The bus driver might need to understand the child's signs

while the grandmother might need to understand *why* signs will help her grandchild. The impact of signing is as extensive as the child's world. The planning team should broadly define classroom staff and family to include, for example, day care staff, favorite playmates, cousins, other teachers with whom the child interacts, and parents of other children in the class who will be incorporated into the child's sign program. It helps if someone acts as the primary coordinator to monitor and facilitate the combined efforts and needs of everyone involved. The coordinator could also arrange regular meetings to discuss the child's sign program and to teach signs to others.

STAFF AND PARENT TRAINING

Where is everyone in the decision process? Have the principal people helped to make the decision or were they only informed about it? The first task is to see whether there is agreement that Johnny should develop signs as a communicative system. Three strategies might influence this group agreement: (a) developing a strong rationale—the team coordinator needs to know and be able to discuss the expected benefits and objectives of sign acquisition. The classroom staff and parents need to feel comfortable in their ability to explain the sign decision to confused relatives, friends, other children's parents, and the inquisitive public; (b) providing observational opportunities to see other hearing children signing and to see other

TABLE 2
Programming for Signs

General Focus/ Degree of Structure	*Classroom/Home Setting(s)*	*Goals*
Acquisition Formal: Highly Structured	1:1 Sign instruction Snack Story	To learn how to form signs. To gain confidence in forming signs. To increase manual dexterity. To acquire mnemonic devices, i.e., initialization and associations.[a] To begin to form combinations of signs. To learn new signs. To learn to read signs, i.e., to understand other's signs. To establish a core of signs and to increase variety. To begin communicative use of signs.[b] To begin to self-correct production with and without prompts.
Transfer & Maintenance Semi-Formal: Semi-Structured	Snack/Meals Story Music Child-directed play Walks Dressing Bathing Academic instruction	To increase communicative use of signs. To gain confidence in using signs to communicate in familiar settings/situations. To practice for fluency (retrieval & formation). To self-correct production. To self-correct use of signs, i.e., to use the appropriate sign. To increase the use of sign combinations. To begin using signs as a language system.
Generalization Informal: Natural	Snack/Meals Story Music Child-directed play Riding in the car Trips to the zoo, beach, grocery store, shopping, movies Walks Gross Motor Skills/Games Outdoor Play Dressing Bathing	To spontaneously use signs to communicate. To demonstrate confidence in using signs to communicate in a variety of settings/situations, with a variety of people. To help other children/adults understand and learn signs.[b] To teach children and other adult signs and how to read signs.

[a] Adult goal.
[b] Child goal.

staff incorporating signs into a classroom; and (c) outlining a general plan—the coordinator needs to decide with the staff how much time will be involved, how the classroom will change, how staff will be trained, and what resources are available to parents.

Affective Concerns

Even if everyone agrees to support the signing programs and understands its scope, there may be unresolved feelings that need to be discussed.

Feeling awkward, self-conscious. Signing is out in the open; mistakes are visible and obvious. The people involved will need some outlet, perhaps a group meeting, to discuss how difficult it is to learn signs initially, how self-conscious one becomes in public or when someone is watching, and how difficult it is to use and explain signs for a hearing child.

Family reaction. In reality, can parents feel comfortable using signs in their home? How will the siblings react? How does one respond to grandparents who imply that the child "looks different," or "won't ever learn to talk"? Can more family members come into the clinic or school or participate in home visit discussions?

Anxiety about the child's response. Staff or parent meetings should be arranged for discussions of problems that might arise. For instance, what if the child focuses most of his or her energy on signs and loses some speech skill? What if the expected rate of sign acquisition is not met? Suppose the child is not interested in watching the signer's hands? What if there is more time involved than everyone anticipated? In regular meetings, staff and family can acknowledge these concerns and make program modifications.

Acquisition

Someone may be available to teach everyone all they need to know. However, it is more likely the staff will have to teach each other. There are various ways of going about this. For example, in brief daily planning sessions, the group can review activities for the day, consider how signs will be incorporated, review the child's changing sign ability and needs, discuss ways to involve the other children, and teach each other new sign vocabulary.

The group should choose one sign system by investigating the predominant sign system in the child's school district (Bornstein, 1975), and one sign dictionary for family and staff to use (e.g., Bornstein, Hamilton, Saulnier, & Roy, 1975; Fant, 1972; Gustason et al., 1975; Washington State School for the Deaf, 1972). Taking signs from several resources results in confusion for all involved. The staff should learn signs which are most crucial for the child's and family's needs, and for the classroom environment. They should practice supplemental skills such as reading each other's signs, producing fluent sentences in sign, having fun with conversations in sign, and learning initialization using the manual alphabet to cue into sign (for example, "big" = two b's separating, "little" = two l's meeting). They can use verbal associations to teach each other; e.g., "cat" is "like whiskers on a cat." Practice drills help; for example, the alphabet, lists of vocabulary, finger movements, and practicing units of information. It also helps if one person coordinates the signing group, with each group member (including family, school staff, etc.) responsible for some teaching.

Interactions

Involved individuals must agree about what they want the child to do when they sign. Too often the child is expected just to imitate. This is unnatural, breaks down a communicative response, and sets up a stimulus/response interaction. Are some adults expecting the child to attempt speech while signing? As noted previously, this might conflict with the child's abilities. In interactions with the child, there will be varying degrees of fluency. If someone does not have the specific sign vocabulary he or she should sign as much as possible and say the rest, trying to be natural in rate and intonation. If the child does not focus on signs, there should be agreement on strategies to increase visual attending. The same teaching strategies should be used by all individuals in the child's program.

A parent who uses signs with a hearing-impaired baby has many months to adjust to this form of communication. The baby considers the parents' communication quite a natural mode. However, this does not apply to the hearing, nonverbal preschooler or school-age child. Both child and parent need to tolerate and adjust to this "foreign language." Parents are asked to think about what they are saying, how they are saying it, how to teach their child and, in addition, to use signs. The child is suddenly expected to accept parents as teachers and as signers. Regular sessions to observe and support both parent and child as they interact through sign will not only generalize the signs but stimulate effective responses.

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PLANNING AN INITIAL EXPRESSIVE SIGN LEXICON FOR PERSONS WITH SEVERE COMMUNICATION IMPAIRMENT[1]

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Selecting an initial sign lexicon for an individual requires far more than simply making a list of useful words or translating a spoken lexicon into signs through use of a sign dictionary. It requires knowledge of child language acquisition, knowledge of manual signs and linguistic constraints on their use, and knowledge of the needs and desires of the individual for whom the lexicon is intended. Suggestions of writers such as Holland (1975) and Lahey and Bloom (1977) are studied in terms of their appropriateness for visual-manual communication and are applied to approximately 50 signs most frequently taught to retarded and autistic persons (Fristoe and Lloyd, 1979a) to aid in lexicon planning. Additional signs are proposed for extending this basic list. The resulting sample lexicon is evaluated against the suggestions of Holland and of Lahey and Bloom. Rationales given for determining these selections, deletions, and additions can be applied to modify this initial lexicon to make it better suited for a specific individual.

As the use of manual signs grows as an alternative to spoken communication and/or as a means for facilitating development of spoken communication (Fristoe and Lloyd, 1979b), one question that naturally arises concerns the nature of the initial sign lexicon to be taught. While some attention has been given to the selection of the first sign to be taught to severely mentally retarded and autistic children (Fristoe and Lloyd, 1977b, 1979; Fristoe, Lloyd, and Wilbur, 1977; Kiernan, Jordan, and Saunders, 1978; Lake, 1976; Smith, 1975), relatively little has been written about the selection of other signs for what would be comparable to the single word stage in children developing a spoken form of communication. Other than saying that a concept should be present before a sign is taught (Fristoe et al, 1977; Richardson, 1975; Robbins, 1976), or that initial signs should be functional (Donnellan-Walsh, Gossage, LaVigna, Schuler, and Traphagen, 1976; Fristoe and Lloyd, 1977b, 1979; Fristoe et al, 1977; Kopchick and Lloyd, 1976; Schaeffer, 1977; Schaeffer, Kollinzas, Musil, and McDowell, 1977), or easy to make (Donnellan-Walsh et al, 1976) most writers have provided only limited rationale on which to base selection of other signs to be taught as part of a first lexicon. Many writers simply present a list of signs without explaining how specific choices were made. Exceptions to this are studies that emphasize the physical aspects of manual signs (Fouts, 1975; Fouts, Couch, and O'Neil, 1979), and the grouping of signs on the basis of meaning (Stremel-Campbell, Cantrell, and Halle, 1977; Konstantareas, Oxman, and Webster, 1978), and selections that consider reports of spoken language acquisition in similar populations (Cornforth, Johnston, and Walker, 1974).

PRELIMINARY CONCERNS

How does one go about planning a first sign lexicon? What should be its size? Its content? We looked at the vocabularies presented in 20 manuals designed for use with retarded and autistic persons who are learning to communicate through the use of manual signs. All the vocabulary items in these 20 manuals were listed, and a frequency count was made of the more than 850 vocabulary items that appeared on two or more lists (Fristoe and Lloyd, in press). Our initial goal was to perform analyses of the most frequently occurring items with regard to some of the characteristics mentioned in an earlier paper (Fristoe and Lloyd, 1977b). Some of these characteristics are (1) the use of signs made with one versus two hands; (2) the touching of two hands together or one or both hands to the body; (3) the categorization of signs; and (4) the iconicity—transparency (guessibility) or translucency—of signs.

Work on this project was in progress when an article by Lahey and Bloom (1977) was published, stimulating us to write the present article. Lahey and Bloom wrote in response to an earlier article by Holland (1975), which gave a sample core lexicon as part of presenting suggestions for teaching *spoken* child language. The considerations that Holland listed were (1) using child language as a model; (2) emphasizing what is important to the child; (3) placing stress on communication rather than simply on language skills; and (4) focusing on objects that are present and events that are happening.

Lahey and Bloom reflected further on what should go into a spoken first lexicon and added three additional considerations: (1) the relative ease with which a concept can be demonstrated in context (relation to referent and ease of nonlinguistic demonstration); (2) the eventual usefulness to the child of particular words—their potential for combination to convey meaning (interaction of form and content); and (3) the organization of lexical items according to the ideas they encode (content categories). They were particularly mindful of providing language-impaired children with a basis for eventually developing syntactic two-word utterances, as found in normal language development.

Lahey and Bloom analyzed children's expressive language according to form and content. With regard to form, they indicated that words used by young children can be divided into two categories: substantive words and relational words. Substantive words are used to refer to particular objects or

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[1] An expansion of a paper presented at the Eleventh Annual Gatlinburg Conference on Research in Mental Retardation, Gatlinburg, Tennessee, March 8, 1978.

categories. (Here it is important to use those objects or categories most frequently encountered by the child.) Relational words are less specific and refer to relations between objects. For example, *no* is a relational word that can cover several types of negation: nonexistence or disappearance, refusal, and denial. They further divided relational words into two groups: those that can be used with many objects and those that are not object specific. (Actually there is a third category implied—words that can be used with only a very limited number of objects. For example, the verb *bat* can be used with a very limited number of objects, mainly balls.) They indicated that words such as *give, get, make,* and *fall* are more generally useful in a vocabulary than verbs such as *eat* and *throw,* because they can be used with more different objects. *Eat* and *throw,* however, are more generally useful than *drink* and *tear.* Adjectives or modifiers such as *big* and *dirty* are more useful than more specific ones such as *orange* or *round.* As a general rule those that are least specific have the most potential for communication in a variety of different situations.

CONSIDERATION OF EXISTING VOCABULARIES

Using these guidelines, which refer to normal child language development of the spoken type, we have examined the results of the vocabulary study and developed a suggested initial expressive *sign* lexicon that meets these requirements for use with persons with essentially normal hearing who have not been able to learn spoken communication. We reasoned that signs were chosen for use in the 20 vocabularies because they represented ideas or symbols that were useful, or easy to teach, or both. We chose a lexicon of approximately 50 signs as our target. A sign lexicon of this size was chosen because a speaking child usually has approximately this many words in his or her expressive vocabulary when beginning to use two-word phrases (Nelson, 1973), a significant leap in linguistic development. Also, we have observed clinically the spontaneous production of two-sign phrases when children have a sign vocabulary of approximately 50 signs.

Next, we determined how well the 50 or so signs appearing most frequently met the criteria proposed by Holland and by Lahey and Bloom. On the basis of this evaluation, we made adjustments, adding and deleting signs to arrive at a suggested initial sign lexicon for use with mentally retarded persons and others with severe communication disorders. In summary, the strategy for planning a first lexicon to be taught is, given a finite number of slots, what is the most useful content to include?

SUGGESTED MODIFICATIONS

Examination of the signs (actually the written English glosses of the signs) appearing most often in the vocabulary of 20 sign manuals (see Table 1) suggests some adjustments that can be made. Because one sign can often be used to represent several words, a number of individual words can be deleted.

TABLE 1. An initial expressive sign lexicon.

		Basic List[3]			
S	APPLE	S	DOG	R_2	ON
••S	BABY	S	DOOR	••R_2	OPEN
R_2	BAD	••R_2/S	DRINK	•S	PANTS
S	BALL	••R_2/S	EAT/FOOD	R_2	PLAY
S	BATHROOM/	S	FATHER/DADDY		(RED)
	TOILET/POTTY	S	GIRL	R_2	RUN
••S	BED/SLEEP	•R_2	GIVE	•S	SCHOOL
S	BIRD	R_2	GO	S	SHIRT
	(BLUE)	R_2	GOOD	S	SHOE(S)
S	BOOK		(GREEN)	S	SOCK
S	BOY	R_2	HAPPY	S	SPOON
S	CANDY	S	HAT	•R_2	STAND
••S	CAR	R_2	HELP	R_1	STOP
S	CAT	R_2	HOT	S	TABLE
S/R_2	CHAIR/SIT	•S	HOUSE	••R_2	WALK
	(CLEAN)	•R_2	IN	R_2	WASH
S	COAT	R_2	LOOK/WATCH	S	WATER
	(COLD)	S	MILK		(WHAT)
•S	COMB		(MONEY)		(WHO)
R_2	COME	S	MOTHER/MOMMY		(WORK)
S	COOKIE	S	name sign (I, ME, MY)		(YELLOW)
••R_2	CRY		(NO)	••S	YOU
S	CUP	R_1	NOW		
R_2	DIRTY				
		Recommended Additions			
R_2	AFRAID	R_2	DOWN	R_2	PUT
R_1	ALL-GONE/USED-UP/	R_2	FALL	R_2	SAD
	FINISHED	R_2	GET	S	T.V.
R_1	NEGATIVE	R_2	HAVE/POSSESS	R_1	THIS/THAT/
R_2	ANGRY/MAD	R_2	HEAVY		THOSE
R_2	BIG	R_2	KISS	R_2	THROW
R_2	BREAK/BROKEN	R_2	MAKE	R_2	UNDER
R_2	BRING	S	MAN	R_2	UP
R_2	DO	R_1	MORE	S	WOMAN

Slashes indicate single sign used to represent more than one word.
S — Substantive signs
R_1 — Relational signs that are not object specific
R_2 — Relational signs that relate to fewer objects than R_1 signs

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[3] Entries appearing most often in vocabularies designed for training nonspeaking retarded and autistic persons (Fristoe and Lloyd, in press). Recommended deletions are in parentheses. Signs which were found to be most iconic in the Lloyd and Fristoe (1978) transparency study, which included signs from this Basic List, are indicated by asterisks (• = 25% of subjects guessed sign meaning correctly, •• = 50% of subjects guessed sign meaning correctly).

These have been placed in parentheses. For example, the teaching of signs representing personal pronouns such as *I, me,* and *my,* as well as *mine, your, yours, he,* and *she* can be postponed until a later stage of linguistic development. In the early stages of communication development, the ideas encoded in personal pronouns can be represented first through pointing and later through use of name signs. This also will avoid problems caused by shifting pronoun reference. (Note that YOU[2] has not been deleted from the Basic List because the sign for *you* is a point.) The names of colors have been deleted from this list on the basis of their use being too limited to justify inclusion at this level. Although teaching color names is basic to many intervention programs, such names have limited communicative importance, and Clark (1974) has argued that colors are of relatively limited importance in early cognitive development. Although some children use WH-question words, notably *what* and *where*, at the one-word stage in spoken language development (Nelson, 1973), the functions that these words serve can be achieved through the use of facial expression, gesture, and/or direction of gaze. (Parents will use WH-question signs in talking with their child at this stage, but inclusion in the child's expressive vocabulary training can be postponed.)

The form of the signs used is an important matter and depends on the meaning that is to be conveyed rather than the English word used in the gloss. WATCH is an action, not a timepiece; COMB is an action or a label, as is DRINK. The meaning encoded in the words *bathroom, toilet,* and *potty* is the same at this level, and a single sign represents that meaning, even though all three words appear on different vocabulary lists (Fristoe and Lloyd, in press).

In addition to postponing until a later stage the teaching of signs to represent color names, it is recommended that teaching signs that represent the marked member of polar opposites be postponed. For example, CLEAN can be represented by the combination of NEGATION and DIRTY; thus CLEAN has been deleted from the initial lexicon. The teaching of MONEY might be delayed in some circumstances because it would seem to have little communicative value and be of relatively little importance to a person who has not yet developed a basic single word vocabulary. The choice must depend on the individual's needs and interests.

The means for expressing negation in sign at the one- and two-word stages is one that demands special attention. Despite the many forms of negation that they hear their parents use, children who are developing spoken language frequently use the word *no* to represent all three types of negation (Bloom, 1970). *No milk* can mean *I don't want any milk* (refusal), *I don't have any milk* or *My milk is all gone* (nonexistence), or *You can't fool me—That's not milk, that's water* (denial). The word *no* usually occurs in adult speech, however, only as a type of interjection, standing alone or used to answer a preceding question or correct another's statement (*No,* that *is my car*). Just as there are many forms for expressing negation in spoken English (*not, don't, can't, finished,* or *none*, etc.), there are many signs used to express negation, varying according to meaning and structure.

The NO that expresses the opposite of AFFIRMATIVE (YES) is not the one that is normally used in these contexts in signing. Studies of sign development in infants growing up in a milieu in which signing is the normal means of conversation can give us some enlightenment on this topic. Lacy (1972) and Ellenberger, Moores, and Hoffmeister (1975) have observed that such children initially use a head shake, first as a gesture and later linguistically, for negation comparable to that expressed by *no* in the one- and two-word stages of spoken communication development, as reported by Bellugi (1967) and by Bloom (1970). It is suggested that, at the level of communication development represented by the initial sign lexicon, negation be represented by a headshake because that is the first negation sign that appears in normal development. Later, separate signs can be added for ALL-GONE, NOT, CAN'T, NONE, and the interjection NO.

Additions to signs found in the Basic List, those occurring most frequently in manual sign vocabularies, should next be made. These would include signs that express emotions, as recommended by Holland, but with the reservation that the emotions must have some visible means of expression, as recommended by Lahey and Bloom (1977). Signs for AFRAID, ANGRY (MAD), and SAD can be added to HAPPY, which is already in the Basic List, because these signs include the facial expressions that usually accompany these emotions. (It is assumed that the referents for the signs at this stage may be the facial expressions rather than the internal emotions.) MORE can be used to reflect awareness of recurrence of objects and actions on objects and can encode the ideas represented by the words *more, again,* and *another*, so that only one sign is needed to express these variations in the idea of recurrence. A demonstrative such as *this* or *that* is needed for noting the existence of objects or for identifying objects. The same sign can be used for *this, that,* and *those* at this early stage of linguistic development, with distinction being made by making the sign toward the designated object or objects. Although a single sign can be used to represent the infinitive *to be* and various forms such as *is, am,* and *are*, the use of this verb is not usually observed at the earliest levels of spoken communication development and is best reserved until later stages are reached. When it is introduced, it should be used as a copula before it is used as an auxiliary (Brown, 1973), and, initially, a single sign can be used to represent all forms of the verb.

Among the words that Lahey and Bloom (1977) suggested as useful for encoding actions on objects are *eat, wash,* and *give*. Signs for these three actions are already on the Basic List. Optional additions of less frequently occurring signs are DO, KISS, MAKE, THROW, and GET (BRING being an alternative to GET). WORK can be deleted from the Basic List because DO and MAKE can be used to represent the uses of WORK most commonly observed by the authors in beginning signers. Lahey and Bloom suggested inclusion of ways of indicating actions involved in locating objects or self. GET and GO are signs that are already on the Basic List, and we might add DOWN, FALL, PUT, UP, and GET (or BRING) from Lahey and Bloom's suggested items. Finally, we need to encode attributes or descriptions. BIG, DIRTY, and HOT are signs that are already on the Basic List. HEAVY is an additional one that Lahey and Bloom recommended. BROKEN is especially useful. (The verb

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[2] We have followed the convention of showing words in italics and English glosses for signs in all capital letters.

break and the adjective *broken* are represented by a single sign, but its use to describe objects will prevail at early stages, as in COOKIE BROKEN.)

There is a balance between substantive words and relational words on the Basic List. (Note that some signs, such as CHAIR/SIT and DRINK, can be either substantive or relational, depending on whether they are used to represent objects or actions.) Almost all of the items on the Recommended Additions list, however, are relational words. This addition of relational words is desirable because, as they relate to many objects, their inclusion increases the potential for combining signs to create novel utterances. Only three additional substantive signs are recommended—WOMAN, MAN, and T.V. (It is curious that a sign for this common object appeared in only half of the vocabularies.) The clinician will want to select other substantive signs that are of particular importance to a specific client, however. Names of persons and pets are sure to be given high priority.

EVALUATION

How well does this suggested sign-lexicon (see Table 1) address the general lexicon planning ideas that were reviewed earlier? Holland's first consideration that was accepted by Lahey and Bloom was that data from normal child language development should be used in planning a lexicon. This is reflected in a number of ways, ranging from starting with single words or signs to providing opportunities to combine signs in new ways.

Holland's second consideration that was acknowledged by Lahey and Bloom was that the selections be made according to what is important to the child. This is addressed in two ways: by looking at what is important to all children at a particular level of cognitive development (which influences most of the choices made) and by looking at what is of interest to a particular person, that being reflected in the substantive signs that are chosen on the basis of what is available in that person's environment and on his or her own demonstrated interests.

Placing the stress on communication rather than simply on language, an idea important to Holland and to Lahey and Bloom alike, means that from the beginning we must provide opportunity for the use of the signs being taught rather than emphasize syntactic development, attempt to teach use of morphological markers from the first, or stress imitation of adult form. (This is obviously related to the decision to teach single signs before combinations of signs.)

Emphasizing objects that are present and events that are happening, as advised by Holland and reiterated by Lahey and Bloom, is made possible by providing in the lexicon signs for items and happenings in the person's environment. To be successful, training must be situational. This involves contriving interesting happenings as well as taking advantage of those that occur spontaneously.

The three additional considerations provided by Lahey and Bloom are also addressed. They indicated that the ease with which a concept can be demonstrated in context is related to the choice of words for a spoken lexicon. We believe that the same is true for signs. In addition, signs appearing in the suggested lexicon have a higher percentage that are transparent or guessable than would be found in all manual signs taken as a group (Lloyd and Fristoe, 1978, 1979). That is, the signs themselves carry cues to their meaning. This is a phenomenon found much more in visual than in auditory modes of communication (Brown, 1977; Mandel, 1977). This iconicity may be one of the strongest advantages that signs have over spoken words for some individuals who are experiencing difficulty in learning language (Fristoe and Lloyd, 1977b, 1979). Nonlinguistic and linguistic representation are much more closely related in the visual-manual than in the auditory-vocal mode (Brown, 1977; Mandel, 1977). Transparency or guessability may be used to increase the chances of success in initial training. In the initial sign lexicon in Table 1, asterisks are used to indicate the 9 to 16 most transparent signs (Lloyd and Fristoe, 1978, 1979).

Another of Lahey and Bloom's considerations is the potential usefulness to the child of particular words for conveying meaning, especially when words are combined. This is just as true for signs; therefore, additional relational signs have been recommended to provide a basis for producing many two-sign combinations later.

Finally, Lahey and Bloom suggested organization of lexical items according to the ideas that they encode. Lahey and Bloom's organization has been used with this initial lexicon as a double-check. All of the categories have been represented, as can be seen in Table 2. Teaching of signs would proceed by choosing one or more from each content category, most of the choices available being in the substantive signs list and the list of signs relating to many objects.

A FINAL WORD

We present this initial sign lexicon with the caution that it is not to be regarded as *the* lexicon for all persons needing such a beginning—the intent of this paper is to provide a rationale for planning a first sign lexicon. Choice of the first sign lexicon for a person with severe communication impairment requires knowledge of language development, knowledge of signs and linguistic constraints on their use (see, for example, Wilbur, 1976, 1979), and knowledge of the needs and interests of the individual for whom the lexicon is being planned. All of these should be taken into consideration in initiation of communication in nonspeaking persons.

TABLE 2. Organization of a first sign lexicon by content and form (after Lahey and Bloom 1977).

Content Categories	Form		
	Relational Signs		Substantive Signs
	Signs that are not object specific	Signs relating to many objects	
Rejection	NEGATIVE		
Nonexistence or disappearance	NEGATIVE, ALL-GONE		
Cessation of action	NEGATIVE, STOP		
Prohibition of action	NEGATIVE		
Recurrence of objects and actions on objects	MORE		
Noting the existence of or identifying objects	THIS/THAT/THOSE		
Actions on objects		BRING, DRINK, EAT, GET, GIVE, HELP, KISS, LOOK, MAKE, OPEN, PLAY, THROW, WASH	
Actions involved in locating objects or self		FALL, GO, PUT, SIT, STAND, RUN, WALK, UP, DOWN	
Attributes or descriptions of objects		BAD, BIG, BROKEN, DIRTY, GOOD, HAPPY, HEAVY, HOT, OPEN	
Persons and animals associated with objects (as in possession)			BABY, BIG, BIRD, CAT, DOG, FATHER, GIRL, HAT, MOTHER, YOU, and name signs
Other objects named			APPLE, BALL, BATHROOM/TOILET/POTTY, BOOK, CANDY, CAR, CHAIR/SIT, COAT, COMB, COOKIE, CUP, DOOR, DRINK, EAT/FOOD, HOUSE, MILK, PANTS, SCHOOL, SHIRT, SHOE(S), SOCK, SPOON, T.V., TABLE, WATER

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Signs and Manual Communication Systems: Selection, Standardization, and Development

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The need for selection, standardization, and development of signs and manual communication systems for use in the educational setting is discussed. The importance of considering human physiology, the socio-linguistic climate of American Sign Language (ASL) and English, and the structural linguistic characteristics of ASL and English in meeting this need is emphasized. A process is described for sign selection, standardization, and development which places emphasis on current sign usage and a set of guidelines based on ASL. Also, support is provided for the use of both ASL and manually coded English in the educational setting.

> **"Thus," writes Sicard, "neither I nor my illustrious teacher is the inventor of sign language (it must be said) and, as a foreigner cannot teach a Frenchman the French language, so a man who speaks should not get involved in inventing signs." (Lane, 1977, p. 5)**

INTRODUCTION

The trend toward the inclusion of manual communication as part of a "total" approach to the education of hearing-impaired persons has been documented by Jordan, Gustason, and Rosen (1976). These authors sent a survey form to all 970 educational programs for the hearing impaired on the Office of Demographic Studies mailing list. The total number of responses was 796 (82%). Table 1 gives the number of programs and classes reporting the use of manual communication as part of their Total Communication Approach,[2] and shows that over 50% of all classes at all educational levels are using manual communication. Further data reported by Jordan et al. showed that of 343 programs reporting a recent change in communication modes used, 333 of these reported a change to include the use of manual communication. When major decisions such as this are made, more often than not new major decisions need

Table 1. Number of educational programs and classes for the hearing-impaired reporting use of manual communication as part of their Total Communication Approach—total number of responses 796 (extrapolated from Jordan et al., 1976)

	Programs	*Classes*
Pre-School	324 of 627	689 of 1259
Elementary	411 of 773	2196 of 3522
Jr. High	212 of 422	688 of 1086
High School	192 of 353	1046 of 1314

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[2] *Total Communication (TC) and simultaneous communication (SC) are often equated. However, SC is only one method of communication that may be used in a TC program. Holcomb (Note 1) has emphasized the difference between TC and SC. He stated that the goal of TC is full communication for all, and since many deaf people do not know manual communication nor can they speechread, SC would be little or no communication at all for these people. A more in-depth discussion of the difference between TC and SC is presented in Caccamise and Drury (1976) and Cokely (Note 2).*

to be confronted. In this case the decision to include the use of manual communication in the education of hearing-impaired children has led to discussions, and sometimes confrontations, relative to the question, "How should we sign or manually communicate?" The purpose of this paper is to provide information which should assist the reader in responding to this question.

In practice the above question has become two questions: 1) Which signs should be used? and 2) Which manual communication system(s) (or languages) should be used? The first question involves the selection of individual lexical units, i.e., the selection of signs.[3] Most books and standardization projects have addressed this question. The second question involves selection of an entire language, including how the lexical units (signs) selected are to be combined into phrases and sentences. In this paper sign selection will first be discussed, and then selection of manual communication systems. The general goal of this paper is to provide a rational, objective basis for the process used in selection, standardization and development of signs and manual communication systems. It is hoped that this base will assist others in establishing policies on usage of signs and manual communication systems on an equally objective basis, rather than depending on any one sign or manual communication book (or books).

The Need for Sign Selection, Standardization, and Development (SSSD)

Regardless of the mode of communication or language used, "consistency" is recognized as a critical factor for efficient, effective communication and language development. This is the basic premise upon which the need for sign standardization rests. As Gustason (1973, pp. 38-48) has stated, "It is less important that one adhere faithfully to a given book than that consistency be attempted in a specific program" (p. 46).

The fact that many educational programs have identified sign standardization as a need is evident from the data reported by Jordan et al. (1976). Responses to their survey indicated that among the 565 programs reporting the use of Total Communication, 340 had attempted sign standardization and 87 more would possibly do so in the future. Support from the deaf community for sign standardization has been stated by the editor of *The Deaf American*, Jess Smith (1975): "We still hold that some kind of standardization is overdue . . . . Too many people and organizations are riding off in all directions" (p. 2). Rosen (Note 3), in discussing sign selection and standardization, stated:

> **People have expressed concerns to Gallaudet College and asked about the possibility of standardization of signs . . . . From the input gathered, it was determined that the problem as exists relates to newly developed signs for instructional purposes, rather than to American Sign Language . . . . The Gallaudet Sign Language Program and the Committee on Communications agree that there is a need for clarification and that something needs to be done to alleviate the confusion resulting from new signs for the same English words. Gallaudet is not out to control or suppress the growth of sign language. To draw an analogy, English is a living and complex language, but dictionaries are available for clarification and reference. (p. 10)**

Striking a similar note, Stokoe (1976) stated:

> **Standard is of course not a matter of legislation but of currency. When leaders of the national deaf organizations discuss standardization of Sign as part of their work, e.g., the National Association of the Deaf, the Communicative Skills Programs (of the N.A.D.), or the Jewish Deaf Association, they are not trying to halt the tides of natural language change but only to recognize that there are local, provincial, standard, conservative, and puristic kinds of Sign, and to indicate that one who studies, practices, and uses standard Sign is on the surest ground. (p. 21)**

Attempts at organizing sign standardization on a national level have been made at the 1973 National Association of the Deaf Convention in Seattle, Washington, and the 1974 Conference of American Instructors of the Deaf in Tucson, Arizona. The need for a cooperative effort in sign standardization on a national level has been stated by Husted (Note 4): "At Seattle Community College, the interpreting staff is presently putting together a manual of . . . technical signs used or devised in this area. This approach . . . is less than optimal as it will lead to regionalization of signs. A national workshop on technical sign standardization and development would help to avoid such a problem" (p. 1).

Caccamise, Blasdell, and Bradley (Note 5) and Caccamise, Bradley, Battison, Blasdell, Warren, and Hurwitz (1977) have discussed the importance of not only standardizing existing signs in order to promote consistency in communication, but also the importance of considering the development of new signs. These authors recognized the danger involved in any prescriptive approach to language and/or communication selection, standardization and development. They emphasized that such an approach can lead to a decrease in the ability of a language or communication system to adapt to

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[3] *The lexicon of a language consists of all the signs, or words, which the language employs. A single member of a lexicon is a lexical item, i.e., a single sign or a single word.*

needed modifications and additions for purposes of communication. On the other hand, these authors stressed that a laissez-faire policy toward sign selection, standardization and development (especially technical signs) may not be the best approach at this time for several reasons. These reasons include the following:

1. The rapid expansion in educational opportunities for the deaf has led to the need for deaf Americans to learn and use vocabulary which few of them have used in the past.

2. Reception of fingerspelling is a difficult skill to master.

3. Expression of fingerspelling is not only a difficult skill to master, but in fact even under optimal conditions may disrupt the normal flow of the visual and auditory aspects of speech.

4. Instructors having minimal knowledge of the linguistic structure of existing signs, and sometimes having minimal signing skills, have invented sign equivalents for English technical vocabulary.

GENERAL PRINCIPLES AND COMPONENTS FOR SIGN SELECTION, STANDARDIZATION, AND DEVELOPMENT (SSSD)

The NTID Technical Sign Selection, Standardization and Development Project has as its primary goal the establishment and maintenance of a technical sign storage and retrieval system which can serve the technical communication needs of hearing-impaired students and their instructors, interpreters, and counselors. This project has included the development of a set of principles and components which, as suggested above, can be of benefit to any SSSD project.

Listings of the general principles and parallel components used at NTID for SSSD are given in Tables 2 and 3 respectively.

Table 2. General Principles for Sign Selection, Standardization, and Development at the National Technical Institute for the Deaf (NTID)

1. Any committee should include users and communication/language experts
2. Identification of important vocabulary precedes sign collection
3. Sign collection precedes sign invention
4. Sign "synonyms" accepted and encouraged
5. Fingerspelling viable alternative to sign invention
6. Signs and fingerspelled words selected are recommended—not required
7. On-going evaluation a necessity
8. Cooperation important:
   A. Internal
   B. External/National
9. Continued research on manual/simultaneous communication, including observations in natural communication situations
10. Sign Guidelines:
    A. Consistency of use by native signers major guideline
    B. Use by "content" experts who are skilled signers second major guideline
    C. A set of guidelines based on the American Sign Language (ASL) lexicon

Table 3. Components of the Sign Selection, Standardization, and Development Project at the National Technical Institute for the Deaf (NTID)

1. A committee which includes important users of manual/simultaneous communication and communication/language experts (the NTID committee includes interpreters and manual/simultaneous communication instructors of staff, students, and interpreters)
2. A set of guidelines based on the structural characteristics of ASL signs
3. A systematic on-going process which includes:
   A. Identification of important vocabulary (internal = I)
   B. Collection of existing signs and fingerspelled (FS) words (I)
   C. Evaluation of existing signs and FS words (I)
   D. "Initial-final" recording and storage of signs and FS words (I)
   E. Dissemination/sharing (I)
   F. Evaluation (I)
   G. Sharing and collection of signs and FS words (external = E)
   H. Evaluation (I & E)
   I. Development/invention of new signs (I & E)
   J. Evaluation (I & E)

A SET OF GUIDELINES FOR SIGN SELECTION, STANDARDIZATION AND DEVELOPMENT BASED ON THE AMERICAN SIGN LANGUAGE (ASL) LEXICON

Table 4 presents a listing of sign selection, standardization, and development guidelines which are based on the existing ways in which the four major parameters of signs are combined in ASL signs, i.e., ways in which hand positions, hand movements, handshapes, and hand orientations are combined in ASL signs. An explanation of these guidelines, including a discussion of the "whys" for each, has been provided by Caccamise et al. (Note 5) (see Appendix A).

Table 4. Listing of Tentative Guidelines for Selection, Standardization, and Development of Signs based on the American Sign Language (ASL) Lexicon

1. The Signing Space
2. Signs and the Visual Center of the Signing Space
3. The Relationship of Sign Hand Position and other Sign Parameters
4. One-Hand and Two-Hand Signs and Symmetry
5. Two-Handed Signs in which only One Hand Moves
6. Number of Handshapes Per Sign
7. Signs Involving Contact
8. Semantically Related Signs

As stated by the above authors, these guidelines are tentative in nature, and modifications may be expected as more is learned about manual communication in general and ASL in particular. The guidelines developed to date are primarily phonological in nature, although collectively they may be considered as morphological guidelines. Guidelines based on other productive processes in ASL are needed.[8] For example, Battison (1977) discusses ASL borrowings from English through systematic modifications of fingerspelling. These modifications are examples of productive processes which may assist in selection of handshapes, positions, movements, and orientations to be used when one or more letters of a word are selected as part of a sign. Also, research on how (and if) ASL marks nouns, verbs, adverbs, and adjectives can be useful information for SSSD. For example, many noun-verb pairs in ASL can be distinguished by their movement, i.e., nouns tend to have repeated, restrained movement and verbs smooth, singular or unidirectional movement (Supalla & Newport, in press; Warren, in press). Examples of such noun-verb sign pairs include AIRPLANE-FLY, CHAIR-SIT, and FOOD-EAT.

Another important area to consider in SSSD is the normal time sequence and pattern for development of manual communication skills. This is especially important in selecting and developing signs for use with children. Bornstein (Note 13), in a paper on the new manual communication systems designed to represent English, stated that "The primary thesis of this essay is that the principle limitations of these systems are not their linguistic characteristics but the characteristics of the developing child, especially his motor control, the perceptual problems inherent in the medium in which these manual systems operate" (pp. 2-3).

Although much more research is needed, some information is available on the developmental time sequence and pattern for the phonological and morphological aspects of signs and fingerspelling. For example, Siple (In press-a) discussed Jakobson's theory of "markedness," i.e., the order of phonological development corresponds to the degree of markedness of the sounds acquired, with the least marked sounds acquired first. Using this notion of markedness, Boyes-Braem (Note 14) proposed a four-stage order of acquisition for ASL handshapes based on phonological descriptions of these handshapes and the physiology of the developing child's hands. Classifying the "A" handshape as unmarked, Boyes-Braem identified the following four factors as being important to the sequential development of handshapes: 1) opposition of thumb, with no contact between any finger and thumb; 2) extension of one or more fingers; 3) contact of fingers with thumb; and 4) crossing of adjacent fingers. McIntire (Note 15) studied the handshape development of one child, and the results supported and extended the work of Boyes-Braem. Stages of development reported by McIntire were:

1. Stage 1 - 5, S, L, A, G, C, baby "O" (The latter handshape is the only one at this stage which requires contact between a finger and the thumb.)
2. Stage 2 - B, F, adult "O"
3. Stage 3 - I, Y, D, P, 3, V, H, W (Some of these include extension of weaker fingers.)
4. Stage 4 - 8, 7, X, R, T, M, N, E (Some of these involve crossing fingers.)

Stages 2, 3 and 4 include handshapes which involve touching the thumb to a finger or more than one of the factors described above. Further, McIntire reported that analysis of "baby signs" showed that when misarticulations occurred, the substitutions tended to be

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[8] *The authors wish to thank Joan Forman, a member of the English Department at NTID, for providing the authors insights relative to productive processes in ASL.*

less marked handshapes, e.g., the sign APPLE made with an "A" instead of an "X" handshape.

Crandall (1974) and Fristoe, Lloyd, and Wilbur (Note 16) have provided information about sign morphological development. Crandall studied the sign language development of 20 children between three and seven years of age. Results showed that signs with positions involving a moving and nonmoving hand and signs with double different handshapes were the most difficult signs for children to learn. Fristoe et al.'s observations of children learning signs indicated that signs involving contact with the body were easier to learn than signs which did not involve contact.

Other research on development of manual communication skills is discussed below in a section on selection of manual communication systems. The basic point to be remembered is that the time sequence and pattern for development of manual communication skills need to be considered both in selecting signs and manual communication systems, and in our expectations for children in their production and reception of manually and simultaneously coded messages. Since the existing knowledge of the normal developmental process for acquisition of signs and fingerspelling is limited, those who work with young children have an opportunity to make significant contributions to this body of knowledge. To do this requires flexibility, recognition of the importance of observing children communicating, and a readiness to admit that children can show us better ways to accomplish our goals of more effective communication and language development among deaf and hard-of-hearing children. As Lane (1977) has stated,

> **I would like to say a word as a teacher to other teachers here. Society puts us in a false rôle. We are presented as the purveyors of wisdom. But that was not the contribution of Epee, that was not the contribution of Sicard, nor of Gallaudet. The genius of these men was to have the sensitivity, the openness to observe their pupils. I think that's what makes a great teacher: a willingness to be the pupil oneself . . . . The milestones in the education of the deaf were placed there jointly by hearing teachers with the humility to become pupils and by deaf pupils who cared enough to teach them. Thank you for teaching me. Long live the collaboration. (p. 7)**

Further discussion, review, observations, and research on both the productive processes in ASL and the development of manual communication skills are expected to lead to the development of additional guidelines for SSSD and possible modifications of the present guidelines.

SELECTION OF MANUAL COMMUNICATION SYSTEMS

As stated in the first section of this paper, the decision by an ever increasing number of educational programs to include manual communication as part of their Total Communication Approach has led to the question, "Which manual communication system(s) (or languages) should be used?" Basically, there are three answers to this question: 1) Use ASL only; 2) use a manually coded English (MCE) system only; or 3) use a bilingual approach; i.e., one can choose to use both ASL and a MCE system. The seriousness of this choice has been stressed by Stokoe (1976): "The real issue is not oralism *vs.* manualism, as much time has been wasted arguing; instead the issue is whether the true bilingual situation of the deaf—Sign *and* English—is to be recognized" (p. 25). (Here Stokoe is using sign *to refer to ASL.*)

Appendix C discusses the confusion that exists in the use of terminology for manual communication systems, the problems involved in placement of manual communication systems along a continuum, and the suggestion that in actual practice most people use an eclectic approach which involves a combination of ASL and English, i.e., some form of Pidgin Sign English (PSE). Appendix D is a listing of manual communication systems and Appendix E provides a brief description of ASL, MCE systems, and in-group signs.[12]

Descriptions of ASL have been provided by Cokely (Note 18), Siple (in press-a), Stokoe, Casterline, and Croneberg (1965), and Wilbur (1976, pp. 423-500). Descriptions of MCE have been provided by Anthony (1971), Bornstein (1973), Caccamise and Drury (1976), Cokely (Note 10), Gustason et al. (1975), Gustason and Woodward (1973), and Wampler (1971). Pidgin Sign English has been described by Cokely and Gawlik (1974), Woodward (1973), and Woodward and Markowicz (Note 19). Critical reviews of the newer manual communication systems designed to mirror English more closely than ASL have been provided by Bornstein (Note 13), Charrow (Note 20), Cokely and Gawlik (1973), Markowicz (Note 21), and Wilbur (1976). Rather than repeat in detail the information which is available in the above publications, this section will concentrate on general information and principles which should assist persons in making an informed response to which manual communication system(s) should be used. This section will include factors to consider in efforts to develop a code for a language,

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[12] *Appendices C, D, and E were all prepared by the authors listed at the top of Appendix C.*

a discussion of manual communication and language development, and the simultaneous use of oral-aural and manual communication.

Cokely (Note 22) stressed the importance of distinguishing between languages and codes in discussing manual communication systems, and provided the following definitions:

> **A *language* is a naturally developed method of communication among members of a given community. A language has its own lexicon (vocabulary) and syntax (grammar); e.g., French, Russian, ASL, English, Chinese, etc.**
>
> **A *code* is an *artificially* invented means of representing an already existing language. A code relies entirely upon the lexicon and syntax of the represented language. A code is *not* a language but merely a representation of a language; e.g., Morse Code, semaphore, Rochester Method, "Manual English," braille, etc. (p. 2)**

Given these definitions Cokely stated that it is obvious that all of the newer manual communication systems designed to represent English are codes (e.g., Seeing Essential English (SEE$_1$), Signing Exact English (SEE$_2$) and Linguistics of Visual English (LOVE)).

When one attempts to develop a new code for English, such a code may be patterned on any of the following aspects of English:

1. Phonology—the study of the smallest units of speech (phonemes) and the set of rules which govern these units (i.e., combinations, distribution, loss, and other processes).

2. Orthography—conventional spellings of words.

3. Morphology—the study of the smallest meaningful units of a language (morphemes) and the rules which govern their occurrence. There are two types of morphemes: free morphemes which can stand alone (e.g., *fast*, *week*), and bound morphemes which in use must be attached to a free morpheme (e.g., fast*er*, week*ly*).

4. Syntax—principles for forming grammatical sentences (word order, etc.); a set of rules followed when the words of a language are put into phrases and sentences.

5. Semantics—the study of meaning in a language.

6. Pragmatics—refers to the instrumental use of language. Pragmatics involves connecting the world and person through the use of language, and includes the affective domain. Bates (1976) stated that pragmatics refers to the rules governing the use of language in context, and Prutting and Rees (Note 23) stressed that pragmatics helps us to understand how phonology, syntax, and semantics function in actual communication situations (units of pragmatics, called preferences, are unknown at present).

Considering the above, in the selection and development of any manual code for English there is a need to minimally understand and make choices relative to the lexicon, syntactic structure, and pragmatics of the code:

1. *Lexicon.* Manually coded English words may be based on English pronunciation (phonology), spelling (orthography), and/or meaning (morphology and semantics). For example, the Rochester Method and Visible English involve the manual coding of English words strictly on the basis of their spelling since all words are fingerspelled. In contrast, ASL signs are based on meaning, and this meaning base has developed in a natural manner according to the needs of ASL communicators, and not according to the needs of English speakers. Pidgin Sign English (PSE) systems tend to maintain ASL signs, with the major accommodation to English being at the syntactical rather than lexical level. In contrast, the new manual communication systems designed as codes for English (SEE$_1$, SEE$_2$, LOVE, Gallaudet Signed English Pre-School System) involve major lexical as well as syntactic differences from ASL. The rules of SEE$_1$, SEE$_2$, and LOVE for sign selection and development are based primarily on English word pronunciation, spelling, and meaning (see footnote 9).

2. *Syntax.* This includes consideration of sign-word and/or fingerspelled word order to be used in forming grammatical English sentences and the manual representation of English affixes and functor words (articles, determiners, prepositions). All MCE systems use English word order, although PSE is somewhat flexible in this regard. PSE systems generally incorporate a limited number of English functor words and affixes, borrowing some signs from the newer manual communication systems, and involve more fingerspelling than ASL or these newer systems. The newer manual communication systems include invented signs for all or most English functor words; SEE$_2$ includes signs for 118 affixes and SEE$_2$ includes signs for 70 affixes. The Gallaudet Signed English Pre-School System includes 14 affixes, which are referred to as sign markers. In this system it was arbitrarily decided that only one sign marker could be added to a sign, and that which cannot be represented by this approach should be fingerspelled. For adults who are unable or unwilling to learn all 14 markers a smaller set of seven markers are identified for use.

3. *Pragmatics.* This area considers how a MCE system can best be structured to facilitate effective, efficient communication in natural situations. Pragmatics includes psycholinguistic and sociolinguistic considerations, including

the importance of allowing a language to vary in usage according to the situation (i.e., the occasion, the people involved, etc.). Cokely (Note 10) stressed that in defining a policy for the manual coding of English it is important to consider not only the linguistic structure of both ASL and English, but also the existing sociolinguistic framework of ASL and English and the theory of language planning. Relative to language planning, Cokely emphasized the importance of Haugen's (1966) proposed three criteria of efficiency, adequacy, and acceptability in deciding upon a code for manually representing English. Cokely (Note 10, p. 3) defined these three criteria as follows:

> **Efficiency of planning refers to the development of specifications for an application of a given set of linguistic rules or principles to a proposed language program. Adequacy of planning refers to the degree of precision with which a given linguistic form can convey the information called for by a set of linguistic principles. Acceptability of planning is the sociological component of language planning and it refers to the effect of a proposed change upon the attitudes of the users of the language.**

Based on these three criteria and his review of relevant literature, Cokely (Note 10, Note 18) recommended the use of both manually coded English and ASL in the educational setting.

Although significant efforts have been made in describing lexical rules for some MCE systems, there is evidence to suggest that greater efforts should be expended in the development and/or selection of syntactic principles for MCE systems. Traditionally the major problems of deaf children with English have been syntactic in nature: 1) omission of important words and inappropriate use of words, especially functors; 2) greater competence in use of lexical meanings than in structural meanings, indicating problems in deducing meaning from context; 3) problems with English affixing; 4) use of fewer adverbs, auxiliaries, and conjunctions than hearing children; 5) use of simpler and more rigid sentence structures than hearing children; and 6) problems with passive voice and question forms. The importance of syntax has been discussed by Cokely (Note 10):

> **It must be pointed out that the critical need for the deaf child is the acquisition of syntactic rather than lexical competence . . . since there is a critical age for syntactic acquisition . . . it would seem logical that our concerns are centered about syntactic uniformity. However, it must also be remembered that the situation is one in which an oral/aural language is being coded visually and manually and that there are certain constraints which arise from the nature of the codes themselves.**
>
> **From a linguistic point of view, it is a very sound approach to deal only with those elements of English syntax which are essential to the functioning of the language and to retain a semantically based approach to lexicon with the careful and guided addition of needed signs (p. 15).**

Caccamise and Johnson (in press), Siple (in press-a), and Wilbur (1976) have all provided reviews of the literature on manual communication and language development. The major findings based on these reviews may be summarized as follows: 1) language competency may be developed primarily through the visual and manual modalities as is evidenced by the developed competency in ASL and English; 2) ASL can assist in the development of English language skills, and may facilitate the development of oral-aural communication skills; and 3) language development milestones in terms of stages and time sequence are similar for oral and manual language forms.

> **We find in Pola's early combinations of signs the full range of semantic relations expressed by hearing children. We also find a steady increase in the length of her signed sequences that matches the increases found in hearing children. It does seem that, in spite of the change in modality, the milestones of language development may be the same. (Bellugi & Klima, 1972, p. 61)**

Developmental similarities between oral and manual language forms have been reported for the following language skills: babbling, onset of first word, onset of two and three word combinations, growth in mean length of utterance (counted in morphemes), holophrastic speech (use of single words for multiple meanings), generalization and overgeneralization in use of language rules and word usage, and acquisition of negation.

Siple (in press-a) suggested that "general language processes may very well be universal and independent of modality. However, the mechanisms for carrying out the processes may be modality specific. Certain mechanisms in ASL are similar to those used in spoken languages while others are dependent on the spatial nature of a manual language" (p. 15). Siple discussed differences in the development of oral and manual language forms in terms of locatives and both yes-no and WH-questions. Bellugi and Klima (1972) concluded that the study of manual languages gives us insight into the structure of language and the universality of communication, and Friedman (1977) stated that "The study of ASL is not merely an investigation of another language, but a study of the ways in which the channel of communication—the mode of the signal—can affect the language" (p. 1). Friedman then discussed oral language codes and the visual nature and use of space by ASL and concluded that the suggested language universals of total arbitrariness and discreteness are not necessary conditions for language:

> **If we fail to consider the role of iconicity and insist on analyzing ASL with reference [illegible] to its arbitrary elements we will fail to grasp the essential nature of its formational properties . . . . It would be unnatural, given the nature of man—in terms of his reliance on visual imagery in thought—and the nature of language, if both iconicity and arbitrariness and both discreteness and nondiscreteness did not exist in any manual/visual language (pp. 49-50, 55).[13]**

In considering oral languages and the selection and development of manual communication codes or systems, it is also important to remember that development and maintenance of oral-aural communication skills is a major educational goal for hearing-impaired children and adults. Therefore, educators generally use speech and encourage students to accompany their manual communication with speech, i.e., simultaneous communication. This requires that in sign and manual communication system selection, standardization, and development consideration be given to those characteristics of manual languages and codes that may impact upon the flow of the spoken language form. Ideally the manual code should: 1) facilitate as normal a rate of speech flow as possible, and 2) occur as much in synchrony with the oral language form as possible. Problems in accomplishing these objectives when speech and fingerspelling are used together have been discussed above (e.g., Reich & Bick, 1976, Note 7; Blasdell, Note 8). As previously stated, Blasdell's pilot research has indicated that a closer synchrony between speech and the manual code occurs with signs than fingerspelling. In addition, Bornstein (Note 13) has reported that although the presenter's spoken words averaged 27 milliseconds longer when accompanied with signs than when spoken only, the correlation between the times required to speak words alone and to speak words with signs suggested that the normal speech timing was not significantly distorted when signs and speech were uttered together. Bellugi (1972, pp. 68-84), Bellugi and Fischer (1972), and Bornstein (Note 13) have reported that ASL and spoken English require about the same amount of total time to convey a message, with the number of propositions and semantic ground covered being the same. However, the spoken versions included a significantly greater number of lexical items. Commenting on the work of Bellugi and Fischer (1972), Stokes and Menyuk (Note 24) stated that Signed English versions of sentences required two to two-and-a-half times longer to produce than ASL and spoken English versions.[14] A note of caution is necessary here since specific descriptions of the "Signed English" versions were not given. However, the above findings again emphasize the importance of human physiology in the expression and reception of signs and manual communication systems, especially when they are intended to be used in conjunction with a spoken language.

In summary, selecting a code to manually represent English requires that the sociolinguistic climate and structural linguistic characteristics of both English and ASL be considered. The effect of modality of language codes will result in necessary differences between orally and manually coded English forms, just as there are differences between spoken and written English. Regardless of these differences, research has shown that manual languages and codes can be used to teach English and may facilitate the development of oral-aural communication skills.

Given all of the above, a MCE system which incorporates the salient features of English and naturally evolved sign languages such as ASL is recommended for use in the educational setting. Appendix F outlines two proposed policies for manually coding English which incorporate salient features of English and ASL. These are presented as examples and are not meant to be inclusive of all necessary or possible policies. The need for further research to assess the efficiency, adequacy, and acceptability of such approaches is recognized.

In addition, the use of American Sign Language in the educational setting is recommended. ASL can assist in achieving the following goals: 1) the development of English language skills in students whose native language

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[13] *The following definitions for arbitrariness and discreteness in language are contained in Friedman (1977): 1) Arbitrariness refers to the concept that the relation between a meaningful element in language and its denotation is independent of any physical or geometrical resemblance between the two, and 2) discreteness refers to the concept that all possible messages in any language constitute a discrete repertory rather than a continuous one. Based on her discussion of American Sign Language, Friedman challenges both these concepts, suggesting that rather than being language universals, arbitrariness and discreteness are limitations of oral-aural language codes.*

[14] *Bellugi and Fischer (1972) discuss several mechanisms of ASL that are used to compensate for this time difference: 1) doing without—this primarily involves function words; 2) minimal anaphora—use of location in space to maintain relations (e.g., pronominalization); 3) general and specific verbs—use of "denser" rather than periphrastic constructions of verbs, e.g., "enter" instead of "go into," bathe" instead of "take a bath," "knot the rope" instead of "make knots in the rope," etc.; 4) incorporation of location and numbers with verbs, and incorporation of plurality, size and shape with nouns (examples include* LOOK AT, INVITE, SIT, PARK-A-CAR, *and sweep of one hand in semicircle while other hand signs a verb to indicate* ALL-OF-YOU).

is ASL and in students who are having difficulty learning English;[15] 2) the development of skills in a second language by students whose native language is English; 3) the effective functioning of students as participants and leaders in the deaf community in America; 4) the development in hearing-impaired (and hearing) students of an appreciation of the role of deaf people in the American culture, and in so doing, a positive image of themselves; and 5) the total educational development (academic, personal, and social) of the student. Cokely (Note 18) stressed that "as a child learns concepts in two languages, he/she becomes more flexible and better able to handle concepts" (p. 33). For a more in-depth discussion of the importance and benefits of using ASL see Caccamise and Johnson (in press) and Cokely (Note 18).

CONCLUSIONS

Research in communication, language development, cognitive development and learning, gestural-visual and oral-aural physiology, and the existing sociolinguistic climate in America may all be used to support the use of both ASL and MCE in the educational setting. Further, any sign selection, standardization, and development process and all MCE systems should take into account both current manual communication usage and the salient features of ASL and English.

However, extreme caution must be exercised before finalizing any policies for the use of manual and simultaneous communication in the educational setting. One of the major benefits of the trend toward the inclusion of manual communication as part of a "total" educational approach has been the greater opportunity for individualization of programs based on each student's abilities, skills, and needs. This opportunity can best be exploited by maintaining an open, flexible approach to usage of manual communication and simultaneous communication in the educational setting. Stokoe (1976) has suggested that rather than oralism versus manualism, the real issue is whether the bilingual situation of the deaf, ASL and English, is to be recognized. Whether one agrees or disagrees with Stokoe, it is hoped that advocates of the use of manual and simultaneous communication will not become rigid in their support of a specific manual communication system or signs. Just as one educational method will never be appropriate for all students, one approach to the use of manual communication will never be appropriate for all students.

APPENDIX A

A Set of Guidelines for Sign Selection, Standardization, and Development Based on the American Sign Language Lexicon

(The following is taken from Caccamise et al., 1977, pp. 3-8.)

Stokoe et al. (1965), Battison (1974), and Lane et al. (1976) have identified four major parameters of ASL signs: 1) hand position, 2) hand movement, 3) handshape or configuration, and 4) hand orientation, which primarily refers to the direction of the palm. The guidelines for the technical sign project at NTID are based on existing ways in which these four sign parameters are combined in ASL signs. In application, therefore, these guidelines may be used to assess signs in terms of acceptable and unacceptable combinations of the four major parameters of ASL signs. . . . the guidelines developed at NTID are tentative and are expected to undergo further refinement as more is learned about manual communication in general, and the structural patterns of signs within the ASL lexicon in particular. The guidelines developed to date at NTID for technical sign selection, standardization and development are as follows:

1. *The Signing Space.* Signs generally fall within a particular signing space, bounded by the top of the head and the area just above the waist, with the space towards the sides of the body involving a comfortable, but not fully extended, reach of the arms. The physical center of the signing space is the hollow of the neck (Frishberg & Gough, Note 25). It is important to recognize that for a variety of reasons signs may be made outside of this general signing space (e.g., for theatrical signing, or for emphasis).

The mouth area is considered not to be within the general signing space. This is partly based on the fact that it has been consistently observed, and reported by signers themselves, that when reading signs people tend to watch the face area of the signer, rather than the signer's hands per se. This agrees with the contention that facial expressions and lip movement (whether or not words are mouthed or spoken) are important parts of manual communication. Also, in making observations of historical changes in signs, Frishberg (1975) found that signs made in the mouth area tended to displace away from the mouth toward the sides of the mouth or the chin area. For example, the sign RED used to be made on the lips (and is still depicted that way in many sign books); however, many signers now make the sign lower, on the chin. Therefore, an effort should be made to not obstruct the mouth area when signing (also, see guideline #2).

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[15] *This is not to suggest that competency in ASL is an easier skill to develop than is competency in English. However, given the natural evolution which ASL has undergone, it may be that ASL can better facilitate initial development of communication and language skills in some individuals than would the more artificial MCE systems.*

2. *Signs and the Visual Center of the Signing Space.* The visual center of the signing space is the nose-mouth area (Siple, in press-b). Many signs are made in close proximity to this visual center, but seldom are signs made within this center.

In addition to what is presented in guideline #1, the logic for this is based on the following:

A. Visual acuity is sharpest near the visual center of the signing space, becoming poorer as you move toward the periphery or away from this visual center (Siple, in press-b).

B. Research has shown hearing-impaired persons to perform better on tests of receptive communication skills when oral and manual communication modes are used together as opposed to either alone (Caccamise & Blasdell, 1977; Johnson, 1975, 1976; Klopping, 1971; Stuckless, Note 26). If lip movement is contributing to this superiority of the combined oral-manual condition over either oral or manual alone, the blockage of the mouth area may reduce efficiency of communication.

3. *The Relationship of Sign Hand Position and Other Sign Parameters.* Signs made near the visual center of the signing space tend to have finer distinctions for all parameters than signs made in the periphery (Siple, in press-b). The probability of perceiving detailed information is greatest in areas of high acuity, and in areas like the face which have a large number of visually distinguishable landmarks. Therefore, smaller motions and distinctions among signs are feasible in such areas (i.e., areas close to the visual center) as opposed to lower acuity areas (i.e., areas more peripheral to the visual center).

4. *One-Hand and Two-Hand Signs.* In general, signs made near the visual center of the signing space involve the use of one hand, while signs made near the periphery tend to involve two hands having symmetrical handshapes, movements, positions, and orientations.

It is logical to expect that duplication of information through the use of two symmetrical handshapes, etc., is of greater importance for signs made in peripheral or low acuity areas, as opposed to signs made closer to the high acuity visual center area of signing. In fact, duplication involving the two hands in the high acuity face area is often overredundant (Frishberg, 1975).

Based on these facts it is suggested that:

A. For signs made in the neck and face area use one hand, with the position toward the periphery for face area signs (also, see guideline #2).

B. For signs made below the neck use two hands having the same handshape. Also, the movements, positions, and orientations of the two hands should be symmetrical (Battison, 1974).

Movements are considered symmetrical if the hands have the same basic movement either in the same or opposite directions.

Positions are considered symmetrical if the hands contact the same position or corresponding positions on halves of the body.

Orientations are considered symmetrical if the orientations of the hands are the same or are polar opposites (reciprocals).

5. *Two-Handed Signs in Which Only One Hand Moves.*

A. The nonmoving (passive) hand should have one of the seven neutral handshapes (1-A-S-B-C-5-0), or should have the same handshape as the moving (active) hand (Battison, 1974, 1977).

B. When two or more such signs differ only in the handshape of one hand, this difference should occur in the moving hand. Logically one would expect that for signs involving one moving and one still hand the receiver will attend to the moving hand.

6. *Number of Handshapes Per Sign* (Battison, 1977). Most signs in ASL (whether one-handed or two-handed) require only one handshape on each hand. However, some signs require that the handshape change during the articulation of the sign. For example, MILK is made in neutral space with one hand, and that hand closes from a C handshape to an S handshape (repeatedly); the sign SPAT changes repeatedly from O to B handshapes; PRINT uses two handshapes, one with the thumb and forefinger separated, and one in which they contact. What is important to note about these handshape-changing signs is that they all involve no more than two handshapes; there is no ASL sign which uses three or more handshapes. Undoubtedly this has naturally evolved so as to limit the number of handshape discriminations found in the native ASL lexicon. In view of such an absolute restriction found in the native ASL lexicon, it is recommended that no invented signs use more than two handshapes.

7. *Signs Involving Contact.* Four major areas of "contact" in signs are the head, trunk, arm, and hand. Battison, Markowicz, and Woodward (1975) found that ASL signs are systematic in regard to the contacts in these areas, and this adds to the redundancy factor in signing which is necessary for efficient language reception.

Signs made with double contacts are made within the same major area (e.g., INDIAN has both contacts on the head, WE has both contacts on the trunk, etc.). The exceptions to this rule are signs which are historically derived from compounds, and move from a contact in one major area to a second contact in another major area (e.g., REMEMBER, a compound derived from THINK + SEAL, contacts first the hand area and then the opposite hand; DAUGHTER, derived from GIRL + BABY, contacts first the head and then the arm).

Therefore, it is recommended that signs having two contacts have both contacts within one of the four major areas previously listed, i.e., the head, trunk, arm or hand.

8. *Semantically Related Signs.* Signs which are semantically related (e.e., related in meaning) are often related in terms of formation. "Semantically related" refers to those signs whose English glosses are approximately synonymous with each other, and/or whose English glosses have a conceptual relationship. For example, a change in handshape can change the meaning of the sign GROUP to CLASS, ASSOCIATION, or SOCIETY. All of these are semantically related in that each refers to a group or a kind of group. Also, all are formationally related in that their corresponding signs have the same position, movement, and orientation, with only handshapes distinguishing among them. This relationship between semantics (meaning) and formation of signs is an example of internal structure at the morphological level (Frishberg, 1975). This type of structural relationship should be taken into account by those involved in sign selection, standardization, and development.

APPENDIX D

A Listing of Manual Communication Systems

AMERICAN SIGN LANGUAGE	MANUALLY CODED ENGLISH	
ASL	**PIDGIN SIGN ENGLISH**	**MANUAL ENGLISH**
Ameslan	Ameslish	Fingerspelling
Sign Language	Sign English	(Rochester Method)
Sign	Singlish	(Visible English)
	Signed English	Seeing Essential English (SEE$_1$)
	Manual English	Signing Exact English (SEE$_2$)
		Linguistics of Visual English (LOVE)
		Signed English (Bornstein, Gallaudet Preschool)

In-Group Signs
  Home
  School
  Local

APPENDIX E

A Brief Description of Manual Communication Systems

1. *American Sign Language (ASL):* A language in which gestures do the work of spoken words, and which is used by many deaf people and their children. It is now generally recognized as a separate, distinct language from English, with its own grammar, inflections, and idioms. Ameslan, Sign, and Sign Language are other terms for ASL.

2. *Manually Coded English:*

A. *Pidgin Sign English (PSE)*—PSE involves the use of ASL signs in English word order with the proportions of ASL and English varying according to the practitioners. This may include speaking, word-mouthing, fingerspelling (abbreviations and "slurrings" are tolerated), gestures, ASL grammar occasionally, "new" signs, body English, facial expression, etc. Siglish, Ameslish, and Sign English are other terms. Signed English and Manual English have also been labels applied to this type of manual communication system.

B. *Manual English*—Manual English supplements the signs of Pidgin Sign English with invented signs to manually represent every word and inflection spoken. Some systems, such as the Washington State School for the Deaf's book *An Introduction to Manual English,* retain the "meaning" base of ASL signs and also use fingerspelling and new signs. Others try to represent English words more specifically, relying on a "two-of-three" criteria involving English meaning, pronunciation, and spelling. Degree of closeness of ASL signs and amount of attention given to the "root" meanings of words varies. Some published systems of Manual English include Seeing Essential English, Linguistics of Visual English, Signing Exact English, and the Gallaudet Preschool Signed English storybooks. ASL elements such as use of space (sight line, directionality) and reduplication may be used in Manual English.

C. *Fingerspelling*—The use of handshapes, movements, and orientations to represent letters of the alphabet and ampersand (and). This may or may not be used in conjunction with speech. Visible English and the Rochester Method use fingerspelling and speech exclusively.

3. *In-Group Signs:* This label refers to signs understood by a relatively small group of people. These may be subdivided into the following:

A. *Home Signs*—Signs developed and used by individual families. These may range from near-mime gestures to more sophisticated signs used only by the family members, and are generally limited to relatively few sign-words. They may be used by hearing families and with no contact with adult deaf signers, or by deaf families in a manner akin to "family jokes."

B. *School Signs*—Generally signs developed and used by children in a school setting, often because of the lack of adult deaf models. Every school has examples of these. They are often not understood by deaf adults in the community.

C. *Local Signs*—Signs which are somewhat like regional dialects. The sign for "football," for instance, may vary from region to region, just as a sandwich may be called in English a hoagie, submarine, grinder, hero, poor boy, etc.

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COMMUNICATING

with

Hearing Impaired/Developmentally Disabled Persons

Introduction for Direct Service Staff

Hearing impaired developmentally (HIDD) persons are those individuals with a hearing loss plus one or more developmental disabilities (e.g. mental retardation, autism, cerebral palsy, learning disabilities).

Inadequate diagnosis, education, and habilitation complicate the communication problems caused by deafness and a developmental disability.

Some factors influencing individual communication development are:

1. Type of hearing loss.
2. Severity of loss
3. Age at onset of loss
4. Environment/Family situation
5. Education and Training
6. Type of developmental disability
7. Severity of developmental disability

Awareness of these factors and their various implications regarding the communication process can improve service delivery to this population.

Interpersonal communication involves receptive and expressive components. In communicating with individuals having receptive or expresive communication disorders, we may find ourselves more effective if we are creative and innovative. Our expectations may need to be changed. Some indiviuals may have no formal languge and may use rudimentary gestures, drawings, and unclear speech in an attempt to relay basic needs and wants. A "total communication" approach can encompass formal and informal communication techniques including speech reading, natural getures, formal sign language systems, speech, reading, visual symbol systems (e.g. Bliss, Rebus), writing, and the use of residual hearing.

Expressive Communication Hints

1. Interact with the HIDD person as a unique individual. Treat him/her with respect.

2. Attract the person's visual attention before starting to communicate.

3. Be patient, take all the time necessary to ensure a comfortable communication environment.

4. Do not stand in front of windows while talking. Glare makes it difficult to see lip shapes and hand shapes.

5. Be creative; draw, use natural body gestures, pantomime, and use any and all available objects for demonstration.

6. When using sign language, learn signs in advance, and practice to ensure clarity and consistency.

7. When using communication boards, learn the organization of information/symbols on the board so that communications can be as natural and complete as possible.

8. Keep facial expression and body language appropriate to, and in agreement with, the message.

9. Keep communication concrete rather than abstract. Use present tense and a normal sequence of events.

10. Since smiling and head nodding may indicate a lack of understanding, repeat until you are positive that understanding has occured.

Practice may be required to improve your ability to understand the HIDD individual's various communication methods. It is important to reinforce all communication attempts, thus encouraging self-expression and information exchange. Reception is the beginning of understanding, and understanding leads to more successful interaction. Communication should be both meaningful and reinforcing for the staff member and the HIDD individual.

Receptive Communication Hints

1. Be receptive to all communication attempts.
2. Relaxing will improve your comprehension and put the HIDD person at ease.
3. Watch for contextual clues and emotional tone from body language and facial expression.
4. Sign language production varies with degree of motor impairment; gross approximations may represent conventional signs.
5. Speech intelligibility varies with age at onset and degree of hearing loss, developmental disabilities, and amount of education and speech therapy.
6. Use of communication boards and other augmentative devices may be inefficient or slow due to the severity of motor impairment. Be patient and respectful of independent communication efforts.
7. A person's frustrations may reflect his/her long-term expressive difficulties rather than his/her reaction to the current situation. Don't take this frustration personally.
8. Acting out (or aggressive behavior) may be a method of self-expression for some clients.
9. If communication is exceptionally difficult, an interpreter or a deaf person familiar with minimal language skill clients may be able to offer help.

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CHAPTER VI

INTERPRETING FOR DEAF-BLIND PERSONS

Frank Caccamise, James Stangarone, and Marguerite Moore

Introduction

Legal blindness is defined as visual acuity of 20/200 or worse in the better eye with best correction and/or field of vision which is constricted to less than 20 degrees (<u>Seminar on Deaf-Blindness for Interpreters for the Deaf</u>, 1979). Not all people who are referred to as deaf-blind, however, are legally blind. In brief, although all "deaf-blind" persons have both hearing and vision impairments, the severity of these two impairments vary among individuals. Further, some people are born with both impairments, others are born with one of the impairments and acquire the other at a later age, and still others acquire both impairments after having normal hearing and vision for a number of years. These, and many other factors that have been discussed earlier in this book (e.g., life experiences and language skills and preferences), impact on the interpreting situation.

This chapter discusses methods of communication and procedural suggestions for interpreting with individuals having both hearing and vision impairments.

Methods of Communication

In addition to signing, fingerspelling, and speech (with and without voice), there is a variety of other methods that may be used to communicate with persons having both hearing and vision impairments (DiPietro, 1978; Jensema, 1979a, b, 1980). This section briefly discusses those communication methods that are most likely to be used in interpreting situations.

1. Signing, Fingerspelling, Speech (with and without voice): Each of these communication methods may be used alone or in combination with other methods. The interpreter may sign and/or fingerspell in a visual field relatively close to consumers when they have some residual vision. When consumers have little or no residual vision, they generally prefer to cup their hands lightly over the back of the interpreter's hands or have the interpreter sign and/or fingerspell in the palm of their hand.

2. The Tadoma Method: A vibro-tactile form of speechreading (lipreading) in which the consumer rests her/his thumb on the interpreter's lips. The remaining fingers may all rest in the throat area of the interpreter or the consumer may choose to place the index finger near the nose with the remaining three fingers or little finger in the throat area.

3. The Lorm Alphabet: The interpreter forms dots and lines with her/his fingers on the receiver's hand. These dots and lines correspond to specified letters of the alphabet.

4. Braille Print/Hand Speech: The interpreter reproduces the equivalent of Braille dots representing letters, contractions, and words as they are used in standard Braille in the consumer's palm.

5. Braille Alphabet Card: The consumer holds a card into which the Braille alphabet letters have been pressed. The interpreter guides the index finger of the consumer to the appropriate letters.

6. The International Standard Manual Alphabet: The interpreter uses the index finger to print capital letters in the palm of the consumer's hand.

7. The Alphabet Plate: Same as the Braille Alphabet Card, except the Alphabet Plate contains embossed letters of the English alphabet.

8. The Alphabet Glove: A glove on which the letters of the alphabet are printed. The glove is worn by the consumer and the interpreter spells words by touching letters on the glove.

9. The International Morse Code: Using a tap to represent dots and a stroke to represent dashes, the interpreter uses the International Morse Code to tactually spell words.

10. The Tellatouch Machine: A machine that has both regular and typewriter keyboard (with English letters) and Braille keys. The consumer places a finger on the back of the machine, and as the interpreter types corresponding Braille letters rise under the finger of the consumer.

Procedural Suggestions

This section provides a list of general suggestions for effective interpreting with deaf-blind consumers regardless of the communication methods used. It should be noted that interpreting for deaf-blind persons is almost always done on a one-to-one basis.

1. With deaf-blind consumers, the location of the interpreting assignment has a significant impact on the responsibilities the interpreter will likely need to assume (DiPietro, 1978). In general, interpreting in environments unfamiliar to consumers will require greater responsibilities for the interpreter than environments that are familiar. For example, in unfamiliar environments the interpreter may need to assume a major role in helping to meet the mobility needs of deaf-blind persons. Training in mobility, therefore, is suggested for individuals who provide interpreting services on a regular basis for deaf-blind consumers. Also, the interpreter should provide the deaf-blind consumer with a description of the environment if it is unfamiliar.

2. As in all interpreting situations, establishment of the mode(s) of communication and language(s) to be used is of highest priority. Given the additional responsibilities that interpreting for deaf-blind consumers may require of the interpreter, it is imperative that interpreters obtain information about the communication and language preferences and skills of deaf-blind consumers (see Chapter IV for a discussion of suggestions for obtaining this information).

3. Participation (questions, comments, etc.) of the deaf-blind consumer in meetings often requires a pre-established signaling system between the consumer and interpreter. Depending on the communication skills of all persons involved, the

deaf-blind consumer may either ask a question directly to the speaker or use the interpreter. How this is to be done must all be agreed to and understood if effective and satisfying communication is to occur.

4. The interpreter should generally maintain physical contact (e.g., placement of hand on consumer's arm) with deaf-blind consumers in order that they may be aware of the interpreter's presence at all times.

5. It is important that the interpreter convey the attitudes/feelings of the speaker(s). With deaf-blind consumers, this often needs to be done via body contact.

6. If seated, chairs for the interpreter and deaf-blind consumer should be arranged so that their knees are at an angle of approximately 45 degrees. Generally, chairs without armrests allow a freer flow of signing and physical contact.

7. When interpreting in a workshop or long meeting for a deaf-blind consumer who prefers communication in the palm of her/his hand (e.g., fingerspelling, Braille Print, etc.), the interpreter should sit side-by-side with the consumer. The consumer should rest the back of her/his hand on the leg of the interpreter.

8. Close proximity between the interpreter and deaf-blind consumer is the general rule. For persons with residual vision, however, the interpreter may need to maintain a specified distance. For example, in a study with eight students having retinitis pigmentosa (which results in a reduction of visual fields or peripheral vision), Hicks (1979) found that on a visual perception task for hand shapes and movements, students' performance increased from 41% to 51% when the stimuli-presentation distance was increased from 3 feet to 6 feet.

9. In general, larger movements for signs and natural gestures are more readily understood than smaller ones by the deaf-blind consumer. Again, however, there are exceptions. In the Hicks (1979) study discussed above, the performance of eight students with retinitis pigmentosa increased from 51% to 79% when the magnitude of the stimuli movements was reduced by 50% at a presentation distance of 6 feet.

10. For deaf-blind persons with residual vision, the clothing of the interpreter is important. In addition to the recommendations for clothing in Chapter IV, gloves may be used to enhance reception of signing and fingerspelling (DiPietro, 1978). Also, interpreters should not wear jewelry which may either be visually distracting or cause physical discomfort (e.g., scratch) for the deaf-blind consumer.

11. Due to the close proximity in interpreting for deaf-blind consumers, special consideration needs to be given to personal hygiene. "Strong scents (perfume, aftershave) and odors (among them smoke, perspiration) may distract the deaf-blind person and cause discomfort. In addition, the interpreter might want to apply hand lotion during breaks, since dry, chapped hands in tactile communication may also be distracting to the client" (DiPietro, 1978, p.9).

12. During lunches and other breaks, deaf-blind consumers may wish to participate in the social interaction. Interpreters should be prepared to provide this service, and should assist deaf-blind consumers in identifying and initiating appropriate social interactions with other persons.

Summary and Conclusions

Interpreting for deaf-blind persons is another special challenge that, like all other interpreting assignments, requires an appreciation and respect for the individual needs, preferences and skills of each consumer. Special training in mobility, and other areas important to deaf-blind persons, is recommended for interpreters who may work or are working with deaf-blind persons on a regular basis.

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APPENDIX C

INTERPRETING FOR HEARING-IMPAIRED PERSONS WITH MINIMAL LANGUAGE SKILLS (MLS): SOME SUGGESTIONS

Rita Dominque DeVries, Suzie Kirchner, and Frank Caccamise

The key to interpreting for persons with Minimal Language Skills (MLS) is "simplicity." The following is a list of suggestions that will help to establish a communication base with persons having MLS.

A. Maintain Eye Contact. This is important as it can indicate acceptance, interest, and respect for the person, and thus aid in establishing rapport and communication.

B. Be a Good Observer. Carefully watch facial expression, body language and other clues that indicate the person is understanding. Frequently stop and re-check for that understanding.

C. Think in a Natural Order and Set the Scene. Using signs, gestures and mime, describe events in the order of their temporal occurence. Set the scene before giving the activity or action that you wish to communicate.

D. Be Aware of "Home-Made" Signs. Some minimal language skills persons use signs or gestures whose meaning is known only to a few family members and/or close friends. Interpreters should learn and use these.

E. Use of Pantomime (Mime). When pantomime is used, be clear and simple. Avoid detailed movements or acting out. Give small segments at a time, and periodically check for understanding before proceeding.

F. Use of Gestures. Imitating the action and/or appearance of persons, animals, and things, when combined with facial expressions in a meaningful context, is a helpful device. Certain gestures are understood by a wide variety of hearing and hearing-impaired persons and should be utilized as much as possible; e.g., you, me, eat, sleep, drink, walk, drive, and pointing at objects.

G. Use of Real Objects. Life size objects can be manipulated and/or pointed at by the interpreter and the client to establish communication. This might include clocks, calendars, furniture, etc. Miniature reproductions of real objects may also be used.

H. Use of Pictures. A good file of pictures of things, places, situations and persons can provide a valuable and easy means of communication. Pictures can be arranged to show a sequence of events.

I. Drawing Pictures. Use of stick figures, pictures or other simple line drawings can be used by an interpreter and client to exchange or convey information.

J. Use of Key Words. Mouthing or even writing of key words may be beneficial. Use only the most common English words and do not use a running stream of talk or written words; e.g., if "mother" is the key word, writing this word could be helpful.

K. Use of an Intermediary Interpreter. Sometimes this is necessary when communication is especially difficult. Two interpreters may be able to pool resources, both at the expressive and receptive level. When possible, the intermediary interpreter should be someone who is familiar with the communication behavior and skills of the consumer.

L. Use of Other Resource Persons. Family members and friends can be valuable resources since they have experience with the consumer and, therefore, may be able to provide the interpreter with specific input relative to the consumer's communication behaviors and skills, as well as important background information (e.g., where the consumer has lived, worked, etc.).

Position statement on nonspeech communication

The following position statement, drafted by the Ad Hoc Committee on Communication Processes and Nonspeaking Persons, was adopted as an official policy statement of the American Speech-Language-Hearing Association by its Legislative Council in November, 1980 (LC 15-80). 1980 committee members included. Billie Ackerman, ex officio; David R. Beukelman; Faith Carlson; Carol Cohen; Pam Elder; Suzanne Evans-Morris, public representative; Rich Foulds, public representative; Macalyne Fristoe; Linda F. Goodman; Debrah Harris; Arlene Kraat, public representative; Lyle Lloyd; Judy Montgomery; Howard Shane, chairman; Franklin G. Silverman; Barbara Sonies, Ronnie Wilber, public representative; Gregg Vanderheiden; James Viggiano, public representative; and David Yoder, Vice President for Clinical Affairs.

WHEREAS, the Executive Board of the American Speech-Language-Hearing Association (ASHA) established an Ad Hoc Committee on Communication Processes for Nonspeaking Persons, and

WHEREAS, one of the committee's charges was to develop a position statement for ASHA relative to its role in serving the communication needs of the more than 1½ million nonspeaking persons, and

WHEREAS, such a paper has been developed and published in the April, 1980 issue of *Asha* for peer review, and

WHEREAS, revisions of the position paper have been made to be in compliance with the ASHA Code of Ethics and the Council on Professional Standards in Speech-Language Pathology along with other membership concerns; therefore

LC 15-80. RESOLVED, That the position paper on Nonspeech Communication be adopted and disseminated in the same manner as have other position papers.

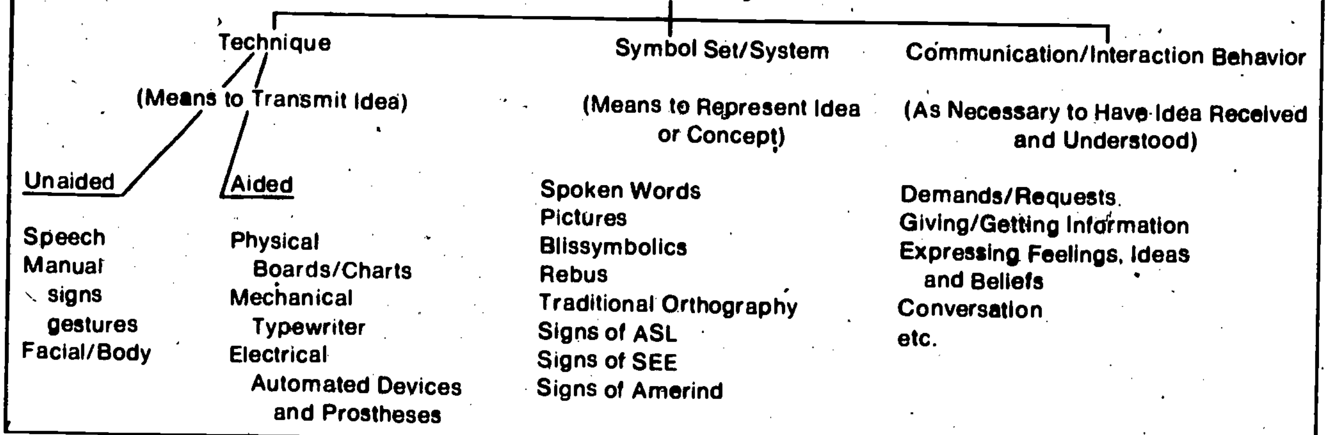
Recently, there has been a rapid and dramatic increase in the quality and quantity of services available to severely handicapped persons. Diversification of the provision of services to persons with multiple or severe handicaps has resulted in the expansion of professional competencies required of service providers. This situation has become particularly acute in those instances where professionals are assuming the responsibility of developing comprehensive service delivery programs for heretofore unserved or minimally served populations. One such group of individuals includes children, adolescents and adults who are nonspeaking and who usually exhibit to some degree neurological, emotional, physical or cognitive handicaps. It is encouraging that programs and services are now being made available to these persons, and that many advances have been made recently regarding the types of communication programs and systems which are available to them. Provision of effective and beneficial services and programs, however, depends upon the competencies of professional service providers. Although numerous professions will be included in the provision of communication services to the nonspeaking individual, speech-language pathologists should be primarily responsible for the development of treatment and intervention programs as such. Speech-language pathologists must have thorough working knowledge of and training in topic areas related to communication development for persons for whom speech may not be the primary mode of expression. There are a number of issues and concerns which relate to the development of such competencies in the speech-language pathologist. Issues of concern related to the design, implementation, and evaluation of communication programs for nonspeaking persons include: 1) terminology and delineation of client populations; 2) historical perspective related to service delivery in this area; 3) delineation of components involved in service delivery; 4) the role and professional responsibility of the speech-language pathologist in the provision of services; 5) impact of service needs on personnel preparation and the development of professional competencies; 6) professional ethics related to service delivery; and 7) current research and interprofessional activity needs.

Terminology

Numerous terms have been used to label the nonspeaking population, the methods used to improve their communication, and the intervention programs which have been used. The most frequent labels that are, and have been, used to describe the population include: severely speech impaired, speechless, nonoral, nonvocal, nonverbal, aphonic and nonspeaking. Operationally we are discussing a group of individuals for whom speech is temporarily or permanently inadequate to meet all of his or her communication needs, and whose inability to speak is not due primarily to a hearing impairment. In order to provide consistency with regard to terminology, the population under consideration will be referred to as nonspeaking persons. It is recognized that, although some of these individuals can produce a limited amount of speech, the speech exhibited is not adequate to meet all of their communication needs.

In order to provide effective communication systems for individuals whose speech is not fully functional a number of communication techniques have been developed which are in widespread use. Terms often used interchangeably to describe such communication techniques and programs include: nonoral, manual, nonvocal, gestural, nonspeech, nonverbal, alternative, assistive, augmentative, supplementary, aphonic, prosthetic and aided.

Figure 1.
Communication System



These communication techniques are seen as augmentative in that they are designed and utilized in such a manner as to supplement whatever vocal skills the individual may possess. The term augmentative will, therefore, be used to refer to this general classification of procedures which include both aided and unaided communicative techniques.

The term *augmentative communication system* will be used to refer to the total functional communication system of an individual which includes: 1) a communicative technique; 2) a symbol set or system; and 3) Communication/Interaction Behavior (See Figure 1).

The term *unaided* will be used to refer to all techniques which do not require any physical aids. Manual, gestural, manual/visual, sign or facial communication as well as oral speaking are considered *unaided communication* techniques (see Figure 1).

The term *aided* will be used to refer to all techniques where some type of physical object or device is used. Techniques which use communication boards, charts, and mechanical or electrical aids are considered *aided* communication techniques.

Symbols and symbol systems refer to the means to represent ideas and concepts. Examples of symbol sets/systems include spoken words, pictures, Blissymbolics, Rebus, traditional orthography, signs of American Sign Language, signs of Signing Exact English, and signs of Amerind (see Figure 1).

It should be recognized and cautioned that these "definitions" are generic and that speech-language pathologists should describe and provide specific detail regarding the etiology of the nonspeaking condition when referring to clients, and to the specific type of communication technique and intervention program used.

Historial perspective on service delivery

Historically, nonspeaking persons were placed in a speech treatment program or not given treatment, because oral speech did not appear to be feasible. Some pioneering efforts were made by a small number of speech-language pathologists and others in the development and use of communication boards for the severely physically handicapped or the use of manual signs with hearing, mentally retarded persons.

Recent technological advances in the development of augmentative communication aids and systems have offered new options for the nonspeaking population. In addition, augmentative communication systems have been developed, and/or applied differently, to effect communication with this population. The combined use of these communication techniques and symbol systems have been found to be effective in augmenting residual speech skills, and providing communication access.

Given the state of the art regarding the development and use of communication techniques, there is no nonspeaking person too physically handicapped to be able to utilize some augmentative communication system. Therefore, the speech and language professional is now faced with increasingly diverse program and treatment options for nonspeaking persons and she/he must develop the competency necessary to serve these clinical needs.

A large, previously untreated population exists. Recent prevalence figures indicate that there are over one million children and adults who are nonspeaking as a result of neurological, physical, emotional or cognitive disability. The development of effective communication systems is a current unmet need of these persons, and a need which will become the primary responsibility of speech and language professionals. For example, recent legislation (PL 94-142) mandates the development and implementation of effective educational programs for all handicapped persons under 22 years of age. As a result, many nonspeaking persons are currently being enrolled in educational programs. Their success depends upon the acquisition and demonstration of competent communication skills. The above factor alone will dramatically increase the number and diversity of nonspeaking persons on the speech and language professional's caseload within an educational setting. Another factor which will affect provision of service involves recent advances in the development and use of communication techniques and symbol systems.

Recent rapid advances in the development of augmentative communication systems has been fortunate for nonspeaking persons. At present, there is a critical need to supplement the speech and language professional's current knowledge of basic speech, language, and communication processes with training specifically dealing with the development and implementation of augmentative communication systems.

Components involved in service delivery

1) Assessment to Determine the Need and Appropriateness of an Augmentative Communication System or Systems:

In order to determine the need for the development and use of an augmentative system, and the intervention entry point, the nonspeaking persons should be assessed with regard to physical, sensory, emotional, and cognitive ability; speech and language skills; correct seating and positioning; general communication skills; communication needs (conversational and written) for social, emotional, educational and/or vocational purposes; family needs; and nature and quality of supportive services.

2) Selection and Development of An Effective Augmentative Communication/Interaction System or Systems:

Once the need for intervention has been decided, specific exploration related to selection and development of augmentative systems, which can provide the individual with the most effective and functional communication, needs to be explored. This involves consideration of unaided and aided communication techniques. In addition to determining the physical expressive means, an appropriate symbol system through which communicative messages can be formulated and expressed needs to be developed. This involves consideration of symbol systems.

3) Developing Interactive Skills:

Once an augmentative communication approach has been selected, the nonspeaking person will need to be provided with training in skills which will enable him/her to utilize the augmentative technique and symbol system in such a manner as to be able to achieve communicative competence as defined by the message-receiving community. This training includes: use of appropriate technique and selected symbols, strategies for developing effective communication interaction, as well as the training of persons who interact or potentially will interact with augmentative communication system users.

4) Follow Up and Ongoing Evaluation:

Appropriate implementation should include continual evaluation of the communication/interaction effected by the system, appropriate alteration of the system and communication strategies if indicated, and preparatory training for future use of different or more complex systems.

Role of the speech-language pathologist

Depending upon the particular needs of the client, the interdisciplinary evaluation team may include any or all of the following: speech-language pathologist, physical therapist, occupational therapist, educator, medical specialists, audiologist, psychologist, seating and fitting specialist, engineer, social worker, vocational counselor, vendors, third party agent, extended family and friends, primary caregivers, and the client.

The central role in initiating and coordinating the services of this team should be taken by the person most likely to initiate the recommendation for an augmentative communication system, based on his/her evaluation of the client's oral motor performance, language competence, and communication needs. Further, the person needs to possess the knowledge of language development and communication interaction which will be essential to the client's success in augmentative communication. In most cases the speech-language pathologist would be the person who best meets these requirements.

Therefore, the professional role of the speech-language pathologist in providing services to nonspeaking persons includes:

1) Assessing, describing, documenting, and continually evaluating the communication/interaction behaviors and needs of these persons;

2) Evaluating and assisting in the selection of the various communication techniques in order to develop an effective repertoire of communicative modes;

3) Developing speech and vocal communication to the fullest extent possible;

4) Evaluating and selecting the symbol systems for use with above selected techniques;

5) Developing (and evaluating the effectiveness of) intervention procedures to teach the skills necessary to utilize augmentative systems in an optimal manner;

6) Integrating assessment and program procedures with family members and other professional team members;

7) Training of persons who interact with the nonspeaking individual; and,

8) Coordination of augmentative communication services.

In addition to the above, another primary role of the speech-language pathologist is that of client advocacy. Although there is continual increase in the use of nonvocal communication modes, there remains, for the most part, a knowledge/experience gap in terms of the general public's acceptance and understanding of these modes. Successful communication development programs necessitate that speech-language pathologists help clients to develop effective skills with which to interact with both speaking and other nonspeaking persons in their community. In order to achieve this, and in order to help clients secure financial support for needed communication prostheses, clinicians must be able to serve as client advocates—educating their co-workers and communities about nonspeech communication in general and their client's needs in particular.

Personnel preparation

Current training should provide speech-language pathologists with competency in the areas of basic speech, language, and hearing processes. Training in competency areas specifically related to the development and use of augmentative communication systems has not been incorporated into most programs. This latter training should include the development of competencies specifically related to:

1) Assessment procedures for determining augmentative communication system candidacy, and selection of system components;
2) Assessment of prelinguistic communicative interaction strategies in nonspeaking persons;
3) Knowledge of currently available aided and unaided techniques;
4) Knowledge of available symbol options;
5) Knowledge of the nature of augmentative communication in interaction with speaking and nonspeaking persons;
6) Development and evaluation of communication intervention programs specifically designed to teach nonspeaking persons those skills needed in order to achieve communication competence via augmentative communication techniques;
7). Knowledge of the effect of appropriate seating and positioning on the users control of the speech mechanism and on a nonspeaker's communication technique; and,
8) Advocacy and funding procedures.

Professional ethics related to service delivery for nonspeaking persons

The revised Code of Ethics of the American Speech-Language-Hearing Association effective January 1, 1979, stresses the professional responsibility of speech-language pathologists and audiologists in providing services. For those individuals who serve nonspeaking persons and recommend augmentative communication systems, several fundamental rules of ethical conduct are particularly relevant:

Training:

> *"Individuals shall maintain high standards of professional competence* . . . Individuals must neither provide services for which they have not been properly prepared, nor permit services to be provided by any of their staff who are not properly prepared" (Principle of Ethics II, Ethical Proscription 1).

Few education and training programs include instruction or clinical experience in augmentative communication. Therefore, speech-language pathologists and audiologists who lack formal training in nonspeech communication must assume responsibility for continuing education by reading, attending meetings and workshops, seeking consultation, and other means of increasing their knowledge and competence about this aspect of habilitation.

Services:

> *"Individuals shall hold paramount the welfare of persons served professionally.* Individuals shall use every resource available, including referral to other specialists as needed, to provide the best service possible" (Principle of Ethics I, A).

If a speech-language pathologist or audiologist is unable to adequately assess and instruct clients in the use of augmentative communication systems, the client should be referred to a specialist who can provide appropriate services. Furthermore, it appears to us that the speech-language pathologist has the obligation, despite his/her own bias with regard to speech and an augmentative communication system, to inform the individual and his/her family about the existence of those systems and the available options for communication.

> *"Individuals shall honor their responsibilities to the public, their profession, and their relationship with colleagues and members of allied professions* . . . Individuals should strive to increase knowledge within the profession and share research with colleagues . . . establish harmonious relations with colleagues and members of other professions . . . inform members of related professions . . . as well as seek information from them" (Principle of Ethics V, Professional Propriety 3, 4).

Speech-language pathologists and audiologists who are knowledgeable about augmentative communication have a professional responsibility to share information which will benefit communicatively handicapped individuals. Providing nonspeaking persons with augmentative communication devices necessitates interdisciplinary cooperation. Therefore, it is imperative that parents, physical therapists, occupational therapists, psychologists, teachers, physicians, and other specialists involved in providing service to a nonspeaking person be provided and share information about augmentative communication systems.

Dispensing of products

> *"Individuals shall maintain objectivity in all matters concerning the welfare of persons served professionally.* Individuals who dispense products to persons served professionally shall observe the following standards:
>
> (1) Products associated with professional practice must be dispensed to the person served as part of a program of comprehensive habilitative care.
> (2) Fees established for professional services must be independent of whether a product is dispensed.
> (3) Persons served must be provided freedom of choice for the source of services and products.
> (4) Price information about professional services rendered and products dispensed must be disclosed by providing to, or posting for, persons served a complete schedule of fees and charges in advance of rendering services, which schedule differentiates between fees for professional services and charges for products dispensed.
> (5) Products dispensed to the person served must be evaluated to determine effectiveness" (Principle of Ethics IV, A).

In order to dispense augmentative communication devices, speech-language pathologists and audiologists must observe the ethical principles stated above. In addition, they should have an adequate knowledge of various types of devices in order to make a judicious evaluation and recommendation. Ideally, several communication devices should be available to permit a nonspeaking person to use a device prior to the selection and purchase of one.

Current research and interprofessional activity needs

Attention to the needs of nonspeaking persons has grown so rapidly that the "consumer market" and client population is currently overwhelmed with the variety of aided and unaided techniques and program options available, and with the lack of substantive information regarding the use, applicability, and effectiveness of each. As a result, service delivery programs are being implemented in an unorganized fashion and many client's needs are not being met or are being met in an inappropriate manner.

Therefore, critical research needs and questions are:

1) What are the most effective strategies for:
   a. symbol acquisition;
   b. learning to use aided and unaided techniques;
   c. facilitating interaction?
2) Considering the physical, cognitive, linguistic and communication parameters of the nonspeaking person, which available augmentative systems best meet his/her needs?
3) If clinical observations regarding increase in vocalizations following exposure to augmentative communication systems are correct, why is this so?
4) What is the role of iconicity in the learning of a symbol system?
5) How can spontaneous communication be encouraged?
6) Which factors, singly or in combination, make a person high risk for not becoming an oral communicator?
7) How can interaction best be fostered between speaking and nonspeaking persons?
8) What are effective means of increasing rate of communication by augmentative communication systems users?
9) Does the language development of users of augmentative systems parallel that of normal language development?

In addition, the Committee sees the need for:

1) Greater investigation and use of electronic and computer-assisted systems; and
2) The development of tests and procedures for assessing the communication abilities of the nonspeaking population.

As regards future interprofessional activities, there is a need to develop some vehicle/organization which can:

—provide a "common ground" for written and verbal communication between professionals from the diverse disciplines which serve nonspeaking persons;

—assume an active role in advocating and providing for the nonspeaking client's communication needs; and

—disseminate information in the area to professionals, parents, and nonspeaking persons.

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A paper presented at the CEC 3rd National
Congress, Winnipeg, 1978

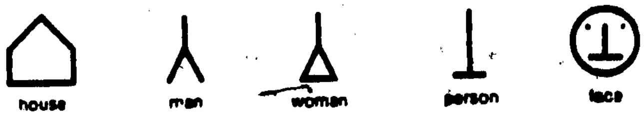
BLISSYMBOLICS

Shirley McNaughton
Programme Director
Blissymbolics Communication Institute

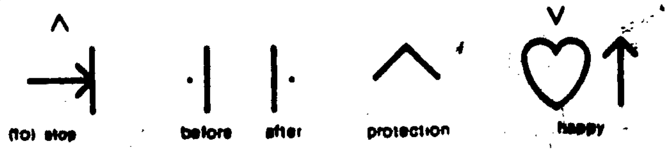
Blissymbolics is a communication system which is having widespread application within a growing number of disability groups. It was initially conceived in the 1940's by Charles K. Bliss as an international language for the promotion of world understanding (Bliss, 1965). It's first application, however, was for a very different purpose. In 1971, cerebral palsied children at the Ontario Crippled Children's Centre, Toronto, Ontario, were introduced to Blissymbols by an interdisciplinary team working to facilitate the communication of children unable to speak due to motor disturbances of the systems involved with the production of speech. (Kates & McNaughton, 1975).

This presentation includes a brief description of the system of Blissymbolics followed by discussion of its application, with attention being directed toward its possible strenghts and weaknesses for the various populations with whom it is being utilized.

Blissymbolics is a visual, meaning-based communication system. Some of the symbols are *pictographs:* they look like the things they represent.



Some symbols are *ideographs:* they represent ideas.

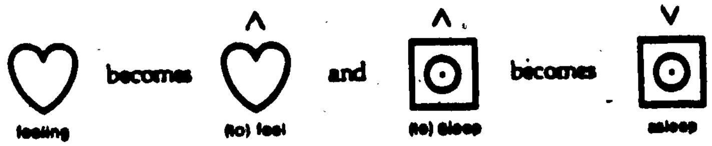


Other symbols are *international,* recognized and used throughout the world.

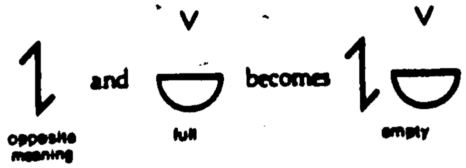
Still other symbols are *arbitrary.*

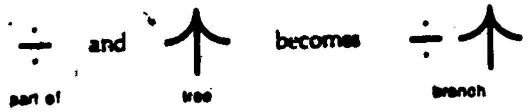
The structure of the system enables the user to expand a small number of basic symbols into a symbol vocabulary of infinite size. Symbol elements may be *combined* to create new symbol expressions.

Through the addition or substitution of *indicators*, a symbol may be changed from one part of speech to another.

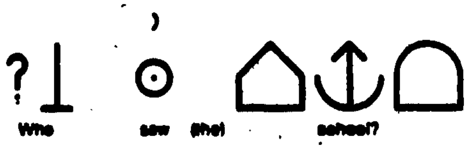


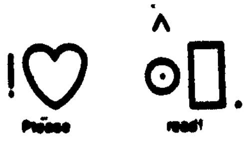
A group of symbols designated as *strategies* allows a user to expand his symbol vocabulary. The examples below show the strategies of "opposite meaning" and "part of".





Above all, Blissymbolics provides the user with the capability to communicate in *sentences*.





As an integral part of the system, a *word equivalent* appears with each symbol. This enables a person unfamiliar with Blissymbols to follow and understand the communication of a symbol user.

Much development has taken place since the initial Ontario application of Blissymbolics with a group of six physically handicapped children ranging in age from 4 years to 8 years. Blissymbols are now being used by an estimated 12,000 to 18,000 children throughout the world. Countries with Blissymbol programmes include: Canada, U.S.A., Great Britain, Sweden, Australia, New Zealand, France, Holland, Israel.[1]

Blissymbols are known to be assisting persons with communication difficulties within the following disability groups: physically handicapped, retarded, multiply handicapped, autistic, aphasic, adult stroke patients. (Cook, 1976; Elder, 1978; Fristoe, 1978; Goddard, 1977; Harman & Hollingsworth, 1978; Harris-Vanderheiden, 1975; Harris et. al., 1979; Hughes, 1976; Kaprowy, 1977; McNaughton & Kates, 1978; Reckell, 1977; Saya, 1978; Scoville, 1978; Seigman-Wine, 1978; Silverman, McNaughton & Kates, 1978; Warrick, 1978). Through material development and distribution, Associate Membership, instructor training and the study and advancement of the system of Blissymbolics, the Blissymbolics Communication Institute (B.C.I.) works to maintain a standard form of Blissymbolics and to promote a responsible and informed application of the system[2] (McNaughton, 1978). Current support materials available from the Blissymbolics Communcation Institute, Toronoto, focus upon the individualization of Blissymbol displays to meet the needs of each user. Symbol stamps, blank grids and an explanatory pamphlet assist the instructor in constructing displays through selecting from 1,000 symbols. The Handbook of Blissymbolics, based on the results of an Evaluation Study[3] which examined the symbol programmes of 157 students in 32 settings, provides a valuable resource book for instructors, users, administrators and parents. It offers introductory information relating to the system and a detailed presentation relating to assessment and programming. Newly available, a set of 250 symbol cards now gives the instructor a wide choice of large-size symbols for the early Blissymbol display as well as an aid to be used as flash cards within the instructional programme. Other instructional support materials include: templates for symbol drawing; introductory workbooks (see Mann, 1978); Blissymbols for Preschool children, a booklet; (see Warrick, 1978).

Given the diverse needs of special populations composed of different age, intellectual and disability levels, the system's structure and capabilities can be perceived as either strengths or weaknesses. In Non-Speech Language & Communication Analysis and Intervention, (Schiefelbusch, 1979) McNaughton and

Kates outline the general strengths and weaknesses of Blissymbolics as a communication system for persons who lack functional speech. As experience is gained with specific disability groups, the system's strengths and weaknesses for particular populations, become apparent. Here are some examples. The small number of shapes from which Blissymbols are composed facilitates their reproduction; provides simple, clearly-defined outline symbols; allows the preschool child to draw them; enables the physically handicapped person to semantically reuse symbols to create new meanings through "combining" symbols. This "strength" of the system may be a "weakness" in applying Blissymbols with retarded students, for whom size, angle and directional differences of a limited number of shapes are diffficult to perceive. The "strength" of Blissymbolics for the physically handicapped and mentally retarded populations in the way it facilitates teleghraphic, direct statements may prove to be a weakness in applying Blissymbolics to the young child for whom native language patterns are being encouraged. The capability of Blissymbolics to represent a number of extended and related meanings is extremely valuable to the physically handicapped person, young child, stroke patient; however, it may be confusing to the retarded or multi-handicapped person who needs a one-to-one correspondence between symbol and referrent.

One "strength" which applies to <u>all</u> applications of Blissymbolics is the widespread usage of Blissymbols, with the resultant broadening of the Blissymbol community. Kaprowy (1977) reports the continuation of Blissymbol instruction for a student who moved to Winnipeg from a distance of 1500 miles. Blissymbol instruction is becomming available in more and more regions of North American and in more and more countries around the world. The growing number of support products, the increasing familiarity with the system's creative, "fun" aspects, research and technological interest in Blissymbolics -- all contribute to its wider application.

In the same way in which Blissymbolics' strengths and weaknesses can be assessed through examining the capabilities of a particular population of users, so can its characteristics be evaluated as the symbols are presented through various technical media. (McNaughton, 1977). Whether the Blissymbols are printed on tape as with the Blissom[4], portrayed on a television screen as with the Blissymbol Terminal[5], or printed on a display grid[6&7], the constraints of the medium and the basic system requirements of Blissymbolics need to be carefully considered. The system's requirements for size, angle, shape, spacing, and position uniformity present serious difficulties for aid developers. Appreciation of the importance of maintaining a standard form of Blissymbolics for each presentation medium is leading to many cooperative ventures between the Blissymbolics Communication Institute and individuals and organizations who are developing aids. What could be initially perceived as weaknesses in Blissymbolics with regard to the difficulty of presentation through different media become problems to be tackled and solved.

It becomes increasingly important, as Blissymbols spread to new groups for new purposes, to base any application and research of the system upon a thorough knowledge of the system itself. Providing a source for the information and ensurring that the system develops in a way which is consistent yet relevant to its application is the function of the Blissymbolics Communication Institute through its Toronoto base and its network of Resource Centres. It is a formidable responsibility, yet one which is essential during these early years of Blissymbol Communication. Through Associate Membership[8], the involvement of all Blissymbol users, instructors and supporters is welcomed.

FOOTNOTES

[1] Based on information derived from the number of instructors trained through Toronoto and field Elementary Workshops, conducted by the Blissymbolics Communication Institute, (B.C.I.) and its current and former Resource Centres in Vancouver, B.C.; Sarnia, Ontario; Ottawa, Ontario; Toronto, Ontario; Quebec City, P.Q.' Philadelphia, Penn.; Madison, Wisc.; Great Britain; Sweden.

[2] Complete information regarding Associate membership and B.C.I. services available through the Blissymbolics Communcation Institute, 320 Rumsey Road, Toronto, Ontario, Canada, M4G 1R8.

[3] "Formative Evaluation of the Ontario Crippled Children's Centre Symbol Communication Programme", Section 2, Handbook of Blissymbolics, 1978 published by the Blissymbolics Communication Institute; authors: Silverman, H.; Kates, B. McNaughton, S., 1978.

*[4] Bliscom, developed by TRACE Centre, Madison, Wisconsin. (Silverman & Kelso, 1977).

*[5] Blissymbol Terminal, developed by NORPAK Industries through funding from NCR, Canada.

*[6] 100 Blissymbol and 512 Blissymbol displays developed by PRENTIKE-ROMICH.

*[7] 512 Blissymbol Display developed by Dr. G. Iles, Ontario Crippled Children's Centre, 1978.

[8] Associate membership entitles Blissymbol users, parents, instructors and supporters to the Blissymbolics Communication institute Bulletin and newsletter -- each distributed three times per year. Application forms are obtainable from the Blissymbolics Communication Institute. 862 Englinton Avenue East, Toronto, Canada, M4G 2L1.

* Further information on the above aids available through Blissymbolics Communcation Institute.

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ELECTION CRITERIA FOR THE ADOPTION OF AN AUGMENTATIVE COMMUNICATION SYSTEM: PRELIMINARY CONSIDERATIONS

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Criteria for determining candidacy for an augmentative communication system are reviewed. Included is a consideration of cognitive, oral reflex, language, motor, intelligibility, emotional, chronological age, previous therapy, imitative, and environmental factors. The multiple factors are arranged on a branching type decision matrix, which yields a decision to either elect, reject, or delay implementation of an augmentative communication system. Case data demonstrating application of the decision matrix are presented.

Within the past 10 years, the increase in the use of augmentative communication systems has been significant. The decision to recommend an atypical method of communication has a pervasive influence not only on handicapped communicators but also on all those with whom they interact. What is needed are specific criteria upon which that decision can be based.

We propose a preliminary decision-making process for determining an individual's candidacy for an augmentative communication system. We will not address which system or teaching method would best serve the individual for whom a nonspeech system is deemed appropriate. Although augmentative communication systems are used with persons having adventitious communication disorders, the described decision process is intended for disorders having a congenital origin.

Decision making results from an evaluation of data derived from 10 areas of clinical concern arranged in levels of a branching type decision matrix described in Figure 1. These include considerations of cognitive status, oral reflex status, language and motor speech production, intelligibility, emotional factors, chronological age, previous therapy, speech imitative ability and the environment.

DISCUSSION

Decision Outcomes

The decisions generated from the matrix are specified as to whether the

final decision is to elect, delay, or reject an augmentative communication system. A decision to elect designates that such a system be used to facilitate oral language production (Skelly, Schinsky, Smith and Fust, 1974), to augment communication (Vanderheiden and Harris-Vanderheiden, 1976), to enhance oral speech intelligibility (Beukelman and Yorkston, 1977), or some combination of the above. A decision to delay indicates that an augmentative communication system is inappropriate at the time, possibly because of lack of cognitive readiness or the need to study the effects of a different form of therapy. A decision to reject indicates that expression through speech rather than through a nonspeech system is considered more appropriate.

The Decision Matrix

The decision matrix consists of the 10 categories (I-X), the specific components of each category, and the branching alternatives (refer to Figure 1).

Level I—Cognitive Factors. At the first level, cognitive factors are investigated. The three specific interrelated factors deal with sensorimotor intelligence (Chapman and Miller, 1980), mental age, and the ability to represent through pictures (Shane, 1980). Noncompliance with any of these factors leads to a decision to delay. Such a decision reflects the lack of cognitive prerequisites necessary for intentional communication (Reichle and Yoder, 1979; Chapman and Miller, In Press) or the ability to represent the object world through two-dimensional pictorial information. In this case, attention to facilitating cognitive growth, such as that advocated by Kahn (1978), is recommended. Also, teaching specific prerequisite abilities for augmentative communication system use might be suggested, that is, attending behavior, scanning, direct selection, and/or visual discrimination. Compliance with one or more of the cognitive factors leads to Level II, a focus on oral reflex factors.

Level II—Oral Reflex Factors. A significant aspect of the oral reflex level of the decision matrix is that of all the factors investigated, obligatory persistence of oral reflexes can, in isolation, lead to a decision to elect an augmentative communication system. No other factor in isolation has such a solitary influence on election. Our observation and that of others experienced in prespeech intervention[1] and speech therapy for the cerebral palsied (Mysak, 1963) is that persistent pathological oral reflexes suggest an extremely poor prognosis for oral speech development. We view these factors as an early predictor of failure to develop speech and as one which leads to election of an augmentative communication system. Thus, if these factors are present, a move to Level X—Implementation Factors-Environment is recommended. In addition, the recommendation to try to inhibit the obligatory reflex pat-

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[1] S. E. Morris, Personal communication (1978).

LEVEL I COGNITIVE FACTORS
At least Stage V sensorimotor intelligence?
At least 18 months mental age; or ability to recognize at least at photograph level?
YES → Go to II
NO → Delay

LEVEL II ORAL REFLEX FACTORS
Persistent (1) Rooting; (2) Gag; (3) Bite; (4) Suckle/Swallow, or (5) Jaw Extension Reflex?
YES → ELECT → Go to X
NO → Continue to III

LEVEL III LANGUAGE AND MOTOR SPEECH PRODUCTION FACTORS
A. Is there a discrepancy between receptive and expressive skills?
YES → Go to III B
NO → Go to V
B. Is the discrepancy explained predominantly on the basis of a motor speech disorder?
YES → Go to V
NO → Go to III C
UNCERTAIN → Go to IV
C. Is the discrepancy explained predominantly on the basis of an expressive language disorder?
YES → Go to VII
NO → Go to VI
UNCERTAIN → Go to V

LEVEL IV MOTOR SPEECH—SOME CONTRIBUTING FACTORS
Presence of neuromuscular involvement affecting postural tone and/or postural stability?
Presence of praxic disturbance?
Vocal production consists primarily of vowel production?
Vocal production consists primarily of undifferentiated sounds?
History of eating problems?
Excessive drooling?
YES → Evidence to support motor speech involvement (Go to V)
NO → Evidence against motor speech involvement (Go to V)

LEVEL V PRODUCTION—SOME CONTRIBUTING FACTORS
Speech unintelligible except to family and immediate friends?
Predominant mode of communication is through pointing, gesture, facial-body affect?
Predominance of single word utterances?
Frustration associated with inability to speak?
YES → (Evidence to ELECT) Go to VII
NO → (Evidence to DELAY OR REJECT) Go to VII

LEVEL VI EMOTIONAL FACTORS
A. History of precipitous loss of expressive speech?
YES → Go to VIII
NO → Go to VI B
B. Speaks to selected persons or refuses to speak?
YES → Go to VIII
NO → Go to V

LEVEL VII CHRONOLOGICAL AGE FACTORS
A. Chronological age less than 3 years?
YES → Go to VIII A
B. Chronological age between 3 and 5 years?
YES → Go to VIII A
C. Chronological age greater than 5 years?
YES → Go to VIII A

LEVEL VIII PREVIOUS THERAPY FACTORS
A. Has had previous therapy?
YES → Go to VIII B
NO → Go to IX, weigh evidence - (DELAY with Trial Therapy or ELECT) Go to X
B. Previous therapy appropriate?
YES → Go to VIII C
NO → DELAY with Trial Therapy
C. Therapy progress too slow to enable effective communication?
YES → ELECT → Go to X
NO → DELAY → continue therapy
D. Therapy appropriately withheld?
YES → ELECT → Go to X
NO → DELAY with trial therapy

LEVEL IX PREVIOUS THERAPY—SOME CONTRIBUTING FACTORS
Able to imitate (with accuracy) speech sounds or words; gross motor or oral motor movements?
YES → (Evidence to DELAY) Go to VIII
NO → (Evidence to ELECT) Go to VIII

LEVEL X IMPLEMENTATION FACTORS—ENVIRONMENT
Family willing to implement (use, allow to be introduced) Augmentative Communication System recommendation?
YES → IMPLEMENT
NO → COUNSEL

Figure 1. Election Decision Matrix.

terms might be appropriate. The nonexistence of abnormal oral reflexes leads to Level III.

Level III—Language and Motor Speech Production Factors. This level is used to establish whether motor (Level III B) or language (Level III C) factors can account for a discrepancy between receptive and expressive skills (Level III A). As the nature of the discrepant function is assessed and determined, branching to specified juncture points occurs. In III B and C, the notion of clinical uncertainty presents itself. To counter clinical indecision or possible inappropriate nonspeech system adoption, Level IV—Motor Speech - Some Contributing Factors and Level V—Production - Some Contributing Factors, have been included in the decision matrix.

Level IV—Motor Speech - Some Contributing Factors. In young or hard-to-test individuals, specifying the presence of a motor speech disorder may be difficult. Consequently, Level IV contains a cluster of factors that are thought to contribute to the diagnosis of neuromotor involvement. These factors include neuromuscular status, eating history, praxic skills, vocal repertoire, and excessive drooling. The practitioner is encouraged to evaluate these factors and use this information for effective decision making.

Level V—Production - Some Contributing Factors. Factors included in Level V contribute to an understanding of production deficits. Here a communicator's intelligibility, utterance length, frustration, and use of nonverbal communication forms are studied. As in Level IV, information derived from this level offers evidence for overall decision making.

Level VI—Emotional Factors. For some potential nonspeech system candidates, emotional factors exist, for example, elective mutism, that warrant careful study. The decision matrix attempts to account for this in Level VI—Emotional Factors. Careful historical information, including a detailed account of previous therapy, is crucial for appropriate decision making in cases in which the primary etiology is emotionally based.

Level VII—Chronological Age Factors. In the decision-making process, chronological age should be considered. However, its influence tends to be one of changing the relative influence or importance of other factors at different ages rather than one of having a solitary effect. Chapman and Miller (1980) suggest that chronological age be used as a standard to compare factors such as development of cognition, comprehension, and production. Although each of the age ranges is listed as a separate factor in the matrix, each leads to the identical outcome, Level VIII A. The practitioner is encouraged to use chronological age as a reminder that the weighing of other factors will vary as a function of age. Accordingly, a 10-year-old nonspeaking child would be viewed differently from a child with similar clinical symptomotology who is three years of age. With the 10 year old, the discrepancy between physical, cognitive, and linguistic functioning and chronological age would tend to exaggerate the lack of expression and influence the election option. With further research, understanding of how age influences

decision making and of the predictive ability to identify potential nonspeakers at an earlier age should improve. The earlier we are able to predict that an individual will be nonspeaking, the sooner we can introduce an augmentative communication system that may permit effective communication.

Level VIII—Previous Therapy Factors. Previous therapy is a critical juncture in the decision-making process and one that clinicians often overlook in their zeal to effect communicative growth. The factors at this level imply that the practitioner has knowledge of a myriad of speech therapy practices if therapy appropriateness and outcome expectations are to be systematically considered. We prefer that individuals be oral communicators. Consequently, knowing the response to previous speech therapy or allowing time for trial therapy seems obligatory before any decision to elect is made. For this reason, a decision to delay is a frequent outcome at this level.

Level IX—Previous Therapy - Some Contributing Factors. Guess, Sailor and Baer (1978) report that the inability to imitate relates closely with failure in their orally-based functional language program. Kent (1974) considers imitation as prerequisite to her language program. We view the ability to imitate as contributing to success in traditional speech therapy programs. The ability is a useful factor in our attempts to determine whether to delay or to elect is the appropriate decision.

Level X—Implementation Factors - Environment. Level X—Implementation is perhaps the most powerful factor in the decision-making process. At this level, the family must decide whether or not to sanction the actual implementation of a recommended nonspeech communication system. Our clinical experience is that for most families, accepting an elect decision is both painful and difficult. Whenever a family is unwilling to implement a system, counseling, in the form of a review and restatement of the factors that led to the decision, is urged. Some individuals have educational decisions made by peripherally interested parties. This is often the case with children who are state wards and living in institutional environments. We believe that stronger advocacy at the implementation level would result in more individuals being appropriately placed and making notable progress with augmentative communication systems.

CLINICAL APPLICATION

The applicability of the model will be demonstrated through the use of three case examples. Figures 2-4 illustrate the movement through various levels, the intermediate decision-making process, and a final outcome. In Figures 2 and 3, the decision matrix is applied to two children having mixed (spastic and athetoid) cerebral palsy. The decision for both cases was election of an augmentative communication system. Although in Case 2 (Figure 3), a decision to elect was derived from the matrix at Level II, after a positive finding regarding persistent and obligatory oral reflexes, diagnostic information from other levels of the matrix is still needed.

	Area of Assessment	Decision	Branching Statement
Level I:	Cognitive Status	Yes	Go to II
Level II:	Oral Reflex Behavior	No	Go to III
Level III:	Language and Motor Speech,		
III A:		Yes	Go to III B
III B:		Yes	Go to V
Level V:	Production Contributory	Yes	Go to VII A
Level VII A:	Age	Yes	Go to VIII A
Level VIII A:	Previous Therapy	Yes	Go to VIII B
Level VIII B:		Yes	Go to VIII C
Level VIII C:		Yes	Elect Go to X
Level X:	Implementation	Yes	Implement

Figure 2. Case 1: A.T., Chronological Age = 3 yrs.

	Areas of Assessment	Decision	Branching Statement
Level I:	Cognitive	Yes	Go to II
Level II:	Oral Reflex Behavior	Yes	Adopt Go to X
Level X:	Implement	Yes	Implement

Figure 3. Case 2: M.C.L., Chronological Age = 6 yrs. 5 mon.

Figure 4 presents the case of an adolescent girl who was referred to the Children's Hospital Medical Center for development of an augmentative communication system. The initial interview revealed that she had ceased talking to selected persons in selected situations. No previous oral therapy had been tried. Following a diagnosis of elective mutism, six months of therapy that centered on expression through speech resulted in a return of her previous oral speaking abilities.

	Area of Assessment	Decision	Branching Statement
Level I:	Cognitive	Yes	Go to II
Level II:	Oral Reflex	No	Go to III
Level III:	Language and Motor Speech		
III A:		Yes	Go to III B
III B:		No	Go to III C
III C:		No	Go to VI
Level VI A:	Emotional	No	Go to VI B
Level VI B:	Emotional	Yes	Go to VII A
Level VIII A:	Previous Therapy	No	Delay

Figure 4. Case 3: S.K., Chronological Age = 17 yrs.

We have attempted to make explicit some of the clinical considerations used in the evaluation of nonspeaking children by imposing decision logic. We are aware, however, that we have not succeeded in removing intuitive good sense from the process, and such was not our intent.

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The nonspeech child should be provided with an augmentative system for communication. Factors to be considered in the selection of such a system are discussed.

Communication Systems for Nonspeech Children

David E. Yoder

The problem discussed in this chapter is the one faced by teachers, clinicians, parents, rehabilitation counselors and others trying to develop an effective means of communication for children who are nonspeaking. The term nonspeech child as used here refers to those individuals for whom speech is not *now* a functional means of meeting their communication needs. This does not mean the child has no speech or vocalization abilities, nor does it mean that the child may not develop fully functional speech in the future. There is evidence that augmentative communication aids and systems do promote speech, both developmentally and for functional use. We are referring to nonspeech children as those who are at present severely handicapped in communicating because they are unable to fulfill their communication needs with their limited or nonexistent speech abilities. In the United States, there are an estimated 1,225,000 children who are nonspeaking, or severely speech impaired as a result of a neurological, physical, or psychological disability. Children whose nonspeech behavior results primarily from hearing impairment and/or deafness are not included in this discussion (see Maestas y Moores, and Moores this volume).

The term nonspeech children, as used in this chapter, groups together completely nonvocal, nonoral, nonvocal/nonoral, nonspeech with potential for later development of speech, and the partially speaking (severe intelligibility

problems). This is done for the following reasons: All of these children have the same problem—a nonfunctional communication system; they all need a means to augment their present way of communicating in order to compensate for partial or complete inadequacies in their oral communication system; and they all have similar communication needs. With respect to a nonfunctional communication system, this is viewed primarily as an ineffective means to express ideas, thoughts, and needs. Because of severe speech-motor problems (both congenital and acquired), the child is not able to formulate the sounds, words and phrases in an intelligible manner. On the other hand, a number of neurologically, cognitively, and emotionally impaired children may not have acquired the receptive, comprehension and/or expressive skills for effective speech communication. In the latter case, finding an effective communication system means finding a system through which the child acquires comprehension as well as expressive skills.

All nonspeech children need an augmentative means of communicating and interacting. The emphasis here is on the concept of *augmentation*. When speech is not currently useful as the major means of communication, we look for supplementary techniques and systems to enhance and facilitate communication by complementation of whatever vocal/oral skills the individual possesses. Harris and Vanderheiden (1979) suggest that use of augmentative techniques supplement speech in partially vocal-speaking persons, and facilitates the development of language and communication in persons who can not yet speak, but may eventually develop functional speech. It is suggested that if augmentative communication techniques and systems are implemented early, delayed development in the motor control necessary for speech and fine motor movement need not have severe delaying effects upon the development of language and social skills. A necessary point to make here is augmentative systems and techniques are not to be viewed as alternatives for speech. The term *alternative system* rather than "augmentative" system reflects the notion of failure or defeat for the nonspeech child ("you have failed at speakin[illegible] and so we will replace speech"). This certainly reduces the importance of speech in partially vocal and speaking individuals, and further suggests that from now on speech is ruled out. Only when there is incontrovertible evidence that the child will not ever be able to use speech should we think of the notion of replacing speech with an aid or device. If possible, speech therapy should continue as part of the child's habilitation program, even though an augmentative system has been adopted.

Regardless of the living environment, educational setting and eventual vocational placement, there are communication demands which are quite similar with respect to everyday functions. Whether we are persons who use or are unable to use speech has little to do with the personal demands which are present for communication and interaction. Consequently, having an augmentative aid available allows for the use of the system when speech skills are inadequate or when the unfamiliarity of those with whom nonspeech children interact prevents communication via speech.

Nonspeech Variables to Consider

We have discussed the fact that nonspeaking children vary in their speech and communication abilities, but there are additional ways in which they will differ. These variables are interactive with the speech-communication problem the person exhibits. For that reason, when working to develop effective communication systems for the widely varying population, it is necessary to bring together an interdisciplinary team to determine the best solutions and approaches.

Age. Communication needs will differ with age, and there will be an interaction of age with all the variables which follow. The point to keep in mind is that communication and language development are directly related to motor, cognitive and sensory developmental phenomena. The gaps which may appear between and among these behaviors are important to note, both for selecting an appropriate augmentative system and aid and for predicting how it will be used by the child.

Cognitive Ability. Many nonspeaking children may experience cognitive deficits in conjunction with motor and social skill development problems. These deficits may range from mild to severe mental retardation. The child with a mild or moderate cognitive delay may only be slow in acquiring and using the augmentative system selected. However, the child with severe cognitive deficits in addition to severe motoric handicaps will require special consideration, and possibly a combination of techniques and approaches in the development and use of a communication system. Chapman and Miller (1979) and Reichle and Yoder (in press) suggest that augmentative communication systems will not be successfully acquired or used until the child has reached the sensorimotor stage of V and VI.

Motor Ability. The extent of the physical and motor problem manifested by the child can have definite consequences on communication and cognitive development. Primary reduction or inconsistent ability to interact with and explore the environment through play or vocalizations present a number of complications in developing communication and interaction skills in general, and also in learning to use an augmentative system. Impairment of motor coordination handicaps the child's ability to explore, manipulate and experience objects, persons and events in the environment. Piaget (1964) has postulated that throughout the sensorimotor period (0 to 21 months) motoric interaction and object manipulation are important for the development of symbolic representation and related cognitive skills which are prerequisite to the development and use of language. We also find that reduced and inconsistent ability to play and interact with primary caregivers, peers, and others through "usual" motor patterning and movements (facial, vocal, and verbal imitations) adversely effects the development of cognitive and linguistic skills (Yarrow and others, 1975). Nonspeaking children with severe physical handicaps are frequently unable to stimulate positive affect from caregivers in their environment. Social interaction is frequently decreased due to the spastic or athetoid movements, persistence of infantile reflex patterns, involuntary facial grimaces, lack of consistent smiling responses, and the necessity for continual supportive care in daily living skills. Motor-related handicaps do result in social, interactional, motivational, and communicative handicaps. In addition, most augmentative communication systems are basically operated through motor movements of one sort or another; therefore, it is of importance whether the child has the motor coordination to point to objects and symbols, or has motor posture movement problems that make the use of any type of communication device difficult.

Visual Ability. The environment is explored not only by means of motor interaction, but visually as well. During the first few months of life, children engage in visual tracking, localizing, and nonspeech communicative acts of "line of regard" (Reichle and Yoder, 1979). Essentially, children are engaging in "eye pointing" which is intended to direct the attention or actions of other persons in the environment to specific objects, events, and actions of interest to the child. For many motor-handicapped children who do not have the ability to grasp, reach, and point for and to objects, the use of the eyes for carrying out such activities becomes extremely important. The use of the eyes for pointing to objects and symbols on augmentative aids may be the most efficient mode for communication. Bruner (1975) has pointed out the importance of vision as it relates to the development of cognitive skills as well as for social and communication purposes.

Communication Ability. Frequently we become so engrossed in the speech motor mechanism as the primary cause of speech and communication problems that we fail to look at other modes of interaction which may be appropriate for communication. We must look beyond the motoric barriers to communication development. For example, the child may experience an inability to express sounds of happiness, sadness, pain/discomfort and other affective feelings. There may be the inability to express ideas, requests, and demands through speech, and as a result of the severe speech mechanism disorder that disallows such behavior, the child is thought to be noncommunicative or alinguistic. Our insensitivity to the nonspeaking child's nonspeech communication, in relation to any type of communication other than speech, may inhibit the development of communication and interaction in the young child. This attitude, we have found, also kills most motivation to communicate, regardless of the system or aid available.

The Environment. Yarrow and others (1975) suggest that early cognitive and communication development can be significantly related to the level of social stimulation, intensity of expression of positive affect, active kinesthetic stimulation, and variety in the inanimate environment. This suggests that we must be attentive to issues from the first few months of life with the severely handicapped child, to assist in providing experiences that facilitate cognitive and communicative behavior. In the case where motor behaviors interfere with routine care, we find that caregivers may react negatively to the child. For example, feeding, bathing, dressing, and playing with the infant and young child is usually a warm and rewarding situation for both the child and caregiver. However, frustration and tension may replace these feelings when the caregiver is uncomfortable in dealing with the physically handicapped, nonspeaking child's erratic, involuntary, and spastic movements. Consequently, children may spend considerable time in physical environments which change infrequently, and in social environments which do not provide much touching, holding, hugging, or other physical contact. We must be continually aware of the living situation and the educational environment, as well as the community of prospective interacters with the nonspeaking child. Not only are we concerned about the situation for acquiring the appropriate communication skills, but we must be equally cognizant of the interaction which can take place with the nonspeaking child once an augmentative system has been selected.

The Team that Assists in Decision Making

Looking at this list of variables brings us immediately to the issue of who is most appropriate to make decisions for the nonspeaking child in regard to augmentative systems or aids best suited to his or her abilities and needs. It becomes obvious when looking at this list of variables that no professional discipline is sufficiently knowledgeable to make such a decision alone. Consequently, people from a variety of disciplines, working as a team, are needed. Because of the nature of the communication problem, the professional who understands language and communication development, speech-motor disorders, and has experience in speech, language and communication programming should head the interdisciplinary team. While it may be the major responsibility of this person to coordinate the information necessary to make the communication system and aid choice, it is not and cannot be the full responsibility of this person to make the decisions.

The professional team should have input from the parents, since there is probably no one who knows the child better than the primary caregivers (parents). It is therefore extremely important to include them in the decision-making process. If the child is in an educational placement, then the teacher or an educational consultant should have major input into the selection of the augmentative system. Because of the motor and physical problems which the child has, and may continue to have, it is necessary to have consultants who know motor behavior well. Where possible, both an occupational therapist and physical therapist should be included on the team.

Today there are persons who are specially trained to deal with the problems of positioning and prosthesis fitting. If such an individual is available, then, it may be of importance to seek that person's advice relative to positioning the potential aid user, and to arrive at the best means of accessing the communication board or device. Along with the growth of information regarding communication devices has come a group of persons who are specialists in this area. Most people who function in this capacity are speech and language clinicians. The point to be made is that before any aid, device, or system is selected, the potential user must be evaluated in light of what aids and systems are available for that person. There is no one communication system or device which will meet the needs of all children who are nonspeaking. There are a number of systems and devices, and from this variety a best fit can be made. Selecting the most appropriate system requires much information and thought on the part of the team who studies the nonspeech child. The most neglected person in this entire selection process is usually the user of the communication system. Whenever possible, the child should be included in the selection process. We take from the child cognitive, motor, speech, communication, and other behavioral data, but we usually fail to seek their advice or wish when choosing the system or device. In many cases, they may not be able to make a choice, or so it may seem to us, but whenever possible, they must have a vote on what is going to eventually be their communication system with the world. Each team member must come to this task with an appreciation of the essential expertise of each other member, including the potential user, for without their collective contributions, the foundations for successful augmentative communication will not be laid.

The Physical Mechanism for Augmentative Communication

Since the nonspeaking children comprising the subject of this chapter do not have the oral speech-motor mechanism available for speech, or may suffer from other neurological or emotional disorders which preclude acquiring and using speech as a means of communication, it is necessary to develop a means that will allow the child to communicate. There are a number of techniques that have been developed to allow any child, no matter how severely handicapped, to effectively indicate communication messages to receivers. (A complete review of techniques may be found in Vanderheiden and Harris-Vanderheiden, 1976; Vanderheiden and Grilley, 1975; and Vanderheiden, 1978.)

Techniques and aids have been developed to provide the nonspeech child with a means of interacting with others. These techniques and aids vary from simple manual communication boards, which the child uses by pointing to the message elements (such as pictures) needed, to advanced portable electronic communication aids that are capable of translating the erratic pointing movements of the severely handicapped cerebral palsy individual into a printed message and computerized speech. The number of commercially available communication aids has increased dramatically in the last few years and with future advances in engineering and technology will continue to increase. With the array of communication techniques and aids presently being marketed, the selection process for professionals and consumers has become complex.

Each technique developed for the nonspeech child has advantages and disadvantages, and is more applicable to some types of disabilities than to others. Some of the techniques require minimal motor control, while others use refined movements. Vanderheiden and Harris-Vanderheiden (1976) suggest that the greater the number and complexity of a child's controlled movements, the faster his speed of communication can be. To achieve optimal speed, however, a child must be matched with the technique that best utilizes his particular type and degree of motor control.

As mentioned earlier, the child's age and cognitive abilities will influence language and communication development and use. They will likewise influence the applicability of a technique or aid. Both the complexity of the technique and the types of symbols that can be used with the technique or aid must be examined in relation to the child's present and best estimate of future capabilities. A technique that requires the use of a complex code, or an aid that requires the user to spell, may be inappropriate for a child who has not reached the appropriate stage of cognitive development.

There is no "one system" for a particular child, but there is usually a technique or aid that is most effective, given a careful evaluation of the environmental demands, communication needs, cognitive abilities, and motor skills of the child. As the child develops, the environment, the communication needs, and cognitive and motor abilities will change. To meet these changes, the communication system—along with the techniques and aids—will need to be reevaluated and revised as necessary. Augmentative communication systems must be dynamic, just as speech and language are dynamic for speaking persons. For this reason, the selection of a technique and system that is functionally flexible is desirable.

Basic Techniques for Augmentative Communication

Vanderheiden and Harris-Vanderheiden (1976) suggest that all the techniques available for providing nonspeech children a means of communication interaction fall into three basic approaches. (For a full discussion of these approaches, please refer to the above reference, as well as Vanderheiden and Grilley, 1975; and Vanderheiden, 1978.)

Communication which relies on a direct selection technique is one in which the user indicates directly the desired message elements. This is usually accomplished by the person pointing to the desired object, symbol, or word. Simple communication boards can be put together without great expense for use by the nonspeech child (Vicker, 1974). On the other hand, very sophisticated and independent direct selection aids are available.

A major advantage of the direct selection approach is its straightforward nature, which involves no learning of the technique required except pointing. Direct selection aids have been successful with low-functioning chil[illegible], and the potential speed of communicating with this approach is limited only by the pointing speed of the child. In putting together such an aid for a child, one must be mindful of the child's range of motion. This is true both for positioning the aid for best access, as well as for the arrangement of the vocabulary display on the aid, whether it is pictures, symbolics, or words. Direct selection aids are useful for ambulatory children, as well as those confined to a wheelchair or walker. Putting together a display for the ambulatory child may require innovative and creative ideas on the part of the clinician, teacher, or parent. But in each case the aid must be developed to best fit the child's abilities and needs. In one case, a small apron-like communication aid was fitted for a young ambulatory girl, but the same type of arrangement met with resistance from a boy of similar age and functioning level. For him, a display was bonded between two pieces of plastic, rolled up and carried in a toy gun holster, belted around his waist.

The direct selection approach provides a comparatively efficient, fast, and simple means of communication for the child who has the motor control for pointing and an adequate range of motion. A note to keep in mind is that when we talk of range of motion, it need not be restricted to range of the arms and hands. Many children use pointing sticks attached to a harness around the head, or a pointing stick held between the teeth. Pointing and direct selection may also be done with the eyes.

A second approach is that of scanning. In this approach the user responds with a prearranged signal or switch to the desired message elements, as they appear in a predetermined sequence. The simplest and probably most-used example of the scanning approach is the yes/no "twenty questions" guessing game. Here we have established some prearranged yes/no signal, which may be a head nod, diverted eye gaze, movement of hand, or any other detectable sign of which the child is capable. The person interacting with the child presents the child with question choices one at a time, and the child signals "yes" when the sender reaches the desired question or message element. In a classroom situation, the teacher may point individually to stimuli on a communication board. Again, the child responds to the sender with some signal when the person points to the desired element.

Today there are a number of automatic sequencing aids available, ranging from simple to complex. The switching devices available are such that no matter how severely physically handicapped the child, he or she can be taught to effectively indicate communication elements on a scanning device. Since they are simple to operate, even low-functioning children can use them. The major disadvantage of the scanning approach is its relative slowness. On the other hand, technology has provided individual speed control for the user, and new switching devices do allow for scanning in a more efficient manner than was possible a year ago. Technology will probably allow for more effective and efficient scanning aids in the future.

The third approach is that of encoding. Mutual code systems are the major component here. The message being communicated is indicated by multiple signals from the child in a pattern that must be known or accessible to the receiver of the message. The Morse code is an example of such a system. A message can be sent by pointing to a series of numbers, colors, or letters arranged on a display corresponding with a vocabulary list or board elsewhere. For example, a severely handicapped young man, who spent most of his day in a semireclining position on an ortho-cart, had a plexiglass board suspended above him on which was a series of numbers corresponding to a vocabulary list posted on the wall of the classroom. By pointing to a single number, or combination of numbers, he was able to indicate the word, words, or phrases listed on the vocabulary list which he wanted to communicate. Encoding techniques provide a fast means of communication, and a means of accessing large vocabularies with limited movement. However, the encoding technique requires relatively complex cognitive skills and, in many cases, greater physical control than scanning aids. Some of the newer encoding aids are very sophisticated, and interface with automated speech.

Placing all communication approaches under these three categories is somewhat simplistic. The different approaches are frequently combined, to take advantage of the individual assets of each approach. Such combinations can be better and more efficiently fitted to the individual needs of children. Consequently, it is possible to combine the technology of the scanning aid with the construct of the encoding technique and have a scan-encode system. This is being incorporated in a number of different communication aids presently being marketed (Vanderheiden, 1978).

Introducing the Child to the Augmentative Communication Device

Regardless of the augmentative communication technique chosen, it should be introduced to the child through play and interactive activities. Harris and Vanderheiden (1979) suggest that severely handicapped children who may not have pointing skills may be able to voluntarily control a light which scans across a matrix by utilizing a controllable gross motor movement, such as moving the head, arm, foot, leg, or knee. This experience, they say, can eventually be transferred for use in communication by having the child activate and stop a light which scans through a vocabulary matrix of pictures, symbols or words. The suggestion here is that the child be given experiences in nonlinguistic settings which allow for certain interactions and control of the environment; these experiences can later be used for communication purposes. The child could be allowed to activate toys, radios, televisions, and other environmental objects through starting and stopping the selector light on various squares of a matrix. In other words, the child is playing with, interacting with, and controlling aspects of the environment with the same technique through which communicative intent will later be expressed. While motivation to communicate by means of an augmentative system is a problem in many cases, early experience with environmental control can lead to such activities becoming reinforcing and pleasurable. These experiences should lead naturally to using the "fun" technique for more complex communication activities, much in the way early vocal and motor behavior of nonhandicapped children leads into speech behavior.

Augmentative Symbol Systems

Now that we have discussed techniques by which communication interaction can take place between two persons—one basically a nonspeaker—it is appropriate to examine various symbol systems which might be used with the techniques and aids. The symbol system chosen for the child must provide a means for representing thoughts in a form that can be physically transmitted or presented to those with whom the child will be interacting.

For young children, as well as those functioning cognitively at sensorimotor stage V and VI, the selection and development of a symbol system and vocabulary is more important to communication effectiveness than is the specific augmentative aid or technique. The symbol system and individual vocabulary selected will mark the success of the communication system for the child. Just as there is no one technique or aid for a child, there is no one symbol system or vocabulary for a child. What may have been determined as the most effective symbol system in the initial evaluation period may change over time because of developmental and environmental changes. The selection process is therefore to be viewed as continuous and dynamic.

It is also important to view the selection and development of symbol system strategies in light of the multiple environments with which the child may interact. For example, what might be best suited for daily living and use at home or in the residential setting, might not be best suited for the classroom or general social environments. For this reason it might serve the child's best interest to develop symbols, vocabularies, and aids to fit given environments. One family found it necessary to keep a symbol display and vocabulary board in the glove compartment of the car in order to carry on effective communication with their child while traveling. On the other hand, that same vocabulary display was not appropriate or useful at home or in school, and other symbols and vocabularies were selected and developed accordingly.

Some children who are not physically handicapped may be greatly restricted by the use of physical displays such as communication boards and books. For these individuals, it may be well to investigate the use of manual signing, or total communication, a communication system frequently used with hearing impaired and deaf individuals. Since the basic discussion of such systems as they relate to the hearing impaired is treated by Maestas y Moores and Moores in this volume, little time will be spent on the topic. However, it is important to point out that manual signing and total communication systems have been used effectively as augmentative systems with many severely cognitively and emotionally handicapped children (Schaeffer, 1979). It is important to note that if a manual or total communication system is selected for a child, the individual must have attained a cognitive functioning level of sensorimotor stage V or VI. One cannot expect a child to use Finger Spelling as a communication means until the child reaches the developmental level of approximately age seven. The specific signing system which is best suited to a given child may be a personal decision or one governed by what the largest community of users within the family's community environment might be. On the other hand, the author has a preference for using Signing Exact English (SEE) for those children who have serious developmental delays because there is a one-to-one correspondence between the sign being expressed and the spoken word that accompanies it. Learning a communication system will be difficult for many multiply handicapped children, and our responsibility is to assist in making the task simple, yet providing the most effective system possible.

Some advantages of the total communication system are its portability, its expediency, and in many cases, its less strenuous cognitive demands. Certainly the disadvantages of using the total communication system are that it has a limited audience and interactive availability. Unless there are a number of persons in the community who use sign language, the child may be using a communicatively restricted system. Other limitations are related to the need for good motor control. Communicating in sign language rules out using the hands for most ordinary purposes while signing, and the audience must be watching the message sender in order to receive the message. With respect to this latter point, it is also a problem with users of nonautomated communication boards, where a receiver must be present and attentive to the communication board during the communication interaction.

There are a variety of symbol systems available which have been adapted to communication board use. These systems have been discussed in more detail by Vanderheiden and Harris-Vanderheiden (1976), Harris and Vanderheiden (1979), Clark and Woodcock (1976), and Kates, McNaughton, and Silvermann (1977). The professional team should keep the following considerations in mind when selecting the symbol system to be used with a given aid or technique:

1. Is the symbol system and vocabulary compatible with the aid or technique selected?
2. Does it allow for the greatest interaction with the fewest number of symbols? (Space becomes a premium.)
3. Is the system and the vocabulary selected appropriate for the child's cognitive level, language comprehension skills, motor competency and environmental demands?
4. Is the system dynamic, developmentally based, generative and flexible to allow for the child's future growth and changes?
5. Is the system acceptable to the child, parents, caregivers, teachers and those persons with whom the individual will interact most frequently? The most commonly used ones are: photos, pictures and/or line drawings, Blissymbols, and traditional orthography (words, for example).

For young children and low-functioning children, pictures and photos may be the most appropriate elements. The child using a picture vocabulary system usually points to pictures that represents objects, ideas, or thoughts. For the young child who has been pointing to objects for communicative purposes, an appropriate transition is to have photos made of the objects the child has been using for interaction, and have those mounted on a display for communication use. Subsequently, pictures from magazines or black and white line drawings may be substituted for the photos. The size of the pictures selected will, or course, depend upon the child's visual, motor, and perceptual skills. Size of pictures may also be determined by the number of picture symbols which need to be placed on the communication board display. Pictures are applicable to nearly all of the basic techniques and aids, except for the higher-level independent aids that have some form of printout display. In any case, pictures are usually thought of as the easiest system to implement with young children and mentally retarded children. On the other hand, adolescent mentally retarded persons may become resentful when pictures are routinely used, because they feel they are being treated as "babies."

In the last several years, Blissymbolics have become popular and useful for many nonspeaking persons, both with normal and delayed cognitive functioning (Harris and others, 1975; Harris and others, 1979; Kates, McNaughton and Silvermann, 1977). Blissymbolics are ideographic symbols that represent concepts (as opposed to words only) through simple line drawings. These symbols are both pictographic and ideographic, which means that they are both "picture-like" and representative of an idea or concept. Like picture systems, Blissymbolics can be used with young prereading and cognitively low-functioning individuals (Harris and others, 1979). Because symbolics are idea-based rather than object-based, as picture systems are, they are able to evoke generalizations more effectively than pictures. They also contain many concepts and abstractions that could not be easily depicted with pictures, such as affective responses of "hurt", "happy," and so forth.

Blissymbolics, like pictures, may be applicable to and used on all of the basic techniques and aids. Even some independent aids have a printout for symbolics. The symbolic may serve as a transitional system for the child who is not yet ready for traditional orthography, but is in need of a more versatile system than pictures offer. Because of the linguistic nature of the Blissymbolic, it has been found to facilitate the acquistion of language, and has enhanced communication initiation and interactive skills (Harris and others, 1979).

Traditional Orthography (T.O.) has been used on communication cards for years. Basically, T.O. is the twenty-six-letter alphabet system, and all words in the T.O. system are formed by combining these letters. The twenty-six letters can be placed on the communication aid, allowing the child an unlimited vocabulary potential. This, of course, assumes that the child is at a developmental level where spelling is an option. On the other hand, it is possible to place words on the communication aid. This requires that the child be able to read. Also, there is some limitation to the number of words which can ultimately be placed on the communication board; therefore, the size of the printed word should accommodate both visual and motor ability.

Because T.O. is the system used by nonhandicapped persons, it is often preferred by parents and teachers who want the child to appear and be as "unhandicapped" as possible. If T.O. is to be used, one must keep in mind that the child will be required to learn to read and spell before he or she can communicate effectively. It is well to keep in mind that the nonhandicapped child is not asked to acquire reading and spelling skills until long after he or she has mastered the skill of speech communication. T.O. is a skill which should certainly be learned by all children who are cognitively able to do so.

The T.O. system can be applied to aids and techniques at all levels of implementation. It is the most versatile of the systems, but the entry level for effective use is about seven years developmentally (Clark and Woodcock, 1976).

Introducing the Child to an Augmentative Symbol System

Just as spoken words are natural symbol models for children who will develop speech, and children develop familiarity with them prior to using speech, the symbols which the nonspeech child will use should become familiar to him or her prior to their communicative use. The augmentative symbol system which the child will be using for communicative purposes (pictures, Blissymbolics, orthography) should be visually available to the child before they are taught or used in communication. The symbols should always be used in conjunction with speech in interacting with the child, and in interacting with other persons in the child's presence. Pairing the symbols with spoken words/objects and persons in the environment should assist the child in learning their referential status and meaning.

Factors to Consider When Comparing Augmentative Communication Aids and Systems

The job of selecting the most appropriate augmentative communication aid and symbol system for the child is complex, and at times almost forbidding. The system, however, must be continually under observation and scrutiny. There are various factors which must be under constant and consistent consideration by the team, some of which are:

1. The *speed* with which the child can communicate with others. Most persons are impatient listeners at best, and if the child's system is a slow one, the message receiver may spend little time interacting.

2. The *degree of independence* which the system allows. Is it possible to put together the message intended to be sent, and then call the person's attention to the fact that the sender has something to "say"? It is also important for the system to allow for initiating communication, as well as being one which has basic respondent characteristics.

3. The *availability* of the augmentative aid or the materials for its construction. If there is a six-month wait for an aid, or it takes a highly skilled engineer to make an aid in a community where one is not available, valuable time and effort may be lost. Various aid options should be investigated to find what might be a best fit, and also readily available. Another consideration is the availability of service to repair aids. Even the best aids will need repairs. Physically handicapped persons are not as well coordinated as nonhandicapped persons, and the probability of dropping aids is high. Many aids are relatively fragile and "down time" for an aid may be of considerable consequence to the user.

4. The *cost* of an aid and system. Aids can vary in cost from a few dollars, for those homemade boards of plywood, to thousands of dollars for independent electronic varieties. One must consider carefully what will be accomplished by the more expensive aid that cannot be taken care of by a less expensive aid. An electronic scanning aid with a limited display may be cheaper than one with a larger display, but will the child have outgrown the smaller display aid in six months and need the larger one? Who pays for a communication aid becomes of concern for many persons. To date, some private insurance companies pay for "communication prostheses," but for the most part, aids must be paid for by the family or community service agencies. At no time should the cost of an aid be the sole determinant for recommending one aid over another, but it must be given serious consideration when there are cheaper but comparable options are available.

5. The *acceptance* of the aid or system *by the child*, the family, and the educational system. Best laid plans and recommendations may be of little value if the system selected is not acceptable to the user as well as those with whom the child will communicate. Whenever possible, it might be wise to allow a child to have experience with more than one type of communication aid or symbol system. There are frequent debates as to whether the child should be taught to use a signing system or a communication aid with a symbol system. Such considerations must be given careful thought, but a good principle to keep in mind is: Which system will allow the child to have the most interaction socially, educationally and, eventually, vocationally?

6. The *practicality* of the system. Is the system and aid we have selected for the user so complex that most message receivers react negatively to it? Communication is for interaction purposes. If the system selected discourages interaction with others, including peers, then we have not selected the appropriate aid and system. In many cases we are finding that children who have become interactive with peers, using a Blissymbolics system, move on to traditional orthography for reading purposes. This is to be encouraged; however, if

all the peers are using Blissymbolics, it is best to have the child use the Blissymbolics board for peer interaction. When the peers are also using traditional orthography, a complete switch may be made, thus allowing the child to use the system which best fits the social community.

7. The *allowance for flexibility*. Much time can be spent in making aids and displays. There should be room on the board for adding symbols, and materials should be used so that symbols can be moved about on the board. One important advantage of Blissymbolics and traditional orthography is an infinite number of vocabulary possibilities; the basic limitation is the space on the display itself. From that standpoint, we need to provide a vocabulary that has the most potential use possible.

Conclusion

Communication development for the nonspeaking child, as with all individuals, is an ongoing process. Continued evaluation is needed to assist nonspeaking individuals in expanding their communication systems to meet changing needs.

There is wide variation in the communication needs and abilities of individuals who can use augmentative systems. For some children, particularly those who are physically handicapped, it can be the difference between participating in the activities around them, or simply watching others act. For many multiply handicapped persons, an effective communication aid will have important effects on the personal, social, and educational process, as well as future vocation considerations. For others, an appropriate communication system will permit them to systematically communicate their needs, and to express emotions in a manner understandable to others.

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SPEECH PROSTHESIS AS A LEGAL ENTITLEMENT

This is directed to persons seeking assistance in paying for communication devices. The contents may also assist a lawyer seeking such assistance for a client.

Suppose you need a communications device, a "speech prosthesis,"[1] in order to communicate effectively and you're totally disabled. Suppose it is difficult or impossible for you to pay for one. You seek help from private foundations and organizations but don't get it. Can you obtain help from the state or federal government?

Maybe. But it probably isn't going to be just a matter of going in and asking. Chances are when you ask you'll be refused, or referred to another agency, or smothered in paperwork. So what can you do? Get a good lawyer.

How do you find a good lawyer? It isn't easy. A good lawyer for your case is a litigator, a lawyer who tries cases in court, a lawyer who knows how to promise the government he or she means business and how to deliver action to back up his promises. You don't need a facilitator, a lawyer who just goes on doing for you what you and yours have been doing for yourself — asking for favors — you need a lawyer who'll enforce your full rights under the law.

To find this kind of lawyer you've got to search, and ask. Lawyers who represent hospitals and clinics on their Medicare claims, lawyers who have worked for a Legal Services Program in the past, lawyers who sue the government[2] — these lawyers are likely to have the knowledge needed to get a handle on your claim, but experience isn't nearly as essential as intelligence, persuasiveness and pugnacity. Your lawyer is going to enforce your *rights* under the law, not ask for favors. There is no easy or sure way to locate a lawyer with that kind of drive.

Suppose you've found a good lawyer — can you afford him or her? You may not have to. If a case is filed in court to protect rights secured to you by federal law or by the United States Constitution under 42 United States Code ("U.S.C.") §1988 the agency or persons you sue may have to pay your lawyer, if you win. If you can prove the decision denying you a device caused you harm[3] and that you were entitled to the device, you may recover damages, a money judgment. When a money judgment is reasonably possible, a lawyer may take your case on a contingent fee — a percentage of your recovered damages. If you get money, he or she takes a share, a percentage — if you get no money, neither does your lawyer.

Your local legal services office (funded through the federal Legal Services Corporation) may be able to furnish you a lawyer if you have low income such as Social Security benefits or SSI benefits.

There are also lawyers who, on occasion, take a case for nothing, *pro bono publico* ("for the public good") because they want to see people treated fairly under the law. In that situation however you're back to charity again — it's better to have a case that offers the lawyer a fee[4] because lawyers have to earn a living and a *pro bono* case earns nothing.

Okay, you've found a lawyer and you've worked out the fee arrangement, now what can he do?

Medicaid[5] is the most likely place for you to obtain financial help. Generally, to qualify for Medicaid you have to be entitled to Social Security benefits or to public assistance; your income[6] must be below a certain level; and you have to be an adult.[7] If you qualify for Medicaid,[8] your lawyer will then determine whether your *state* has opted by statute to pay for prosthetic devices under 42 U.S.C. §1396d (a)(12).[9] "Prosthetic device" is defined by *federal* regulation as

> replacement, *corrective*, or supportive *devices prescribed by a physician* or other licensed practitioner of the healing arts within the scope of his practice as defined by state law to —
> (1) Artificially replace a missing portion of the body, or
> (2) Prevent or *correct physical* deformity or *malfunction;*
> or
> (3) Support a weak or deformed portion of the body.
> 42 Code of Federal Regulations
> ("C.F.R.") 440.120(C) [italics added]

Next your lawyer will look to see whether by state statute or regulation your state has defined "prosthesis". California, for instance, in 1974, had opted to provide payment for prosthetic devices and (by regulation) limited the benefit to those devices "medically necessary"[10] and not exceeding "items or services received by the public generally for similar conditions." An orthopedic mattress was held by a California court *not* to be a prosthetic device because it did not restore the function of a body part or replace a body part. California's regulation offered to provide

> all prosthetic . . . appliances necessary for the restoration of function or replacement of body parts . . .
> *Piontkowski* v. *Geduldig*
> (1974) 30 Cal. App. 3d 498, 114 Cal. Rptr. 316

In California, in 1974, then, your lawyer would want to show that the communications device you wanted was: (1) prescribed for you by a doctor or speech pathologist as "medically necessary"; (2) did not exceed items received by the public generally for similar medical conditions; and (3) served to replace the function of a body part. These are matters of fact, not questions of law, and can be proved by the testimony (oral or written) of experts, such as doctors and speech pathologists. If you and your lawyer can prove these points, you are entitled to the device (at least in California in 1974).

If no regulation bears on the point, you and your lawyer may argue that the general wording of the federal regulation set out above includes the communications device as a "prosthesis."

Procedurally your lawyer can, after you have your first refusal from the state Medicaid agency, require the agency to grant you a hearing and to state the *legal* basis for refusing you the device. That legal basis must be found in the statutes (federal or state) or regulations (federal or state). Any facts used by the agency to justify its refusal must also be brought forth at the hearing. The decision to deny you the benefit cannot simply be the unfettered judgment of a case worker or supervisor but must be reasonably based on the written law. Nor can the decision be based on funding — if the law gives you the right to the benefit, it is irrelevant that the device is expensive or that others will also require one. Unless and until the written statute or regulation is changed, lack of funding cannot deprive you of a prosthesis to which you are entitled by law.

Suppose after your initial request for Medicaid you are told by the agency, "at this time the Medicaid program is not considering purchase of such equipment for enrolled participants." Your lawyer may then call for an agency hearing to determine why and on what legal basis (if any) the agency bases its position. After a final determination at the agency level, if you still have not got your device, your lawyer can file suit in either state or federal court to overturn the agency decision. Such a suit could ask for damages, attorney's fees, a declaratory judgment that the device is a "prosthesis", an injunction directing the agency to furnish you the device, etc. It would not be completed overnight — it could easily take a year from the filing of the suit to final judgment, and appeals could follow — but it could be won. The effects of a victory in the courts would reach beyond your particular case — i.e., the state agency could not continue to deny the device to others.

Similar procedural principles apply to many agencies other than Medicaid[11] and a lawyer's help can be valuable in dealing with these agencies as well.

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FOOTNOTES

1. Such as HandiVoice, Autocom, ZYGO, etc.
2. Try contacting the National Organization of Social Security Claimants' Representatives (NOSSCR) P.O. Box 794, Pearl River, NY 10965. (914) 735-8812.
3. Such as depriving you of the ability to communicate for x months or y years while you awaited the trial of your case.
4. Paid by you, by the other side (under 42 U.S.C. §1983), or out of damages (contingent fee).
5. The federal statutes on this program are found at 42 U.S.C. §1396a *et seq*. The federal regulations are found at 42 C.F.R. 430. *et seq*. The states have adopted various versions of the program by state statute and the states have their own regulations. The Michigan statutes are at Michigan Compiled Laws Annotated 400.1 *et seq*. The Michigan regulations are at Michigan Administrative Code R400.1 *et seq*. See also Commerce Clearing House ("CCH") *Medicare Medicaid Reporter* and *Medicare and Medicaid Claims and Procedures*, McCormick (1977, West Publishing Co.). Medicaid is a state-administrated program for persons of limited financial resources using federal funds in part. Medicare is the social security program primarily for senior citizens and uses all federal funds.
6. Including Social Security but deducting medical expenses.
7. A minor may qualify depending on his or her income and that of his or her parents.
8. Qualifying for Medicaid means coming within some fairly complex guidelines contained in state statutes. The foregoing explanation is not complete and is only generally accurate. The simplest way to find out is to file an application for Medicaid. If you are rejected and want to pursue the matter, go to a lawyer.
9. There are also other provisions of this law under which you might also be entitled to receive a communications device, such as inpatient hospital services 42 U.S.C. §1396d (a)(1), physical therapy 42 U.S.C §1396d (a)(11), etc.
10. 42 C.F.R 440.230 (federal regulation) requires:

    (b) Each service must be sufficient in amount, duration, and scope to reasonably achieve its purpose.

    • • •

    (c) (2) The [State] agency may place appropriate limits on a service based on such critera as medical necessity or on utilization control procedures.
11. Vocational Rehabilitation Service, Special Education Programs in the Public Schools, Veteran's Administration, Medicare, Department of Mental Health, Crippled Childrens Services. Procedures differ among these agencies as do regulations and statutes.

INSTRUCTIONAL MANAGEMENT MODULE

This module addresses the problems of choosing, adapting, and designing curricula, activities and instructional strategies for effecting individualized educational programs for hearing impaired developmentally disabled students. The descriptors 'hearing impaired developmentally disabled' (HIDD), and 'multihandicapped hearing impaired' (MHHI) are used interchangeably; they may be misinterpreted as indicating individuals constituting a homogeneous group whose educational needs can be met through a single specially designated MHHI/HIDD curriculum. This group can only be considered as homogeneous on an abstract level of disability description and classification. For professionals concerned with education and habilitation, the adaptive, linguistic, and academic heterogeneity of HIDD students are formidable. These students present programming challenges particularly in educational settings atuned primarily to the child with a single disability. Because their needs are complex and widely varying, using a single curriculum for this group of learners oftimes proves frustrating. This chapter presents an overview of major issues and suggested approaches to curricular and instructional planning with accompanying guidelines for choosing, adapting, and evaluating curricula and materials for their appropriateness with individual children.

The first three articles offer a framework for reviewing major philosophical and curricular approaches with MHHI students. The Hawkins-Shepard article "Educational Planning for Deaf Children With Learning Disabilities" explores problems in definition and identification, stressing adaptations in academic, language, and instructional strategies for more able MHHI students. Zylstra Owner's "Curriculum Selection and Development for Severely Involved Multiply Handicapped Hearing Impaired Students" focuses on curricula for more severely multiply handicapped students who require support and direct programming in adaptive skills, social and behavioral self-management, basic communication, and rudimentary academic and prevocational skills. "Functional Curriculum Development for Multiply Involved Hearing-Impaired Students" by Arkell amplifies several of the curricular approaches identified in the Zylstra-Owner article, providing an in-depth analysis of the developmental vs. the functional approach. Following these articles is a brief listing of curricula and educational resources useful with MHHI students.

Claudia Arkell's "Educational Programming for Multiply Involved Deaf Students" describes a six-stage cycle for designing and implementing instructional programs. Arkell provides a clear model for integrating formal and informal assessment data to serve as a foundation for individual program design; her reminder that no one source of assessment data is sufficient with MHHI students is timely. As more than one type of observation is valuable, more than one approach to evaluation of progress is also important. Zylstra Owner points out that these students require more 'finely sliced' learning steps to achieve task mastery. Anderson-Inman provides an overview of criterion referenced testing - an assessment strategy of value to educators in measuring mastery of finely sliced components of academic tasks taught to MHHI students.

The next two articles "Behavior Management and Multiply Handicapped Hearing Impaired Students" and "A Program Model for Intervention with Emotionally/Behaviorally Disturbed Hearing Impaired Children" reinforce the need for and benefits of systemmatic management of social and interactional behaviors of MHHI children, but approach the same task from different viewpoints. Despite the difference in terminology and perspectives, both authors arrive at a similar set of principles for managing behaviors, including the principles of fairness, predictability, and consistency. Insuring that students understand the meaning of rules established through linguistic means is crucial; this is more significant in effective behavior management for HIDD/MHHI youngsters than it might be for similarly developmentally disabled youngsters without hearing loss. The authors emphasize the importance of MHHI children's understanding the meaning of the language used to proscribe limits, to indicate future events and consequences, and to offer reasons 'why'. Polsgrove's "Self Control: Methods for Child Training" complements the preceeding articles with a clear presentation of the developmental aspects of self control, and a review of the research on interventions in academic and behavioral self-management with a variety of special needs students. Although MHHI children are not specifically addressed, educators and others will derive insights on strategies for fostering independence in these student as supplements to more externally-controlled behavior modification approaches.

With MHHI students, as with other children with special learning and medical needs, parents and family members must be considered integral members of the educational team serving their children. (Refer to Meadow's article in the Communication chapter for implications of a hearing loss on parent-child interaction and family life.) "Training Parents of Multiply Handicapped/Hearing Impaired Children" by Stromer and Miller presents selected research studies evaluating the effectiveness of various approaches to training parents to 'teach' their children through formal and informal techniques.

HEARING IMPAIRED LEARNERS WITH LEARNING DISABILITIES

Charlotte Hawkins-Shepard

Special education professionals are already somewhat acquainted with the confusion that has developed over many of the issues of learning disabilities and proposals for their remediation. In order to provide some direction regarding instructional management for hearing impaired learners with learning disabilities (some of whom may also be developmentally disabled), this section offers a reveiw of literature from the fields of both learning disabilities and deaf education. Definition, and terminology, incidence, etiological theories, measurement, and intervention strategies will be discussed briefly, along with related research.

Definition and Terminology

The term "learning disabilities" was first introduced and defined in an article by Kirk & Bateman (1962) in the journal Exceptional Children, published by the Council for Exceptional Children (CEC). This article offered what would be the first of many attempts by professionals in the field to define learning disabilities. Initial adoption of the term can be traced to a 1963 meeting in Chicago, in which concerned parents from a number of separate parent groups had gathered to consider working together on behalf of their children. Seeking a single term to describe children of average or better intelligence, who had been called perceptually handicapped, brain-injured, neurologically impaired, etc., the group was receptive to the term "learning disabilities" when Kirk suggested it in an address to them (Hallahan & Kauffman, 1976; Lerner, 1981). Although Kirk's term has prevailed, and is relatively solidly entrenched, there are some professionals who object to the use of this label, and who still prefer other terms.

Difficulties in defining learning disabilities have been in evidence since the term was introduced. Although the field has been fairly uniform in referring to "children with learning disabilities", it has not seemed to be uniform in agreement about exactly to whom the term refers (Lloyd, Hallahan & Kauffman, 1980).

A review of the many definitions offered throughout the years by key educators and organizations can be found in major text books on learning disabilities (e.g., Bryan & Bryan, 1978; Deno, 1978; Hallahan & Kauffman, 1976; Haring & Bateman, 1977; Learner, 1981; Mann, Goodman, & Wiederholt, 1978; Ross, 1977; Wallace & McLaughlin, 1979). Definitions discussed here can be found in Table 1.

A definition that is agreed upon and generally accepted is vital, as definition affects terminology, prevalence, selection criteria and identification procedure, population characteristics, and remedial activities. Until recently, most of the well known definitions actually excluded deaf or hearing impaired persons. Some only contained an exclusion section that eliminates hearing handicaps when they are the primary cause of a learning problem.

Current definitions to be considered here are the federal definition and one proposed by of the National Joint Council for Learning Disabilities. The former is part of Public Law 94-142, and has been the basis for federal and state law, and for many learning disabilities programs.

The latter, introduced in 1981, has been endorsed by boards of numerous organizations, including ASHA, IRA, DCCD, CLD, and the Orton Dyslexia Society. These organizations all belong to the National Joint Council for Learning Disabilities (NJCLD), and felt that objections to the federal definiton provided justification for a new definiton. After prolonged discussion and compromise, they reached an agreement on wording. (National Joint Council for Learning Disabilities, 1981; Myers & Hammill, 1982, p. 6). This definition has not been accepted by the Association for Children with Learning Disabilities, and it is not yet known what the new federal definition will be, although revision is expected.

Table 1
Key Definitions of Learning Disabilities

Sources	Definition
Kirk & Bateman (1962) (p. 73)	A learning disability refers to a retardation, disorder, or delayed development in one or more of the processes of speech, language, reading, writing, arithmetic, or other school subjects resulting from a psychological handicap caused by a possible cerebral dysfunction and/or emotional or behavioral disturbances. It is not the result of mental retardation, sensory deprivation, or cultural or instructional factors.
Federal Definition (*Federal Register*, December 29, 1977, p. 65083)	"Specific learning disability" means a disorder in one or more of the basic psychological processes involved in understanding or in using language spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations. The term includes such conditions as perceptual handicaps, brain injury, minimal brain dysfunction, dyslexia, developmental aphasia. The term does not include children who have learning problems which are primarily the result of visual, hearing, or motor handicaps, of mental retardation, of emotional disturbance, or of environmental, cultural, or economic disadvantage.
National Joint Council for Learning Disabilities (1981)	Learning disabilities is a generic term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities. These disorders are intrinsic to the individual and presumed to be due to central nervous system dysfunction. Even though a learning disability may occur concomitantly with other handicapping conditions (e.g., sensory impairment, mental retardation, social and emotional disturbance) or environmental influences (e.g., cultural differences insufficient/inappropriate instruction, psychogenic factors), it is not a direct result of those conditions or influences.

The field of deaf education is also experiencing difficulties regarding definition terminology. Brill (1971) points to problems in determining incidence of deaf children with additional handicaps. He attributes these problems to lack of precise or uniform definitions used by those compiling statistics. Power and Quigley (1971) in discussing learning disorders related to deafness, have stated that writers have linked so many different concepts together that their concept of learning disorders has been made meaningless. They offer the opinion that many behaviors could well be subsumed under emotional disturbance and motor dysfunction. Stewart (1971) expresses dissatisfaction with the term "multiply handicapped," describing it as a broad rubric encompassing such multiple handicaps as deafness/blindness, deafness/paraplegia, deafness/minimum brain dysfunction, and others. In his view these words tell merely that two or more handicaps are involved. He favors the term "low achieving deaf," but differentiates between students with emotional problems and learning disabilites. Lennan (1973) refers to children with "learning and/or emotional/behavioral problems" in describing a population in the Deaf Multi-handicapped Unit at the California School for the Deaf at Riverside. Jensema (1975) in a study on achievement test scores of multiply handicapped hearing impaired, lists eleven subgroups of specific additional impairments. Three of those include "perceptual motor," "brain damage," and "learning disabilities."

It has been asserted by Rice (1973) that one-third of the deaf persons who leave high school each year do not have qualifications for postsecondary education or employment. He has categorized these persons as "low-achieving" or multi-handicapped, and listed their characteristics as follows: severely limited communication skills, low academic achievement levels, emotional immaturity, poor vocational preparation, and secondary disabilites. Moores (1978) in an introductory text on deafness has underscored the lack of systematic categorization of multi-handicapped youth.

Prevalence and Incidence

A review of literature has yielded more than 40 terms applied to LD children (Cruickshank, 1972). One of the reasons for the terminological confusion and disagreement is that, historically, the field is related to the fields of mental retardation, brain injury, and emotional disturbance. Labels such as "minimal brain dysfunction" or "neurological disorganization" or "brain injury" imply something about what caused the child to have whatever behavior he or she has.

Although there are reliable prevalence estimates for the hearing impaired population (Schein & Delk, 1971), estimates of people with developmental disabilities and hearing impairment, and of individuals with learning disabilities are uncertain. Gross estimates continue to differ due to variations in definition and in reporting procedures. For example, Hagger (1972) cites estimates that at least 25% of all deaf children also have specific learning disabilities. Flathouse (1975) gives a 14% figure from a 1973 teacher survey in the Texas School for the Deaf.

Incidence figures from Ries (1973) show 910 children out of 41,109 having "learning disabilities," 168 as being "brain damaged," and 1885 with "perceptual motor disorders." Powers and Harris (1980) in a monograph on learning disabled hearing impaired children have noted that the number of hearing impaired children who exhibit language and learning difficulties above and beyond those traditionally attributed to a hearing loss appears to be increasing rather rapidly.

All of these figures can be viewed relative to definition. Narrow and restrictive definitions leave out many individuals, while broader ones include a wide population.

Etiology

From a study using a sample of 1,468 deaf children, Vernon (1969) concluded that a significant amount of behavioral variance among deaf children is not due to their hearing loss, but can be understood in terms of the etiology of their deafness. He holds that many of the secondary disabilities such as expressive and receptive communication disorders, mental deficiency, markedly atypical behavior, and learning disabilities are caused by brain damage that results from the same condition that led to the deafness. This runs counter to previous beliefs that many of the learning and behavior problems are due only to deafness.

In addition to citing brain damage as a causal agent, many professionals have attributed learning disabilities to such things as maturation lags, biochemical factors, mixed dominance, perceptual deficits and poor teaching. Proponents of this latter position (e.g. Haring & Bateman, 1977; Lloyd, 1975; Throne, 1973) argue that despite any varying psychophysiological or information processing characteristics, learning disabilities can be prevented or remediated through an adequate instuctional program.

A comprehensive review of key figures in the L.D. field and their theories of etiology is provided by Haring & Bateman (1977, Chaper 2), Kauffman & Hallahan (1976), and Wallace & McLoughlin (1979, Chapter 3).

Research Projects with Learning Disabled Hearing Impaired Subjects

An extensive curriculum project for young deaf children with learning disabilities was carried out by the New York State Education Department from 1966 to 1973. This study is known as the Cooperative Research Endeavors in Education of the Deaf, or Project CREED. Working in stages, project staff studied 12 educational programs including 193 deaf children. They administered a battery of tests, and developed sequential levels of instruction in five areas: gross motor coordination, sensory motor integration, visual analysis, attention and memory, and conceptualization. Direction for the diagnostic battery came from Piaget, and information processing theorists.

Design of curriculum was based on task analysis procedures of Robert Gagne (Restaino, 1970).

Pronovost et al. (1976) conducted a study involving 250 deaf children with "language, learning, and behavioral disabilities." Reports from their investigations include the following findings: (A) four fifths of the children had average or above intelligence, and one fifth were in the dull normal or borderline categories; (B) a majority of the children revealed a language disorder unrelated to reduced hearing acuity per se; (C) very few were making good use of residual hearing through amplification. Conclusions of the research team focused on the need for highly flexible individualized programming, alternate educational prototypes, flexible scheduling, adequate services for parents, and an appropriate communication system with many pupils requiring a total communication approach.

Measurement and its Relation to Instruction
Assessment for the Design of a Program

A teacher of this special population will need competencies in diagnostics for programming. He or she should be able to administer, score, and interpret norm-referenced (standardized) tests used by the school for screening, placement, or an overview of achievement. (This area of testing is addressed comprehensively in the Chapter on Identification and Assessment.) For monitoring through instructional sequences, however, it will often be necessary for teachers of these special learners to develop criterion-referenced assessment devices, as few commercial assessment tools will prove useful. (For a comprehensive overview of criterion referenced testing with handicapped children and youth, see the reprint of Anderson-Inman's 1980 article included in this section.) Determination of which skills a child can or cannot utilize, and of entry skills a child cannot perform is the proper foundation of any individualized program. Information to be useable in the classroom must be translated into instruction. Informal tests should lead directly to establishment of objectives and instructional activities. Basically such tests give a wide sampling of skills, and are directly related to instructional procedures or materials. Teacher made tests that pinpoint learning progress along with structured observations will be appropriate for short samplings of behavior to monitor progress within an instructional program.

Assessment for Continuous Monitoring of Progress

The gap between testing and teaching can be bridged by the use of such strategies as carefully constructed probes. An advantage to the use of probes is that they assess the degree of mastery of the task actually being taught. Construction of probes is simple if learning objectives are written behaviorally and completely. When objectives clearly state the behavior to be learned, the conditions of performance, and the criteria for mastery, probes can be developed to measure precisely student performance at each stage of the learning process. Steps for constructing such measures include: identifying the movement cycle (e.g., in math, movement cycles can be digits written correctly), indicating the conditions of performance (e.g., duration of assessment administration, number of items to be included, gestural cues available), format of presentation, and criterion. These devices provide much needed feedback in the reinforcement of learning, and can also identify and correct learning errors.

The importance of daily assessment cannot be overstated. An overview of daily assessment monitoring for developmentally disabled hearing impaired students is provided by Naiman (1980) in a comprehensive book on educating this population.

Intervention Approaches

Bateman (1967) identifies three distinguishable approaches to teaching the learning disabled child: the etiological, the diagnostic remedial, and the task analytic. The lack of utility in focusing on the etiological approach for remediation purposes is stressed by a number of leaders in the LD field (e.g., Bateman, 1973), who suggest a shift in focus from something deviant or pathological in the child to the arrangement of the environment by the teacher. Bateman (1973) advocates establishing priorities and a finite number of behavioral objectives, analyzing the objectives into all component sub-objectives or sub-skills (teachable units), and then arranging the environment so that learning occurs. Her concept of a teaching model is:

> A more comprehensive teaching model includes presentation of concepts and skills (sometimes employing materials), response and practice opportunities (frequently employing materials) and reinforcement and/or correction procedures. . .No more than a few sessions should be spent using techniques or materials that are not successful. (p. 248).

Among the well known diagnostic-remedial approaches are programs which feature visual, visual-perceptual, and visual-motor-perceptual training. Comprehensive reviews of research on these (Anderson, 1972; Keogh, 1974; Vellutino, 1974) serve to caution educators about the relationship of these programs to improvement in such academic achievement areas as reading. The literature searches of Balow (1971) failed to locate any acceptable data that would lend support to any of the physical, motor, or perceptual programs used in prevention or correction of reading or other learning disabilities.

In a discussion of ability or process training, Ysseldyke & Salvia (1974) point out that the data on relationships between process and skill are only correlational, not causal. They criticize the diagnostic remedial approach for its use of mere hypothetical constructs.

The task analysis approach teaches basic skills directly. The following explanation serves to clarify this approach (Haring & Bateman, 1977):

> Task analysis is a detailed description of what a person does or should be doing to perform a task. . .Task analysis has four basic steps or components: (1) describing desired outcomes in behavioral terms, (2) naming skills and knowledge involved in the task, (3) naming, classifying and measuring the functions of each property named in the second step, and (4) development of the course of action (p. 224).

(See Gagne, 1970 and Bijou, 1971) for a comprehensive review of task analysis and its application to the learning process).

Siegfried Engelman, who originated the task analytically derived DISTAR Language, Reading, and Arithmetic programs (materials carefully designed to teach basic skills to all children, including learning disabled) developed a teaching model known as the Direct Instruction Model. This model was selected as one of more than 20 used in a national study, the Follow Through Program, which compared diverse educational approaches. The academic success of its pupils has brought attention on a national level to the DISTAR program (see Haring & Bateman, 1977, Chapter 6). Fredericks et al. (1972) cite DISTAR as an effective tool in the remediation of learning disabilities.

Researchers who have been working with deaf populations have found behavior modification to be a promising alternative to traditional educational procedures. An appropriate definition for behavior modification endorsed by these researchers is "the systematic application of experimentally derived learning principles to achieve measured change in measureable behavior." A 1971 report by Stewart tells us that systematic teaching methods based on principles of behavior modification offer good results with deaf children with learning disabilities. In 1970 Craig reported that his experiments with visual attending found evidence that immediate and tangible reinforcement, contingent on instructionally directed visual attending, can significantly increase attending for whole classes of deaf students. Other significant findings concerning reinforcement that should be noted include research results cited by Ross (1976) that between the ages of 4 and 7, reinforcer effectiveness is greater if adult and child are of opposite sex.

The field of cognitive psychology includes a variety of research areas. Of particular interest to special educators has been the area of selective attention. Key research on selective attention abilities of LD children was conducted by Hallahan, Gajar, Cohen and Tarver (1978), Hallahan, Kaufman & Ball (1978), and Hallahan, Tarver, Kauffman & Graybeal (1978). Using the central incidental learning paradigm developed by Hagen (1967), LD children were found to be deficient in selective attention performance, and central recall. They performed significantly lower than normal peers in attending selectively to the critical features of a stimulus and in ignoring the unessential aspects. They also do not use efficient learning strategies at as early an age as normal children. They can, however, through training in the use of verbal rehearsal strategies and/or reinforcement for correct responses on central recall bring their level of selective attention performance similar to that of normal peers. Attention training and self instruction to control impulsivity are receiving research attention (Bender, 1980; Meichenbaum & Goodman, 1971). Bender, investigating the use of these strategies with impulsive deaf learners, found results to support using attention deployment strategies for them, with self-instruction given a smaller role. Giving learners cognitive strategies to assist learning may prove to be a highly useful intervention approach, particularly if used in combination with task analytic and applied behavioral analysis techniques.

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CURRICULUM SELECTION AND DEVELOPMENT FOR SEVERELY INVOLVED MULTIPLY HANDICAPPED HEARING IMPAIRED STUDENTS

Susan Zylstra Owner

Professionals concerned with education programs for multiply handicapped hearing impaired students have become increasingly aware of the dearth of appropriate curricula and materials. While some useful resources have been developed (see "Selected Resources on Available Curriculum and Materials...") generally, the available curricula have been designed for higher functioning hearing impaired students. However, these multiply handicapped students by nature of their additional disabilities are a heterogenous group. The curricular needs within a single class may be as diverse as the students being served. While some of these students will progress through curricula designed for typical hearing impaired students, with some teacher-made modifications and adaptations, others will require a more finely sliced approach and an emphasis on basic life skills. A wide range of curricular options often will be necessary. For example, in developing an effective educational program for cerebral palsied deaf students, both self-help skills and grade level academic skills may be included. A teacher should be able to draw upon curricular resources in both these areas. Another student in the same class may have significant learning problems requiring a slow paced, repetitive approach. This section will focus on curriculum issues for severely involved multiply handicapped hearing impaired students.

Developing curricula, selecting materials and identifying strategies are complex tasks. The tasks seem awesome when educators appreciate that they in fact help determine the quality of life for the children they serve. In the past the unserved and underserved multiply handicapped hearing impaired persons have been sent to vocational rehabilitation workers, who at best, are able to place only a few of these clients in sheltered working and living environments. Educators now are actively involved in the lives of these students, beginning at the preschool level. By making informed and individually responsive decisions about what these students are to learn, educators will have a dramatic impact on increasing the quality of life for these multiply handicapped hearing impaired individuals. Perhaps the key is to remember that the purpose in education is to shape the skills, behaviors, and knowledge that these students need to gain the greatest potential for independence in their adult lives. Thus, the selection of curricula content may well determine significant aspects of a student's repertoire in the future. Educators must accept this task with great care for the importance of this responsibility.

Philosophical Basis

Few professionals would advocate the wholesale adoption of any single curriculum for a student or class of students. Rather, they must assess individually the needs of each student, and select goals to strengthen assets and shore up weak areas. In the same way students are assessed individually, curricula must be assessed individually. Curricula, too, have specific strengths. When considering curricula it is helpful to remember that a major philosophical approach provides the basis for the curriculum, either explicity or implicitly. The philosophy, or frame of reference, is usually reflected in the tasks included, the type of sequencing, and the general arrangement and display of skills. Major approaches include the developmental, the task analytic, the functional, and the adaptive/prosthetic. Generally, curricula reflect a combination of these elements; distinctiveness lies in the emphasis placed on a given approach.

Developmental Model

The developmental model is based both on literature and on knowledge of the development of a normal child. The assumption of this approach is that skill development is dependent upon acquisition of prerequisite levels. Here a student is evaluated to determine where he or she is performing in relation to normal developmental sequences, instructional programming then proceeds from this basis.

Task Analytic Model

A task analytic model selects tasks for a variety of reasons and analyzes them into component steps for instruction. Task analysis, to varying degrees, is typically included in curricula aimed at the acquisition of self-help skills.

Functional Model

A functional model selects tasks for inclusion in a curriculum because of their utility for individuals. Such an approach might ask, "What skills and information does an individual need to live independently in a community," and include tasks derived from that approach in a curriculum. Most often, this approach uses task analysis to refine selected tasks into teaching steps.

Adaptive/Prosthetic Approach

An adaptive/prosthetic approach is often incorporated in the development of a curriculum for the multiply handicapped hearing impaired. Tasks which ordinarily require one modality, or are performed in a standard fashion are taught in an alternative way, or prosthetic equipment is used to achieve an intended goal. The use of sign language, or the development of a communication board are examples of the adaptive approach.

Probably there is no curriculum that uses any one of these approaches exclusively. Instead, two or more elements usually are combined in developing the curriculum. It is important, however, to be familiar with these models in order to understand the general approach of a given curriculum.

Evaluating Curricula

A refined, complete curriculum for severely handicapped hearing impaired students should include the following skill areas: pre-academic and academic, leisure time, social interactions, self-help, communication, motor, and pre-vocational and vocational. Sequence behaviors and tasks should be arranged in very small increments of difficulty, and should provide for a maximum amount of success, so the pupil can progress to more complex tasks or skills. The curriculum should not be considered completed, fixed, finished, or bound, it should be open-ended, always being further developed, refined, and modified on the basis of performance data. Through this process one will have responsible, dynamic guidelines for teaching severely handicapped learners (Haring, 1975).

Criteria

In considering the criteria involved in evaluating a curriculum, one finds that a first issue is the appropriateness of a curriculum for the target population. Given the pervasive language difficulties of multiply handicapped-hearing impaired youngsters, this is indeed a critical feature. The linguistic competence required in any given curriculum, and its adaptability to an alternative communication system, must be carefully anslyzed. It is imperative that curriculum selection be matched to the strongest communication modality of the individual student.

In addition, it is important that the selected model be responsive to age and interests, with some consideration of the child's predicted long-range functioning level. A developmentally based curriculum, for example, might be appropriately used with a young, severely retarded hearing impaired child. However, a youth of twenty with the same handicap might be better placed in a curricular sequence which stresses functional skills in self-care, social interaction, and work tasks.

General questions related to appropriateness of curriculum include these:

1. Is the curricular approach (e.g., developmental, functional, adaptive) appropriate for the type of disabilities or learning pattern of the child?
2. Is the curricular approach appropriate for the age of the child?
3. Is the curricular approach appropriate to meet the long-range goals that parents and others have for the child?

Another factor that may affect the curriculum selected is its usefulness in teaching. Does it include all components required? Does it specify the sequence in systematic behavior terminology? Is it sliced finely enough to be useful in teaching? Does it allow flexibility to accommodate for the competency/performance discrepancies which so frequently characterize the skills of multiply handicapped-hearing impaired children and youth?

Also to be considered in evaluating a curriculum are the constituent elements included in it. Some elements are necessary, such as tasks, task sequences, and criteria. Others are quite useful, such as lesson plans and evaluation procedures. This checklist provides some of the elements which may be considered in evaluating the components of a curriculum:

1. Major objective(s)
2. Composite scope and sequence

3. Criteria for each objective/step
4. Placement procedures
5. Lesson plans
6. Evaluation procedures (Gentry, et al., 1976)

Questions should also be asked about field testing or validity research conducted with curricula. Information about these areas is usually lacking, but when included may provide additional support for the use of a specific curriculum.

Of equal importance is the question of a curriculum's usefulness for a particular class. Constraints of staffing, and physical environment, along with the behavioral characteristics of students served, are essential to consider when choosing curriculum.

Conclusion

Identifying severely involved multiply handicapped hearing impaired students is fairly clear-cut because of their obvious disabilities. However, identifying a curriculum that is suited to the whole population is not really possible; each student is unique with individual learning styles, abilities and needs. In addition, each learning environment is unique with different constraints, resources and support systems. It is imperative, that decisions regarding curriculum selection be based on accurate assessment of individual student needs, of environmental characteristics, and of curriculum utility therein. The purpose of this section has been to provide some guidelines to assist in the curriculum selection process.

A multidisciplinary framework enables educators to get an accurate appraisal of both student and curriculum. This principle should be underscored here. One will also find strength among team members and the unit functioning in unison for ongoing support and guidance. It is through team decision making that one can best select that curriculum most capable of meeting the unique needs of these special students.

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Functional Curriculum Development for Multiply Involved Hearing-Impaired Students

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Curricula for multiply involved hearing-impaired students often call for material designed for younger, normal hearing-impaired students. Age-inappropriate curricula fail to prepare students to function independently in varied postschool settings. This article examines different curriculum models and suggests a functional approach to curriculum development for multiply involved hearing-impaired students. The functional approach selects tasks for the curriculum based on their potential to contribute to independent living in multiple environments. Advantages and disadvantages of the functional approach are considered particularly in relation to normal development curriculum models. Basic procedures for designing functional curricula are described.

Increasingly, special educators are confronting the issue of how best to accommodate the multiply involved hearing-impaired youngster in existing or new programs while maintaining compliance with federal mandate Public Law 94-142, the Education for All Handicapped Children Act of 1975. The promises of P.L. 94–142 were many; the task of realizing these promises has fallen, in many cases, to the classroom teacher and/or school administrator. One of the most difficult problems confronting classroom teachers, and to some extent school administrators, concerns the development of meaningful curricula for multiply involved hearing-impaired students. The problem is especially troublesome because it encompasses programmatic, administrative, and legal issues. Programmatically, a curriculum provides a blueprint for the types of educational skills to be taught and the sequences for their instruction. Administratively, a curriculum must be designed and implemented within the realities of a particular school context. While P.L. 94-142 does not specify curricular content, the law does demand that handicapped children receive an "appropriate education" in the "least restrictive" setting. Legally, then, a curriculum must be developed that facilitates both an appropriate education and less restrictive settings.

How should curricula for the multiply involved hearing impaired be modeled if they are to simultaneously foster appropriate education and opportunity for movement into less restrictive settings?

Curriculum Approaches

Over the years, a variety of definitions have emerged for the term "curriculum." When it comes to the multiply handicapped, an essential concept should underlie all definitions. A curriculum should be viewed as a framework with three identifiable stages of focus. First, a curriculum addresses the skills and concepts of the five basic programmatic areas—motor, self-help, communication, social/interpersonal, and cognitive. Second, as a prelude to instruction in these five areas, and as a continuing part of each basic curricular area, sensory stimulation and sensorimotor development must be given emphasis in programs for multiply handicapped youth. A third stage of curricular focus that should appear in programs for multiply handicapped adolescents and adults would offer prevocation/vocational skills and leisure activities (VanEtten, Arkell, & VanEtten, 1980). According to this view, the curriculum primarily addresses the issue of what to teach; it also provides some guidelines for the organization of content areas.

Existing curricula for the multiply handicapped have evolved from two philosophical bases: developmental logic and remedial logic. Developmental logic assumes that the best way to teach skills is to follow the sequences by which normal children acquire skills within specific content areas (e.g., language, motor development). These approaches do not offer alternative sequences to skill development. The basic premise is that within any curricular area there are prerequisite skills. In other words, certain developmental levels must be mastered before subsequent skills can be developed. Developmental logic is based on research in child development, and it draws extensively from cognitive theories of learning. In contrast, remedial logic assumes that multiply handicapped children do not possess the same set of abilities and experiences exhibited by normal children. Remedial logic is not concerned with the order in which normal children acquire skills. Instead, it focuses on skills needed to improve one's ability to operate in the environment, and then determines the most efficient order to teach these skills. The assumption is that many behaviors can be taught separately, since the notion of interdependency between skills is untenable in some areas and/or it is not crucial to behavior acquisition in other skill areas. Remedial logic emanates from behavioral theory and is supported by research, particularly with severely handicapped students (Anderson, Hodson, & Jones, 1975; Brody & Smilovitz, 1974; Guess, Sailor, & Baer, 1977, pp. 360–377).

From these two philosophical bases, four approaches to curriculum design for the multiply handicapped have emerged. These include a *normal developmental* model, a *task analytic* model, a *functional* model, and an *adaptive/prosthetic* model (Gentry, Cupp, Joslyn, & Welch, 1977, pp. 55–68). The models are not exclusive; most curricula reflect a combination of two or more of these models. However, a particular curriculum will tend to emphasize one model over the others.

Normal Developmental Models. These models are reflected in curricula based on normal child development literature (e.g., Alpern & Boll, 1972; Bayley, 1968; Gesell & Amatruda, 1942). Skill areas selected are determined by the behaviors normal children usually develop at various ages. Skills are arranged according to the sequence in which children normally acquire them. In the area of language, for example, this model would first determine a hearing-impaired child's developmental functioning level. For example, if the student were functioning at the 4-year-old level, instructional skills would be selected and ordered according to a normal developmental sequence for language acquisition at the 4-year-old stage. The age of the student would make little difference. The assumption would be that language has a definite and complex structure, and that parts of this structure depend on the language components previously mastered

Task Analytic Model. In some curricula, tasks are selected for a variety of reasons and then sliced into smaller steps for instruction. Curricula designed with a task-analytic framework consider the particular tasks that are important for a child to learn, the learning sequence needed, and the prerequisite behaviors needed to learn the tasks. For example, the skill area of dressing may be considered essential for a student to learn. Because many dressing behaviors can be taught in different ways, tasks would be differently broken down into smaller steps depending on the learning sequence perceived to be easiest for a particular student to master. Thus, the task "puts on T-shirt" might be analyzed and taught to one student by having the student insert the head through the neck hole, followed by the arms through the shirtsleeves; another student may need to approach the task by inserting the arms through the shirtsleeves, followed by the head through the neck hole. Regardless of the learning sequence, certain prerequisite behaviors would be needed by any student in the "T-shirt program," such as the grasp motion, push and pull motions, and directed arm and head movements. The task analytic model reflects remedial philosophy, but the basic strategy can be used with any of the other three models.

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Functional Model. The functional model revolves around the question, "What essential tasks does a student need in order to function in a variety of settings?" With such a question as a guideline, tasks are selected for the curriculum based on potential contributions to independent living. For example, rather than sorting round blocks from square blocks, an older student might be taught to sort dishes (e.g., cups, saucers, and plates) while putting them into a cupboard. Functional models emphasize curricula that are environmentally based, and provide age-appropriate activities that are taught, where possible, in a natural context.

Adaptive/Prosthetic Model. Some curricula are designed especially for students with sensory or motor deficits. Under such a model, tasks that usually require a certain modality are taught by means of another modality. For example, language tasks might be taught to multiply involved hearing-impaired students who have failed to acquire speech through a combination of manual and spoken English. Prosthetic equipment, such as walking devices, might be used to teach tasks to orthopedically involved hearing-impaired students. This approach assumes that some children need to learn skills that are not typically needed by others. The intent is to provide students with alternative skills that will enable them to function more effectively in their environments.

When selecting or developing curricula, teachers should be aware of the different models because they significantly influence the nature and order of instructional tasks students will learn. Given the four options, which approach is best suited to the multiply involved hearing-impaired learner? This question must be considered in relation to the role of curricula in education programs for these learners.

Role of Curricula

Because multiply handicapped students have difficulty acquiring skills through incidental learning, and because they experience more difficulty developing compensating behaviors, curricular deficits are more likely to adversely affect these students' general functioning in childhood and later adulthood. Multiply involved hearing-impaired students stand a greater chance of being institutionalized if, at adulthood, they have failed to acquire the minimum competencies necessary for community living. Viewed in this light, the role of curricula for the multiply involved hearing impaired should aim to prepare them to function as independently as possible in many least restrictive settings. This requires that curricula be longitudinal in scope, and that they consider both current and potential future environments.

Curricula must reflect both the chronological ages and the functioning levels of students. Much curricular content currently used with multiply involved hearing-impaired students is based on material developed for younger, normal hearing-impaired students. The result is often watered-down, age-inappropriate curricula that rarely prepare students to function independently in various postschool settings. Given that the role of curricula for the multiply involved hearing impaired should be to develop functional skills that will maximize the potential for independent living in varied environments, curricula based on a functional model, with a remedial orientation, would seem to have the most merit.

Concerns with Curriculum Based on Normal Development

The primary concern with normal developmental models as a basis for curriculum design with hearing-impaired multiply handicapped students is that such models are usually insensitive to the development of age-appropriate skills. Tasks that are appropriate for normal 6-year-old children are usually inappropriate for 18-year-old students, even if they are functioning at a 6-year-old level. Stacking blocks, for example, may be an appropriate task for a 6-year-old student. But the task is nonfunctional and age-inappropriate for an older student, even if the student is developmentally functioning at a 6-year-old level. Instead, alternative tasks that will elicit stacking behavior should be substituted for the older student, such as stacking dishes, boxes, or clean clothes. For students who are about to graduate from school, developmental sequences do not ordinarily result in the attainment of the skills that are critical to independent functioning in several environments.

At least four other problems are associated with normal development curriculum models for the multiply involved hearing impaired. First, developmental curricula are usually unsuitable for sensory- and motor-impaired children. The milestones of normal development do not take into account the effect of sensory and motor disabilities on child development. In particular, the synergistic effects of multiple handicaps are not reflected in normal developmental milestones. For example, consider the difficulties that an orthopedically handicapped student would encounter trying to progress through a normal developmental sequence in the gross motor area. These difficulties would be substantially magnified in a student with hearing and/or visual impairments.

Second, the appropriateness of readiness and developmental behaviors and their sequences of occurrence are questionable with respect to the multiply involved hearing-impaired child. Clearly, multiply involved hearing-impaired children are not a normal population. Many multiply involved hearing-impaired students cannot, for physiological reasons, display certain normal behaviors. Thus, they will be unable to meet the readiness assumptions associated with normal developmental models. For example, how does a child without hands display the "palmer grasp" response, presumably a prerequisite to numerous motor tasks? By substituting compensating behaviors, such as by relying heavily on other limb parts and shoulders, as well as by using prosthetic hand devices, such a child could accomplish many motor skills—but not

necessarily in the manner specified in a normal developmental sequence, and without the presumed readiness behaviors needed for these tasks. Sometimes multiply involved hearing-impaired people, particularly those who are moderately and severely retarded, acquire some skills in a fragmented fashion. That is, they may develop more complex skills without ever displaying the presumed prerequisites for such skills. Additionally, many multiply involved hearing-impaired students have been institutionalized and/or kept from social and educational experiences. It is illogical to expect these pupils to progress through developmental sequences derived from research on normal children.

Third, because normal development sequences do not take into account the synergistic effects of multiple handicaps, developmental tasks become less and less age-appropriate as multiply involved students get older. Few multiply involved hearing-impaired children gain 12 months developmentally in 12 months of time. A 1-year-old multihandicapped baby may function, for example, at a 2-month-old developmental level at the time of assessment. Thus, the baby is only 10 months behind the normally developing 1-year-old child. By the age of 6, however, this same child may be functioning at only a 2-year-old level, having averaged less than 12 months of developmental gain per year. Now the child is 4 years behind the normally developing 6-year-old. Thus, the discrepancy between multiply involved children's developmental and chronological ages often widens as they grow older.

Finally, normal development models fail to offer alternative sequences for skill development and, therefore, tend to ignore the function of behavior. The function of the developmental milestone of walking, for example, is to move one's body through space. When developmental milestones are translated into their functions, alternative behaviors can be determined that will serve the functions for persons needing alternative skills. Once deviation is needed within a developmental sequence, the remaining portion of the sequence is generally not useful for instructional purposes.

Merits of the Functional Approach to Curriculum Development

The functional approach has several advantages, four of which are especially important for multiply involved hearing-impaired students and their teachers.

1. The approach requires the analysis of current and possible future living and working environments. This encourages curricula to include age-appropriate skills that are functional to individual students. Instructional goals can be ranked in relation to the skills found most essential to competent living.

2. Because the approach considers independent functioning in future as well as current environments, it encourages the development of curricula with a longitudinal scope. This facilitates instructional planning, since a longitudinal curriculum can be used as a map to chart a student's present and past positions and needed future courses.
3. Learning tasks emanate from specific skills needed in several environments. The specificity of the skills makes it easy to develop behavioral objectives, which in turn facilitates pupil evaluation and the measurement of program effectiveness.
4. The functional model is flexible, incorporating task-analytic, adaptive/prosthetic, or normal developmental approaches where necessary.

Limitations of the Functional Model

The functional model also has its share of disadvantages. First, because it is highly individualized, the sequence of skills needed to function in one or more environments often must be searched out, task-analyzed, and mapped longitudinally by the teacher. Clearly, this is a time-consuming endeavor. In contrast, there is extensive literature on normal child development and several commercially available curricula built on developmental models. To some extent, teachers of multiply involved hearing-impaired students can overcome this problem by using curricula developed for the severely/profoundly handicapped. Examples of packages currently on the market include: *The Teaching Research Curriculum for the Moderately and Severely Handicapped* (Fredericks, Riggs, Furey, Groove, Moore, McDonnell, Jordan, Hanson, Baldwin, & Wadlow, 1976); *The Right-to-Education Child* (Myers, Sinco, & Stalma, 1973); and *Learning Staircase* (Coughran & Goff, 1976).

A second limitation of the functional approach is that a logical analysis of several environments needs to be made, sometimes for each student in the class. For example, when multiply involved hearing-impaired students are classified as "severely handicapped" or "multiply handicapped" for service delivery purposes, the teacher must deal with broad categories that may even include children with normal hearing. Functioning levels may be so diverse as to require several analyses of different environments relevant to every student in the class. This would depend on teacher-generated curricula rather than prepackaged materials. When students are grouped according to functioning level as well as age, likelihood increases that one analysis of different environments, and the appropriate skill sequences developed, will be meaningful to most students in the class.

Finally, the functional approach may conflict with the philosophies, objectives, and terminology of education teams within a school. This is particularly a problem in interdisciplinary settings. Members of the interdisciplinary team, particularly physical, occupational, and speech-language therapists, may base their teaching sequences and recommendations on normal development.

Basic Tasks for Structuring a Functional Curriculum

Five tasks are essential to the design of functional curricula. The tasks are interdependent and logically hierarchical, although different tasks can often be conducted concurrently. Several specialists, as well as parents, will need to assist the classroom teacher with these tasks.

First, identify the current home, school, community, and vocational environments in which the hearing-impaired multiply handicapped student presently functions. Possible environments for a secondary-level student might be described: (a) lives at home on weekends, holidays, and during summer months; (b) attends a residential school for the hearing impaired, secondary-level placement; (c) participates only in select community activities initiated by the school, such as an annual art fair and a basketball clinic; (d) works two afternoons a week in a sheltered workshop setting.

Second, identify the activities frequently taking place in these settings. This step requires an ecological inventory. The teacher (or parents, aids, or specialists) would visit each of the settings to monitor and record the types of activities occurring in each setting and the general frequencies with which they occur (e.g., very often, sometimes). In some cases, a checklist of possible activity categories could be developed before visiting a setting if the teacher were familiar with the types of activities that ordinarily occurred in the setting. For example, the school vocational counselor might be quite familiar with the sheltered workshop setting, having placed many students there in the past. If not, the ecological inventory is conducted by taking field notes and recording anecdotal observations. When activities characteristic of each setting have been identified, the teacher then groups them into content areas (e.g., "independent travel" and "being on time" might fall under the vocational area) to form a skills sequence. The resulting sequence should reflect a longitudinal strand, with activities ranging from least to most complex.

Third, identify the next least restrictive environments to which students could proceed after achieving the skills required in their immediate environments. For example, a secondary-level student may be able to move from his or her parent's home to a group home in the community after graduation; or from sporadic school-sponsored community activities, such as the annual art fair, to regular community-sponsored activities such as participation in Scout troops. Even if placements do not change, environments can become less restrictive by widening opportunities and responsibilities within them.

Fourth, identify the activities frequently performed in the environments that have been identified in the third step. For example, what types of activities characterize the local Boy Scout troops? Or, what types of activities must the student be able to conduct to function effectively in a group home setting? When these activities are identified, they can be grouped into content areas and a skills sequence can be formed within content areas. These sequences should be an extension of those developed in the second step.

Finally, identify desirable future environments that would be least restrictive. For example, vocational placement or employment in the private sector is preferable over sheltered workshop arrangements. This step insures early and continuous programming for skills that will broaden opportunities and facilitate independent functioning in adulthood.

Final Considerations

Five tenets of the functional approach are essential to its integrity, and serve as guidelines for the development of functional curricula:

1. The functional approach requires that curricula reflect training areas for multiple environments that are chronologically age-appropriate as well as least restrictive. Environments that are not age-appropriate cannot logically be considered least restrictive, since they do not offer opportunities for teaching or modeling behaviors that are relevant to age.
2. The functional model poses a question before putting any skill in the curriculum: "Will the student be in school long enough to develop this skill to the point where it will become functional?"
3. Despite the flexibility of the functional approach, it is cautious in its use of normal developmental and adaptive/prosthetic models. Normal development sequences are used only when children function near the normal range within a content area, and only if the developmental sequence is seen as facilitating independent functioning in the content area. Adaptive/prosthetic approaches are used only when it has been determined that acquisition of a normal skill is impossible, or that development of an alternative skill would expedite acquisition of a normal skill. Since the goal of a functional model is to develop skills that will maximize interaction in a number of environments, the approach carefully evaluates the substitution of alternative skills for more normal skills. The approach does not automatically assume, for example, that multiply involved hearing-impaired students need alternative communication modes such as sign language, Bliss Symbols, or communication boards. Since such skills can be applied only in limited settings, they may not foster maximal community integration. Nevertheless, some students need alternative skills to operate in their environments. Choosing alternative skills does not rule out efforts to teach the more normal skills in the future. In some cases, the lifelong need for adaptive/prosthetic behaviors is quite clear. For example, a hearing-impaired child with spina bifida may never be able to walk. Obviously an alternative mobility skill must be developed. Under a functional model, the curriculum would include a unit on wheelchair mobility in relation to different environments. This area may be the only aspect of the child's curriculum that draws from the adaptive/prosthetic model.
4. The delivery of instruction is guided by two important factors. First, in choosing multiple environments, desirable settings should not be ignored merely because students will not be able to perform all of the activities that take place in these settings. Instead, it is desirable to develop skills that will allow students to partake in *some* of the activities of different environments. Second, instruction should occur in natural settings wherever possible. In the classroom, a student may be able to select pictures of food items when given their written labels, but this does not mean the student will be able to select them in the grocery store when given a shopping list.
5. Multiply involved hearing-impaired students should constantly be required to perform in varied and increasingly complex environments. As students move into new environments, transition strategies are needed so that moves are success oriented and nonthreatening. Transition plans should address the student's internal needs, such as the skills that are initially required to move into a new setting, and his or her external needs, such as inservice training for an aide and general community awareness.

The functional approach is not a panacea for curriculum development for all multiply involved hearing-impaired students. However, the approach offers a promising alternative to curriculum approaches that have not been successful with the heterogeneous hearing-impaired, multiply handicapped population. Functional curricula maximize the likelihood that students will develop skill repertoires that will help them to adjust in many least restrictive contexts, and such curricula are responsive to legislative mandates.

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Selected Resources on Available Curriculum and Materials Designed for Hearing Impaired Developmentally Disabled

Foster, E., Levy, J., & Cullison, S. Let the Sunshine In: Learning activities for multiply handicapped deaf children. Silver Spring, Md.: National Association of the Deaf, 1972.

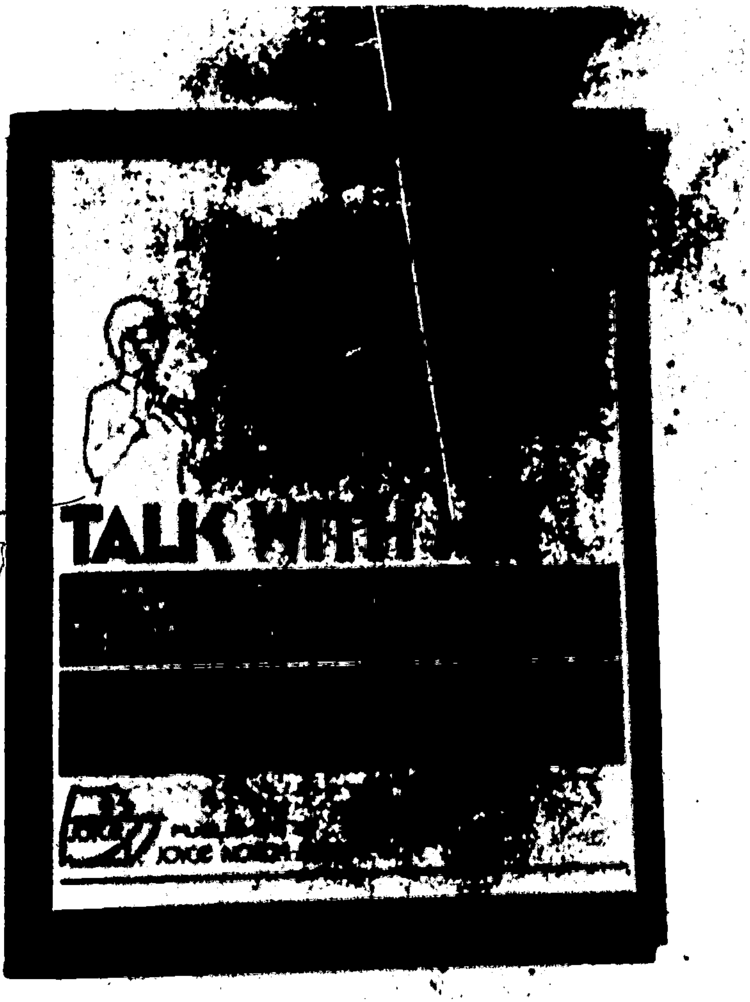
Written to stress an individual approach to learning, this material contains units of study covering social training, time, and money. Vocabulary is introduced by means of a total communication approach to learning. Work is highly structured, and books are bound so that they can be broken apart and used in individual segments.

Huffman, J., Hoffman, B., Gransee, D., Fox, A., James, J., & Schmitz, J.

Talk with me: Communication with the multi-handicapped deaf.

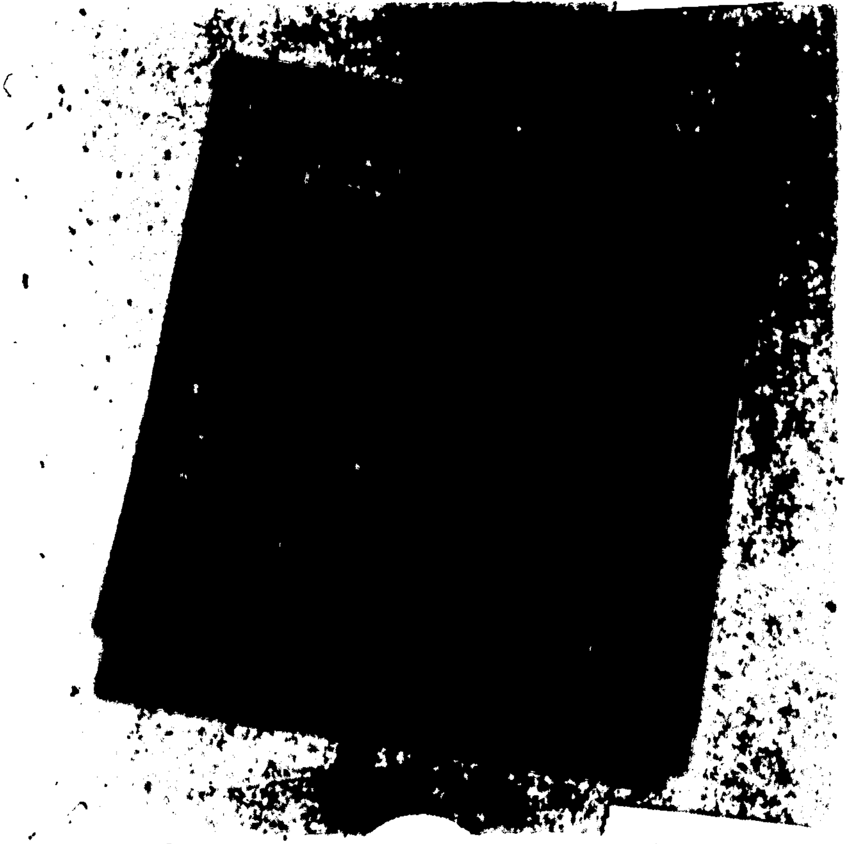
Northridge, Ca.: Joyce Motion Picture Co., 1975.

This manual contains over 400 special signs, and games, receipes, activities, and practice sentences. Material is based on activities proven effective for use with multihandicapped deaf persons in the California State hospital system.



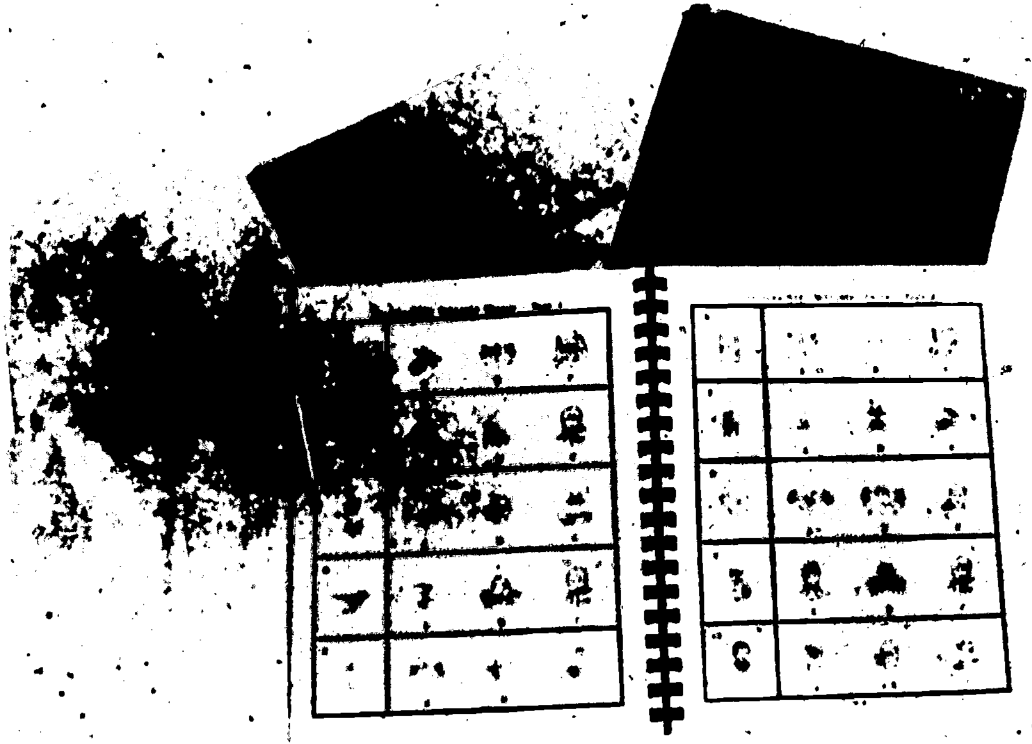
Hyde, S., and Engle, D. The Potomac program: A curriculum for the severely handicapped • deaf • hearing impaired • non verbal. Beaverton, Or.: Dormac Inc., 1977.

Developed by two teachers of the severely multi-handicapped deaf, this curriculum has been designed as a tool for individualized instruction, or for group instruction. The eight sections cover: matching, categorization, sequencing, gross motor skills, fine motor skills, sign language, introduction to hearing aids and auditory training, and introduction to speech. Behavioral objectives, sub-objectives, and activities are provided.



McKinney, V. <u>Toe-hold literacy packet</u>. Los Angeles: Photo-School Films, Inc., 1974. (Distributed in cooperation with Gallaudet College; available from the Gallaudet College Bookstore, Kendall Green, Washington, D.C. 20002.)

Series of books developed for use in teaching communication skills to deaf adolescents and adults who have linguistic skills significantly below-average. Field tested with hearing impaired students. Highly structured materials with core vocabulary provide activities on following commands, generating sentences, and answering questions.



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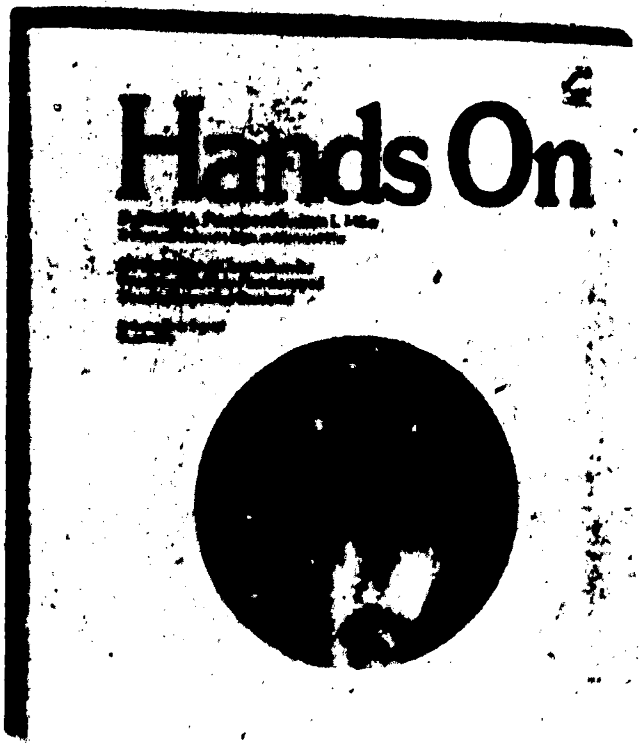
Peterson, B., & Schoenmann, S. Building blocks for developing basic language: Language curriculum developed for deaf-multi-handicapped. Beaverton, Or.: Dormac, Inc., 1977.

This is a revision of the language curriculum originally developed for use in the Deaf Multi-Handicapped Unit at the California School for the Deaf, Riverside. It is based on the Apple Tree sentence patterns used in combination with the color coded Fitzgerald Key. A task analytic approach to language teaching, the curriculum contains performance objectives and sequential teaching/learning activities. Also included are Sample Lesson Plans, a Sample Continuous Record Checksheet, Initial Vocabulary Checksheets, and a Categorization Skills Checksheet.

Potocki, P. A., and Miller, B. L. *Hands on: A manipulative curriculum for teaching multiply handicapped hearing impaired students*. Tucson, Az: Communication Skill Builders, 1980.

This curriculum was developed for use with severely multihandicapped children functioning below a three year level in language and/or conceptual development. A teacher's guide section covers approach, entry behavior, structure and content, and classroom applications. Curriculum sections include readiness, communication, language structures, language concepts, pre-math, aural rehabilitation, and speech. Section notes contain evaluation material, objectives, and a hierarchy of the learning sequence.



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Educational Programming for Multiply Involved Deaf Students

Claudia Arkell

The lack of educational opportunities for multiply involved deaf individuals, coupled with the severity of their handicaps, has usually resulted in these individuals functioning at very low developmental levels across a number of skill areas. This lack of skills presents special problems with respect to educational programming procedures. A strategy for designing education programs for these individuals must be devised if the schooling process is to be successful. This article suggests a six-phase programming cycle to be followed when developing instructional programs for deaf students with multiple involvements. The six phases represent the most important variables in educational programming, as conceptualized by the author. These phases include child observation and assessment, pinpointing behavior, writing instructional objectives, constructing task analyses, developing instructional program designs, and designing evaluation procedures.

Until recently, many multiply involved deaf students did not have easy access to public or private school programs. With the passage of The Education for All Handicapped Children Act of 1975 (Public Law 94-142), these students will be guaranteed admission to public school programs. A strategy for designing optimal education programs for them is needed, if the schooling process is to be maximally effective. Such a strategy should ensure that school programs for these students will not become mere maintenance routines. Rather, the primary goal of education programs for multiply involved students should be to make them as independent as possible, so that they will function as effectively as is possible within the least restrictive environmental setting. All instructional programs for these students should be directed toward this end.

The Programming Process

The myriad of educational problems typically seen in deaf students with multiple involvements necessitates a systematic structuring of the education programming process, if instructional intervention with these students is to be successful. Such a structure has been developed (Arkell, 1976) and field tested in the Albuquerque Public Schools, Albuquerque, New Mexico, and is applicable to deaf students with associated learning disabilities and behavior problems as well as other sensory and physical handicaps. In Albuquerque, all students were functioning in the severely or profoundly retarded range (obtained IQ scores on the Weschler Intelligence Scale for Children were below 35) and all students were functioning at a 3-year-old or less general development level. All students displayed serious deficits in adaptive behavior. In particular, most were nonambulatory, did not possess a functional communication system, and lacked self-help skills. These students required a systematic approach to programming, one that would provide guidelines for structuring the learning environment.

The approach, as described in this paper, results in a cyclical process of student information input, teaching procedures, evaluation, and program modification, similar to diagnostic teaching. The process provides continual directives to the teacher in terms of short- and long-range educational goals.

This programming process involves six phases. These phases and the sequence in which they should occur can be designated as follows: 1) A *child observation/assessment* period is conducted to determine a student's educational strengths and weaknesses; 2) Target behaviors are *pinpointed*; 3) An *instructional objective* for each target behavior is written; 4) A *task analysis* of each behavior in each instructional objective is developed; 5) An *instructional program design* or teaching methodology is constructed to teach the component skills in the task analysis; and finally 6) An *evaluation* procedure, to determine the effectiveness of each instructional program, is designed.

Phase I: Child Observation Assessment Period

The purpose of the child observation and assessment phase is to determine the student's strengths and weaknesses, enabling the teacher to select relevant curriculum areas for educational programming. The usage of informal assessment devices, such as behavioral checklists or criterion-referenced tests, is the most functional approach to this phase. Four observation strategies have been found useful with multiply involved, deaf students (Arkell, 1977). One strategy is to use a normal developmental checklist of behaviors across a number of skill areas, such as motor development, communication, self-help, and socialization. Several such checklists are available (e.g., Cohen, Gross, & Haring, 1976). Most of the behaviors in these lists are operationally stated so that it can be easily determined whether a student does or does not possess the behaviors listed. The usage of such checklists facilitates the measurement of student behavior since a change in behavior readily indicates developmental progress or regression. While it is important to recognize developmental gains or losses, teachers of multiply involved deaf students must also be able to recognize the development of functionally useful skills that do not appear on normal developmental checklists, such as progress in using a communication board.

The behavioral checklist offers an alternative to the developmental checklist. These checklists, often teacher-made, contain a list of behaviors usually in a narrow skill area, such as eating. Teachers can select behavioral checklists, or construct ones, which incorporate skill areas particularly germane to multiply involved deaf students, such as learning to use a nonverbal communication system. The behaviors of these checklists are operationally stated. A teacher observes the student to determine which of the behaviors the student possesses. The major difference between the developmental and behavioral checklist is that the behavioral checklist is not sequenced according to normal development, but rather is "logically" sequenced. That is, behaviors within a particular skill area are listed from easy to hard. Such checklists are useful since many deaf students with multiple involvements demonstrate uneven growth patterns and/or "splinter skills." Both developmental and behavioral checklists provide a teacher with information regarding specific skills the student possesses or lacks. Such information subsequently provides directives for educational programming.

The third approach to child observation is the usage of anecdotal records. Such records usually contain brief remarks of a pupil's behavior, as a teacher perceives it. Anecdotal records have been kept by teachers for many, many years. However, it appears that with the recent advent of operant technology in the schools these records have lost acceptance by educators, presumably because of their inherent subjectivity. Instead, behavioral descriptors of a student's functioning, as in developmental and behavioral checklists, are seen as more objective and, hence, more appropriate. Unfortunately, behavioral and developmental checklists do not always pick up subtleties in student behavior that have implications for programming. The way a teacher perceives a student's general behavior, such as moods and reactions to different environmental stimuli, can have significant implications for designing teaching procedures and education programs.

A fourth approach to child observation is a participant-observation strategy. This strategy, which is based on naturalistic or ethnographic research procedures, is basically a long-term extension of the anecdotal record approach. It entails the keeping of detailed teacher and aide observation statements of students' behaviors. The school program is considered the "field" and teaching staff members frequently go through their field notes in an effort to uncover patterns of student behavior that may be developing.

With the deaf, multiply involved student none of these four approaches should be used to the exclusion of the other three. All of them have individual advantages and, when used in combination, they provide a comprehensive picture of where a student is functioning and what types of instructional programs are needed.

Phase II: Pinpointing Target Behaviors

Once a student's strengths and weaknesses have been assessed, the next step in the educational programming cycle is to pinpoint target behaviors for educational intervention. These are behaviors which the teacher is interested in accelerating, decelerating, or perhaps simply monitoring. With respect to multiply involved, deaf students, there is generally a need to accelerate behaviors across the entire basic skills realm (i.e., self-help, communication, motor development, socialization, and preacademics). Behaviors that often need to be decelerated include stereotypic behaviors (e.g., head banging, rocking) and nonfunctional communication habits (e.g., novel gestures). There is often a need to decelerate socially inappropriate behaviors such as grabbing another child's toy.

The term "pinpoint" originally came from a set of instructional procedures referred to as "precision teaching" (Haring, 1970; Lindsley, 1971). Pinpointing means the precise specification of behavior in measurable terms (Cohen et al., 1976). Since measurement is an inherent part of the definition of pinpointing, it is absolutely essential that the pinpointed behavior be overtly observable. Then it can be measured in order to determine the extent to which the behavior is really occurring. This initial measure is referred to as a baseline or the operant rate. It is a measure of behavior before any kind of intervention procedures are instituted. Since the baseline provides a good measure of the frequency or infrequency of the behavior, it furnishes directives for the type of instructional intervention to be designed.

Phase III: Developing Instructional Objectives

Once target behaviors have been identified, they must be translated into instructional objectives before teaching procedures can be designed. An instructional objective is a statement that describes precisely what skill a student will be able to perform after completing a prescribed unit of instruction, the condition(s) under which the student will exhibit the skill, and state criteria for evaluation of acceptable performance. An example might be: When shown a piece of bread and given the appropriate communication cue, "What is this?" the student will respond, "Bread," in spoken and/or signed form, within 15 seconds with 100 percent accuracy.

Phase IV: Task Analysis

When an instructional objective has been specified, the next step in the programming process is to identify a sequence of component skills which lead from responses in the student's repertoire to performance of the objective (Williams, 1975). Task analysis is the enumeration of such a skills sequence. Essentially it involves determining what skills to teach, and their appropriate sequence (easy to hard). It does not deal with methodology, that is, how to teach a skill.

All of the component skills that students need to be able to perform in order to master the objective are listed, then sequenced from easy to hard. Williams (1975) suggests that a good way to identify all of the component skills is to ask the question: "To master this objective, what necessary component skills must the student be able to perform?" After each component skill is identified, the same question is asked until further component skills cannot be identified.

Task analysis is especially advantageous for multiply involved, deaf students. Most of these students have serious deficits in the receptive communication area. If they are going to learn a task, it is usually necessary to instruct them on each of its steps. Special teacher cues, such as modeling and physical prompts, can be attached to each step of the task to help the child understand what is expected of him or her. With this population of students it is crucial to know whether a child's failure to respond correctly results from conceptual inability to perform the task or from failure to comprehend what he or she was supposed to do.

Phase V: Instructional Program Designs

The next step in the programming process is to develop a teaching plan to implement the skills sequence. One format which has been field tested in the Albuquerque Public Schools and has been found useful with multiply involved, deaf students is a modified version of a format suggested by Williams, Brown, and Certo (1976), delineating eight essential components of good instructional programs. The format used in some Albuquerque Public School programs incorporates several of these components. Specifically, this format includes: a lesson heading, a rationale, the instructional objective, a baseline measure, the sequence of skills enumerated in the task analysis, the teaching strategy, plans for teaching generalization of response, and an evaluation component.

The *lesson heading* is a behavioral description of the exact skill the instructional program is designed to teach. An example might be: Ties Shoes.

The rationale is a statement explaining why the student needs to learn this particular skill. It is of primary importance here to consider how the lesson will contribute to a student's overall level of independent functioning.

The instructional objective, previously determined, is the terminal goal which the student should master if the instructional program is effective.

The baseline measure, usually begun as soon as a target behavior has been pinpointed, is the measure of the operant level at which the student is presently performing the desired response. It is extremely important as it provides an indication of the level at which instruction should begin, as well as a basis for comparison of the pre- and post-instructional intervention periods.

The sequence of skills to be mastered includes not only the component skills of the task but prerequisite skills as well. These are entry behaviors that students must possess before they can master the first component skill determined by the task analysis.

The teaching strategy delineates specific procedures employed to teach the student how to perform each of the component skills described in the task analysis. It is divided into steps which correspond to the number of steps (component skills) in the task analysis. Each of these steps usually contains a minimum of four teacher cues. The first cue is usually an appropriate (spoken and/or signed) communication prompt. That is, the student is requested to perform the desired behavior. Often this prompt is not successful, particularly with deaf-blind and severely retarded deaf students. If this prompt is not successful in getting the student to emit the correct response, the teacher then models the correct behavior. With multiply involved, deaf students, the demonstration should be paired with a spoken and/or signed cue whenever possible, or followed immediately by one. The third cue, a partial physical prompt, is initiated if the modeling is unsuccessful in facilitating the desired student response. This prompt requires that the teacher provide some minimum physical assistance to the student that might be helpful in bringing about the desired response. If this prompt fails, the fourth teacher cue, a full physical prompt, is given. Here, the teacher provides maximum physical assistance by taking the learner physically through the desired behavior. Both types of physical prompts should be coupled with or followed by spoken and/or signed cues since, ultimately, the goal is to get the student to be able to perform the correct response on spoken and/or signed cue only. Usage of this cue heirarchy has proven very successful with multiply involved, deaf students (Arkell, 1977).

Generalization of response is the next section of the program design. Here, plans are briefly outlined for teaching the student how to perform this response in different situations, at the request of different people, using different materials and different language cues. This section is extremely important as multiply involved students often learn a new behavior in a classroom context but are unable to generalize that behavior to other appropriate environmental situations. In particular, multiply involved, deaf students often learn to perform a response based on certain language cues, but if those cues are slightly altered they may fail to comprehend the request. Thus, after these students have adequately learned a new behavior, teachers must consciously build new language cues into the lesson plan so that these students will learn to perform the behavior under different types of cues.

Evaluation of the student's performance is the final section of the instructional program design. This component is on-going throughout the programming process and is the sixth phase in the educational programming cycle.

Phase VI: Evaluation

The purpose of evaluation is to determine the effectiveness of the instructional program in order to provide decision-makers with information regarding the efficacy of their educational procedures. This component should be continued throughout the instructional program. In general, the purpose of evaluation is defeated if it takes place now and again, or only at the end of the instructional program. When selecting an evaluation strategy the teacher should consider at least these things: what is being taught; the nature of the target behavior requested; the overall goal of the instruction program, the ease of taking the data using a particular evaluation approach, and the meaningfulness of the units in which the data are reported for the particular instructional goal.

Because multiply involved, deaf students often make very slow progress, it is important to select a measurement strategy that will indicate minute behavioral gains as they are occurring, if accurate programming decisions are to be made. This precludes pre- and post-testing, which may be useful with deaf students who are not multiply handicapped.

There are six simple ways to evaluate the effectiveness of an instruction program. These evaluation procedures can be designated as: percentage analysis, frequency, rate, duration, trials to criterion, and error to criterion.

In percentage analysis the number of correct responses is divided by the total number of responses possible. For example, if a student got four out of five words correct, the percentage of correct responses would be 80 percent.

It is also possible to keep a tally or a count of correct or incorrect responses. This is usually referred to as a frequency measure.

If time is important in the measurement of a behavior, as well as frequency of the response, the evaluation procedure to use is that of rate. Rate is the total number of responses a student makes (correct or incorrect depending on the purpose of the intervention program) divided by the total amount of time in which the student had to make the responses. If a student gets out of his or her seat five times during a 10-minute interval, the rate of out-of-seat behavior is .50. Rate is particularly valuable when the element of time is a critical variable in production of the response.

Sometimes it is important to know how long a behavior lasts. If this is the case, the appropriate evaluation strategy is that of duration.

Another evaluation strategy has been termed "trials to criterion." As the phrase implies, this is simply a measure of how many teaching trials it took before the student reached criterion (i.e., the goal). Another version of this evaluation strategy has been termed "errors to criterion." This measure indicates how many errors a student made before criterion was reached.

Any one of these evaluation strategies can provide a good indication of the effectiveness of an instruction program, assuming, of course, that the measure selected is appropriate for the nature of the student-target behavior. It is especially useful to graph the results so that it is apparent at a glance what kind of a trend the data are taking.

The Albuquerque Public School Program

The six-phase educational programming cycle discussed here represents a synthesis of various procedures that have been used in educational ventures with multiply and/or severely handicapped students. In particular, this programming cycle has been field-tested with severely handicapped, deaf-mentally retarded, and deaf-blind students in the Albuquerque Public Schools (APS) and other school programs in New Mexico and found to be highly successful.

Field testing of the programming cycle began in January, 1976, when the Albuquerque Public Schools initiated an education program for severely, and multiply handicapped students living in a private residential facility. These students had not received any prior educational training and all were functioning at a profoundly retarded level. Twenty-four students were involved in the field testing. They ranged in age from infancy to 18 years. Educational programming for the preschoolers was conducted by university students, since state funding was appropriate for the school-age population only. Students were placed into one of three groups ("classrooms" within the facility) based on general developmental functioning level. Baseline data were obtained on all children for each of the tasks in which they were to receive instruction. Daily data were then recorded for the duration of each child's instructional programs. The utility of the programming cycle was witnessed within a very short time. By May, 1976, five students had progressed so well that they were selected for integration into a special education program on a regular elementary school campus. Certain teachers at this site were also using the programming cycle. Field-testing continued at the residential facility for the next two years, with minor modifications occurring in some aspects of the programming cycle. By June, 1978, the residential facility was essentially deinstitutionalized. All students, except one who is critically ill, attend special education classes on regular school campuses. The success of the programming cycle has resulted in in-service training on a district-wide basis to familiarize APS teachers at seven special centers with the specifics of the cycle. Each of the seven centers is part of a regular public school campus ("side-by-side" site) where severely and multiply handicapped children receive their education, integrated wherever possible in regular education activities.

In-service training with respect to the programming cycle has also been conducted at several rural school districts throughout New Mexico for teachers of the severely/profoundly handicapped. In addition, this inservice training was provided to teachers and aides in a deaf-blind unit of a state institution in New Mexico for the mentally handicapped. Follow-up site visits suggested the viability of the programming cycle in these circumstances.

Conclusions

Although some of the phases in this programming cycle have a basis in behavioral theory, none of the procedures discussed necessarily requires that a teacher subscribe to a behavioristic philosophy in order to use them effectively. They do, however, require that a teacher be quite cognizant of the variables involved in the educational environment, as well as their interrelationships. This necessitates structuring the environment so that antecedent and consequent events, which impinge upon the learner, become evident enough to be positively manipulated by the teacher. In addition, this approach to programming necessitates stating the relevant events within instructional programs in precise language so that they are clear enough to be understood by all who come in contact with the program and observable to the extent that they lend themselves readily to the measurement process. Such precision is mandatory if education programs for multiply involved, deaf students are to be maximally effective.

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Using Criterion-Referenced Tests with Handicapped Students

Lynne Anderson-Inman

Introduction

Educational history has witnessed a dramatic change in the assumptions educators make about learners. In the past, responsibility for acquiring the knowledge and skills necessary to perform successfully in the adult world was placed primarily on the student. Teachers were provided to direct the course of learning and pass out information but it was the students' responsibility to learn, regardless of the quality of instruction to which they were exposed. Students were assumed to differ widely in their ability to profit from instruction and tests were designed to sort out which students were which.

In the late 1950's and early '60's, psychologists and educators began to explore possible real-world applications for the principles of learning derived from laboratory research. Heavily influenced by B. F. Skinner's initial work with teaching machines and programmed instruction, educators and the general public have become increasingly aware of the power of good instruction. The blame for failing to learn has gradually been lifted from the student, as well-sequenced and systematically implemented instructional programs illuminate the potential for improving *any* student's academic behavior. With the realization that there is such a thing as "good" instruction came the need for teachers to evaluate the quality of their procedures. The advent of powerful instructional interventions and the subsequent desire on the part of the teachers to assess when their teaching had been effective established a need for alternate forms of educational measurement (Popham, 1975). Standardized achievement tests gave an overview of student improvement but were too general to be of any use in demonstrating when instruction on specific goals had occurred successfully. Standardized diagnostic tests were useful in identifying areas of deficiency but were not particularly helpful in pinpointing specific skills requiring instruction.

The Advent of Criterion-Referenced Tests

The term "criterion-referenced" testing was first used by Glaser in 1963 when he drew attention to the need for an approach to measurement which would be sensitive to the effects of instruction. Glaser (1963) called for a test in which a student's score would provide "explicit information as to what the individual can and cannot do." Criterion-referenced tests were gradually accepted as more appropriate for making decisions about individual student performance than tests designed to obtain general information on the relative ability of a student as compared to other students. The latter type of testing, characteristic of most achievement measures currently used in education, has been labeled "norm-referenced" testing.

Comparison of Criterion-Referenced Tests with Norm-Referenced Tests

The most significant difference between criterion-referenced assessment and norm-referenced assessment is the manner in which students' scores on the test are interpreted. Scores obtained from norm-referenced instruments acquire their meaning by referring or comparing the individual's performance to that of other individuals who have taken the same tests, i.e., a norm group. Student performance on norm-referenced tests is reported in a manner which helps to make this comparison clear. Percentile scores, for example, indicate the percentage of students above whom the student scored. Grade-equivalent scores communicate student performance level by referring to the average performance of previous test takers from a variety of different grades. Similar comparisons are implied by scores which are reported as age-equivalents or stanines.

In contrast, scores obtained from criterion-referenced tests acquire their meaning by comparing the individual student's performance on each skill with a previously established criterion or standard (Popham & Husek, 1979). How an individual student performs with respect to other students is considered irrelevant for criterion-referenced assessment. The criterion-referenced test is deliberately constructed to provide measurements for specific tasks or skills (Glaser & Nitko, 1971). The student's performance on each skill is compared with the criterion established as indicative of acceptable performance for that skill. If the student's performance is equal to or better than the pre-established criterion, the student is considered to have attained competence in or mastered that skill. Scores on criterion-referenced tests are most frequently reported as pass/fail for each skill identified, with "pass" indicating mastery to the predetermined standard of performance and "fail" indicating lack of mastery.

The manner in which test items are selected and retained is the second critical difference between norm-referenced and criterion-referenced tests and is directly related to their differences in purpose. Because norm-referenced tests are used primarily to evaluate student differences, i.e., identify how well students perform relative to each other; good test items are those which spread students out along some continuum (reading ability, for example). Test constructors try to select test items which maximize the variability in students' scores, the ideal being an item which 50% of the students answer correctly and 50% of the students answer incorrectly.

Criterion-referenced tests, on the other hand, have been developed to make evaluative decisions about instruction: (a) which skills a student has already acquired and therefore does not need to be taught, (b) which skills the student has not yet acquired and therefore needs to be taught, and (c) the effectiveness of specific instructional procedures on previously unlearned skills. Good test items are those which represent the content of instruction and are sensitive to effective instructional techniques. Test items which students answer incorrectly prior to instruction but answer correctly after instruction would be considered ideal.

There is a danger in using norm-referenced tests for making decisions more appropriately made using criterion-referenced instruments, and the danger rises from this difference in the way test items are selected. Teachers have occasionally tried to analyze individual student performance on norm-referenced achievement tests or standardized diagnostic tests item-by-item in order to gain information useful for instructional programming. This occurs most often when norm-referenced test developers have included a listing of skills or objectives for each item as American Guidance Service, for example, has done with *Key Math* (1971). Test items selected because they add variability to the range of students' scores are not, however, accurate reflections of the skill domain they represent. In developing test items for norm-referenced assessment, the content and format of each item are juggled to achieve the desired variability in student responding. Such juggling is not usually conducive to the creation of test items which best represent the skill to be evaluated or to the inclusion of test items which will be sensitive to changes in student competence as a result of instruction.

Alternative Terms for Criterion-Referenced Testing

Before leaving this general overview of criterion-referenced measurement, a few words need to be shared concerning alternatives to the term "criterion-referenced." As with many popular movements in education, increased familiarity with a phenomenon fosters individualized interpretations by educators attempting to clarify the more subtle aspects of its nature. Such attempts at clarification have often led to the selection of alternative terminology in the belief that the new words will better reflect a particular interpretation and hence eliminate all previous confusion.

It is in this manner that terms such as "objectives-based" testing (Sullivan, 1971), "mastery" testing (Block, 1971, Crehan, 1974), "domain-referenced" testing (Denham, 1975), and "instructional-program based" testing (Becker & Engelmann, 1976) have surfaced. Although differences among the concepts represented by these terms exist, fundamental to all above terms is an approach to measuring student performance which (a) specifies the behaviors to be measured, (b) establishes a minimum level of acceptable performance for each behavior, and (c) communicates information to the teacher which is useful for programming instruction and evaluating the effects of instruction. Although using the term "criterion-referenced" testing for this approach may be confusing to some and offensive to others, popular usage has established its right to be accepted.

Where Do Criterion-Referenced Tests Come From?

As the critical reader has probably already discerned, the term "criterion-referenced" refers more to a way of measuring and interpreting students' performance than it does to any specific test or type of test. In fact, the variety of tests claiming to qualify as "criterion-referenced" is astounding to the point of being suspicious. Developing quality criterion-referenced tests, however, is a difficult and time-consuming process. A growing source of criterion-referenced tests are the commercial publishers of other types of instruments for assessment and evaluation. Commercially developed criterion-referenced tests were slow in appearing, however. Test developers were wary of damaging their thriving market for norm-referenced tests and leery of the need to specify clearly what is being measured (Popham, 1975). The tests developed by commercial publishers are generally of two types: (a) those associated with massive instructional materials systems also published by the same company and (b) those designed to stand alone as diagnostic devices.

In response to the widespread lack of criterion-referenced tests and in concern over their frequent inappropriateness for some populations, numerous state and local educational agencies as well as some university affiliated projects have stepped into the test-making business. Although it is difficult for these part-time test developers to attain the rigor possible by the large commercial developers, locally prepared criterion-referenced tests have the advantage of matching the curricular preferences of a specific region or district. Criterion-referenced tests developed in this manner often reflect the orientation of the teachers who contribute to the tests' content and as such are usually similar in educational philosophy to the prevailing curriculum materials of the time and the geographic area. The tests designed by these groups or agencies have sometimes focused on skills felt to be essential for a specific student population or those with a particular type of handicapping condition. Locally developed criterion-referenced tests have also been growing in popularity as instruments for district-wide assessment (Olson, 1976) and statewide evaluation of minimal competencies for graduation from high school.

Criterion-referenced measurement techniques are also being used with increasing frequency in the development of teacher-made tests, and an excellent resource is available to those interested in designing criterion-referenced tests for classroom instruction (Gronlund, 1973). Teachers are attracted by the utility of criterion-referenced tests and the specificity of information they facilitate. Teacher-made criterion-referenced tests are most often developed by teachers of students with a wide-range of academic problems, teachers who devote a portion of their curriculum to units of study on a specific theme, and teachers who feel the available criterion-referenced tests are incompatible with their approach to instruction or the needs of their students.

Using Criterion-Referenced Tests

The utility of criterion-referenced tests for teachers is derived from the fact that they are direct measures of student performance rather than indirect measures. For example, a student's ability or lack of ability to identify the main idea in a written paragraph does not need to be inferred from a general measure of "reading comprehension." Instead, the presence or absence of the skill can be tested directly using criterion-referenced assessment strategies. Direct measures of student performance are founded on the assumption that what one bothers to measure should be what one plans to teach or, of course, its corollary; what is taught should be what is measured. This approach to assessment necessitates careful specification of the behaviors tested or to be tested. It is exactly this precision, however, which results in information useful to teachers. Most criterion-referenced tests give the teacher pass/fail information for each behavior or skill tested. This information can then be used by the teacher to (a) assess the student's current level of functioning relative to the curriculum content, (b) pinpoint specific skills for immediate instruction, (c) monitor student progress through the curriculum, (d) probe for "mastery" of skills subsequent to instruction, and (e) evaluate the effectiveness of the instructional procedures or program used.

A word of caution is needed at this point. It should be remembered that the purpose of criterion-referenced testing is to measure what is taught or what will be taught. Criterion-referenced tests are only useful to the extent that the behaviors measured correspond to the skills covered in the instructional program. In fact, it is only when testing and teaching cover the same well-specified skills that criterion-referenced tests can be of assistance to teachers for making instructional-based decisions.

Criterion-Referenced Tests and Mainstreaming

The special education teacher is no longer the sole professional responsible for programming and providing education to the handicapped students of this country. Federal legislation (P.L. 94-142) requires that every identified handicapped student have a written program of educational goals and objectives (Individualized Educational Program or IEP) developed by a multidisciplinary team, of which the special education teacher is only one member. In addition, the same legislation requires handicapped students to be educated with nonhandicapped students to the maximum extent possible, thus encouraging increased participation and responsibility on the part of regular education teachers. Although neither of these developments are totally new in concept or practice, both have magnified the importance of criterion-referenced tests in the education of handicapped students: the first because it necessitates diagnostic information on each student's skill deficits, and the second because it requires new levels of data-based communication among teachers.

However, the extent to which and the conditions under which criterion-referenced tests prove useful in public school efforts to mainstream handicapped students varies considerably, largely as a function of school policy and teacher orientation to assessment. In schools or districts participating in large-scale efforts to individualize instruction, criterion-referenced tests are frequently administered to all students in a building on a regular basis for one or more tool subject areas. Tests adopted for such extensive assessment attempts are usually correlated to curriculum materials produced by the same publisher. Probably the best known example of the above are the tests and instructional materials developed by Glaser at the University of Pittsburgh's Learning Research and Development Center. Now published by Appleton Century/Crofts, Glaser's *Individually Prescribed Instruction* (IPI) combines criterion-referenced assessment with self-instructional skill booklets to assist teachers in accommodating to individual student differences in math. A similar approach has been adopted by other publishers as well as by local educational agencies.

Use of criterion-referenced tests for the entire student body provides teachers with skill profiles for each student in a particular subject area, e.g., reading or math. This information is then used to program or group all students in the school for instruction in that subject, usually ignoring traditional grade designations. The advantages for handicapped students of a schoolwide system for assessment and individualizing instruction are probably obvious. The system is designed to accommodate learners at all levels. No student needs to be labeled or segregated in order to receive instruction at the appropriate level or appropriate pace. Handicapped students, tested using the same instruments, can therefore be integrated easily without special arrangements or modifications to the existing curriculum.

In the majority of schools, however, there is not a widespread use of criterion-referenced assessment for the entire student body. Criterion-referenced tests may be used primarily by the special education teacher or diagnostic specialist to gather in-depth information about students who are suspected of having problems with the academic curriculum. The tests most used for assessing current level of functioning and specific skill deficits are those designed to cover a broad range of behaviorally stated objectives for a variety of grade levels. These tests are usually developed to stand on their own as diagnostic instruments but frequently provide the teacher with prescriptive references to a number of commercially available materials, keyed by page to individual objectives.

The availability of criterion-referenced test data on handicapped students has considerable utility in a school's efforts to increase or maintain the extent to which students with learning and behavioral problems are educated with nonhandicapped students. Direct measures of the skills handicapped students have acquired facilitate an objective appraisal of their strengths and deficits, thus enhancing their prospects for appropriate placement within the mainstream of regular education. Individualized Educational Programs (IEPs), developed with the aid of criterion-referenced test data and capitalizing on the specificity of information gathered, are far more likely to truly reflect a student's educational needs than IEPs constructed without such information. This in turn, leads to IEPs which are actually useful for instructional programming as well as functional for communicating with regular class teachers, ancillary personnel, and parents.

Criterion-referenced tests which provide the teacher with an individualized profile of skills are also useful in developing and implementing a cooperative system for monitoring student progress in multiple-class settings. As regular class teachers assume increasing responsibility for the education of handicapped students, efficient procedures need to be established for communication on a systematic basis between regular and special education personnel. Criterion-referenced test data, especially when closely correlated with the curricula of both special education and mainstream settings, can be invaluable in maintaining a well-focused cooperative effort towards meeting the instructional needs of handicapped students. Those tests which provide prescriptive information referenced to specific instructional materials are additionally useful by facilitating the search for supplementary materials on selected behaviors or skills requiring remediation. And finally, but not unimportantly, criterion-referenced tests can play a significant role in evaluating the success of selected instructional procedures, thus providing the feedback to regular and special education teachers necessary for joint revision of the instructional process.

Selecting Appropriate Criterion-Referenced Tests

Unfortunately, there is no easy way to assess whether or not a specific criterion-referenced test is appropriate in any given situation. Numerous factors determine what type of criterion-referenced test would be useful, and an equally large number of factors influence the quality of any single test of that type. Wise selection of criterion-referenced tests necessitates an adequate awareness of the types of tests available and of the decisions test developers have had to make in designing a useful instrument for assessment.

In examining criterion-referenced tests, four features should stand out as common to all instruments eligible for the classification (Note 1). The first, and perhaps the most meaningful to teachers, is a behavioral statement of each skill assessed by the test. This usually appears as a list of behavioral objectives but is sometimes a more detailed description of a behavioral domain (Popham, 1975) or a checklist of tasks and subtasks. The second feature that criterion-referenced tests have in common is a means of communicating the acceptable standard of performance for each behavior or skill. This, the "criterion," might be individualized for each skill or it might be standard across all skills evaluated. The third essential feature is, of course, the test items themselves. Although usually of the same paper and pencil type found on norm-referenced tests, criterion-referenced assessment is conducive to less artificial ways of evaluating knowledge or skill, and these methods are sometimes employed. Regardless of format the test items should be selected or designed specifically to represent the exact behaviors stated in the objectives. The fourth and final feature is some form of data reporting system. Although the format for this may vary considerably, it is critical that specific information on student performance be communicated to the teacher for *each* behavioral statement, skill, or objective. This allows the teacher to plan instruction around each student's individual strengths and weaknesses.

Variations in Criterion-Referenced Tests

Both beyond and within these four essential features, one will find considerable variation among commercially marketed criterion-referenced tests. Knowledge of the possible variations can be useful when critiquing a test for purchase and when interpreting the meaning of student performance.

Additional Components

Many tests have one or more additional components which can greatly assist teachers in administering the tests and interpreting the results afterward. Some tests, for example, have included a survey or placement instrument which allows the teacher to estimate a student's level of functioning. This information is useful in selecting the appropriate portions of a criterion-referenced instrument to be given to specific students. Some tests include cassette tapes of the test instructions, thus freeing the teacher and allowing students to administer the tests themselves. This feature is especially helpful if the test is to be used frequently to monitor student progress but is a wasted expense if the students' disabilities prevent taking advantage of it. As this would be the case for most hearing-impaired students, their teachers should exercise caution when considering such instruments. Other criterion-referenced tests are structured to use computer assisted scoring and reporting services. Although definitely a time saver, such services tend to separate the teacher from the student's test performance. Tests which provide computer assisted scoring frequently include performance profiles for the entire class and or school, in addition to the usual individual student profile of skills. These can be useful for grouping students for instruction. Recording instruments for developing a class profile are also sometimes included in other criterion-referenced tests. Perhaps one of the most useful additional components is a prescriptive guide or reference list of instructional materials. It is usually correlated by page number to the test's objectives and can be immensely helpful in locating the resources necessary to provide individualized instruction on specific skills.

Differences in Test Construction

Much less obvious to teachers, but far more critical in determining whether or not a criterion-referenced test will ultimately be useful for planning and evaluating instruction, are the differences in tests, most of which arise from decisions made when the tests are constructed. Criterion-referenced tests vary considerably in the amount of content assessed, the specificity of the behaviors measured, the content of the objectives selected, the rigor of the criterion established as reflective of acceptable performance, the number and type of test items per behavioral objective, and the manner in which student performance is recorded and reported. Each of these is discussed briefly in an attempt to acquaint teachers with the wide range of variables influencing the construction of a criterion-referenced test and their implications for the test's utility.

1. *Amount of content evaluated.* Some criterion-referenced tests have been developed by commercial publishers to evaluate a wide spectrum of skills across all grade levels in a single curriculum content area. The *Fountain Valley Teacher Support System* (1972-74), for example, assesses 785 different behavioral objectives in math alone. By contrast, other tests are designed to merely sample the possible range of skills at any given level. The *Basic Arithmetic Skills Evaluation (BASE)* (1973-74) provides test items for a selection of approximately 20 skills per grade level. Even more narrow are those tests designed to assess student performance for a single unit of instruction (capitalization or time-telling, for example) and those developed to measure functional ability on a single task like toothbrushing. In selecting a criterion-referenced test it is important to match the test to classroom needs. If there is a wide range in student abilities, for example, a test which focuses on skills from a single-grade level would probably not be adequate. On the other hand, if a number of students are in need of intensive instruction on a relatively well defined set of skills, a test providing a narrow but in-depth assessment of a single skill may be ideal.

2. *Specificity of behaviors measured.* Although the intent of a criterion-referenced test is to provide objective information about a student's ability to perform a well-defined behavior, there is incredible variance of opinion over what constitutes a single learner behavior. For some criterion-referenced tests, a single behavior may be as specific as the "ability to correctly add 4+2." Another test, however, might define a single behavior as "the ability to correctly add all single-digit combinations with sums of 12 or less." Most criterion-referenced tests actually provide teachers with information about student performance in a series of "behavior-domains" rather than isolated skills. There is a limit to the amount of information a teacher can effectively process for decision-making (Popham, 1975), and comprehensive tests with hundreds of isolated skills to be evaluated may stretch beyond this limit. Teachers should be cognizant, however, of the specificity they feel is desirable and select a test which corresponds with their own biases.

3. *Content of objectives selected.* Related to specificity of the behaviors measured is the issue of *which* behaviors are measured. To assume that two criterion-referenced tests in reading (or even in a specific performance area such as "structural analysis") require the student to demonstrate the same skills is erroneous. The variations in possible task demands for even a relatively simple behavioral domain are numerous and not to be considered equivalent. If selecting a criterion-referenced test, teachers should examine the objectives or behavioral statements closely and choose a test which corresponds with their perceptions of the critical skills for that content area. Some tests in mathematics, for example, evidence traces of the 1960's movement toward "New Math." Set theory and working with bases other than 10 are no longer generally taught at the elementary level, yet quite a number of criterion-referenced tests include objectives and items to measure such skills. When interpreting the results of a criterion-referenced test, one should take care to refrain from generalizing the results of the tests to skills not actually measured.

4. *Type and level of criterion.* In constructing a criterion-referenced test, one faces two major decisions with respect to the criterion or standard of acceptable performance. First, what *type* of criterion is appro-

priate and, second, what *level* of criterion is appropriate. An informal survey of criterion-referenced tests reveals that many types of criteria have been used. Among those are: (a) percent of test items correct per objective, (b) rate (number of items correct per time period), (c) description of the desired outcome (the criteria for well-formed letters, for instance), (d) duration of responding (usually in the form of a time limit), (e) response latency (the lag between a command to perform a skill and the student's behavior), and (f) the amount of teacher assistance to be allowed. The specific type of criterion used for any specific behavior should reflect the purpose of the test and the performance level that is meaningful for that skill.

It is perhaps ironic that the namesake of a criterion-referenced test, i.e., the criterion level to which student performance is referenced, is probably the most arbitrarily selected feature of the entire test. At the present time there is no good research to guide test developers, whether they be commercial publishers or teachers, in the selection of an appropriate standard for acceptable performance. Numerous real-world factors and constraints influence the selection of a criterion level and teachers aware of these variables are better equipped to interpret the tests' results accurately. In assigning a criterion level to a behavioral statement or objective, test developers are influenced by (a) the specific nature of the skill, i.e., how critical is it for student survival; (b) the proficiency required for the skill to be useful, usually based on real world demands; (c) the proficiency required for the student to profit from later instruction; (d) the number of test items and the criterion type previously selected; and (e) the characteristics of the population for whom the test is designed, e.g., a slower oral reading rate would be appropriate for hearing impaired students.

5. *The number and characteristics of test items.* In designing a criterion-referenced test, the ultimate goal is to select or create test items which accurately reflect the behavior or skill which is being evaluated. The degree of success with which this is accomplished has a tremendous influence on the generalizability of the test results and on the validity and reliability of the test. Even a relatively specific objective has hundreds and perhaps thousands of test items which could be considered representative of the skill being assessed. For example, Klein and Kosecoff (1973) have illustrated that even the following objective, as specific as it may appear, could easily generate an item pool of more than a thousand items:

> The student can compute the correct product of two single digit numerals greater than 0 where the maximum value of this product does not exceed 20. (p. 4)

There are 29 pairs of numbers which could qualify for inclusion in the above objective and at least 10 alternate formats for writing the items, e.g., 6×8=, $\begin{array}{r}6\\ \underline{8}\end{array}$, 6•8=, etc. This results in a total of at least 290 combinations for this one objective. Additional modifications such as altering the sequence of numerals, using different formats (multiple choice vs. completion), changing the mode of presentation (written vs. oral vs. taped), and changing the mode of response all serve to increase the potential item pool from hundreds to thousands (Klein & Kosecoff, 1973). Each of the above alterations can have an effect on the difficulty of the test item as well as on the degree to which the test item matches the presentation of the skill in the student's curriculum materials.

Of more concern to teachers, perhaps, is the *number* of test items selected to represent a particular objective or behavioral domain. Although the usual practice seems to be 3-5 test items per objective, some criterion-referenced tests have as few as a single item for some skills and as many as 12 items for others. As there are no empirically based guidelines on the number of items needed to adequately represent a targeted behavior or skill, the decision is apparently determined more by such practical constraints as desired test length (Klein & Kosecoff, 1973). In short, there is no completely satisfactory way for test items to be selected or constructed, and teachers should examine any prospective purchase carefully.

6. *Reporting format.* Even the best constructed criterion-referenced test will be of limited assistance to teachers if student performance is not communicated in a way which is concise yet meaningful. Most criterion-referenced tests include some form of summary sheet or student profile with a listing of the behaviors or skills measured. There are differences, however, in the way a student's test results are recorded. The most common option is for each student's test performance to be compared with the established criterion for each skill and then evaluated either "pass" or "fail." This evaluation would be recorded, skill by skill, on the student's individual profile sheet, under columns labeled variously "know" or "don't know," "yes" or "no," "pass" or "fail," "reteach" or "proceed," "mastered" or "not mastered," etc. Another popular reporting format, and one frequently used in tests with computer assisted scoring, is a three-tiered communication of a student's level of mastery for each skill. The three levels are usually labeled with categories such as "mastered," "need to review," and "not mastered." Some criterion-referenced tests have been designed to report the number of test items answered correctly or the number of errors per objective. This is especially common in tests with a standard number of test items per skill evaluated. Another frequently used reporting format is the simple checklist. Although similar in concept to reporting pass fail, the checklist is more flexible if skills have been task-analyzed and reporting performance on all requisite subtasks is considered useful for the teacher.

Checklists do not, of course, qualify as criterion-referenced tests if specific guidelines, i.e., criteria, for evaluating each skill are not described.

Some criterion-referenced tests also provide for recording the number of students passing each objective. Although not particularly useful for programming instruction, this information could be of great value in evaluating the success of past instructional procedures. Teachers selecting criterion-referenced tests should examine the manner in which student performance is communicated and assure themselves that the system used will provide the information necessary for efficient use in their classroom.

Final Considerations in Selecting and Using Criterion-Referenced Tests

It is probably obvious from the preceding section that the design and development of criterion-referenced tests necessitates making a variety of critical decisions about (a) objectives (which ones, how specific, how many); (b) criteria (what type, what level, how to report); and (c) test items (how many, how difficult, which ones, what format). The specific decisions made by a test developer have a profound influence on the ultimate utility of the test for classroom teachers and on the degree of confidence one can legitimately have in the test's results. Criterion-referenced tests are increasing in popularity because teachers are attracted by the idea of being able to make absolute interpretations about a student's performance, i.e., precise decisions concerning what a student can and cannot do. Unfortunately, absolute interpretations can be extremely dangerous, especially if accepted and acted upon without reference to the context from which they were derived. Although criterion-referenced tests hold great promise for planning and evaluating the instruction provided to handicapped students, they should *not* be accepted and used uncritically. As with any assessment instrument, the data derived from a criterion-referenced test should always be examined with full knowledge of the test's characteristics and possible weaknesses. Realizing that numerous decisions have had to be made throughout the test's design and construction, and interpreting test results in light of these decisions will help to prevent any abuse of the data derived from its administration.

A final recommendation to teachers is concerned more with test content than test quality. Although alluded to in previous sections, the concern is of adequate importance to warrant restating. In selecting and using a criterion-referenced test one is, in reality, making a commitment to a specific curriculum or a sequence of objectives for that particular content area. Because what one tests should be what one teaches, teachers need to make a decision to accept one of the following alternatives: (a) choose a criterion-referenced test and then develop or find an instructional program to match, (b) choose an instructional program and then develop or find a criterion-referenced test to match (c) choose an instructional program with correlated tests provided, (d) choose a criterion-referenced test with correlated materials provided, or (e) develop a criterion-referenced test and an instructional program to match. Although some of these alternatives may be beyond the time or talents of classroom teachers, the importance of using criterion-referenced tests which measure precisely the same skills upon which there has been or will be instruction cannot be overemphasized. Criterion-referenced tests derive their strength from an ability to pinpoint specific skills requiring instruction and provide feedback on whether or not the instruction given was effective. Consequently, there is little value in assessing student performance on skills that will not be taught or teaching skills that will not be evaluated.

Reference Note

1. This does not mean, however, that all tests which claim to be criterion-referenced warrant the title. As with any movement growing in popularity, claiming an affinity is often profitable. Many tests designated "criterion-referenced" are actually norm-referenced tests with an accompanying list of objectives, or are objectives-based tests with no specified criterion for acceptable performance.

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BEHAVIOR MANAGEMENT AND MULTIPLY-HANDICAPPED HEARING IMPAIRED STUDENTS

Susan Zylstra Owner

A frequently reported need of multiply handicapped hearing impaired youngsters is for behavior management. It has been widely observed that the severity of an individual's handicapping condition is closely related to the appropriateness of his or her social behavior. Because of this unfortunate linkage, hearing impaired youngsters who display significant behavioral problems frequently are deprived of appropriate educational opportunities.

The behavioral approach offers a workable model that teachers can utilize in a wide variety of situations. A significant feature of behavior management is its organized and systematic approach to behavior, and its specification of conditions and the means in which behavior will be developed and maintained. In addition, the behavioral framework includes a means of determining the effectiveness of management. The principles of individualization, direct observation, continuous measurement and systematic manipulation of environmental variables provide the foundation of the behavioral approach. The underlying assumption is that all children can learn if tasks are appropriate, teaching structure clear, and the consequences of behavior meaningful and consistent. If the child fails to acquire a target skill, the failure to respond to the child's needs is a failure in the environment rather than a failure or learning deficit existing within the child.

The effectiveness of behavioral techniques with multiply handicapped hearing impaired youngsters is well documented (Belcastro, 1979; Lennan, 1974; Naiman, Schein and Stewart, 1973; Van Houten & Nau, 1980). Yet programs for deaf youngsters have not fully explored nor utilized the principles of the behavioral approach (Belcastro, 1979; Stewart, 1971). Lennan (1970) suggested that teachers' difficulty in understanding and applying the basic concepts of reinforcement, contingency management and scheduling inhibited effective utilization of behavior management. It is proposed here however, that the problem is more global than not understanding the techniques; it is a failure to perceive behavior management as a systematic process. Too frequently teachers say they are using "behavior modification" when they use a star-chart in the classroom, or when they reinforce children with m & m's for appropriate behavior. These procedures alone are not necessarily evidence of behavioral programming. They often merely represent examples of borrowing one small aspect of an entire process. The behavioral approach is a systematic process; one component utilized in isolation does not constitute behavior management. Isolated application of behavior management techniques without implementation of the total process may jeopardize its effectiveness.

This section will describe an instructional process to provide teachers with a systematic approach incorporating the fundamentals of behavior management. The purpose is to familiarize professionals with the components of a systematic behavior management process and to highlight various elements within that process requiring special attention in dealing with problem behaviors among multiply handicapped hearing impaired students.

Components of A Systematic Behavioral Process

Most children acquire skills and information through incidental learning. Many handicapped children, however, must be presented information and taught skills directly. As Gilhool (1973) states...

> ...The ordinary child may learn willy nilly, wandering in the street, watching television, riding the bus, but the exceptional child, by definition, if he or she is to learn, requires a formal structured program of education. (p. 603)

The need to adhere to systematic guidelines in designing and implementing instructional procedures is intensified with the severity of a handicapping condition (Sontag, et al., 1973). With each multiply handicapped hearing impaired child it is essential to use those instructional procedures that have the greatest potential for meeting his or her unique education needs. For a child who displays disruptive behavior that interferes with skill acquisition, one must be able to introduce systematically different tactics that will decrease inappropriate behaviors and increase responses that are appropriate.

The following guidelines are suggested for implementing a systematic behavioral process: pinpointing the target behavior, setting goals, setting and sequencing objectives, developing and implementing a plan, collecting progress information, and changing the plan.

Pinpoint Target Behavior

In the initial stage the teacher needs to identify and define what behavior will be the focus of the plan. Both academic and social programs should specify the desired and undesired behaviors. This should be accomplished through direct observation (i.e. carefully watching the child in the classroom). It is not sufficient to say the child is disrupting the class, rather we must identify exactly how the child is being disruptive. For example, through observations it may become clear that the child is continually out of seat and demanding teacher attention by yelling or contacting other students. After identifying the out of seat behavior, the yelling, and the contacts with other students as target behaviors, the teacher needs to determine the frequency with which these behaviors occur within a given time frame. For those unfamilar with the behavioral process, it is a good idea to select only one behavior to count in the beginning. Ensuring an accurate count will ultimately aid in evaluating the effectiveness of a plan. During the time of initial data collection, referred to as baseline, it can be helpful to note antecedents - (those events that preceed the behavior) - , and consequences (the actions which follow the behavior). This information will be used in developing the behavior change plan.

Setting Goals

Setting long-term goals should be the responsibility of a team consisting of those directly involved with the development and well being of the student. The purpose of goal setting is to identify those areas in which instruction is to be provided and to project where the child should be at the end of the academic year.

Setting and Sequencing Objectives

This step involves making specific statements regarding child performance and indicating the sequence for skill acquisition. It is advisable to write objectives for short periods of time, (e.g., from one week to three month periods) and to write them in precise, observable terms that specify the exact target behavior, the conditions under which the behavior will occur, and the criterion for success.

Developing and Implementing A Plan

The fourth step in the behavioral process is the development of a behavior plan. The selection of an intervention strategy should be based on the knowledge of the child gained through observation, interactions with the child, and from information provided by those who know and work with the child. This plan should include a description of the setting in which the program will be conducted, the materials required, the cues and instruction that the teacher will provide, the behavior in which the child is supposed to engage, and the consequences (if any) that should be arranged to encourage the best possible performance. The plan should then be implemented and followed as closely as possible.

One example of a plan to modify out of seat behavior involves ignoring children when they are not in their seats and reinforcing them for each 2-3 min. they remain in their chairs. For an entire classroom where the students have differing, individualized target behaviors on which to work, a behavior game such as "marbles in a jar" can be effective. In this group approach, any member of the class can warrant teacher praise and the placement of a marble in the jar for any good behavior (i.e., appropriate interaction with a peer, helping a peer, waiting nicely). In the same manner, when students display their target inappropriate behavior, the teacher removes a marble from the jar. When enough marbles accumulate in the jar to fill it completely, then the whole class gets a special treat. This kind of system helps the teacher focus on positive behaviors and exerts some degree of positive peer pressure, which can be very powerful.

Collecting Progress Information

Continuous daily monitoring of the child's progress enables decisions to be made concerning the effectiveness of the plan. Quick, simple and timely decisions can be made if data are charted to form a picture of the child's progress. This step is essential for the ultimate success of the program.

Changing the Plan

If the data reveal satisfactory progress, little change or intervention may be needed. However, should the child fail to improve, or progress too slowly, the educational team will have the responsibility for changing the plan to enable the child to succeed. The key is careful monitoring of progress so that the plan can be changed before a problem grows to insurmountable proportions.

In essence, the process becomes a self correcting chain. It is a dynamic activity in which the teacher both provides and receives information. The teacher and the child are in continuous communication, learning from each other, and making changes along the way. The child is learning new behaviors, and the teacher is learning how to arrange the teaching/learning situation so that the child can succeed.

Managing Problem Behaviors

This section focuses on procedures found effective in managing problem behaviors. It identifies where breakdowns frequently occur in the design of behavior management systems, and strategies that have been found to be effective in increasing the likelihood of success.

The Physical Environment

Behavior management plans will need to address the topic of the physical environment of the classroom. Rooms should be arranged to support instruction (individual, small group, large group) with a minimum of distractions, competing responses and other conditions that promote inappropriate behavior. Classroom routines should be consistent to minimize confusion, and to help ease the transition from one activity to another. The importance of maintaining a routine cannot be overemphasized. A daily routine with which students are familiar will help these students anticipate what will happen each day, and enhance their feelings of security within the environment. In addition, the behavior program itself must maintain a routine. Absolute consistency in carrying out the plan is necessary for the student to understand what the desired and undesired behaviors are, and what the consequences will be. It is also helpful to maintain consistency in the language used in dealing with target behaviors. For instance, a teacher might say to the student out of his seat, "oh, you must take one marble from the jar -- the rule is "stay in your chair." What is the rule? That's right; "stay in chair." Remember to keep the language simple, short, and consistent. Having students repeat the rule helps to reinforce the process, and cues them to anticipate the consequence. At the conclusion of delivering a consequence one must remember to find the first opportunity for praising appropriate behavior. As the saying goes, "Catch a child being good!".

Monitor Plan Progress

As mentioned earlier, behavior management should be perceived as a process rather than a prescription. This is especially true with regard to the elimination of inappropriate behaviors. It should be noted that each step of the process is necessary for the achievement of the desired outcome.

Too frequently, teachers disregard the component of ongoing measurement, or collection of progress information. This often leads a teacher to give up on a program prematurely. It is observed frequently that undesirable behaviors escalate immediately following the implementation of a plan, while the child tests the limits of the program. Undesireable behaviors will gradually decrease as the child learns that inappropriate behavior no longer pays off. This phenomenon needs to be anticipated, and planned for, or the teachers may discontinue a program in its early states of implementation, saying to themselves "it does not work," or "it just makes this child worse."

Objective data collection can be a means of providing immediate feedback on discrete behavior change. Teachers need to know as soon as possible the effects of their efforts. Managing a behavior program requires work, time, and commitment.

A danger in not keeping accurate records on child behavior is that the program may be geared to a level where the child will not progress. It is important that a child experience an adequate level of success, so that he or she will be motivated to repeat the desired response. Typically, if an objective is too high the child will continually fail resulting in frustration which may lead to more behavior problems. If the objective is too low, the child may not be challenged, or may become bored with the program reverting to undesirable behavior. Teachers must continue to assess critically whether their plan meets the child's need and continue to modify the plan as indicated by a child's behavior.

Withholding Reinforcement

Children will sometimes go to great lengths to capture the teacher's attention (e.g., shouting, spitting, or pounding on the tables). Often, simply ignoring these behaviors makes them ineffective in controlling teacher attention, and results in the extinction of those behaviors. The power of removing all reinforcement following a specified behavior is frequently underestimated by classroom teachers. The consistent withholding of reinforcers for inappropriate behavior will, in the majority of cases, lead to the eventual reduction and elimination of that behavior. When all reinforcement ceases, the probability increases that the inappropriate behavior will also cease.

Conclusion

To ensure optimal educational opportunities for multiply handicapped hearing impaired students, any system adopted should allow for flexibility to meet the unique learning styles of each child. The system should also be simple enough to be applied easily within constraints of the various classroom settings. The behavioral process provides a framework that offers these advantages, while accomodating for individual differences among children, teachers, and learning situations. Problem behaviors of multiply handicapped children can be brought under control through this systematic process. Unlike models that focus on abstract theories not directly related to instruction (see Engleman 1967), the behavioral model is a process that teachers can comprehend easily and use in an effective manner. The behavioral model requires teachers to become familiar with the process, develop the necessary skills for each of the steps, and observe the efficient and effective learning environment that they have created. Once the basic conditions are met, results with multiply handicapped deaf students are likely to be quite impressive.

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A Program Model for Intervention With Emotionally/Behaviorally Disturbed Hearing Impaired Children

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This article describes an intervention program model for emotionally/behaviorally disturbed, hearing impaired children 6-10 years of age. The Psycho-Educational Center is a model demonstration project funded for 3 years under contract with the DHEW Bureau of Education for the Handicapped. Dr. Goulder and Ms. Edelstein, originators of the PEC Project, are now the project director and program consultant, respectively. Ms. Singer was program coordinator for the first year of the project's operation.

Historical Perspective

The need for accurate identification and appropriate description of emotionally/behaviorally disturbed, hearing impaired children has long been of concern to educators and mental health professionals. However, only recently have systematic attempts been made to estimate the prevalence of this problem and to design appropriate intervention programs.

The diagnostic situation is complicated by the fact that the major etiologies of deafness, i.e., heredity, maternal rubella, prematurity, meningitis, and Rh incompatibility, are frequently associated with neurological defects, which can form the basis for later emotional and behavioral disturbances. Vernon (1969), in his study of multiply handicapped deaf children, demonstrated that diseases such as rubella often result in the child being restless, hyperactive, distractible, impulsive, and somewhat unstable. To compound the problem, one out of every four hearing impaired children in special education programs has one or more educationally significant handicapping conditions other than emotional/behavioral disturbances, e.g., visual impairments, serious heart disorders, orthopedic handicaps, cerebral palsy, etc.

The interrelationship of organic brain pathology, sensory deprivation, and other handicapping conditions in a child cannot but lead to greater degrees of stress and behavioral problems. On the other hand, physical handicaps can so dominate an examiner's perception of a child that objective diagnosis yields to misdiagnosis.

To further define the emotional/behavioral problems of the hearing impaired population, a national survey of psychiatric facilities serving the deaf was conducted (Goulder, 1977) in the spring of 1976. This study reported that 727 adult deaf persons were being served by 15 mental health programs for deaf persons.

The lack of mental health services among school age children is even more dramatic. Edelstein (1977) surveyed 80 educational institutions in 28 States, identifying facilities offering special psycho-educational services to emotionally disturbed, deaf children. Eleven programs reported having self-contained units within schools for the deaf children, which served children having problems of deafness and emotional disturbances. Children in these programs were of normal intelligence but were referred to the special unit because their ability to function in class was limited by emotional/behavioral problems. A total of 215 children were being served in the 11 programs. Staff included 185 professionals, more than half of whom were employed on a part-time or consulting basis. Thus, of the 3,457 deaf children reported as having emotional/behavioral problems on the Annual Survey of Hearing Impaired Children and Youth, only 215 (6 percent) were reported as receiving special help in units designed for emotionally/behaviorally disturbed children.

Description of the Psycho-Educational Center

A Psycho-Educational Center (PEC) was funded by the Bureau of Education for the Handicapped in the spring of 1977, in response to the need for diagnosis and treatment of children reported having emotional/behavioral problems. Located at a residential school for the deaf in the Boston Metropolitan Area, the center provides services to five New England States. The center's major components are diagnostic psycho-educational evaluations, short-term day and residential treatment, behavioral management counseling for parents; and consultation and training for staff members from schools and agencies serving hearing impaired children.

The specific goals of this program model are:

(1) to test the validity of the basic program construct, namely, that an initial, highly structured individualized psycho-educational program can serve as an educational bridge for reintegration of hearing impaired children with an emotional overlay into appropriate regular educational programs for the deaf and

(2) to develop, test, and refine treatment strategies that use behavioral and psychodynamic techniques in the remediation of emotional/behavioral problems.

The underlying philosophy of the project is twofold: First, clear differential diagnosis is essential to the formulation of an appropriate treatment plan; and second, development of a "therapeutic milieu" is fundamental to enhance the social-emotional and academic development of hearing impaired, emotionally disturbed children. (The therapeutic milieu is a mode of treatment that recognizes the effect of the environment and incorporates the total environment into the intervention plan.)

In February 1978, six children were enrolled for treatment at PEC, three on day basis, three as residential students. Acceptance for admission was determined by the results of a behavior checklist completed by the youngster's teacher or parent; the PEC evaluation; and a conference attended by the youngster's parent, referring school personnel, the PEC Director, and a local school district representative. To maintain staff-to-student ratio of 1:2 or 1:3, daily attendance was limited to six children. However, during the 1977-78 school year, the project staff served 17 additional children through its evaluation and consultation services.

The day-treatment program is convened from 8:30 a.m. to 2:00 p.m., Monday through Friday. Youngsters participate in a full classroom program stressing language and communication. The classroom program includes mathematics, reading, social studies, science, and art. The therapeutic components consist of milieu, activity, art, group, individual, and play therapies. Youngsters are scheduled in terms of individual needs. Psychodynamic and behavioral intervention techniques are vehicles employed in treatment. Residential students participate in an after-school and dormitory program, in which the dormitory counselor-therapist continues treatment under the supervision of the director. Some after-school activities are coordinated with those of the school for the deaf.

Because PEC is a short-term treatment facility, the goal of which is to help youngsters gain the skills necessary to return to their home and school settings as soon as possible, weekly parent counseling sessions and frequent conferences with the sending school are conducted throughout treatment. Each youngster's treatment progress is clearly monitored. A trial reintegration program is developed and implemented within the school for the deaf with which the PEC is affiliated, while the youngster is still in treatment in PEC. Meanwhile training is provided to parents, teachers, and other personnel who will work with the youngster on his return home.

Factors To Be Considered in the Treatment of Emotionally/Behaviorally Disturbed Hearing Impaired Children

Diagnosis. A proper differential diagnosis is basic to successful treatment. The process begins, in most instances, with a referral from the parent or teacher who is experiencing difficulty managing the child or who has noticed unusually disturbing behaviors. In most such referrals, parents report difficulty handling their child around everyday social routines, such as eating, sleeping, and toileting. The child does not obey simple directives and has problems interacting with adults and/or siblings. Teachers report disruptive or withdrawn behavior in the classroom. They often describe the youngster as having a language disability and general difficulty mastering school subjects.

The second step in the diagnostic process is to help the parent or teacher describe the child's behavior in behavioral terms. To facilitate this, a school behavior checklist is used. This checklist contains 96 items with "yes-no" responses. The scoring system consists of six different scales which facilitate identifying major areas of disturbance in the child and specific behaviors related to that disturbance.

Following problem description, the next step is formal psycho-educational testing by the PEC team. The testing battery consists of two components: language and cognitive evaluation and psychological evaluation.

Finally, the child is observed at the center for a 3-month evaluation period. During this time, specific behaviors are targeted, and strategies for their intervention are developed and tested. After the evaluation, the original diagnosis is refined. A core conference is then convened, at which time a determination is made as to whether the child should remain in treatment as a day or residential student, should seek another form of treatment, or should return to his home school.

Educational Prototypes. No treatment plan can be successful unless it takes into account the type of educational programing the hearing impaired child is currently receiving. The child might be attending any one of the following: a residential school for the deaf, a day school, a self-contained classroom, or a resource room in a public school, or he may be enrolled full time in a regular classroom, with or without assistance from an itinerant teacher for the hearing impaired. An understanding of the educational system is essential to planning a treatment program. Interaction with the referral system at the time the diagnosis is made and throughout treatment is essential for success.

Family System. Research efforts in the area of family psychotherapy have demonstrated that, while the child is the identified patient, the immediate and extended family system may be directly involved in the child's pathology. Therefore, it becomes imperative that a child's treatment plan incorporate the major determinants within the family system, i.e., the father, mother, and significant others.

Parent Counseling Process

The following outline describes the parent counseling process:

Session One:

Parents are acquainted with program components. Their expectations are discussed and behavior problems with their child at home are recorded. If etiology is associated with central nervous system damage, a brief neurological overview is discussed.

Parental Expectations

1) Tell us what's wrong with him.
2) Change his behavior.
3) Help him to learn.

Parents' Perceptions of Behavior Problems

1) He does not sleep until 2:00 a.m.
2) He hits other children.
3) He has a tantrum if we say not.

Neurological Overview

1) Brain overview
2) Early development of temporal lobe components
3) Synaptic process
4) Behavior/learning associated with anatomical damage
5) Family history begins

Session Two

1) Review of child's first week.
2) Sharing of observations made by staff—problems identified/positive aspects.
3) Data recording illustrated to parents.
4) Family history continued.

Session Three

1) Family history continues.
2) Behavior data records of school and parents are compared.
3) Treatment plan is developed by therapist, parents, and dormitory staff.

Session Four

1) Treatment plan is reviewed—strategies are revised.

2) Data record is discussed.
3) Parents feelings and questions are discussed.

Process continued until program decisions are made (core evaluation, referral to new system).

Case Studies

The three cases presented illustrate the specific approach the PEC has taken to provide clinical services. The cases are reviewed in a general manner. Indepth studies will be published at the conclusion of the project.

Adam. Adam is a bright, handsome boy with a profound binaural sensorineural hearing loss. He was 7 years old when he first came to PEC. While the etiology of his deafness is unknown, it is suspected that Adam may have lost his hearing at 3 months of age as a result of convulsions. Identified as hearing impaired and first fitted with an aid at 10 months, Adam is now wearing a behind-the-ear binaural hearing aid.

Adam's first school experience was at age 3 in an oral preschool residential program. At 4, he was transferred to a total communication day program near his home. Here he finished preschool, kindergarten, and half of first grade.

At the time of his referral to PEC, Adam was in a first grade class consisting of 20 hearing and 4 hearing impaired youngsters. Team teaching was the classroom model, with two teachers and a teacher's aide. One teacher was a trained teacher of the hearing impaired; both teachers used total communication.

Adam's parents had been divorced for 5 years at the time of his referral and were engaged in a custody suit for Adam and his older brother. Adam lived with his mother but stayed with his father (and his father's new family) every other weekend. Adam's mother had a relatively good facility in sign language. The father's communication was limited to a few signs.

Adam was referred to PEC because of "erratic behavior in school." Adam was emotionally vulnerable and unstable; his behavior fluctuated from withdrawal to abrupt aggression toward peers and teachers. Frequently tantrums disrupted the school day.

During his initial PEC evaluation, Adam was found to be functioning in the superior-to-very-superior range of intelligence, as measured by the WISC-R performance subtests, an IQ of 129. His inability to cope with interpersonal relationships was initially diagnosed as a social/developmental reaction of childhood.

Several months of extended evaluation and preliminary treatment identified the following conditions:

1) Poor self-esteem and inadequate ego development, resulting in an inability to cope with change and stress
2) Insecurity related to his responses to parental conflicts, manifested as an exaggerated need for immediate attention and demonstration of regressive behaviors of crawling, thumbsucking, and whimpering

In summary, Adam suffered from a functional disorder complicated by deafness. Home and school systems were unable to cope with his regressive, aggressive behaviors, and residential treatment was agreed upon by his parents, school personnel, and the PEC evaluation team. The treatment plan for Adam, as in other cases, focused on direct treatment, counseling with the family, and consultation with the educational systems from which he had been referred.

The treatment goals for Adam were as follows:

(1) To help Adam work through his frustrations, anger, and guilt
(2) To encourage and develop age-appropriate behaviors in the classroom, dormitory, and environments

To help Adam work through these problems, his treatment program included individual play therapy twice weekly and a daily art therapy group with two other children. In treatment, Adam was learning that he was not responsible for his parents' conflicts. He was learning to accept the reality of their separate lives and to accept himself as a hearing-impaired person. In conjunction with his therapy, parent counseling was scheduled, primarily with Adam's mother. Weekly sessions continued through the first year of treatment, totaling 24 sessions. The goal of the counseling was to develop an understanding of Adam's problems and to implement strategies for management of specific behaviors.

To encourage age-appropriate behaviors, providing Adam with clear expectations regarding his behaviors was emphasized. In the day program, in the dormitory, and at home, the following intervention strategies were used: (1) setting clear limits through written schedules of daily events, (2) identifying infantile behavior upon its demonstration and pairing with the desired appropriate behavior, and (3) providing Adam with constructive outlets for the expression of feelings. If Adam became angry and destructive, he was removed from the environment, assisted in identifying and labeling his feelings, assisted in role-playing through the event, and provided with alternatives for behavior in written form. His undesirable behaviors were met with appropriate and consistent consequences in each environment. If he became destructive or damaged property, he was shown how to repair the damaged object. If his behavior was aggressive, he was "timed-out," and alternative behaviors were demonstrated.

Adam was reintegrated into a total communication class on a partial integration basis. As he demonstrated ability to adjust to the class, his time in the classroom was extended. At the close of the school year, he was fully integrated into the class except for 1 hour per day, during which he received supportive services and therapy from the PEC day program.

The critical components of Adam's reintegration were:

1) A support system provided to his classroom teacher
2) Group meetings with his classmates
3) Continued therapy
4) After-school support system provided by adult hearing impaired role models
5) Good parent support

Adam is currently enrolled in a school for the deaf as a regular student. He will continue to receive supportive therapy and any additional support services that may be requested.

Ramon. Ramon is a handsome, 9-year-old Hispanic youngster with a profound bilateral sensori-neural hearing loss.

At the time of his referral to PEC, Ramon attended a first-second grade total communication class in a small residential school for the deaf. This was Ramon's third year of school. On weekends Ramon lived with his mother and two younger brothers in a low-income neighborhood in a nearby town. Ramon's grandparents and numerous aunts, uncles, and cousins, who lived near his mother, were important elements in Ramon's home life. Ramon's mother communicated with him using homemade gestures and had difficulty understanding written communications sent to her by the school.

Ramon was referred to PEC because of his inappropriate, acting-out behavior in the classroom. He was described by teaching and dormitory staff as the "King of the Lower School." He attempted to control each environment by playing the clown, refusing to participate in activities, and defying adult authority. His classmates were a captive audience. Attempts by the school staff to deal with the problem were ineffective. Home visits by the school PEC staff revealed that Ramon had problems at home as well as in the classroom and dormitory. His mother described him as defiant and disobedient. She complained of frequent fights between Ramon and his brothers. When Ramon first entered the PEC program, he was convinced he was being punished for his poor behavior. He described himself as "bad" and was sure that all adults were angry at him.

During the evaluation period, Ramon generally distinguished himself as alternately congenial and aggressive. A child who sought to interact with adults, peers, and younger children, he was often helpful and considerate. At other times, he grabbed for control of situations by refusing to cooperate and by encouraging his peers to copy his inappropriate behavior.

Highly success oriented, Ramon demonstrated a need to win even in noncompetitive activities. He rushed through his work, demanding constant feedback even when tasks were easy for him. Ramon exhibited self-correcting behaviors in most activities but often refused to try tasks that he felt did not guarantee success.

The evaluation summary described a youngster who was (1) emotionally insecure, (2) frequently hostile and aggressive, (3) distrusting of close relationships and of authority figures, (4) in need of clarification of others' expectations, and (5) experiencing communication difficulties.

Ramon attended the treatment program at PEC for 16 weeks. During his final month at the center, Ramon was gradually reintegrated into his home school, to which he returned full time in September.

Because of Ramon's emotional insecurity, his treatment plan provided him with opportunities throughout the day to express his feelings and to have these feelings acknowledged, reflected, and respected. These opportunities were provided in art and individual play therapy and were also built into the daily classroom program.

In response to his hostile aggressive behaviors (which were seen as a defense against his feelings of insecurity), Ramon was disciplined with firmness but without hostility. When correction was necessary, written communication often assisted in avoiding personal, possibly physical confrontations between Ramon and his teacher or therapist. As an alternative to his physical attention-getting behaviors (e.g., rocking in his chair, hitting tops of doorways, pulling light cords, etc.), a weekly 1-hour session of sports and skill-building activities with a high school volunteer was provided for Ramon. Ramon was reinforced for age-appropriate behaviors in all areas.

In weekly individual play therapy sessions with the director and in daily interactions with the staff, Ramon had a chance to deal with his fear of getting close to adults. Throughout the day, Ramon constantly tested the clearly delineated limits set for him. Because the staff-student ratio was small, it was always possible for staff to follow through after an incident, explaining to Ramon what he had done wrong and what was expected of him (and why)—and requiring him to conform to basic rules.

To facilitate clarifying expectations for Ramon, a written schedule was outlined each day, and expectations relating to behavior and task completion were anticipated. In the classroom, a simple contract was implemented to be used within each learning area.

In relation to his communication difficulties, the PEC staff made several visits to Ramon's home to work with his mother, brothers, and members of the extended family: grandparents, aunts, uncles, and cousins who lived nearby. During the 16 weeks, however, his mother was unable to attend counseling sessions or sign language classes at school. A recommendation for followup treatment was made that Ramon's mother and brothers be provided with sign language instructions at home. In addition, it was recommended that Ramon's brothers be invited to Ramon's school to spend some time in the classroom and the dormitory so that they could gain a better understanding of the implications of his hearing loss. Though the staff did not have an opportunity to work in-depth in counseling and sign language instruction with this family, Ramon responded positively to the fact that the staff was in contact with his family through home visits and phone calls.

It was the contact with Ramon's school (and dormitory) that proved to be most supportive to the therapeutic process. The staff worked very closely with teaching, administrative, and dormitory staff in providing consultation and sharing in developing the treatment plan. The reintegration process began the moment Ramon was admitted to the program. Ramon's classmates from his school and his dorm mates were invited to visit PEC to see exactly where Ramon went to school and to meet his teachers and new companions. Conferences with the sending school personnel were scheduled once a week. Academic and treatment-planning progress were discussed continuously. Rules and expectations were developed cooperatively, as were consequences for inappropriate behavior. This process was shared with Ramon, and he shared in the development of his behavior contract.

The project director returned with Ramon to his original class to lead group counseling sessions. In this way Ramon and his classmates were given an opportunity to understand why Ramon had left the group, where he had gone, and what the class rules would be upon his return. They were encouraged to express their feelings and to communicate to one another in a fair and constructive manner.

Six weeks before school ended, Ramon returned to his original classroom for a period of 1 hour. He attended class 2 hours the next week, 3 the following week, and so forth, until by the end of the school term he had been successfully reintegrated with his class.

The reintegration plan was contingent on appropriate classroom behavior. Ramon internalized the school structure and was able to return the following year without the need for ongoing intervention. He developed the ability to identify his feelings, to label them, i.e., anger, fear, or happiness, and to express himself without becoming aggressive. This process of behavioral self-control and language development is currently being researched in the PEC project.

Bobby. Bobby's mode of communication when first admitted to the program was limited to a few unintelligible words, verbalizations, and gross gestures. Bobby's abilities were immature and characterized by aggressive motor activity. The attention of adults and peers was captured by kicking or hitting, and he sought immediate gratification for his wants without regard for the need to delay his wish. Such expressions often instigated aggressive outbursts from peers when their own space was impinged upon, thereby creating an experience of negative interaction. This was seen as a contributing factor in Bobby's reluctance to play with other children, fostering his unyielding egocentricity and initial inability to share and wait his turn.

At the age of 5, this child had not yet been afforded an effective means to receive language input or to express his many powerful thoughts, feelings, and needs. Bobby was restricted in the development of a good self-image and sound interpersonal relationships with family and peers. Past experience had taught Bobby that communication was not a rewarding endeavor but rather a constant source of frustration and anxiety. Bobby's seeming inability to participate in the communication process and the suspected neurological implications of the etiology of his deafness (Rubella) were viewed as major causes of the behavior that he exhibited upon admission to the program. Bobby's behaviors included hyperactivity, poor eye contact, few social peer contacts, a reluctance to interact with other children in play situations, aggressive behaviors (kicking, hitting self and others), frequent tantrums, constrained facial configurations, and involuntary tics.

In consideration of Bobby's inappropriate social behaviors and his deprivation in terms of communication and language development, emphasis was placed upon providing him with a structured environment in which limits and expectations were clearly defined. The lack of a dependable symbol system, through which to receive, comprehend, and, therefore, transmit language, inhibited the development of communication, provoking frustration, confusion, and disorganization. The emotional impact of the inability to communicate ideas, feelings, and needs was manifested in a variety of inappropriate behaviors. It was, therefore, necessary to modify behaviors while exposing Bobby to a reliable visual-verbal symbol system implementing a total approach using all modes of communication. Bobby responded well to the exposure to a total communication approach, which was implemented in the classroom, in the dormitory, and at home by Bobby's parents. As associations were made between experience in his environment and the symbol system used to relate those experiences, a gradual, yet dramatic decrease in aggressive behaviors and tantrums was observed, as was improvement in peer and family relationships, eye contact, ability to follow directives, and ability to participate in small group instruction.

The following treatment principles were employed by the staff throughout Bobby's experience at PEC:

1) Implementation of a total communication approach using signed English.

2) Providing Bobby with activities that would enable him to learn about language and, therefore, develop language

3) Exposure to language preceding comprehension and expression

4) Initial exposure and understanding of conversation preceding exposure through language rules or formal language lessons

5) Acceptance of all attempts of expression (self-initiated, child-devised gestures were interpreted and reflected back to the child, acknowledging understanding and fostering comprehension by the child)

6) Use of Bobby's attention to objects as a starting point for interaction, approaching Bobby at his level

7) Defining all physical areas (visually, verbally, manually) in order to structure an anticipation process

8) Clearly delineating behavioral expectations and limitations and providing consistency in expectations in all settings (classroom, dormitory, and home)

9) Structuring the daily routine, outlining daily schedule and special activities on a daily basis

10) Attending to all inappropriate behaviors at the time of occurrence, providing immediate consequence and modeling of appropriate routine

11) Daily attendance at Morning Meeting, a period during which students share experiences, ideas, and feelings

During treatment, Bobby made significant gains in his language and behavior. His vocabulary as measured on the Peabody Picture Vocabulary improved from "unmeasurable" (October 1977) to a mental age of 6.6 (as tested in

April 1979). Initial psychological testing yielded a performance IQ score of 82 on the WISC-R scale. When retested in April 1979, performance subtest scores were measured in the superior range of intelligence on all subtests, with the exception of picture completion. (The depressed score in picture completion has occurred in a large number of test protocols with rubella-affected children. This finding is being researched by the PEC.)

In summary, Bobby was diagnosed as psychoneurologically learning disabled. This impairment was due to maternal rubella. Further, the impairment resulted in a development deficiency, specifically the "means-to-end" perceptual learning structure.

Currently Bobby is living at home and is being reintegrated into a total communication classroom at his former school. The PEC will continue to follow up his programs and assist his classroom teacher.

Summary

This paper has reviewed the philosophical basis underlying the provision of specialized treatment services to emotionally disturbed deaf children. The program constructs emphasize milieu intervention and a regional scheme for delivery of services. Evaluation and differential diagnosis are major areas of focus, as is incorporation of parents in the treatment process and referring school during the aftercare period.

The case studies, although general in nature, have attempted to illustrate a comprehensive approach to the treatment of three diagnostic types: (1) the child who has a functional disorder due to a reaction formation process, (2) the child who has a functional disorder due to social and educational deprivation, and (3) the child who has a psychoneurological disorder due to the etiology of deafness. The Psycho-Educational Center is continuing its clinical research into these major diagnostic categories and expects to share detailed findings in future publications. Currently, the PEC continues to provide quality residential and day treatment to emotionally/behaviorally disturbed, hearing impaired children.

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Self-control: Methods for Child Training

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Behavioral scientists have long been interested in applying operant technology to develop ideal social and educational environments (Skinner, 1953, 1968; Staats, 1959, 1975a, 1975b). A generation of applied studies have employed external reinforcement systems to manage effectively children's social and academic behavior (Hanley, 1971; Kazdin & Bootzin, 1972; O'Leary & Drabman, 1971). To date, a variety of studies have demonstrated the success of these systems for managing children's behavior in public schools (Hewett, 1967; O'Leary & Becker, 1967) and in the home (Patterson, 1973), as well as in institutional settings (Haring & Phillips, 1962; Phillips, 1971). Because of their success some writers have advocated their wholesale use (Skinner, 1968; Staats, 1973).

The unlimited use of behavioral technology for managing children's behavior raises some important issues, however. First, it creates a risk that children may become overly dependent on them and not develop necessary skills for maintaining behavior or for dealing with novel or unstructured situations. Second, the effects of these systems rarely generalize across settings or over time (O'Leary & Drabman, 1971). The use of behavioral technology to manipulate children into conforming to often unwarranted institutional goals, moreover, is ethically questionable (Rogers, 1956; Rogers & Skinner, 1956; Winnett & Winkler, 1972).

These issues of generalization training and freedom versus control have influenced researchers and practitioners to develop techniques for teaching children behavioral self-control. This emerging technology has particularly important implications for deinstitutionalization as well as for mainstreaming exceptional children into regular classroom environments. The intent of this chapter is to familiarize teacher trainers and practitioners with some of the major concepts of self-control literature, to discuss methods by which children acquire self-regulatory behavior, and to describe and assess the methods currently available for training children in self-control. Present techniques for training children in self-control are based on a number of laboratory and analog studies that have been adequately described elsewhere (Aronfreed, 1968; Bandura, 1969, 1971; Masters & Mokros, 1974). This chapter will thus review available applied studies and evaluate the utility of self-control training techniques in field settings.

PERSPECTIVE ON SELF-CONTROL

Persons choose to delay immediate gratifications presumably because of anticipation of the ultimate benefits that they may receive by such decision making (Thoresen, 1973; Thoresen & Mahoney, 1974). This assumption has led most writers on the subject to agree that the "ultimate source of control" lies in the external environment (Kanfer & Karoly, 1972; Skinner, 1953; Thoresen & Mahoney, 1974). Explanations of the self-control process thus are concerned with methods that individuals use to maintain their behavior in the absence of immediate external control. Most individuals have some capacity for self-control; one may be able to pass up an extra helping of parfait or the thirtieth cigarette of the day. But a long-term behavioral self-control program may require a number of complex cognitive skills—the ability for self-observation and for interpreting complex internal and external stimuli as well as the capacity for planning, selecting, and maintaining appropriate behavior (Goldfried & Merbaum, 1973).

While the traditional operant behaviorism has emphasized the role of environmental variables in controlling behavior (Skinner, 1953), a number of behaviorists (e.g., Bandura, 1969; Mahoney, 1974: Meichenbaum 1975; Staats, 1975) recognize the interdependence of cognitive and external variables in determining behavior. These "cognitive behaviorists" assume covert behavior is influenced in the same manner as overt behavior that is, by a combination of antecedent and consequent stimuli. Training persons in self-control, then, involves teaching them to manipulate internal and external discriminative and reinforcing stimuli to alter their behavior (Goldfried & Merbaum, 1973; Kanfer, 1976; Mahoney & Thoresen, 1974; Thoresen & Mahoney, 1974).

ACQUISITION OF SELF-CONTROL

Laboratory studies (Grusec, 1966; Liebert & Allen, 1967; Mischel & Liebert, 1966; Rosenhan, Frederick, & Burrowes, 1968) as well as applied research (Bolstad & Johnson, 1972; Felixbrod & O'Leary, 1973; Fredericksen & Fredericksen, 1975; Uhlman & Shook, 1976) have demonstrated that children can be taught self-controlling responses through contingently administered social and tangible reinforcement. Recent studies suggest that children may learn these responses through the use of didactic training methods as well, (Russell & Thoresen, 1976; Spivack, Platt, & Shure, 1976; Stark, 1976). Another important way children acquire self-controlling responses is through observational learning (Aronfreed, 1968; Bandura, 1969).

Aronfreed (1968) observed that children acquire internal sources of control as the result of direct training experiences provided by parents, teachers, or other significant persons. These agents teach children to control their behavior by rewarding appropriate behavior and punishing or withholding consequences for inappropriate behavior. According to Aronfreed (1968), positive or aversive stimuli present in a training situation become associated with certain physical, affective, and cognitive responses produced by the child. While external stimuli remain important sources of control, these "internal monitors" allow the child to evaluate his ongoing behavior and to anticipate its outcomes and maintain or alter it. With children who have adequate cognitive processing ability, agents can use verbal-symbolic methods rather than having to arrange training situations (Aronfreed, 1968).

Children also can learn to set behavioral performance standards, adopt patterns of self-evaluation and self-reinforcement, and exert verbal control over their behavior by observing and imitating social models (Bandura, Grusec, & Menlove, 1967; Bandura & Krupers, 1964; Bandura & Perloff, 1967; Goodwin & Mahoney, 1976; Luria, 1965; Meichenbaum & Goodman, 1971). Bandura (1969) considers the capacity for awareness, symbolic codification, memory storage, and response retrieval and activation as essential cognitive processes for the acquisition and subsequent performance of an observed behavioral sequence. He makes a sharp distinction, however, between acquisition of a behavioral sequence and its later performance. A child's acquisition in a modeled sequence also depends largely on characteristics of both the model and observer as well as consequences produced by the model's behaviors and the degree of attention that he has given to the model. Whether he reproduces a modeled sequence depends upon available reinforcement for these responses, his capacity to retain the behavioral sequence, his ability to reproduce the behavior, and the amount of motivation he has for imitating the behavior (Bandura, 1969, 1971).

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SELF-MANAGEMENT METHODS

Accounts of how children acquire self-control are based largely on laboratory research and provide information that can be used for developing self-control training methods with children. The following discussion considers both *self-management methods*, which are primarily concerned with manipulating internal and external behavioral consequences to alter behavior, and *cognitive methods*, which emphasize manipulating covert antecedent events. These distinctions, however, are arbitrary—the procedures overlap considerably—and are made only for organization of the material to be presented.

Kanfer and Karoly (1972) and Kanfer (1975) view self-control as the final outcome of a three-stage self-regulatory process involving (1) self-monitoring, (2) self-evaluation, and (3) self-reinforcement. During the *self-monitoring* process the person may observe his behavior and, on the basis of this information, set behavioral standards. Next, the person may establish a contract with himself or another specifying the goals and contingencies that he must meet before allowing himself access to reinforcement. In the *self-evaluation* stage the person compares his performance against established standards. He may then alter or maintain his behavior through the use of *self-reinforcement* procedures. A number of studies have used self-monitoring, contracting, and self-evaluation and self-reinforcement for training children in self-control training programs. Studies related to these methods will be reviewed here.

Self-monitoring

Because behavior may become so thoroughly-conditioned to certain stimulus conditions, persons who act inappropriately in a given situation may not be fully aware of the variables controlling their behavior. For example, children who have been frequently exposed to aggressive models or who have received social approval for aggressive behavior as a way of solving interpersonal conflicts may start fighting at the slightest provocation. To alter this pattern, a socialization agent may have them keep records of their aggressive acts to increase their behavioral awareness. Self-monitoring, thus, may be an important first step in "deautomatizing" a behavioral chain (Kanfer, 1975).

In training a child to monitor his behavior a trainer may first select and behaviorally define a target behavior. Next, he may have the child record examples of his behavior using a wrist counter, abacus, tally card, or stopwatch. The child also may maintain a graph, chart, or a journal of his behavior. Self-monitoring and recording provide visual feedback of the child's progress and lead to self-evaluation (Kanfer, 1975).

In several studies children were taught self-monitoring as part of a larger classroom program. Gottman and McFall (1972) discovered that disruptive adolescents contributed more to class discussions when asked to record instances in which they spoke out. Children in a comparison group, who recorded the number of times they felt like speaking out but failed to do so, decreased their class discussion behaviors. Bolstad and Johnson (1972) had elementary school students record the frequency of their unauthorized speech, out-of-seat behavior, and physical aggression; those who closely matched a classroom observer's frequency count received points that were redeemable for back-up reinforcers. This training was somewhat more effective in minimizing disruptive behavior than external reinforcement alone. Broden, Hall, and Mitts (1971) found that when a preadolescent girl recorded and reported her "study" and "nonstudy" behaviors weekly to a school counselor, classroom attention increased; self-recording, however, failed to maintain initial reductions of disruptive behavior in a second student. Glynn, Thomas, and Shee (1973) trained primary school children to monitor accurately their behavior and used these data as a basis for contingent self-reinforcement. Reiber, Schilmoeller, and LeBlanc (1976) taught five preschoolers to count their on-task behaviors during a listening class. Self-monitoring and showing the children a graph of their on-task behavior from preceeding days were effective in increasing their attending behavior.

Although some studies have shown that children tend to overestimate their desirable behaviors and to underestimate their undesirable behaviors, others reveal that accurate self-monitoring may not be essential for producing desirable changes in children's behavior. The effectiveness of self-monitoring in influencing behavior is unclear, however, for in most studies the contributions of experimenter expectancies, demand characteristics, and other variables were not isolated (McLaughlin, 1976). The results of recent studies indicate that when the effects of expectancies, observers, and sources of reinforcement are controlled, self-monitoring of social behavior may have limited utility as a "reactive" treatment (Cohen, 1977). Some evidence indicates, however, that associating behavioral self-recording directly to positive outcomes may improve its treatment effectiveness (Reith, Polsgrove, McLeskey, et al, 1978).

The available literature suggests that having children monitor their behavior produces mixed effects across situations, subjects, and behaviors. Kazdin (1974) concluded that (1) self-monitoring may be most effective when used early in a response chain, (2) having individuals record both target and incompatible behaviors simultaneously may increase its effectiveness, and (3) self-monitoring should be used continuously in the initial phases of a treatment program and faded to intermittent use in later stages. Self-monitoring may produce early behavioral changes that tend to dissipate over time unless supported with additional self-control procedures, such as contingency contracting, self-evaluation, or self-reinforcement (Kanfer, 1975; McLaughlin, 1976).

Contingency Contracting

Following a period of self-monitoring, individuals may set goals and specify the contingencies for reinforcing a particular set of their behavior. They may, in effect, contract with themselves or others to alter or maintain desirable behavior. Where self-arranged contracts have proven ineffective, externally controlled contracts may be necessary until an individual can assume the responsibility for controlling his behavior.

Contracts may vary from informal verbal agreements to formal, written documents. Formal, written contracts may be required when verbal contracts have failed to produce desirable behavioral outcomes. These contracts may contain several components:

1 The target behavior(s)
2 The performance criteria for the target behavior(s)
3 The payoff ratio between the target behavior(s) and the consequences
4 The time of delivery of payoffs
5 A bonus clause listing additional payoffs for near perfect performances
6 A penalty clause stating aversive consequences for failure to comply with the contract
7. The method for evaluating whether target behavior(s) meet selected criteria (Homme, et al., 1969; Kanfer, 1975; Stuart, 1971).

Contracts have proven useful for increasing responsibility taking in home chores (Dinoff & Rickard, 1969), for improving academic achievement (Cantrell, Cantrell, Huddleston, & Woolridge, 1969), for improving school attendance (Brooks, 1974; MacDonald, Gallimore, & MacDonald, 1970) as well as for reducing aggressive (Bristol, 1976) and delinquent behavior (Stuart, 1971; Tharp & Wetzel, 1969). In these studies the contract has been part of a treatment package: the specific effects of contracts in changing behavior was not investigated.

An important feature of contracts is that they may serve as a link between external and self-control programs. Homme and associates (1969) proposed a five-stage method for fading a child from trainer-controlled to student-controlled programs by use of contracts. In the first stage the trainer specifies the task to be performed, the criteria, the reinforcers, and the payoff ratio. Through negotiations with the trainer the child then gradually assumes responsibilities for these functions, until he can assume total responsibility for arranging all of these components.

No studies have been reported in which formal, written contracts were used systematically for developing children's self-control. A few researchers have studied modified forms of contracts as part of their studies. Felixbrod and O'Leary (1973), for example, demonstrated that students who selected their own goals and reward ratios were as academically productive as those whose goals and ratios were externally set; and they performed significantly better than a control group that received no opportunity to earn rewards.

More recently, Uhlman and Shook (1976) used Homme's (1969) model to train adolescent multiply handicapped students to manage their academic behavior. The teacher first specified weekly objectives, tasks, task schedules, and amounts of time that students could spend in free-time activities. Through negotiation with the teacher students gradually assumed total responsibility for directing their academic programs. The time students spent working, number of daily objectives met, and number of math problems completed increased sizably over baseline.

Brigham and Stoerzinger (1976) showed that children are highly motivated by selecting their own reinforcing events. In negotiating contracts children presumably have some control over establishing rules governing their behavior and may fulfill contracts in order to maintain freedom from external control (Brigham & Sherman, 1973, Kanfer, 1977; Kiesler, 1971). Thus, contracts may serve as discriminative stimuli for appropriate behavior in the absence of external controls. They may provide a method for shaping self-management skills by allowing children to select target behaviors, set goals, evaluate their behavior, and contingently administer self-reinforcement. These conclusions must be considered tenuous, however, as the data in this area are limited. Given the demonstrated success of contracts in managing a variety of children's behavior, it is surprising that this procedure has not been used more extensively for training children in self-control.

Self-evaluation and Self-reinforcement

Since the self-evaluation process involves a comparison of performance against established personal or normative standards, individuals may more readily evaluate their performances when behavioral data are available in the form of a graph or chart or when their goals are explicitly stated, as in a contract. Self-evaluation serves as a cue for determining the degree of allowable *self-reinforcement*. Thus, when persons evaluate their performance favorably, they may engage in positive covert and/or overt self-reinforcement; unfavorable evaluations may result in aversive self-administered consequences. In this way individuals alter or maintain their behavior independent of external controls.

Most research concerned with training children to control their behavior by using self-evaluation and self-reinforcement has involved an

external training and feedback approach. Typically, trainers provide children opportunities to earn tokens for following classroom rules or meeting established behavioral standards. Their behavior is periodically evaluated by a teacher or observer to determine their eligibility for reinforcement. Those ratings that closely match those by trainers may become eligible for tokens or points. Thus, the children are taught to use their self-ratings for contingent self-reinforcement. Once acceptable patterns of self-evaluation and self-reinforcement are well established, the external control mechanisms are faded, giving the children full responsibility for managing their behavior.

In one study using this approach (Bolstad & Johnson, 1972) students in two self-evaluation/self-reinforcement groups showed less disruptive behavior than those assigned to a group that received only external reinforcement. These experimental groups emitted significantly less disruptive behavior than control groups. Fredericksen and Fredericksen (1975) also demonstrated that pre-adolescent special education students with self-management training could improve their task-oriented and prosocial behavior over that observed during teacher-controlled reinforcement periods. In a similar study by Turkewitz, O'Leary, and Ironsmith (1973) elementary school students' academic performances under self-management conditions were maintained at normal rates while their disruptive behavior dropped significantly below that observed during baseline.

The effects of self-evaluation and self-reinforcement also have been studied in clinic populations. Kaufman and O'Leary (1972) trained adolescents in a psychiatric hospital classroom to assess appropriately their compliance with teacher-imposed classroom rules. In an allied study, by Santogrossi, O'Leary, Romanczyk, and Kaufman (1973), similar subjects increased their disruptive behavior and became difficult to control even with a subsequent token program.

The studies reported here indicate that, under certain conditions, self-evaluation and self-reinforcement procedures can maintain academic behavior and minimize disruptive behavior. Although several investigators have reported the superiority of self-controlled over external-controlled programs, such conclusions must be regarded as tentative (McLaughlin, 1976). Almost all of the studies to date have exposed children to some type of self-management training before allowing them to control reinforcing events. In two studies in which students evaluated their behavior and scheduled their reinforcement without prior training (Klein & Gory, 1976; Santogrossi, O'Leary, Romanczyk, & Kaufman, 1973), control over the target behaviors was not established. Most studies also have failed to control for the presence of the teacher and observer as discriminative stimuli for appropriate behavior. Consequently, it is difficult to conclude whether the results obtained in these studies were the result of self-control or improved discrimination.

COGNITIVE METHODS

In current social learning theory cognitive stimuli—thoughts, feelings, and images—are considered links in a chain of external and internal events that may influence an individual's overt behavior (Mahoney, 1974; Meichenbaum, 1975). If, as is assumed, overt behavior is a function of covert behaviors, then the alteration of the covert behaviors may produce changes in overt behavior. This hypothesis has stimulated research interest in training problem children to manipulate instrumentally their cognitive behaviors as a means of self-control. Research in this area has begun only recently, but some promising new techniques have emerged. Although a considerable amount of overlap may exist between these strategies, three distinct procedures can be identified: self-instruction, problem solving, and modeling/rehearsal.

Self-instruction

The role of verbal behavior in influencing affective and overt behavior has received much recent attention in the behavioral literature (Bandura, 1969; Mahoney, 1974; Meichenbaum, 1975). A theoretical analysis of the relationship of affective experiences may be a combined effect of emotional arousal and the meaning that is attached to feelings, that is, whether persons experience "fear," "anger," or "apprehension" in a situation may be determined by the way they label their emotions (Schachter & Singer, 1962). Some evidence indicates that persons may alter feelings of elation or depression as a function of reading positively or negatively worded statements (Velten, 1968). Clinical studies also have successfully modified anxiety and depression by having clients use self-instructions (Flannery, 1972; Jackson, 1972; Meichenbaum & Cameron, 1974). In fact, some writers view therapy as a process in which persons are taught to talk appropriately to themselves to alter their behavioral responses (Goldfried & Goldfried, 1975; Homme, 1965; Kanfer & Phillips, 1970; Marston, 1965). This background underlies the interest in training children to use self-instructions for behavioral self-control.

Experimental studies indicate that children may be taught to control their behavior by using self-instructions. In a study by Hartig and Kanfer (1972), for example, children who were instructed to use verbal coping statements (e.g., "If I don't look at the toy, I'll be a good boy") showed a greater resistance to disobeying an adult's directions than those who merely recited nursery rhymes.

The use of self-instructions has been effective in increasing prosocial behaviors (O'Leary, 1968) as well as the ability to learn academic skills (Bem, 1976) and has been explored for training hyperactive and impulsive children to control their behavior (Meichenbaum & Cameron, 1974; Meichenbaum & Goodman, 1971; Palkes, Stewart, & Kahana, 1969).

Meichenbaum and Goodman (1969) taught impulsive children to improve their performances on complex motor tasks by using self-instructions. The children first watched a model perform a task while verbalizing self-instructions: the model asked questions about the task requirements, answered these questions by rehearsing and planning their solutions, used performance and error-correction statements, verbally managed feelings about failures, and provided self-reinforcing statements for adequate performance. Next, children performed the task while the model verbally directed them. The children then verbalized the instructions while performing the task. Finally, they were directed to instruct themselves covertly while doing the task. Compared to controls, children who were trained in these techniques showed significant improved performances on the Porteous Maze test, a standardized intelligence test, and a measure of cognitive control.

On the basis of this and other studies Meichenbaum and Cameron (1974) have outlined a strategy for teaching children self-management behaviors. They suggest that trainers initially select tasks that children can perform easily and introduce self-instruction as part of their natural activities. Children can be taught to break complex tasks down in small, sequential steps and to undertake a task stepwise. In working on a task trainers should model performance instructions as well as coping, relaxation, and reinforcing self-statements and then require children to imitate these as practice in performing a task. Children also may learn to manage their impulsive, aggressive, and emotional responses by being taught to identify internal and external stimuli that trigger these behaviors and to use these as cues for initiating self-instructional procedures.

At present the potential usefulness of self-instructional strategies for modifying children's academic and problem behavior remains unclear. The few studies that have been completed have been limited to carefully controlled experimental situations and to the use of relatively insignificant dependent variables. Some studies do indicate that self-instructional techniques may be useful in everyday classroom applications (Bommarito & Meichenbaum, 1975; Meichenbaum, 1975), but substantial corroborative evidence is unavailable. Further research is needed to determine the effectiveness of existing training procedures in natural settings to determine the effectiveness of this technique with a variety of academic and social target behaviors and with various child populations.

Problem Solving

Another way for developing self-control is to teach the children methods of effective problem solving (Mahoney, 1974; Spivack, Platt & Shure, 1976). This approach is not designed to teach children specific responses to specific problems. Instead, it gives them a general strategy for dealing with problem situations (D'Zurilla & Goldfried, 1973).

D'Zurilla and Goldfried (1973) have identified five phases of the problem-solving process that may be used to train children in self-control. In the *orientation phase* trainers may teach children to recognize problems as common events that should not be reacted to or ignored but that require action to resolve. In the *problem definition and formulation phase* children may be instructed in defining a problem, identifying its elements, and recognizing its origins as well as factors that prevent its resolution. Children then may be taught to *generate alternative solutions* to a problem in the third phase of the process; in this phase trainers may uncritically encourage children to produce as many diverse alternatives as possible to a problem (Mahoney, 1974). In the fourth, or *decision-making*, phase children may be instructed in methods for assessing alternatives in terms of their predicted outcomes. Finally, in the *verification phase* children may be taught the process of selecting and trying out the most desirable alternative in applied situations by observing its consequences and then comparing these outcomes against those predicted.

Only two studies investigating the effects of training children in problem solving have been reported to date. Spivack and Shure (1974) trained normal and disruptive preschoolers to generate alternative solutions to social problems. This instruction also was found to improve social functioning among disruptive children as well as normal children. These results suggest that training in problem solving may hold promise as an intervention as well as a prevention technique.

In a second study Russell and Thoresen (1976) used written materials and audiotapes of peers modeling the problem-solving process to teach institutionalized preadolescent aggressive children to deal with problem situations. The children gave somewhat more ($p < .10$) alternatives and consequences to simulated problems after this training than they produced beforehand. Anecdotal information from the institutional staff suggested that the children also generalized their newly acquired skills to applied situations.

Several basic studies (Spivack, Platt, & Shure, 1976) have indicated that deviant child populations may not be as adept as normal children at producing alternative solutions to social problems. The implications of these results are that training behaviorally disordered or impulsive children in interpersonal problem solving may be an important treatment technique for improving their self-control and adjustment. While preliminary field applications have produced some encouraging results, the data are too limited to evaluate the effectiveness of this approach for this purpose. There is a need to conduct further field studies on problem solving using direct behavioral measures to determine if this training will generalize across problem situations and if it will be maintained over time.

Modeling and Rehearsal

In training children in self-control through the use of social modeling and behavioral rehearsal a peer trainer might first model the desirable responses in a role-play problem situation or have the children observe these behaviors in vivo or on videotape. The children may then be required to imitate not only the appropriate verbal behaviors, but also all of the salient features of the response pattern—the voice inflections, gestures, and possibly even pauses. A trainer may then have the child reproduce the entire behavioral sequence with coaching and assistance. Finally, the child may be instructed to rehearse covertly the desirable behaviors.

Masters and Mokros (1974) have exhaustively reviewed the literature on children's self-reinforcement processes. The following are some of the highlights of their review that have implications for training children in self-control: (1) Children may more readily adopt externally imposed than modeled standards for self-reward: (2) Children tend to select the self-reinforcement standards of more lenient social models: (3) When a model's imposed standards conflict with his modeled standards for self-reinforcement, children tend to adopt the more lenient standards: (4) In general, children more readily adopt the self-reinforcement standards of competent, powerful models but not necessarily that of nurturant models: (5) Children tend to imitate self-regulatory behavior of models whose performances are closer to their competence levels rather than those who show superior performances: (6) A model's praise may increase a child's imitation of self-controlling behavior.

Experimenters have used modeling to reduce children's fear of animals (Bandura, Grusec, & Menlove, 1967; Bandura & Menlove, 1968; Ritter, 1968), to increase their social interactions (Ross, Ross, & Evans, 1971), to improve their task performance (Meichenbaum & Goodman, 1971), and to reduce their inappropriate classroom behavior (Csapo, 1972). Csapo (1972) demonstrated that having socially mature peers model appropriate behavior and award behaviorally disordered students tokens for imitating this behavior reduced the deviant behavior of these students, a reduction that was maintained for ten days after the treatment was withdrawn. Maintenance of behavior over time is a critical index of its value in promoting self-control.

Several studies have suggested that the effects of modeling for fostering children's self-control may be enhanced through the use of behavioral rehearsal procedures. In an early case study Gittelman (1965) used modeling and behavioral rehearsal techniques to reduce impulsive and aggressive behaviors in a preadolescent boy. After he identified situations that provoked the boy's anger, group members attempted to incite the boy's anger by acting out progressively more provocative scenarios (group members also modeled the boy's behavior in role-playing exercises). Reports indicated that this approach reduced aggression in the therapy group as well as in the school and home situations.

Goodwin and Mahoney (1975) applied a similar approach with three "hyperactive" boys. The boys played a "taunting" game in which one stood in an inner circle while the others attempted to provoke him into displaying aggressive behavior. The boys were shown videotaped models controlling their anger using self-instructions. By discussing and rehearsing these strategies the boys successfully reduced their aggressive and withdrawal behaviors in the therapy setting; the amount of disruptive behavior that they displayed in their regular school classroom also declined considerably during this time. Although the absence of a control group makes these findings tentative, they do suggest that a combination of modeling and rehearsal may be effective in developing children's self-control over their aggressive responses.

Modeling and rehearsal have also been used for training delinquent populations. Kifer, Lewis, Green, and Phillips (1974) used these techniques to teach predelinquent children and their parents to resolve conflicts. The experimenters presented the participants with written conflictual situations and had them identify and select outcomes to these situations. With instructional feedback provided by the training, the clients rehearsed these outcomes and negotiated settlements to the conflicts. Negotiations consisted of a statement of each person's position, identification of the issues, and tentative resolutions and outcomes. This training resulted in improved interpersonal negotiation skills between parents and their children, skills that transferred to home situations. Sarason and Ganzer (1973) trained delinquent youths in small groups in which they observed live models demonstrate appropriate behavior in scripted role plays. The plays involved conflicts familiar to the participants. After observing the models the youths discussed the content and outcome of the scenarios, imitated the model's behavior, and rehearsed their own version of the role play. Videotapes of their efforts were then reviewed and discussed. Sarason reported favorable results with this treatment package.

The results from laboratory research underscores the necessity for controlling agents—parents, teachers, and other authorities—to demonstrate appropriate self-regulatory behaviors themselves to foster the development of self-control in children. Studies also indicate that modeling is quite powerful in producing positive changes in children's behavior, and the addition of behavioral rehearsal may enhance its value for promoting children's self-control. As with other primarily cognitive approaches, however, field applications are very limited. The available field studies suffer from a lack of appropriate precision in data collection (Csapo, 1972), inadequate follow-up data (Csapo, 1972; Gittelman, 1965), unconvincing dependent measures (Gittelman, 1965), as well as a lack of appropriate control groups (Gittelman, 1965; Goodwin & Mahoney, 1975; Sarason & Ganzer, 1973). There is a need for applied studies that evaluate the contributions made by rehearsal procedures and that concentrate on the generalization and maintenance effects of this training using direct measures and appropriate comparison groups.

IMPLICATIONS AND EVALUATION OF SELF-CONTROL APPROACHES FOR TRAINING EXCEPTIONAL CHILDREN

The development of a technology of self-control stems from concerns relating to generalization and maintenance of training effects as well as those related to developing a "humanistic" approach to child guidance. The specific research issues related to self-control have been detailed elsewhere (Jeffery, 1974; Jones, Nelson, & Kazdin, 1977; Mahoney, 1972; McLaughlin, 1976) and will not be reiterated here. Instead, the results of field studies in self-management and cognitive approaches to self-control that have implications for training exceptional children will be summarized.

Self-management methods (self-monitoring, contracting, self-evaluation, and self-reinforcement) are probably the most well-researched self-control training procedures. Although the evidence is unclear, claims that self-management techniques rival external techniques in maintaining behavior are unfounded. In most studies history effects (Campbell & Stanley, 1963), sociocultural factors (Glynn, 1970), expectations and demand characteristics (Orne, 1969), and contributions of external reinforcement and discriminative stimuli have not been ruled out as competing hypotheses (Jones, Nelson, & Kazdin, 1977; McLaughlin, 1976). Studies, however, have yielded some valuable information concerning the use of these techniques.

In general, self-monitoring—the recording of one's behavior—appears to be an active intervention in its own right under conditions in which children are motivated to change or where external consequences maintain this behavior. This process appears to sensitize children to the frequency of their behavior and its controlling variables; thus practitioners can most effectively employ this technique by providing children with external reinforcement for maintaining self-monitoring accuracy and using the self-monitoring record to aid them in establishing and sequencing academic and social goals. This record also may be essential for shaping childrens' accurate self-evaluation and appropriate self-reinforcement.

Research indicates that a reliable procedure for training children in appropriate self-evaluation and self-reinforcement is first to establish these behaviors through external methods, such as contracts or token-reinforcement programs. Once the appropriate behaviors are established, external evaluations and control of reinforcement is gradually relinquished to the children through negotiation or fading procedures (Bolstad & Johnson, 1972; Drabman, Spitalnik, & O'Leary, 1973; Uhlman & Shook, 1976).

Although few researchers have evaluated cognitive approaches for training children in behavioral self-control, there is evidence accruing that these approaches may have considerable promise (Mahoney, 1974). The use of modeling and rehearsal for developing children's self-control appears to be particularly suited to applied situations. Trainers, first of all, would be well advised to model self-control for their students as well as to set reasonable standards for appropriate behavior and reinforce attainment of these by students (Bandura, 1969; Kanfer & Phillips, 1970; Masters & Mokros, 1974).

In cases involving interpersonal conflict teachers or peers could model appropriate methods of verbal and behavioral interaction (self-instructions, reinforcing self-statements, etc.) and have children rehearse these behaviors while receiving appropriate instructional feedback and reinforcement (Csapo, 1972). In the classroom teachers can also verbally model the steps for approaching and solving academic problems (Lovitt, 1976; Meichenbaum & Goodman, 1971) and require students to verbalize (rehearse) these steps prior to engaging in problem-solving activities. Thus, the procedure used by Meichenbaum and his associates (see Meichenbaum & Cameron, 1974) encompasses a highly useful combination of modeling, self-instruction, and rehearsal for both academic and social behaviors.

Problem solving as a self-control training technique differs from other methods in that the objective is to teach children a set of procedures that they can use across various situations. Available information (Spivack, Platt, & Shure, 1976) indicates that normal children may have more ability for interpersonal problem solving than deviant children. As an intervention technique teachers could be trained to teach deviant children that interpersonal, as well as intrapersonal, conflicts can be viewed as problems to be solved and that in many cases acting on problems is more effective than withdrawing from them or reacting to them emotionally. Teachers then could lead the children through a series of steps involving brainstorming alternative solutions and having them systematically try these out.

One of the most important issues currently facing researchers and practitioners alike is the generalization and maintenance of behavior (Stokes & Baer, 1977). Training children in behavioral self-control holds the promise that they may generalize appropriate behavior from one setting to another (i.e., from one classroom to another or from the school to the home setting) and that they may reduce their reliance on external control by maintaining appropriate behavior themselves (Cautela, 1969). Despite the growing literature related to teaching children self-control skills, the effects of this training across settings and over time has not been addressed adequately in the literature (McLaughlin, 1976). Clearly, future studies should evaluate the effectiveness of self-control training with children in terms of its generalization and maintenance effects (Karoly, 1977; Stokes & Baer, 1977).

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12

Training Parents of Multiply Handicapped/ Hearing Impaired Children

Robert Stromer and June Miller

The provision of direct services to the multiply handicapped/hearing impaired child is, in itself, a formidable undertaking. To facilitate the child's development via parent involvement may represent an even greater challenge. Few parents of handicapped children are optimally prepared to function as home teachers. The discrepancy between existing parenting skills and those needed may be quite pronounced when the child involved is multiply handicapped. Fortunately, many parents recognize the need to take constructive measures to become more effective caregivers. Professionals who are able to engage parents in explicit teaching activities have an opportunity to enhance their services to the child and family significantly. The parent/teacher can support and augment the concentrated efforts of the professional or, in some cases, become the primary figure in the child's education. In addition, parents with first-hand knowledge of accountable instruction might be in the best position to secure appropriate placement for the child in the future. Thus, explicit parent involvement has enormous implications for the generalization, transfer, and maintenance of child treatment (Marholin, Siegel, & Phillips, 1976). Moreover, appropriate parent intervention can obviate the need for intensive remediation in the future (Weathers & Liberman, 1978).

This chapter provides an overview of some of the ways direct parent intervention can be accomplished. The literature cited is mostly selected parent training programs and curriculum guides generated by specialists in hearing impairment and educators of developmentally delayed persons. Either discipline may be called upon to serve the multiply handicapped/hearing impaired student; to do so effectively requires an integration of their respective methodologies. Only a few research articles related to specific training issues are discussed. The interested reader can find extensive reviews of parent training research elsewhere (Baker, 1976; Berkowitz & Graziano, 1972; Graziano, 1975, 1977; Johnson & Katz, 1973; O'Dell, 1974; Tavormina, 1974; Wahler, 1976).

The bulk of this chapter is organized under headings pertaining to training settings, naturalistic environments, and the generalization of parent instruction. Within these contexts, several models of parent training and evaluation strategies are illustrated. Parent programs are often administered from a school or clinic, but direct home intervention is becoming more prevalent. The extent to which parents have been responsible for various aspects of the teaching process is also considered. Parent involvement may vary with the content of the child's program and/or the scope of the teaching duties assigned (e.g., assessment, program design, data collection).

Our conceptions of "training" and "naturalistic" settings are similar to the distinction Hart and Rogers-Warren (1978) have made between "training" and "milieu" child intervention. Programming in the training environment is characterized by massed trials of carefully graded teaching sequences, often administered in one-to-one situations. The instructional stimuli are typically adult controlled, and consequences for correct and incorrect responses are precisely programmed. Comprehensive programs seek to develop the "total" child and include training on a variety of verbal and motor behaviors. Program categories might include language/communication, cognitive/preacademic, social, self-help, and motor behaviors. Programs follow ongoing cycles of testing and teaching to verify skill acquisition. This kind of teaching would generally constitute a child's school program. Parents have been used as adjunct teachers to school programs by concentrating on one or a few instructional areas. In some cases, the entire instructional process is taught to parents; programming occurs in the home and encompasses the entire realm of curriculum areas. The attempt is to teach the child behaviors that are functional in school settings, the community, and home. Likewise, the parents' teaching skills should serve a broader function than those defined by the child's specific program objectives.

Naturalistic intervention is a direct attempt to program behavioral development in "real life" environmental situations. Parents have numerous opportunities to prompt and reinforce emerging behaviors while following the normal child-rearing practices unique to their homes. But as seasoned interventionists can appreciate, generative child or parent behaviors are no guaranteed by experience in training settings alone. For example, consider the child who is capable of limited expressive labeling but who exhibits this skill only during formal training. Functional language usage in the home may necessitate adjustments in both the physical environment and parent-child interactions. For example, access to desired objects and materials should be made contingent upon oral requests to the adult. The parent, in turn, should be prepared to teach expression under these circumstances. In some ways, naturalistic intervention may appear less of an imposition on family routines and parental responsibilities. However, because of the unstructured nature of the interactions, parental instruction no doubt requires considerable modeling, rehearsal, and corrective feedback.

IMPLICATIONS OF THE HEARING LOSS

An integral part of any programming effort must attend to the hearing status of the multiply handicapped/hearing impaired child. A thorough audiologic evaluation is basic to the child's educational needs at school and home. The point is emphasized because a hearing loss can have a pervasive impact upon communicative behavior, particularly when it interacts with other handicapping conditions (Graham, 1976). Early identification and appropriate amplification may prevent further debilitation (Ross, 1976). Furthermore, the audiologic assessment should be an ongoing process that invites frequent interchange between the hearing children and those directly responsible for the child's education (Lowell & Lowell, 1978). Kenworthy (Chapter 5) builds a strong case for the audiologist's role in intervention. Continuous amplification management must be integrated into every aspect of the child's intervention program, the home included (Ross, 1976). Parents need detailed instruction and hands-on practice in hearing aid use and management procedures. A perusal of available literature reviews (e.g., Cox & Lloyd, 1976; Ross, 1976) and parent curriculum guides (e.g., Clark, 1975; Northcott, 1977; Sitnick, Rushmer, & Arpan, 1978) will facilitate program organization. The principles and practices illustrated in the subsequent review are applicable to the conduct of this training component.

PROGRAMS FOR TRAINING SETTINGS

Fredricks, Baldwin, and Grove (1976) described three parent training routines used in conjunction with a child's school placement. The child's data-based instruction at school features the following curriculum areas: language, fine and gross motor, preacademic, and self-help (Fredricks, Riggs, Furey, Grove, Moore, McDonnell, Jordan, Hanson, Baldwin, & Wadlow, 1976). In addition, programs are devised to remedy certain behaviors incompatible with school and/or home functioning (e.g., tantrums and noncompliance). The school/home system involves concurrent teaching of one or more skills by both the child's teacher and the parents. After the parent decides on the area(s) of home training, the parent is taught how to administer the program and how to record data. Daily records of the child's progress are passed between home and school, and instruction in either setting picks up where the other leaves off. Compared to school-based instruction alone, coordinated school/home programming may facilitate skill acquisition. Fredricks et al. (1976) provided two case illustrations; one involved a sight-word program, the other a rote counting program. The authors suggested that one might expect 50% parent participation in home teaching with one to four programs conducted daily.

A second version of parent training is school based but designed for situations unique to the home. The teacher writes a prescriptive program based on parent conferences and parent-gathered baseline data. The program is monitored via data sheets sent to school every few days and occasional phone conversations. Data from a home program to increase compliance to commands provides evidence that parents might profit from indirect intervention (Fredricks et al., 1976). In either the school/home or the home-only training, parents receive didactic instruction covering the general rationale and procedures of behavioral intervention, as well as readings relevant to their current program area (Baldwin, Fredricks, & Brodsky, 1973).

A third approach utilizes the parent as a volunteer aide in one of the center's classrooms. The parent receives a slightly broader base of didactic instruction and supervised practica in a variety of programs. The hope is that the parent will be able to generalize the principles and procedures and independently institute similar programs at home. The teacher may assist the parent to conduct home programs as described in one of the two previously mentioned systems.

The program developed by MacDonald and his co-workers (Horstmeier & MacDonald, 1978a, 1978b, 1978c; MacDonald, 1978a, 1978b) is designed to teach parents to perform home language training with their child. MacDonald's approach to language instruction deemphasizes the concern over training adult-like grammatical structures and instead focuses on the semantics and pragmatics of early language. Consequently, the child's use of language during play and socialization in the natural environment is of paramount importance. The curriculum contains four major categories of instructional programs:

1. The attending behaviors include making eye contact with people and objects, sitting, and compliance with basic tutoring procedures.
2. The nonverbal category focuses on functional play with objects and motor imitation.
3. Receptive language behaviors include following simple directions and identifying actions and objects.
4. The expressive language behaviors range from imitation of sounds and labeling of actions and objects to more advanced social conversation.

The parent program is presented as a clinic-based approach and organized on the basis of data gathered from the consultant's administration of criterion-referenced language tests to the child. The consultant and parent then plan an initial week of teaching duties to be conducted in the home by the parent. The consultant models the desired procedures and allows the parent time for practice and feedback. Subsequent weekly sessions are spent having the parent demonstrate the previous week's training activities with the consultant remediating any difficulties in the parent's technique. Time is also spent on review of previous child data and planning the coming week's home training. If necessary, new procedures are rehearsed. A third segment of the session is devoted to the preparation of adult and child language "rules." The rules are written reminders to adults regarding the language expectations from the child in the natural environment. For example, the child's rule might state that sounds or words are to be used when making requests, not gestures. And the adult's rule might include a prompt to reinforce the child's use of sounds or words with praise and attention and immediate response to the request, while pausing after gestures and granting the request only after an imitative response.

A parent manual (Horstmeier & MacDonald, 1978c) contains readings pertaining to the rationale and procedures used in the various instructional areas. Consultation time is set aside to address the points made in the readings. The child's daily progress is documented on simple score sheets located in the parent's manual. At the end of the 10-12 week program, the language pretests are readministered to determine skill acquisition. Horstmeier and MacDonald (1978b) also provide an observation guide for sampling parent teaching skills. A subjective 4-point scale can be used to assess behaviors such as positioning the child for formal instruction, the appropriate use of nonverbal assistance, and the effective use of reinforcement.

Research on preliminary versions of MacDonald's program (summarized in MacDonald, 1976) has demonstrated significant gains in language use by 3-5-year-old Down syndrome children as compared to nontreatment controls. Children exposed to parent programming went from single-word expression to longer and more complex utterances. Anecdotal observations suggested that both the child's language and the parent's teaching skills tended to be used in unstructured situations. So far, use of the subjective rating scale of parent teaching behavior has not been reported.

In the programs examined thus far, parent instruction (i.e., demonstrations and supervised rehearsal) has taken place in a school or clinic. Parents are then supposed to carry out the procedures in the home. One should appreciate that this is not always accomplished without closely scrutinizing the home environment. The remaining programs in this selection circumvent many potential problems of generalization by providing in-home instruction for parents and children.

In the home-based Portage Project (Shearer, 1976; Shearer & Shearer, 1976), consultants meet with parents on a weekly basis to assist the parent in teaching an array of skills to the child. The child's program is generally organized around a curriculum guide (Bluma, Shearer, Frohman, & Hilliard,

1976) that encompasses the following areas: infant stimulation, socialization, language, self-help, cognitive, and motor. A behavior checklist is used for assessment and overall planning purposes and to document major child accomplishments. A card file system contains teaching suggestions coded for each checklist item. Home consultation centers around the parent's specific teaching activities. In most instances, the consultant initiates a program with a baseline assessment of the behaviors targeted. If the child lacks the skill, the consultant demonstrates the teaching procedures and the parent imitates the activities. The parent may be teaching three or more skills per day. Each program is briefly described on an activity chart where daily recordings of the child's progress are noted by the parent. The consultant also conducts post-baseline assessments on previously assigned activities to verify accomplishment or the need for further training. Home visits also involve discussions of assigned reading materials (Boyd & Bluma, 1977) that cover the home teaching process and behavioral principles of instruction and child management.

The overall intent of the Portage Project is to develop a parent who evidences comprehensive, generalized teaching skills. At the present time, the project offers no systematic way of training the generative parent/teacher and documenting progress, but an important step has been made in this direction. Boyd and Stauber (described in Boyd, Stauber, & Bluma, 1977) have developed a Parent Behavior Inventory that subjectively rates the parent's ability to engage in appropriate teaching antecedents, child management, and instructional planning, and to gather materials and deliver consequences. Suggestions for using the parent inventory, along with an elaboration of the home teaching process, can be found in booklets available from the project (Boyd et al., 1977; Weber, Jesien, Shearer, Bluma, Hilliard, Shearer, Schortinghuis, & Boyd, 1975). To the extent that the Parent Behavior Inventory proves reliable in assessing teaching behavior, consultants will be in a better position to pinpoint and evaluate the needs of an individual parent.

Broad-based evaluations of the Portage Project (Shearer, 1976; Shearer & Shearer, 1976) suggest that home-based instruction is a viable option to traditional classroom education. Pre-post administrations of intelligence tests showed that the average child in the project gained 15 months during the 8-month period in the program. A few children were reassessed 1 year later and showed no appreciable loss in test performance. Compared to a group of classroom controls, Portage children evidenced greater gains in mental age, IQ scores, and language, academic and social skills. Although data were not reported, Shearer and Shearer (1976) related that many parents were able to plan their own child's curriculum and devise instructional procedures. Some parents also reported using the teaching procedures with other family members.

Watson and Bassinger (1974) developed a comprehensive home-based program that combines formal academic training and supervised hands-on applications. The 20-hour academic package utilizes textbook readings, lectures and slides, and examinations regarding the materials. These activities are conducted in a group setting or on an individual basis in the parent's home. Topics include the principles and application of reinforcement, shaping, stimulus control, and methods of data collection. Parents are required to pass each of 10 tests with 90%-100% accuracy.

Practicum training is organized around three presentations: self-help, language, and social/recreational skill building. The parent views a movie covering one of the areas, discusses it with the consultant, then attempts to apply the methods with the child. The consultant rates parent performance with a checklist containing 40 items pertaining to appropriate teaching methodology. Training continues until the parent is at least 90% proficient in each of the three practicum areas. The parent is then coached through specific applications with his or her child involving programs to eliminate undesirable behavior and to train self-help, language and speech, educational, and social/recreational skills. The parent is involved in all phases of measuring child progress. The basic program generally lasts 6-8 weeks. Thereafter, the consultant visits a parent once per week. The consultant's obligation to the family continues during the child's transition into a community school program.

Watson and Bassinger (1974) reported data from mini-experiments designed to assess changes in both parent and child behavior. The major parent data indicated that knowledge of academic areas alone did little to increase practicum skills. Compared to observing the training films alone, supervised practice in teaching their own child was most effective according to the 40-item checklist rating. Changes in various child behaviors as a function of changes in parent teaching were also reported.

A parent program published by Kozloff (1974, 1979) is very similar to Watson and Bassinger's in that a systematic attempt is made to involve the parent in all aspects of home teaching. Through a combination of didactic instruction and supervised home practica, parents learn behavior theory, program design and implementation, and evaluation strategies. The curriculum covers the following skill areas: attending, motor, motor imitation, verbal imitation, functional speech, chores, self-help, and problem behaviors. The professional guide (Kozloff, 1979) is an excellent source of ideas pertaining to the entire realm of parent training activities including counseling tactics to facilitate participation and how to administer and evaluate a program. Results of the recent program have not been published; however, preliminary work using the same general format showed positive gains in both parent and child behavior (Kozloff, 1973).

Most of the preceding programs include a component in which the consultant works directly with the parent/child dyad. Other programs attempt to affect parent-child behavior entirely through indirect means. Intervention is considered indirect because the consultant never observes actual parent-child interactions (Boyd et al., 1977). Fredricks et al. (1976) used this approach to deal with a mother's desire to increase compliance in the home. On a large scale, the Responsive Parent Program (Hall, Collier, Leiker, Grinstead, Kearns, Robie, & Rotton, 1978) is another example of this approach. This program is designed to teach parents a general set of principles and procedures useful for a variety of home management pursuits. Parents are taught basics of learning theory, methods of behavioral measurement and evaluation, and rudimentary intervention tactics. Large group sessions are conducted weekly where parents listen to lectures, discuss readings (Hall, 1974a, 1974b, 1975), view films, take exams, and engage in role-playing exercises. Small group time is devoted to the parent's behavior change projects. Parents learn to identify and define behavior operationally and to gather baseline data on a chosen child behavior. With the assistance of a behavioral consultant, the parent devises a treatment plan, implements it, and records its effect. These data are the focal point of subsequent small group discussions where the parent receives feedback from the consultant and other group members. Parents are also required to incorporate reliability observations into each phase of the project. The parent is encouraged to complete as many projects as possible during the 10-week program.

The Responsive Parent Program's major evaluative strength comes from the project data gathered by the parents. Exemplary parent projects and descriptions of Responsive Parenting are readily available (Hall, 1972; Hall, Axelrod, Tyler, Grief, Jones, & Robertson, 1972; Hall, Copeland, & Clark, 1976). In one noteworthy instance, a mother used a simple timeout procedure to diminish her multiply handicapped daughter's violent tantrums, screaming, stamping, and spitting. In another case, the parent successfully decreased whines, shouts, and screams by learning to consistently ignore occurrences of these behaviors. Weathers and Liberman (1978) describe a similar parent program that operates out of a community mental health facility. The obvious strength of indirect intervention programs is the feasibility of having an impact on large numbers of parents with relatively little expenditure of professional time. However, the efficacy of indirect intervention for parents initiating complex skill-building tactics remains to be ascertained.

PROGRAMS FOR NATURALISTIC SETTINGS

The technology for producing and documenting behavior change in natural environments has generally lagged behind that existing for training settings. Parent consultants are suddenly faced with a multitude of factors that are largely avoided within the confines of one-to-one or small group instruction. The purview of adult-child interactions in the home is especially demanding, given the child's mobility and the parent's inability to monitor the child continuously (Gardner, 1976). In addition, learning to facilitate child development under informal circumstances may be relatively difficult for the parent (Gardner, 1976), particularly if baseline levels of positive adult-child interactions are low. Despite the obstacles, the need for naturalistic parent training has not gone unnoticed.

Early interventionists working with the hearing impaired population have long recognized the crucial role parents play in child development (Horton, 1974, 1976; McConnell, 1968; Miller, 1964, 1970; Miller & Miller, 1959; Simmons-Martin, 1976, 1978). The need to develop a "total" communicative environment for the child was immediately evident to these educators, and the parent was logically sought as an intervention agent. Education is oriented toward the unique possibilities for parent-child interactions in the family and the way opportunities for speech and language growth abound within these exchanges. Training may occur in a clinic or the parent's home, but many programs operate from a "model home" setting. The model home may be a residential facility near the agency or institution that has been transformed into a parent training site. The home-like atmosphere enhances the consultant's attempts to duplicate interactions common to the home. The consultant provides models of desired interactions and allows the parent a chance to imitate the procedures. Sessions may be videotaped for subsequent review, discussion, and feedback.

The specific kinds of interactions targeted depend, of course, on the child's entry skills. Possible categories related to communication development include: appropriate ways of conversing with the child, increasing vocalization, teaching imitation, facilitating spontaneous communication, and expanding child utterances (Schumaker & Sherman, 1978). Teaching the child to respond to nonhuman auditory stimuli is also characteristic of many parent training agenda (e.g., Horton, 1976; Miller, 1970). A comprehensive program should also include intervention tactics designed to further motor development and independence during play, eating, dressing, bathing, and toileting. Parents should be taught the generalized usage of providing various levels of physical and verbal assistance during such activities. Parent instruction in handling inappropriate behavior may be needed as well.

Unfortunately, published accounts of naturalistic intervention by deaf educators provide few replicable guidelines for specific parent training activities. Program evaluation is an area of particular concern. It became apparent to deaf educators that informal clinical observations and parent questionnaires were insufficient feedback when attempting to revise programs for more effective training (McConnell, 1968; Miller, 1964, 1970; Miller & Miller, 1959). The void of detailed accounts of language instruction via naturalistic parent-child interactions may have prevented other professionals from adopting similar strategies.

Several recent curriculum guides for hearing impaired youngsters and their parents adhere to the foregoing philosophy of naturalistic intervention (e.g., Clark, 1975; Northcott, 1977; Sitnick et al., 1978). The *Parent-Infant Communication* program developed by Sitnick et al. appears particularly well thought out. The guide consists of two curricula, one for the child and one for the parent. The child's curriculum guide contains behavior checklists pertaining to auditory perception and to receptive and expressive language. Each

item in the checklist is accompanied by teaching suggestions designed to achieve that skill. The curriculum for parents combines didactic and practical experiences in the development of communication skills, the use and maintenance of amplification systems, the nature of various levels of hearing loss, and total communication. The inclusion of parent objectives as they relate to their program and of general principles of communication development are noteworthy features. The broad parent-child objectives invite further specificity and could serve as useful resources for parent programming and evaluation.

The "training" programs previously illustrated provide minimum examples of accountable delivery systems that might be considered. At present, there are few "naturalistic" data that will elucidate the procedures one might employ and their expected outcomes in parent training. Exceptions to this statement, however, can be found by clinicians assisting parents with noncompliant or oppositional children (e.g., Forehand, 1977; Patterson, 1977; Wahler, 1972, 1976). Likewise, some significant methodological inroads have been made in skill-building interventions; this section concludes with a brief look at that research.

Research in the area of "incidental teaching" (Hart & Risley, 1975, 1976; Hart & Rogers-Warren, 1978) has important implications for the development of replicable, naturalistic intervention strategies. Incidental teaching represents an explicit attempt to bridge the gap between skills taught in formal training settings and their use in the natural environment. Applications thus far have established requesting and social conversation skills during free play with economically disadvantaged preschoolers (Hart and Risley, 1968, 1974, 1975). Incidental teaching has also been used to teach visual matching-to-sample and receptive language within the context of free play (Montes, 1974). The overall orientation is not unlike the "natural language" approach advocated over two decades ago for hearing impaired youngsters (Groht, 1958). The approach is also consonant with more recent models of communication developed for children with hearing deficits (Ling, 1976; Ling & Ling, 1978; Vorce, 1974).

Simply stated, incidental teaching takes advantage of a child's attempts to "use" an adult to secure goods and services (i.e., reinforcers) in natural or informal situations. These goods and services may be unobtainable or their receipt considerably delayed without adult mediation. The adult's compliance with a given request is made contingent upon the child performing some behavior in return. The behavior might be eye contact, vocalization, a gesture, a sign, an object-label, social conversation, or some preacademic skill. The behavior may or may not have been trained previously in a formal setting.

To better appreciate the adult-child interactions proposed here, consider a hypothetical situation derived from Hart and Risley's research. The objective might be to teach appropriate labeling of materials desired during play. The child has first been taught that receipt of materials requires an adult's assistance. The child may seek attention by standing near a shelf where the toys are kept, making eye contact with the adult, and pointing to one of the toys. The adult returns the eye contact and walks to the child. The adult says nothing for a few seconds, thus giving the child an opportunity to verbalize a request; Hart and Risley (1975) have called this the cue of "focused attention." Ideally, the child responds to the adult's attention by immediately labeling the toy, (e.g., "car"). The adult then praises the child and awards the toy. If the child fails to verbalize, the adult immediately provides a verbal cue, for example, "What do you want?" Appropriate labeling produces praise and the toy. Assume, however, that the child is only able to imitate an adult's model. The objective, then, is to shift control of the child's label from the adult's model to the question, "What do you want?" Hart and Risley (1975, 1976) suggest three levels of prompts for the child capable of verbal imitation:

1. Fullest degree: imitation ("Say car")
2. Medium degree: partial imitation ("Say c____")
3. Minimum degree: request for the terminal behavior ("What's this?")

If the child fails to respond, or responds incorrectly following a prompt, the adult prompts again with the next level of assistance. Prompted responses are also reinforced with praise and the material sought.

The preceding falls short of adequately describing the intricacies of incidental teaching. For example, it should be apparent that materials and objects may not function as reinforcers for some children. Thus, the child's environment requires constant monitoring to ensure that engaging materials are available, or the deficits of some children may necessitate a systematic effort to teach acceptable toy manipulation. Using the adult as a mediator for reinforcement may also require explicit teaching. As suggested earlier, the communicative behavior prompted from a child can be quite rudimentary at first. For some children, making eye contact unaccompanied by screaming and hitting can be a monumental accomplishment.

Incidental teaching has not been researched with children exhibiting severe developmental delays, nor have parents been instructed in its use. Extensions of this sort would contribute a great deal to the armamentarium of the parent consultant. And as shown by Montes (1974), the principles of incidental teaching need not be limited to the development of communication skills. A related work speaks to the possibility of using naturalistic procedures for other areas of intervention.

Like incidental teaching, Nordquist's (cited in Wahler, 1976) naturalistic strategy capitalizes on child behavior exhibited in unstructured settings. The procedures have been employed by parents to conduct motor imitation training with their children in the home. The parent first assesses how the child's time is allocated across various play activities. Those activities most often engaged in are presumed to be potential reinforcers (Premack, 1963). Later,

when the child is observed to participate in a preferred activity, the parent interrupts the activity and has the child perform a targeted imitative behavior. The child is then allowed to continue the activity. In addition to the evaluation of activity preferences, the parent keeps daily records of the number of teaching episodes, the behaviors asked for, and whether or not the behavior was correct. Parents reportedly find this kind of intervention relatively easy to implement as it can be conducted without drastic alterations in existing home schedules.

GENERALIZATION OF PARENT BEHAVIOR

Child behaviors taught in formal instructional settings are virtually useless if they are not functional in the natural environment (Marholin & Siegel, 1978; Marholin, Siegel, & Phillips, 1976). This statement also applies to parenting skills acquired under well-controlled conditions. Most clinicians recognize this, but they often adopt a "train and hope" (Stokes & Baer, 1977) approach to intervention. The approach has merit to the extent that training settings encompass procedures that are likely to result in generalization and the outcomes are documented. Parent consultants usually expect the parent to become a "generalist" (Gardner, 1976) with respect to his or her teaching prowess. But, as with children, the generalization and transfer of new training skills must be programmed as carefully as the original training itself (Baer, Wolf, & Risley, 1968). In fact, generalization of behavior should be viewed as an explicit therapeutic objective for parent training (Graziano, 1977). The following research addresses the generalization issue from the perspective of both parent and child.

Sajwaj (1973) reported several case studies, two that involved teaching parents to deal with child noncompliance. It is important to note that both sets of parents were observed to be very cooperative and willing to conduct the program as negotiated. The mothers of the two families were taught to respond to their children's compliance with praise and attention and to ignore instances of noncompliance. The mothers were successful in modifying their children's behavior in the clinic where they were trained, but the child's misbehavior persisted at home. In both cases, the parents failed to respond differentially to their children as they had learned in the clinic. Home observations revealed that competing responsibilities, such as meal preparation and household chores, made it difficult for the mothers to follow through as originally trained. In one case, the problem at home was alleviated when the mother was taught to use a timeout strategy in the clinic. However, a similar procedure ultimately failed in the second case. The use of timeout was contrary to the father's attitude toward child rearing and he subsequently withdrew the family from the program. This conflict might have been rectified had the father been an active participant during the conception of the program. A home-based program may be necessary to avoid the scheduling problems posed by clinic-based training.

In Sajwaj's third case, a mother and father were taught to differentially attend to their son's behavior during mealtime. All parent training was conducted in the home, and the objective was to decrease disruptive acts during dinner time. Parent instructions alone were unsuccessful in altering either the child's or parent's behavior. Progress was apparent when the trainer prompted the parents to attend to appropriate eating. However, when the prompts were removed, the parents resumed their low rates of praise and attention. The trainer finally resorted to the timeout procedure for misbehavior with good results.

Forehand (1977) critiqued Sajwaj's study and many others dealing with noncompliance. Collectively, the results of clinic-based parent training are equivocal. When effective, the combination of differential attention for compliance and timeout for noncompliance appears to be the method of choice. But analog training in the clinic fails frequently enough to warrant direct intervention in the home. Similar difficulties may arise when parents are taught skill-building procedures in the school or clinic. This may be particularly true when the parent is initiating a program and is likely to encounter problems that were not evidenced and appropriately countered during the school-clinic training.

Another study by Miller and Sloane (1976) addressed the issue of generalization with regard to parent and child behavior. The participants were five mothers and their language-delayed children. The purpose was to train each mother to increase her child's rate of vocalization via prompts and reinforcement. Training took place in two settings within the home, snack time and formal speech training. Generalization of the parent's use of prompts and reinforcement was examined during a pre-snack setting and during a formal speech session and free play at school. The results showed that the parent training effectively increased child vocalization during the training setting; however, neither child nor parent behavior uniformly generalized across settings. In the pre-snack period, three of five parents prompted and differentially attended to vocalizations, albeit the rates were far below the training levels. There were only marginal overall increases in child behavior and the results were highly variable. Assessments of child vocal behavior at school revealed no substantial gains in either the formal speech session or free play.

Another level of generalization concerns the degree to which one must train a parent to produce generative teaching within a training setting. Koegel, Glahn, and Nieminen (1978) recently conducted a study that examined some of the aspects of training that might result in a generalized ability to teach different tasks to children. In their first experiment, four mothers and their autistic children participated. Additional children were assigned to two of the parents in order to increase the range of child behaviors taught. The objective for each parent was to teach several different child behaviors (e.g., to stand up on command, to draw a triangle, and to discriminate square versus circle). During baseline, the parent was given an opportunity to teach a task without training. If unsuccessful, the parent received instruction and was given

another chance to teach a behavior. Throughout, observers evaluated five aspects of the parent's teaching proficiency: presentation of discriminative stimuli, use of prompts, use of shaping, use of consequences, and presentation of discrete trials. The observer also noted whether or not the child's task performance improved as a function of the parent's teaching.

The parents were exposed to two kinds of training. First, a consultant demonstrated correct aspects of teaching the specific child behavior being pursued at that time by the parent. Later, the parent received a "generalization training" package intended to illustrate the use of the teaching methods in a broad context. This training consisted of attending and discussing three 30-minute lectures and two 37-minute videotapes that explained appropriate performance of the five observational categories previously outlined. The two videotapes depicted the presentation of antecedents and the delivery of consequences, respectively. Subsequently, the parent attempted to teach the remaining behaviors assigned to the child.

The results clearly demonstrate the differential effectiveness of the two parent training procedures. The task-specific training resulted in a parent successfully teaching that particular behavior, but generalization of parent behavior did not occur for the remaining tasks. Additional parent training was required on each succeeding task. A child's performance improved only when the parent's teaching behavior was appropriate, as measured by the five observational categories. The generalization training, on the other hand, had the anticipated outcome: All parents successfully taught three new behaviors following the lecture-videotaped training procedure.

In a second experiment, Koegel et al. (1978) conducted a partial component analysis of the generalization training package with new participants: The purpose was to assess whether videotape instruction alone could influence parent/child performance. The authors also asked if videotape instruction on either antecedents or consequences alone would augment performance. Generally, videotape training facilitated parent behavior and a corresponding rise in child performance occurred. However, parent behavior seemed specific to the tape viewed prior to exposure to both tapes. That is, a parent's use of antecedents improved after exposure to the tape relevant to antecedents; use of consequences was generally unaltered until that tape was used in training. Marked improvements in child behavior were evident only after a parent had viewed both videotapes and was appropriately administering both antecedents and consequences.

SUMMARY AND CONCLUSIONS

That explicit parent involvement can have a pronounced influence on early intervention is widely acknowledged. The preceding review illustrates several levels of parent training that might be incorporated into child intervention programs. The perceived needs of the multiply handicapped/hearing impaired child have guided our particular integration of programs, guides, and research. However, the principles and procedures surrounding parent training are largely noncategorical and have obvious implications for any personnel preparation pursuit, including parent intervention with older developmentally delayed clients. Economic factors may ultimately dictate the scope of parent training pursued at any given facility. But, ideally, an agency would be in a position to equip a parent with a full array of teaching skills applicable in all aspects of child rearing. The methodology for applications in training situations is reasonably intact. Extensions to naturalistic situations generally await research and development. It is in this latter setting, however, where both parent and child are likely to profit most from parent training.

The issue of generalization arises at several points in the design, implementation, and evaluation of parent training programs. A fundamental reason for engaging parents at all is the concern for generalization of child treatment to the home environment. Accomplishing this objective requires careful thought regarding the method and site of delivering training to parents, the content of the program, and evaluation strategies. At a rudimentary level, limited hands-on experience should not be expected to have a generalized impact on other child behaviors. This may require several *in vivo* applications under the tutelage of a consultant, and may be combined with audio-video "generalization training" for effective results (Koegel et al., 1978). Furthermore, the presence of generalized teaching within a training setting does not ensure spontaneous applications in naturalistic environments. Appropriate intervention and documentation of training requires observation of naturalistic parent-child interactions in settings where behavior change is expected to occur.

The needs of parents with multiply handicapped/hearing impaired children goes well beyond the training issues addressed in this chapter. To the extent that parents have a "need to know," a continuum of educational services from a variety of specialists in developmental disabilities is warranted. Multidisciplinary approaches to assessment and intervention currently advocated find their roots in early efforts to serve hearing impaired persons. For example, as early as 1949, personnel affiliated with the Kansas "Parent Institutes" attempted to alleviate informational deficits experienced by parents (Miller, 1964; Miller & Miller, 1959). An intensive week-long program was feasible for up to 20 families by housing them at the residential school where the institutes were held. The program often drew families from distant rural communities where services for the hearing impaired population were minimal or nonexistent. The professional staff included a pediatrician, psychologist, audiologist, otologist, teacher of the deaf, social worker, and nutritionist. Group sessions with the parents focused on information-sharing activities. Topics included medical aspects of hearing impairment, physiology of hearing and speech mechanisms, nutrition, normal child development, effects of hearing loss on speech and language, methods of facilitating speech and language in the natural environment, and community recreational and educational services available. Parents also participated in counseling sessions where role-playing and discussion centered on various adjustment problems often encountered by families with hearing impaired youngsters. While the parents attended group sessions, their children participated in classroom activities and individualized assessments with the Parent Institute specialists. The parents were presented comprehensive interpretative summaries and recommendations at the conclusion of an institute week. Subsequent therapy sessions were scheduled to assist the parents in their daily implementation of recommended home teaching and management strategies. Follow-up instruction concentrated on amplification use and maintenance, and the incorporation of speech and language training into everyday interactions with the child.

The provision of educational and/or therapeutic services not directly related to home teaching can engage parents who would otherwise be unattracted to structured training programs. For some parents, simply the opportunity to socialize with other parents of handicapped children can inspire participation. In a sense, such sessions "shape up" involvement that can culminate at the hands-on teaching level. Additionally, consultants who appropriately respond to the "emotional needs" of parents can be more effective parent trainers. Clinical observations suggest that parents go through several emotional "stages" with respect to accepting their unique caregiver responsibilities (Stream & Stream, 1978). Prior to "acceptance," the adult's behavior may be influenced by emotional factors such as denial, anger, guilt, and anxiety that hinder or preclude compliance with the demands of acquiring new parenting skills. To the degree emotional states can be objectively identified and therapeutic effects achieved and documented, consultants can be successful in modifying parent behavior. The recent writings of several authors suggest several tactics applicable to counseling parents of handicapped children (e.g., Luterman, 1979; Stream & Stream, 1978; Thompson & Young, 1977; West, 1978). However, the objective of achieving beneficial parent-child interactions must remain top priority and receive concomitant attention as other therapeutic endeavors are implemented.

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"The Socioemotional Impact of Infant Deafness," a discussion of considerations in working with parents of the deaf child by Kenneth Moses and Madeleine Van Hecke-Wulatin, provides a conceptualization of parental reactions to the child's handicap as a grieving process. The authors suggest counseling techniques which are helpful in addressing parent reactions.

To a large extent, the principles involved in working with deaf children have broad applicability to interventions with severely handicapped children and their families. One difference, of course, is in the intensity of overall programming for the MHHI child. Some of these considerations are outlined by Carol Cober-Ostby in the monograph from the Arizona Demonstration Project on "Family Support Programs."

To illustrate further the issues of clinical interpretation and special adaptation of clinical techniques in working with a deaf child who is also presenting emotional/behavioral symptoms, we have included major excerpts from Paul Brinich's case analysis, "Application of the Metapsychological Profile to the Assessment of Deaf Children." Once again, the application of technique and the clinical understanding of the impact of deafness is demonstrated in this psychoanalytic case study.

A preventative mental health issue of growing importance in the field deals with the reactions of professionals working with handicapped children and the phenomenon of "burnout." This definitive paper by Kathryn Meadow includes the findings from a study of 245 deaf educators. The paper analyzes the sources of "burnout" in dedicated professionals and examines the relationship of selected support networks to job satisfaction.

The final selection in this chapter "Sign Language Power and Mental Health" by Raymond Trybus states a point of view regarding the relationship of self-esteem, power and the individual's relationship within the deaf community. The paper provides a perspective in which to understand the deaf child's experience in growing up and developing a sense of self-esteem within his/her community.

Other materials of direct relevance to mental health concerns affecting the HI-DD population are presented in the chapters **Identification and Assessment** and **Programmatic Options.**

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Kathryn P. Meadow
Raymond J. Trybus

28

Behavioral and Emotional Problems of Deaf Children: An Overview

Deafness is first of all a handicap of human communication. Its major effect is to erect an unseen barrier between the deaf person and the human community of which he or she is a part. The success of the deaf person in educational attainment, in social interaction, in job achievement, or in self-fulfillment depends on his breaching of that unseen barrier. Social and emotional development results from communication, by means of which the values and mores of the community are imparted to the child, by means of which the feelings and experiences of the child are given name and shape, and by means of which the child learns, by manipulating the verbal symbols, to manipulate his own thoughts, feelings, and overt behavior.

Emotional and behavioral control are learned through human communication no less than any other aspect of human life—and so it is not surprising that the handicap of deafness intrudes here as well. This chapter focuses on the emotional and behavioral problems of deaf children, their prevalence, their origin, their nature, and the implications for professional practice with deaf children.

THE PREVALENCE OF EMOTIONAL/BEHAVIORAL PROBLEMS IN DEAF CHILDREN

While the available studies of the prevalence of emotional/behavioral problems in deaf children differ in method, population studied, and findings, all are in agreement that the rate of emotional/behavioral problems is significantly higher among deaf children than among hearing children of otherwise comparable circumstances.

Since these various studies used different definitions of disturbance, different groups of children, and different methodology overall, it is not surprising that different proportions of children in each study are reported to be disturbed. In fact, given the differences in methodology and approach, the findings are remarkably consistent.

Large-scale Survey Data

The Annual Survey of Hearing Impaired Children and Youth is a continuing research and statistical program of Gallaudet College. All programs in the United States known to be providing special education and related services to hearing-impaired children are contacted annually and asked to submit a variety of information on enrolled children. Participation in the survey is voluntary, and data are received on about 80% of the target population in any one year.

Schools are asked to report, among other items, whether the child has an "educationally significant emotional/behavioral problem." (In the first two years of the survey, these two items were listed separately, resulting in double-counting of some children.) In the school years 1970–1971 through 1975–1976, the proportion of children listed as having emotional or behavioral problems declined slightly: the percentage of the total was 9.6 percent in 1970–1971 as compared to 8.4% in 1975–1976.

It is important to remember that the Annual Survey data are obtained from schools and represent an educational view of emotional disturbance, based on the need to provide special accommodations and/or services for the children so labeled. This educational orientation is evident in the fact that the determination of the emotional/behavioral disturbance was usually made by the child's teacher (43 percent) or by a psychologist (37 percent). The diagnosis was made by a physician in the remaining 20 percent of the cases in which the diagnostician was known.

Other Studies of Small Groups and Samples

A group of British researchers (Graham and Rutter, 1968; Rutter *et al.*, 1970) selected the Isle of Wight, in the English Channel, as the site for a study of the prevalence of all handicapping conditions in a single, self-contained population. All 11,685 children between the ages of 5 and 15 received an assessment of their physical and mental health.

The "presence or absence of psychiatric disorder" was determined by a combination of (1) behavioral questionnaires completed by the child's teacher; (2) similar questionnaires completed by the parents; (3) interviews with parents about their child's behavior, relationships, and emotions; and (4) a psychiatric examination.

Only 13 deaf children were located in this population, of whom 2 (or 15 percent) were reported as having a psychiatric disorder. This rate is more than double the 6.6 percent rate found for the general population of nonhandicapped children, but because of the very small number of deaf children involved, little can be said with confidence on the basis of these findings.

Vernon (1969) studied the relationship between the etiology of the deafness and the nature of secondary disabilities in children who attended, or who were evaluated at, a particular state residential school for the deaf during the period from 1953 to 1964. Vernon concentrated on those children for whom there was firm evidence that the hearing loss resulted from heredity, Rh incompatibility, prematurity, meningitis, and maternal rubella. A major limitation of this study is that the children with the named causes of deafness constituted only 38 percent of the total group.

Vernon used three approaches to assess the psychological adjustment of the children in this study. First, teachers were asked for their judgment as to the child's adjustment on a 5-point scale from "superior" to "poor." Second, school records were examined to determine the number of children dismissed from school because of emotional disturbance. Finally, the psychological evaluations performed at the time pupils were admitted to school were categorized by Vernon as reflecting "normal adjustment" or "severe problems which profoundly jeopardize . . . ability to function adequately in the school setting."

Teachers rated 20.7 percent of their students as showing "poor adjustment," while 22.5 percent of the psychological evaluations were categorized as showing "severe problems." The number of students dismissed because of emotional disturbance amounted to 9 percent of the group studied.

Schlesinger and Meadow (1972) specifically tried to identify those children in a particular state residential school for the deaf considered to be in need of psychiatric treatment in order to define the extent of the need for mental health services and to justify a request for funds to support those services. School personnel (teachers and dormitory counselors) were asked to identify those children who were "severely disturbed and in need of psychiatric help," as well as those who were "not severely disturbed but whose behavior necessitates a disproportionate share of the teacher's time or requires other special attention." This same format, allowing for the identification of both "mild" and "severe" cases, had been used previously in a mental health survey in Los Angeles County. This two-part format was considered preferable to a simple yes-no judgment of emotional disturbance. School personnel were not asked to report or describe the specific behaviors of particular children, but the survey forms suggested some kinds of behavior that might lead teachers or counselors to identify a child as in need of treatment or as requiring disproportionate care: withdrawn from peers, overly dependent, hyperactive, displaying nervous habits such as tics, truancy, accident-proneness, chronic illnesses without identifiable physical causes, and marked aggressive behavior.

Of the 516 students in the school, 11.6 percent were considered to be "severely disturbed and in need of psychiatric treatment," and an additional 19.6 percent were considered to have behavioral problems leading to disproportionate demands on teachers' and counselors' time. The comparable figures in the Los Angeles County study were 2.4 percent severely disturbed and an additional 7.3 percent needing disproportionate attention in the classroom. The rates for the deaf children in this school were, thus, three-to-five times as great as those for the hearing children in the Los Angeles County school system.

Freeman and co-workers (1975) studied a group of 120 severely to profoundly prelingually deaf children in the Greater Vancouver metropolitan area of British Columbia, ranging in age from 5-to-15 years. This group was thought to be an "almost complete sample" of the target group. This study ranged over a wide spectrum of sociodemographic, psychological, medical, and behavioral items and included an assessment of whether or not each child exhibited a psychiatric disorder.

While their procedures for determining the presence of psychiatric disorder are not described precisely, their basic method involved the assigning of a "global four-point rating from none to severe, according to all the information available," which included questionnaires relative to the child's behavior obtained from parents and from teachers. They report quite limited degrees of agreement between parents on ratings of their children ($r = .63$), and even less agreement between parental and teacher ratings ($r = .45$ between mother and school, $r = .16$ between father and school). In any case, they report a finding of 6.7 percent of the children with a "severe" rating and an additional 16.5 percent with a "moderate" psychiatric disorder. They do not report comparable figures for their control group of hearing children from the same metropolitan area.

Summary of Prevalence Data

As indicated in the introduction, each of the available sets of data bearing on prevalence used different methods overall, different definitions, and focused on a variety of large and small groups. The one clear finding throughout is that the rates of serious emotional disturbances are higher among deaf children than among hearing children.

While the National Institute of Mental Health (Joint Commission on Mental Health, 1970) estimated that 2 percent of young people under 25 are "severely disturbed and need immediate psychiatric care," and while the Los Angeles County survey (State of California, 1960) reported 2.4 percent to be severely disturbed, the available studies of deaf children show consistently higher rates.

The studies of the Annual Survey of Hearing Impaired Children and Youth show 8.4 percent to 9.6 percent reported as having educationally significant emotional/behavioral problems. Vernon reports 20.7 percent to 22.5 percent as showing poor adjustment or being psychologically disturbed. Schlesinger and Meadow found 11.6 percent to be severely disturbed. The Vancouver study found 6.1 percent with a severe psychiatric disorder. Many of these studies report even higher proportions of children with emotional/behavioral problems of lesser severity. It would appear that serious emotional problems are three-to-six times as common among deaf children as among hearing children and that disturbances of lesser severity are also observed with greater frequency among deaf children.

THE NATURE OF EMOTIONAL/BEHAVIORAL DISTURBANCES IN DEAF CHILDREN

Having established that emotional/behavioral disturbances are substantially more common among deaf children than among hearing children, the question becomes one of whether deaf children exhibit the same kinds of disturbances as other children or whether characteristic types and patterns are observed. A number of writers have addressed this question, using the results of clinical observation, behavior rating scales of various sorts, and psychological tests. Although there are differences and variations in their findings, there appears to be general agreement on a few typically observed characteristics: immaturity, egocentricity, and impulsivity. These characteristics are not unique to deaf persons, of course, but they seem to be especially important in describing and understanding typical emotional/behavioral problems of deaf children.

Clinical Descriptions

Levine (1956) described an emotional immaturity characterized by "egocentricity, easy irritability, impulsiveness, and suggestibility," and Hess (1960) reported similar findings. Myklebust (1960) found deaf persons to be "immature in caring for others." Altshuler (1974) and Rainer *et al.* (1969) characterized deaf patients as demonstrating "egocentricity, a lack of empathy, dependency." Hurwitz (1967), from the perspective of clinical social work in a rehabilitation setting, described three general "types." The first exhibits "pervasive passivity, which becomes generalized to every sphere of activity." His second type shows "deficiency in capacity for relationships" and "extreme rigidity of behavior." The third type manifests a "lack of apprehension, worry, and concern with [themselves] and . . . an obliviousness in regard to [their] true circumstances." They are "an immature group of young people who are highly self-centered . . . possess the aggression to seek out whatever they consider to be gratifying . . . , tend to make quite unrealistic demands on others, [and] tend to be exploitative of others and to abuse relationships." Lewis (1968) summarized by noting that deaf children often are described as immature in self-awareness, egocentric, lacking in self-confidence and initiative, and having a tendency to be rigid rather than flexible.

Behavioral Studies

At least four studies (Streng and Kirk, 1938; Avery, 1948; Burchard and Myklebust, 1942; Schlesinger and Meadow, 1972) have employed the Vineland Social Maturity Scale (Doll, 1965). All found that deaf children scored lower than hearing children of comparable ages on scales measuring a variety of self-help skills.

A series of studies employed behavioral check lists more directly aimed at describing the actual behavior of deaf children at home or at school. Most of the prevalence studies reported earlier incorporated some form of behavior-rating scale or checklist as part of their procedure. Reivich and Rothrock (1972) analyzed a set of behavior ratings completed by teachers at a state residential school for the deaf to describe the deaf students. Three groupings of descriptions seemed to cover most "disturbed" behavior. These were (1) hyperactive lack of control (behavior that was impulsive, unreflective, and uninhibited); (2) anxious inhibition; and (3) preoccupation (descriptors related to immaturity).

Goulder (1976), in a similar study, obtained descriptions of the classroom behavior of 150 deaf children in three state residential schools for the deaf. However, he used a behavior checklist that had been standardized on a population of 5000 hearing schoolchildren [School Behavior Check List (SBCL), Form A-2, ages 7–13; see Miller, 1973]. Four groups of deaf children were selected for the study: (1) those reported as having an emotional/behavioral (E/B) problem as their only educationally significant additional handicapping condition beyond the hearing loss; (2) those who had an E/B problem *plus* a further handicapping condition; (3) those who had some other handicapping condition(s) but *not* an E/B problem; and (4) those reported as having *neither* an E/B problem *nor* any handicapping condition beyond the hearing loss. Classroom teachers were asked to respond to the 96 true-false descriptors of the SBCL for a specific, named child, but neither the teachers nor the school administrators were informed of the reason for selecting particular children for the study.

The results indicated that children described in school records as emotionally or behaviorally disturbed had significantly higher scores than the non-E/B children on the scales for low-need achievement, aggressiveness, anxiety, and hostile isolation, as well as on a total score. Those children who had additional handicapping conditions had significantly higher scores on anxiety, academic disability, and hostile isolation than did children without additional handicaps. The effects of the presence of emotional disturbance and of other handicapping conditions were independent and additive, so that the second group, who had both reported emotional/behavioral problems and other handicapping conditions, clearly had the most pathological scores.

Also, it is interesting to note that the children reported as having *no* additional handicapping conditions beyond the hearing loss had a behavior pattern quite different from that of the typical hearing child. The main points of difference were a substantially higher rate of reported aggressive, uncontrolled behavior, a higher degree of academic disability, and substantially lower levels of achievement motivation.

Psychological Tests and Psychiatric Assessments

Levine (1956) used the Rorschach (projective inkblot method) with a group of deaf adolescent girls and described them as lacking in social and emotional maturity. More recently, she has utilized the Hand Test (Levine and Wagner, 1974) as a means of describing personality patterns in deaf people.

Williams (1970) assigned psychiatric diagnoses to 51 children who were enrolled in, or applying to, a school for emotionally disturbed deaf children in England. He pointed out that those children who were referred for admission were likely to be those "whose maladjustment is disturbing to their environment."

Chess *et al.* (1971) conducted psychiatric assessments of 243 rubella children at the New York University Medical Center. Of the 47 deaf subjects, 16 (34 percent) were judged to have psychiatric disorders. They indicated that children with multiple physical handicaps were more likely to receive a psychiatric diagnosis as well.

THE GENESIS OF EMOTIONAL/BEHAVIORAL PROBLEMS IN DEAF CHILDREN AND RELATED QUESTIONS

The causes or origins of emotional, behavioral, and mental disorders have been sought in the realms of physiology and biochemistry, the individual psyche, and the family and other social structures. It is a highly complex question, in which causes and consequences are difficult to determine. They may, in fact, be circular and literally inseparable in the individual reality. The truth probably is that each situation involves a tangled web of factors that serve as both causes and consequences and that the interactions among factors may be as significant as the individual factors themselves in leading to a given human response. At least a few basic factors are clearly part of the network, albeit not the whole truth.

Parental Reactions to Deafness

One causal area is the set of parental reactions to the diagnosis of their child's deafness and consequent parental attitudes and actions. These reactions run the gamut from shock, surprise, and disbelief to guilt, despair, and rejection, often within the same person or parental couple. The consequent inadequacy, misinformation, hostility, smothering, overprotection, and other behavior patterns can play a major role in engendering or maintaining inappropriate, unproductive thoughts, feelings, and behavior in the deaf child. Some parents collapse in the face of the problems and accept (and thereby ensure) the "fact" that the deaf child will always be a seriously deficient member of society. Others refuse to face or to accept the fact of the deafness and force the deaf child into medical, educational, and therapeutic settings that acknowledge no difference. They attempt to mold the child as a hearing person by hook or by crook. While some are content to relinquish control of the child to the "experts" and remove themselves emotionally and physically from the scene, others reverse the process and so dominate and direct the deaf child that independent self-confidence and self-control never develop (see Hurwitz, 1967). In any case, the parental reactions to the child's deafness, and the subsequent actions or inactions, constitute one important factor in the development of emotional disorders in deaf children.

Communication Between Parent and Child

A second critical factor is the extent and effectiveness of communication between parents and the deaf child. It must be reiterated that deafness is first of all a handicap of communication. Much of what makes us human is transmitted and shared through the medium of language: feelings, understandings, appreciations, hopes, fears, anticipations, goals, values, and more. The deaf child will acquire and share in these human emotions and transactions to the degree that effective communication—both receptive and expressive—is available.

There has been and continues to be enormous controversy over the appropriate method of communication to be used in the education of deaf children. Regardless of the merits of one system or method over another for schooling in later years, the essential need for basic parent–child interaction in the critical early years of life demands a communication system that is clear, unambiguous, and effective. With a functioning system, much of the handicap of deafness can be overcome. Without it, the deaf child cannot develop normally in all these critical social, psychological, emotional, and related areas.

Lesser and Easser (1972) believe that the marked impulsivity of many deaf children results from their linguistic inability to express needs and feelings. They suggest that children with hearing have the capacity to name an emotion and that "once an affect can be named, it can come under the sway of ego control."

The social skills that enable children to get along with others are developed through language. Heren and Colin (1972) studied deaf children engaged in two tasks: one performed in a competitive setting and one requiring cooperation. They concluded that the lag in the deaf children's ability to accomplish a cooperative assignment was related to their linguistic deprivation.

Often, parents of deaf children do not have the command of an effective communication channel that is necessary for explaining complicated events. The deaf child frequently experiences drastic changes in his environment with no explanation of the meaning, the reason, the probable duration, or the possible resolution of his shifting world. These events might include the disappearance of a parent or grandparent, a move from one house to another or from one city to another, or a trip to the hospital where unknown people do frightening and painful things for unknown reasons.

Parent–child communication problems, then, are a major factor in the genesis of many emotional problems—either directly through the frustrations and angers of not being able to understand and be understood or indirectly through the eventual results of failure to be aware of and thus to acquire parental or societal norms of thought and behavior.

The Influence of Other Characteristics of the Child

A number of other characteristics of the deaf child have been shown to have a relationship to the likelihood of having an emotional/behavioral problem. Jensema and Trybus (1975) examined the relationship of reported E/B problems to a variety of characteristics. First, rates of E/B problems were significantly higher for males (9.8 percent) than for females (5.6 percent). Emotional/behavioral problems were reported at about the same rates for white and for black students, but lower rates were reported for other racial/ethnic groups. Students with hearing losses of 40 dB or less in the better ear had somewhat lower rates, but beyond this point, the degree of hearing loss had little effect.

There were significant variations according to the cause of the hearing loss, with the lowest rates of emotional/behavioral disturbance being associated with mumps, measles (contracted by the child), and hereditary deafness. The highest rates of emotional/behavioral problems were associated with hearing loss due to maternal rubella, trauma at birth, prematurity, pregnancy complications, and high fevers during childhood. Other data reported by Stokoe and Battison (1975), based on the same data sources, indicated that the rate of reported emotional problems was substantially lower among deaf children who had deaf parents (5.0 percent) than among those with hearing parents (9.2 percent).

Some of the most striking data reported by Jensema and Trybus relate to the association of emotional/behavioral problems with other handicapping conditions of deaf children. First, the rate of E/B problems was much higher among deaf children who had one or more additional handicapping conditions (15.7 percent) than among those who had no reported additional handicaps (5.3 percent). There were substantial variations in rates of reported E/B problems according to the specific additional handicapping condition. For example, among deaf children with cerebral palsy or other orthopedic handicaps. the rates of reported E/B problems were 7.8 percent and 8.8 percent. respectively. Much higher rates of emotional/behavioral problems were reported for children with reported brain damage (26.0 percent), perceptual-motor disorders (25.7 percent), and epilepsy (19.3 percent).

Regardless of one's theoretical point of view on the roles of physical and physiological factors in emotional, behavioral, and mental disturbances, these data, as well as those of others (*e.g.*, Vernon, 1969; Mindel and Vernon, 1971), make it indisputable that emotional/behavioral problems are highly associated with (whether or not caused by) a group of variously labeled conditions having to do with damage, disorder, or atypical development of the brain.

Also, it appears clear from these data that additional disabilities or handicaps, whether or not brain-related, are associated with higher rates of emotional/behavioral problems. This is not at all surprising when one considers that such additional disabilities, whatever else they may do, increase the difficulty the child experiences in learning about and coping with various aspects of life. with consequent greater opportunities for frustration, failure, and anger. It is also very likely that the presence of additional disabilities increases the level of negative attitudes and rejecting behaviors the child will encounter from society at large. Since one-fourth to one-third of all hearing-impaired children have one or more additional handicapping conditions (see Gentile and McCarthy, 1973), this is an important consideration in dealing with this group of children.

RESOURCES FOR REFERRAL AND TREATMENT

From all that has been said, it is clear that the professional practitioners working with hearing-impaired children can expect to encounter emotional or behavioral disturbances in at least 1 or 2 out of every 10 cases—and more often than that if the hearing-impaired children have handicapping conditions in addition to the hearing loss.

What resources are available for referral and treatment? Unfortunately, they are limited at present. Development of appropriate services for children with multiple disabilities and difficulties has been slow, with the result that service centers with trained and experienced personnel are few and far between. Recent federal legislation emphasizing the provision of appropriate services for severely and multiply disabled children can perhaps be expected to improve the situation in 5 to 10 years, but the immediate picture is one of limited service availability.

Certainly, there are well-trained and competent psychologists, educational specialists, psychiatrists, and other mental health workers in service centers in all the states. Most of them, however, have no knowledge, training, or experience in working with deaf children or adults, and it is the universal agreement of professionals experienced in such work with deaf persons that knowledge, training, and experience specific to deafness are essential to the provision of adequate mental health services. A statement made by Aurell (1934) more than 40 years ago remains no less true today:

> The ordinary students of psychology are not fully qualified to deal with the psychology of the deaf. . . . They simply do not get hold of the subject of their examination. Their lack of familiarity with the deaf is too obvious to inspire . . . confidence.

A more recent statement echoes the same concern (Vernon, 1967):

> Psychologists who rarely see deaf clients generally feel lost when called upon to provide counseling or testing services for them. This reaction is understandable. It reflects an honest realistic sensitivity to the situation and to the complexity of deafness. Without a knowledge of the psychological, educational, communicational and vocational ramifications of profound hearing loss and an understanding of the techniques to cope with these, professionals . . . are often unable to do full justice to deaf clients.

A discussion of some of the practical issues in this field, and of the state of currently available programs of treatment, can be found in a volume edited by Trybus (1977). This source also includes a listing of the 15 hospital- and clinic-based mental health programs for deaf people and the 19 school-based treatment programs for emotionally disturbed deaf children known to be in operation at the time of that publication. These 34 programs were serving 700-to-800 clients. Although conservative estimates indicate that this covers about 15 percent of the need, it is more likely that only about two percent of deaf persons needing mental health services are able to obtain them.

These 34 programs, and the professional workers employed in them, constitute the primary resource available for evaluation and treatment services for emotionally or behaviorally disturbed deaf children. Secondary resources would be those professional persons in counseling, psychology, psychiatry, and related fields who are employed in special education or rehabilitation service programs for hearing impaired people. A review of published materials on this topic (*e.g.*, Vernon, 1967, 1969, 1976; Levine, 1974) will strengthen the conclusion that only rarely can mental health professionals provide appropriate, effective services for deaf children or adults without specialized training and experience.

SUMMARY

This chapter has reviewed the available data on the prevalence of emotional and/or behavioral problems in deaf children and shown that all agree that the prevalence of such disorders is at least three-to-six times as high among deaf children as among hearing children. Professional workers in the speech and hearing fields, thus, are well advised to acquaint themselves with such problems, since they are almost certain to encounter them in their practice. The nature of these disorders has been reviewed and consideration given to major factors that "cause" or are closely associated with such emotional/behavioral problems. These major factors include the parental and family reactions to the fact of deafness and to the deaf child, with the consequent sets of actions or inactions; the adequacy of the parent-child communication system for the task of enculturation or social and psychological growth; and the "condition of the organism," especially with respect to other disabilities that are frequently associated with emotional/behavioral problems. The discussion was then concluded with some brief considerations of the availability of referral and treatment resources for emotionally disturbed deaf children. Finally, it was emphasized that training and experience specifically related to deafness are necessary for mental health professionals who wish to provide expert assessment, treatment, and consultation services to these children.

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SOCIAL AND EMOTIONAL ADJUSTMENT OF DEAF CHILDREN: DATA FROM TEACHER RATINGS

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The social and emotional adjustment of deaf children is a topic of growing concern to educators and to mental health practitioners. A number of research studies have documented various dimensions of this concern. They include studies of deaf children's abilities to interpret emotions reflected in facial expressions (Odom, Blanton & Laukhuf, 1973); the effect of diminished communicative skill on social interactions (Heider & Heider, 1940; Heider, 1948; Van Lieshout, 1973; Vandell & George, 1981); accurate attributions of feelings (Kusché, Garfield & Greenberg, 1980); and role-taking abilities (Kusché & Greenberg, 1981). Dimensions of emotional or behavioral problems in deaf children have also been considered by numerous clinicians and researchers (Altshuler, 1974; Freeman, Malkin & Hastings, 1975; Meadow, 1981; Meadow & Trybus, 1979; Schlesinger & Meadow, 1972; Vernon, 1969). Data reported in this paper are based on large numbers of teachers' ratings of their deaf students' classroom behaviors, from an inventory developed for and normed on deaf children. Because the sample of hearing-impaired students included both normally developing deaf children and multihandicapped children, the results are of special interest.

Methodology

In 1978, ten schools and programs for deaf children in various parts of the United States were invited to participate in the development of an instrument designed for teachers to use in evaluating social and emotional skills/behaviors of their students. Data were collected on 2,365 hearing-impaired students, most of whom were between the ages of 7 and 21. An item analysis and a factor analysis were performed on the items in the research edition of the inventory. Three factors emerged from the 59 acceptable items and were labelled "social adjustment," "self-image," and "emotional adjustment." (See Meadow, Karchmer, Petersen & Rudner, 1980.) Data reported in this paper are based on mean scores for these scales for a portion of that norming population. Table 1 shows the composition of the norming population with various demographic characteristics compared to the total population of hearing impaired students participating in the 1977-78 annual survey.

It will be noted that the group on which this paper is based is similar to the larger population in distributions of sex, age, age at onset of deafness, race, handicaps in addition to deafness, and cause of deafness. The greatest disparity in the two populations is seen in the type of educational program in which the students are participating: three-quarters of the norming population attend residential schools compared to less than one-third of the Annual Survey group. Likewise, the norming students are more likely to be classified as profoundly deaf, compared to the total survey population: 12 percent of the norming population have hearing levels of 70 decibels or less (better ear average in the speech range), compared to 30 percent of the total survey population.

In the following tables, data are reported separately for each of the three scales (factors). Social adjustment refers to interactions of students with peers and adults. This scale contains 23 items, such as, "Performs cooperatively in group of peers. . ." and "Trustworthy, dependable, reliable." Self-image refers to the way students feel about themselves and about deafness. This scale also includes 23 items, such as, "Takes pride in physical appearance. . ." and "Tries to communicate with others (both deaf and hearing) by any means necessary. . ." Emotional adjustment refers to intrapersonal behaviors, and includes 13 items, most of which refer to problematic adjustment, for example: "Engages in behavior considered by most teachers and students to be bizarre or strange. . ." and "Has many fears. Overly and unrealistically concerned with danger, storms, injury, death." Ratings were completed by teachers and range from "1" (low) to "4" (high). Scale scores are reported as means for all items included in a particular scale.

Findings and Discussion

Sex and Age. Table 2 shows mean ratings on the three separate scales for girls and for boys. Girls were rated by their teachers as showing significantly better social adjustment and more positive self-image than were boys. However, there were no significant differences between girls and boys on ratings for emotional adjustment.

Table 3 shows mean scores on the three scales for each of five age groupings. The teachers' ratings show progressively higher (more positive scores on social adjustment and emotional adjustment) at each successively older age category, while mean scores for self-image decrease with age. (This relationship between age and self-image is not statistically significant.)

Educational Program Type. Table 4 shows mean scores on the three scales by educational program type and by age grouping. In Part A of Table 4, it will be seen that there are no significant differences on the social adjustment scores of students attending the three different types of programs. (The program labelled "public school" refers to students who are mainstreamed as well as those who attend day classes for deaf students located in a regular school for hearing pupils.) While older atudents in both residential and day schools score slightly higher on social adjustment compared to younger students, this gap is quite wide among students in public schools. The same pattern is seen in mean scores on emotional adjustment (Part C of Table 4). Here, indeed, the interaction between school placement and age reaches significance.

There are several possible explanations for this pattern, all possibly relating to the selection of students for the public school setting. It is likely that only those deaf students who are seen by their teachers as being socially and emotionally well-adjusted are nominated for full-time placement in a public school setting on an integrated basis. Conversely, those students who started school in day classes but who had or who developed social or emotional problems may be referred for residential school placement by the time they reach adolescence. Often, either teachers or parents feel that these students cannot be managed and they are then enrolled in a State residential school. The additional possibility exists, of course, that the settings themselves are influencing students' adjustment, or that teachers in different environments use differing criteria for evaluation of pupils. This last hypothesis, however, does not seem likely, because presumably it would be residential school teachers who would have the more narrow base (i.e., only a deaf student population) on which to base comparative judgments.

Part B of Table 4, which shows mean scores on the self-image scale for students at two age levels and three school placement types, contains no statistically significant findings. However, one trend is worth noting. This is the reversal of the age differences in scores for students in residential schools compared to students enrolled in day schools or in public schools. Some important issues regarding the relative influence of dormitory and home life in the social and emotional development of deaf students are raised by these data. Table 5 may be helpful in suggesting additional lines of thought about this relationship. That table shows mean scores on ratings for the three scales for older and younger residential school students who live in dormitories and for those who live at home with their families. Residential school students who live at home score consistently and significantly higher on all three scales than do their age mates who reside in dormitories. This is one of the most striking differences in sub-groups to be reported here. It echoes some other findings and fits with data analyzed previously by Karchmer and Petersen (1980) from the Annual Survey of Hearing Impaired Children and Youth. They analyzed characteristics of "commuter" and residential students at residential schools for the deaf. One analysis relevant to our discussion here shows that two specific handicapping conditions appeared more frequently in the resident group: mental retardation (6.3 percent versus 4 percent for the commuter group) and emotional/behavioral problems (8 percent versus 6.2 percent for the commuter group). Other differences between the two groups of residential school students included older mean age for residential students, more frequent use of hearing aids and higher ratings for intelligible speech for day students. Despite these differences, however, no differences were found in academic achievement test scores.

Another study can be cited as relevant, although the groups are somewhat different from those that have been reviewed. Schlesinger and Meadow (1972) reported results of comparisons among deaf students of deaf parents in a residential school; deaf students of hearing parents in a residential school; and deaf students of hearing parents in day schools (i.e., groups 1 and 2 lived at school; group 3 lived at home with parents). On indices of psycho-social adjustment and of self-image, group 1 scored highest, group 3 was next, and the residential deaf students of hearing parents received the lowest scores or ratings of all three.

Hearing Level. Table 6 shows the relationship of hearing level to mean scores on the three SEAI sub-scales. Hearing level is divided into three categories: children with unaided losses in the better ear of 70 decibels or less (severe losses); those with unaided losses in the better ear of 71 to 90 decibels (moderate losses); and those with unaided losses in the better ear of 91 decibels or more (profound losses).

There is a significant main effect for age and hearing level on scores reflecting social adjustment (Table 6, Part A) and significant main effects and interaction between hearing level and age on scores reflecting emotional adjustment (Table 6, Part C). Essentially, both of these results stem from the large discrepancy between scores of older and younger students with severe losses. In the analysis of emotional adjustment scores especially, the younger children with the least severe hearing losses are seen to be rated lower than either younger or older students with more profound hearing losses. This fits with the statement or hypothesis often heard from those who are knowledgeable about deafness, who speculate that students who are hard-of-hearing are marginal in some sense, belonging neither to the deaf or to the hearing world. Of course, if this were the simple and direct explanation, one would expect that the effect would be maintained across age categories and that ratings for self-image would also be lower for this group of less severely impaired. Part B of Table 6 indicates that while the least severely impaired score somewhat lower on the self-image scale, these differences are not great enough to reach statistical significance.

Race. Table 7 shows scores for social adjustment, self-image and emotional adjustment for White, Black and Hispanic students in two age categories (7 to 12 and 13 to 21). Essentially, it can be said that race is not a significant factor influencing ratings on any of the three sub-scales. On the scale reflecting social adjustment, older students are rated higher than are younger students in all three racial/ethnic groups, with the discrepancy between older and younger students greatest among the Hispanic children. (The main effects and the effects of age are significant in the social adjustment scores.) Younger White children and younger Black children score higher than their older counterparts on self-image, but this age effect is reversed among the Hispanic children, with older students being rated as having more positive self-feelings compared to the younger Hispanic students. In the sub-scale reflecting emotional adjustment, only age has a significant influence, and this is true for the black and Hispanic students only; younger and older white children received precisely the same mean ratings for emotional adjustment.

Cause of Deafness. Table 8 shows mean scores for the three scales for students in five different etiology groups. (Students whose cause of deafness was unknown or not reported were eliminated from this analysis.) Since age differences were not significant when cause of deafness was held constant, Table 8 shows all students ages 7 through 21.

Part A of Table 8 shows that there are no significant differences in ratings of social adjustment that depend on etiology. However, there are significant differences among various etiology groups when ratings for self-image are compared (Part B, Table 9). Duncan's procedure for post hoc comparisons showed that students whose deafness is hereditary are evaluated as having significantly more positive ideas about themselves than those students whose deafness is attributed to maternal rubella. Part C of Table 9 shows that students whose deafness is attributed to heredity or to meningitis receive higher ratings from their teachers for emotional adjustment (that is, have fewer indications of emotional maladjustment) than do students whose deafness was caused by rubella or by a childhood disease other than meningitis. Other studies have shown deaf children of deaf parents (i.e., those with hereditary deafness) to have more positive feelings about themselves, compared to deaf children of hearing parents (Meadow, 1969; Schlesinger & Meadow, 1972) and to be rated more positively for social and emotional adjustment (Meadow, 1968; Vernon, 1969; Stokoe & Battison, 1981).

Rubella-deafened children have been of particular interest to educators because of the very large numbers that have proceeded through the special educational system as a result of the rubella epidemic of

1963 to 1965. While half of rubella-deafened students have no additional handicaps (Vernon & Hicks, 1980), those who do have additional involvements are quite likely to have additional handicaps and are also quite likely to exhibit behavioral problems, especially impulsivity (Chess & Fernandez, 1980).

Additional Handicapping Conditions. The Office of Demographic Studies collects data on additional handicapping conditions of deaf students for each Annual Survey. These conditions include: visual handicaps, brain damage, epilepsy, orthopedic handicaps (other than cerebral palsy), cerebral palsy, heart disorders, mental retardation, emotional/behavioral disorders, learning disorders, perceptual-motor handicaps and "other." For the analysis in Table 9, all students with any one of these additional handicapping conditions were grouped together and compared with those students who were reported as having no handicaps in addition to deafness. As would be expected, the presence of additional handicaps has a major effect on ratings teachers give children for all three areas of the inventory, and for both younger and older age groups.

As has been shown in the other analyses presented earlier, older students with and without additional handicaps are rated higher on social adjustment and on emotional adjustment. Among students with no additional handicaps, younger age students are perceived by teachers to have a more positive conception of themselves than do older students without handicaps; there is virtually no difference in self-image scores of younger and older students with multiple handicaps. As might be expected, those students identified as having mental retardation and emotional/behavioral disorders in the Annual Survey were rated lowest on all three scales of the SEAI. These data are shown in Table 10. Students reported as having perceptual-motor disorders had particularly low scores on the social adjustment and self-image scales; students with cerebral palsy had particularly low scores on the scale reflecting emotional adjustment.

Summary

Data have been reported for approximately 1800 students receiving special educational services for deaf and hearing-impaired students, based on their teachers' ratings of their social and emotional adjustment. These ratings are summaries of teacher observations reported as part of the norming process for the Meadow/Kendall Social-Emotional Assessment Inventory which were then matched against demographic data reported separately to the Office of Demographic Studies at Gallaudet College for the 1977-78 Annual Survey of Deaf and Hearing-Impaired Children. Findings can be summarized as follows:

1. Girls were rated by teachers as showing better social adjustment and more positive self-images than boys. (No significant differences between girls and boys were found on the scale of emotional adjustment.)
2. Older students were rated as having more positive social and emotional adjustments, compared to younger students. The relationship between age and self-image was not significant.
3. No statistically significant differences were found among students attending residential, day, or public school programs on any of the three scales. However, the gap between older and younger students in the day programs was quite wide for scales reflecting social adjustment and emotional adjustment, with older students getting more positive scores.
4. When residential school students were analyzed separately, it was seen that those who lived at home scored consistently and significantly higher on all three scales compared to age mates who live in dormitories.

5. Degree of hearing loss was not a significant variable in differentiating among the students' inventory scores. However, the emotional adjustment of younger students with less profound hearing losses appears to be particularly problematic.
6. Race alone did not differentiate students in terms of their inventory scores, when they were divided into groups of "White," "Black" and "Hispanic." However, younger Hispanic students were rated as having lower scores on the self-image scale than were older hispanic students. This was a reversal of the age relationship among the black and the white students.
7. When students were divided in terms of the etiology of their hearing losses, no differences in their scores for social adjustment were found. However, students with hereditary deafness and those deafened by meningitis were scored significantly higher on the emotional adjustment scale than those deafened because of maternal rubella or a childhood disease other than meningitis.
8. The fact that no major surprises emerge from these data support the notion that the social-emotional inventory may be a useful screening device for assessing the adjustment of deaf students, in addition to providing a tool for future research in this area.

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Table 1

Characteristics of Meadow Norm Population and Annual Survey Population, 1977-78, in Percentages

	Meadow Norm Population (N = 1,873)	Annual Survey Population (N = 54,080)
1. Sex		
Boys	55.5%	53.9%
Girls	44.3	45.7
N.A.	.2	.4
2. Age		
7 to 9 years old	14.5	16.5
10 to 12	21.6	24.6
13 to 15	32.3	30.9
16 to 18	22.5	18.6
19 to 21	9.0	6.5
3. Type of Educational Program		
Residential School	77.9	31.8
Day School	15.2	14.9
Day Class	6.9	50.3
4. Living Arrangements (Residential Schools)		
Dormitory	85.7	74.7
Home	14.3	25.3
5. Hearing Level		
70 dB or less	11.7	29.9
71 - 90 dB	27.5	23.4
91 dB or more	59.7	41.5
N.A.	1.1	5.2
6. Age at Onset of Deafness		
Birth	75.0	77.3
0 - 2 years	20.6	17.2
3 years or older	4.4	5.5
(N.A.)	(17.3)	(25.6)
7. Race		
White	61.5	66.9
Black	22.5	16.4
Hispanic	12.0	8.5
Other or mixed	.9	2.2
Unknown or not reported	3.2	6.0
8. Handicaps in Addition to Deafness		
None reported	78.6	72.0
One or more	21.4	28.0
9. Cause of Deafness		
Maternal rubella	21.8	17.1
Complications during pregnancy or at birth	8.7	10.7
Heredity	10.2	8.8
Meningitis	7.8	6.2
Other childhood disease	8.2	9.1
Unknown or not reported	43.2	47.8

Table 2

SEAI Scale Scores by Sex (Mean Ratings)

	Social Adjustment	Self Image	Emotional Adjustment
Boys	2.89 (1040)	3.01 (892)	3.27 (1031)
Girls	3.07 (829)	3.08 (710)	3.29 (812)
F	55.31***	8.56**	.98

***p ≤ .001 **p ≤ .01

Table 3

SEAI Scale Scores by Age (Mean Ratings)

	Social Adjustment	Self Image	Emotional Adjustment
7 - 9 years	2.88 (272)	3.08 (244)	3.19 (275)
10 - 12 years	2.96 (405)	3.07 (362)	3.29 (403)
13 - 15 years	2.94 (605)	3.02 (539)	3.27 (597)
16 - 18 years	3.04 (422)	3.03 (342)	3.32 (405)
19 - 21 years	3.10 (169)	3.02 (119)	3.36 (167)
F	7.67***	1.10	4.69***

***p ≤ .001

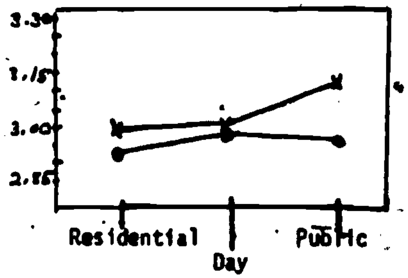
Table 4

SEAI Scores by Educational Program Type and Age: A. Social Adjustment; B. Self-Image; C. Emotional Adjustment

A. Social Adjustment

	$\bar{x}$	(N)
Ages 7 - 12		
Residential School	2.91	(425)
Day School	2.96	(139)
Public School	2.95	(113)
Ages 13 - 21		
Residential School	2.99	(1032)
Day School	2.98	(115)
Public School	3.11	(49)

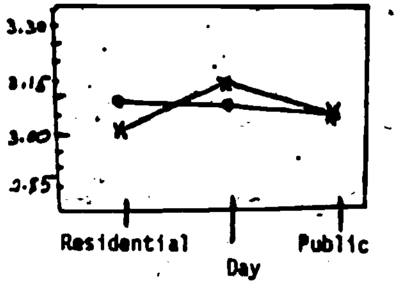
main effects	F = 3.62**
age	F = 10.36***
program type	F = 1.13
interaction	F = .88



B. Self-Image

	$\bar{x}$	(N)
Ages 7 - 12		
Residential School	3.08	(400)
Day School	3.07	(134)
Public School	3.05	(72)
Ages 13 - 21		
Residential School	3.01	(860)
Day School	3.13	(102)
Public School	3.05	(38)

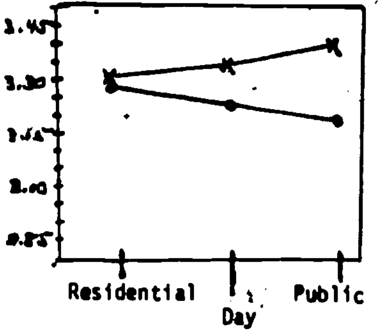
main effects	F = 2.37+
age	F = 3.00+
program type	F = 1.41
interaction	F = 1.96



C. Emotional Adjustment

	$\bar{x}$	(N)
Ages 7 - 12		
Residential School	3.28	(418)
Day School	3.22	(139)
Public School	3.18	(121)
Ages 13 - 21		
Residential School	3.29	(1007)
Day School	3.33	(111)
Public School	3.39	(51)

main effects	F = 1.96
age	F = 4.08*
program type	F = .27
interaction	F = 3.62*



+p ≤ .10 **p ≤ .01
*p ≤ .05 ***p ≤ .001

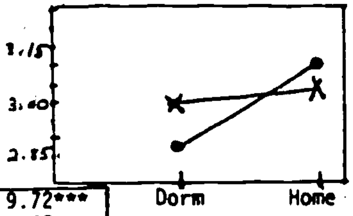
● = ages 7 - 12
X = ages 13 - 21

Table 5

SEAI Scores by Residential School Student Type and Age: A. Social Adjustment; B. Self-Image; C. Emotional Adjustment

A. Social Adjustment

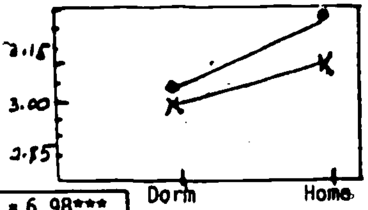
	$\bar{X}$	(N)
Ages 7 - 12		
Residential Student	2.87	(355)
Day Student	3.10	(71)
Ages 13 - 21		
Residential student	2.99	(888)
Day Student	3.06	(136)



main effects F = 9.72***
age F = 9.62**
student type F = 10.68***
interaction F = 3.29+

B. Self-Image

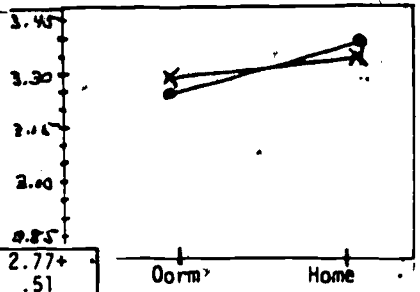
	$\bar{X}$	(N)
Ages 7 - 12		
Residential Student	3.04	(333)
Day Student	3.23	(69)
Ages 13 - 21		
Residential student	3.00	(742)
Day Student	3.07	(110)



main effects F = 6.98***
age F = 4.44*
student type F = 8.76**
interaction F = 2.54

C. Emotional Adjustment

	$\bar{X}$	(N)
Ages 7 - 12		
Residential Student	3.25	(348)
Day Student	3.40	(71)
Ages 13 - 21		
Residential student	3.29	(866)
Day Student	3.33	(133)



main effects F = 2.77+
age F = .51
student type F = 5.16*
interaction F = 1.97

+$p < .10$ *$p \leq .05$ **$p \leq .01$ ***$p \leq .001$

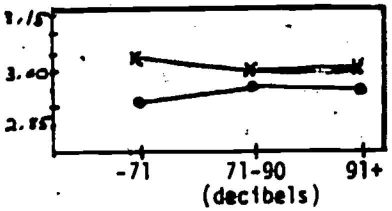
● = ages 7 - 12
x = ages 13 - 21

Table 6

SEAI Scores by Hearing Level and Age: A. Social Adjustment; B. Self-Image; C. Emotional Adjustment

A. Social Adjustment

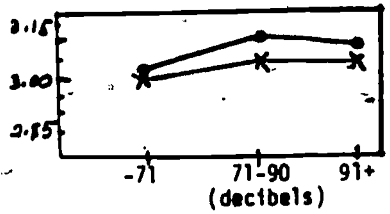
	$\bar{X}$	(N)
Ages 7 - 12		
70 dB or less	2.91	(107)
71 - 90 dB	2.93	(159)
91 dB or more	2.93	(398)
Ages 13 - 21		
70 dB or less	3.04	(112)
71 - 90 dB	2.98	(357)
91 dB or more	3.00	(720)



main effects F = 3.01*
age F = 8.65***
hearing level F = .32
interaction F = .46

B. Self-Image

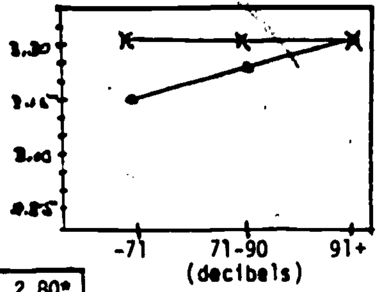
	$\bar{X}$	(N)
Ages 7 - 12		
70 dB or less	3.02	(68)
71 - 90 dB	3.10	(147)
91 dB or more	3.08	(380)
Ages 13 - 21		
70 dB or less	3.01	(88)
71 - 90 dB	3.03	(302)
91 dB or more	3.03	(604)



main effects F = 2.09
age F = 5.43*
hearing level F = .53
interaction F = .24

C. Emotional Adjustment

	$\bar{X}$	(N)
Ages 7 - 12		
70 dB or less	3.15	(113)
71 - 90 dB	3.23	(157)
91 dB or more	3.30	(399)
Ages 13 - 21		
70 dB or less	3.31	(112)
71 - 90 dB	3.30	(353)
91 dB or more	3.30	(697)

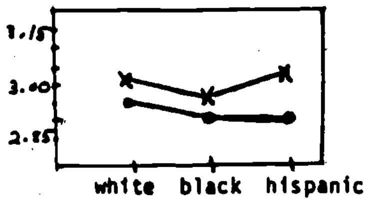


main effects F = 2.80*
age F = 3.80*
hearing level F = 1.99
interaction F = 3.01*

Table 7
SEAI cores by Race/Ethnicity and Age:
A. Social Adjustment; B. Self-Image; C. Emotional Adjustment

A. Social Adjustment

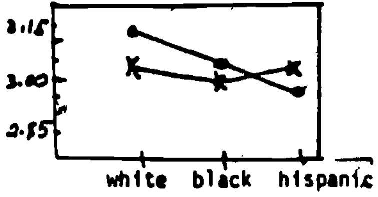
Ages 7 - 12	$\bar{X}$	(*N*)
White	2.94	(413)
Black	2.89	(152)
Hispanic	2.89	(95)
Ages 13 - 21		
White	3.01	(738)
Black	2.96	(269)
Hispanic	3.01	(129)



main effects F = 2.75*
age F = 7.60**
race F = 1.14
interaction F = .53

B. Self-Image

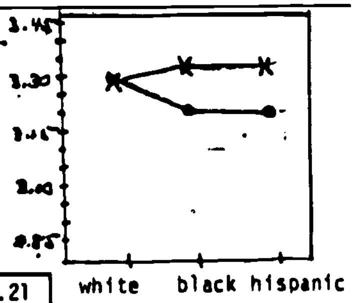
Ages 7 - 12	$\bar{X}$	(*N*)
White	3.12	(375)
Black	3.04	(139)
Hispanic	2.95	(78)
Ages 13 - 21		
White	3.03	(616)
Black	3.00	(225)
Hispanic	3.03	(115)



main effects F = 2.56*
age F = 5.26*
race F = 1.74
interaction F = 1.85

C. Emotional Adjustment

Ages 7 - 12	$\bar{X}$	(*N*)
White	3.28	(413)
Black	3.21	(149)
Hispanic	3.20	(94)
Ages 13 - 21		
White	3.28	(726)
Black	3.32	(260)
Hispanic	3.32	(125)



main effects F = 1.21
age F = 4.29*
race F = .17
interaction F = 2.35

*$p \leq .05$
**$p \leq .01$

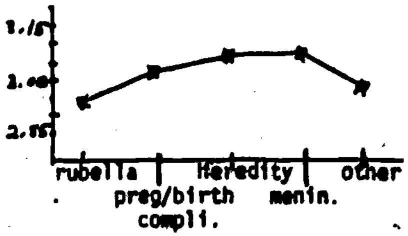
● = ages 7 - 12
x = ages 13 - 21

Table 8
SEAI Scores by Cause of Deafness:
A. Social Adjustment; B. Self-Image; C. Emotional Adjustment

A. Social Adjustment

Cause of Deafness	$\bar{X}$	(N)
1) Maternal Rubella	2.94	(409)
2) Pregnancy or birth complications[1]	3.01	(163)
3) Heredity	3.03	(191)
4) Meningitis	3.03	(146)
5) Other childhood disease[2]	2.93	(154)

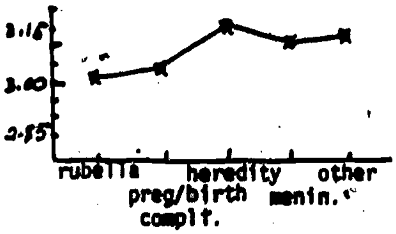
F = 1.83



B. Self-Image

Cause of Deafness	$\bar{X}$	(N)
1) Maternal Rubella	3.01	(350)
2) Pregnancy or birth complications[1]	3.03	(142)
3) Heredity	3.16	(163)
4) Meningitis	3.09	(134)
5) Other childhood disease[2]	3.11	(114)

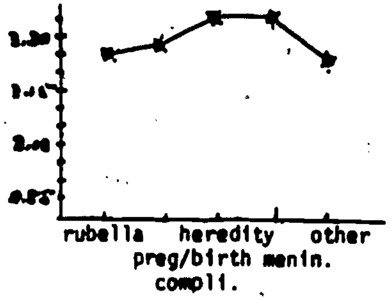
F = 3.23**
3 > 1*



C. Emotional Adjustment

Cause of Deafness	$\bar{X}$	(N)
1) Maternal Rubella	3.25	(398)
2) Pregnancy or birth complications[1]	3.27	(162)
3) Heredity	3.36	(190)
4) Meningitis	3.36	(140)
5) Other childhood disease[2]	3.23	(152)

F = 3.58**
3,4 > 1,5*



*$p \leq .05$ (Duncan's post hoc comparison) **$p \leq .01$

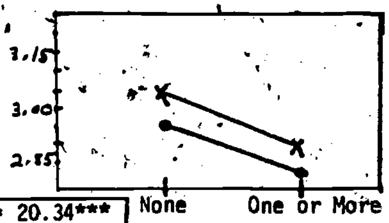
[1] Includes trauma at birth, complications of pregnancy, prematurity, and Rh incompatibility.

[2] Includes high fever, mumps, infection, measles, otitis media, and trauma after birth.

Table 9
SEAI Scores by Handicaps in Addition to Deafness and Age: A. Social Adjustment; B. Self-Image; C. Emotional Adjustment

A. Social Adjustment

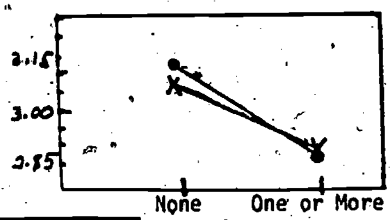
	$\bar{X}$	(N)
Ages 7 - 12		
No Add'l H/C	2.96	(525)
1 or more	2.80	(152)
Ages 13 - 21		
No Add'l H/C	3.03	(948)
1 or more	2.87	(248)



main effects F = 20.34***
age F = 8.07**
handicaps F = 31.94***
interaction F = .02

B. Self-Image

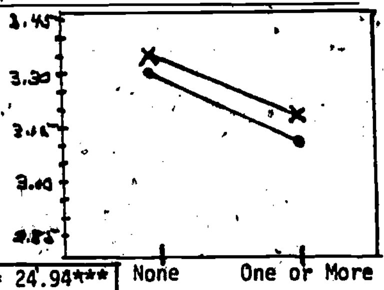
	$\bar{X}$	(N)
Ages 7 - 12		
No Add'l H/C	3.13	(477)
1 or more	2.86	(129)
Ages 13 - 21		
No Add'l H/C	3.07	(797)
1 or more	2.87	(203)



main effects F = 35.12***
age F = 4.87*
handicaps F = 65.78***
interaction F = 1.46

C. Emotional Adjustment

	$\bar{X}$	(N)
Ages 7 - 12		
No Add'l H/C	3.30	(526)
1 or more	3.10	(152)
Ages 13 - 21		
No Add'l H/C	3.33	(937)
1 or more	3.18	(232)



main effects F = 24.94***
age F = 4.54*
handicaps F = 44.43***
interaction F = .74

*$p \leq .05$ **$p \leq .01$ ***$p \leq .001$

● = ages 7 - 12
x = ages 13 - 21

Table 10
SEAI Scores by Type of Additional Handicap: A. Social Adjustment; B. Self-Image; C. Emotional Adjustment

	A. Social Adjustment		B. Self Image		C. Emotional Adjustment	
(No add'l handicaps)	(3.01)		(3.09)		(3.32)	
Type of Additional Handicap						
Visual	3.00	(79)	2.92	(70)*	3.15	(81)**
Brain Damage	2.69	(15)*	2.80	(9)	2.89	(14)***
Epilepsy	3.01	(6)	3.16	(4)	3.52	(5)
Orthopedic	2.88	(18)	2.69	(15)**	3.09	(17)
Cerebral Palsy	2.85	(42)	2.79	(30)**	3.02	(38)***
Heart Disorder	2.99	(23)	2.84	(19)*	3.18	(21)
Mental Retardation	2.69	(70)***	2.62	(58)***	3.14	(68)**
Emotional/Behavioral	2.53	(83)***	2.81	(73)***	3.07	(82)***
Learning Disorder	2.89	(30)	2.84	(21)*	3.12	(29)*
Perceptual-Motor	2.80	(106)***	2.89	(96)***	3.17	(102)**
Other	2.94	(39)	2.84	(31)**	3.14	(37)*

*$p \leq .05$ **$p \leq .01$ ***$p \leq .001$

Table summarized 11 separate one-way ANOVAs for each of the three scales: students with each specific handicap are compared with all students who are not identified for that handicapping condition.

THE SOCIO-EMOTIONAL IMPACT OF INFANT DEAFNESS: A COUNSELLING MODEL

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Introduction. The hearing impaired infant has socio-emotional needs which can profoundly affect the development of language and cognition. These children face the same challenges to develop socially and emotionally as the hearing infant. Development in these areas is, however, less assured because of the effects of the impairment upon both infant and parent. A major difficulty experienced by parents is in providing the positive caregiving needed by their impaired infants, while struggling with the grief they feel as a result of having an impaired child. This paper focuses on how professionals can facilitate the grief process in parents, and so ultimately increase the parents' personal growth and ability to cope effecively with the challenge of parenting a deaf child.

The Social-Emotional Development of the Child. The newborn infant is, in many ways, in a primitive state. He has yet to learn that the cries he hears are, in fact, his; that the fingers which find their way into his mouth are fundamentally different from the breast or bottle he receives. The discovery of where his body ends, and the rest of the world begins, is yet to be made. His own basic needs -- to sleep, to be fed, to be held, to be warm -- are probably experienced as undifferentiated discomfort, just as being cared for is felt as being filled and satiated in a simple, total fashion.

The newborn infant seemingly has no expectations from our world. Somehow, from these rudimentary sensations and experiences, the neonate

Reprinted with permission of Grune and Stratton from Moses, R.L. & M. Van Hecke-Wulatin, "The Socio-emotional Impact of Infant Deafness: A Counselling Model." In Gerber & Mencher. Early Management of Hearing Loss (1981).

forms a conception of the world and the people surrounding him. The first task is to develop a sense of trust in that world, a feeling of security that one is loved and will be taken care of (Erikson, 1963). The establishment of this sense of basic trust is the primary emotional task of infancy.

In addition, the infant will form its first affectionate, meaningful relationship with another human being. The infant will come to distinguish that person from others, to prefer, to feel safe with, and to use that person as a secure base from which to explore the world (Ainsworth, Bell and Stayton, 1974; Bowlby, 1969). The establishment of this close attachment to another person is the major social task of infancy. The processes of developing trust and developing attachment are entwined; both require similar kinds of interaction between the infant and the caregiver, and both are partially mediated by developing cognitive and perceptual abilities.

The Establishment of Trust. Erik Erikson (1963) describes the process that seems crucial if the infant is to develop a basic sense of trust. Erikson believes that the infant defines itself as lovable through sensitive caregiving which occurs predictably. He writes:

> Mothers create a sense of trust in their children by that kind of administration which in its quality combines sensitive care of the baby's individual needs and a firm sense of personal trustworthiness within the trusted framework of their culture's life style. This forms the basis in the child for a sense of identify which will later combine a sense of being oneself, and of becoming what other people trust one will become.

Erikson hints at the cognitive changes necessary for the infant to develop this sort of trust in the mother, and to experience her caregiving as predictable and dependable. The infant needs to develop "the recognition that there is an inner population of remembered and anticipated sensations and images which are firmly correlated with the outer population of familiar and predictable things and people" to allow the mother to become "an inner certainty as well as an outer predictability."

Schlesinger (1972; 1978) writes on the impact of infant deafness and the development of this sense of trust. Such trust requires a "mutual regulation" between infant and care-giver which is predictable, and largely positive. On the part of the infant, this means the ability to link one's own behaviour to responses made by the caregiver. The infant needs to recognize that cries of pain lead to relief, cries of hunger to food intake, clinging to cuddling, and smiles to a reciprocal social response. Early infant deafness may make it more difficult for the infant to recognize this connection between self behaviour and that of the caregiver (Liben, 1978; Schlesinger, 1972). The hearing infant may perceive the warmth and nurturance of the mother earlier by hearing her voice and the sound of her approach. In contrast, the deaf infant may find it more difficult to see the relationship between expressions of distress and the caregiver's response. Moreover, deafness may lead the hearing impaired infant to organize perceptual input differently, making it more difficult to perceive and retain patterns of stimulus change (Liben 1978; Schelsinger, 1972).

In addition to those characteristics of the infant which might impair the development of trust, the mother's response to deafness in her child may impede her ability to provide the kind of positive mutual interaction necessary for trust. Mothers must resolve this crisis of parenthood to establish positive relationships with their children (Schlesinger, 1982). This entails a strong sense of self-esteem, yet the birth of an impaired child often has devastating effects upon parental self-esteem (Gordeuk, 1976; Meadow, 1975). Mothers resolve the crisis of pregnancy partly by anticipating positive interactions with the child after birth. The belief that the impairment will diminish such positive interactions generates grief and disappointment which may undermine the parents' ability to be emotionally available to that child. The parents of unimpaired children need cultural and familial support to cope with the demands of parenting. The demands of the deaf child are greater, and parents depend heavily upon professionals who are often perceived as not providing adequate support.

In sum, the infant's limitation and the caregiver's reactions to having a deaf child may impede the development of trust. These same factors may also disrupt the process of attachment.

The Attachment Process. Attachment may be defined as a "focused relationship of one person to another that includes strong affection and a mutual regulation of one another" (Yussen and Santrock, 1978). Attachment requires, first of all, that the infant recognize that the mother exists even when she is not present, and the ability to distinguish her from others. The concept that the mother is a permanent rather than transient part of the environment has been termed "person permanence", and is akin to Piaget's (1952) notion of "object permanence," in which the infant gradually becomes aware that objects exist in the environment even when they are not physically present. According to Piaget, the development of object permanence requires the repeated experience of the loss and reappearance of objects. The deaf infant may experience difficulty in the development of person permanence because of a primary reliance on vision, and is thus bound to the immediate environment (Liben, 1978). In contrast, the hearing infant who recognizes the sound of the approaching mother before she appears may have an advantage in forming the concept that she exists, even when she is not in sight.

Similarly, the hearing impaired infant may have more difficulty perceiving the mother as a distinct individual. The infant learns to recognize and respond differently to the mother's voice, compared to other voices (Wolff, 1966). This suggests that the hearing infant recognizes the mother as a separate individual based on a composite of cues: her physical appearance, voice, smell, etc. The deaf infant is, in effect, deprived of one of the cues available to the hearing infant, thus, possibly delaying the attachment process.

In addition to requiring that the infant be capable of distinguishing a caregiver from others, secure attachment also requires that the infant and caregiver experience their relationship as reciprocal. It seems important that the infant not only respond to the caregiver, but recognize that she responds to the infant's crying, vocalizing, smiling and eye contact (Bell, 1974; Lewis and Freedle, 1973; Lewis and Rosenblum, 1974; Lewis, Weinraub and Ban, 1973). Playful interaction with the infant has been found to be a powerful determinant of attachment. Infants attach to those adults who respond positively to their signals for attention, and who engage in reciprocal play with them. Much of this playful interaction involves early and frequent patterns of alternative vocalizations by the infant and the caregiver (Schaffer and Emerson, 1964).

Similarly, the mother needs to be aware that the infant responds positively to her interactions. Changes in the maturing infant seem to facilitate the attachment of the mother to the unimpaired infant, Playful social interactions tend to increase as the infant matures, partly because the infant's demands for physical care diminish in intensity allow more social responses from the caregiver. The new behaviours exhibited by the maturing infant probably elicits increased interaction. For example, by the third week of life, the unimpaired infant becomes attentive to the sound of the mother's voice and smiles in response to it. This, in turn, evokes a social interaction from the mother (Bell, 1974).

There are several implications for the deaf infant. Clearly, it is less able to perceive and respond to the auditory dimension of the infant-caregiver relationship. The infant's difficulty in recognizing the predictable pattern of response may also result in less awareness of the important reciprocal aspect of interactions with the caregiver. Moreover, the hearing impaired child may be less capable of eliciting playful interactions from the caregiver. Demands may not decline in intensity to the same extent or at the same pace as the unimpaired infant, and the child is certainly less capable of exhibiting novel behaviours in reponse to the caregiver's auditory messages. The parents of the hearing impaired infant may be so intent on using all verbal interactions as a training ground for language development that they destroy the potentially playful quality of such interactions (Schlesinger, 1972).

On her part, the impaired infant's mother or caregiver may be less able to engage in the reciprocity which in the cornerstone of attachment. Her own emotional reactions having an impaired child may make it difficult for her to respond as positively or playfully to the infant as she might otherwise. She may less frequently experience her interactions as having an effect on the child, interfering with her ability to experience the relationship as reciprocal.

The possibility that lack of infant reponsiveness may disturb the mother's attachment to her infant is suggested by observations of the attachment process in unimpaired infants. Mothers whose tempermental infants were difficult to comfort experienced a disturbed attachment to their infants (Robson and Moss, 1970). Mothers of hearing infants interpreted nonresponsiveness in their babies as intentional, and reacted negatively to the lack of responsiveness as though it had personal meaning (Brazelton, Koelowshi and Main, 1974).

Implicitly, mothers may experience their deaf infants as being nonresponsive, thereby disrupting maternal attachment. The distress of even very young infants can be soothed by the sound of a human voice (Hetherington and Parke, 1975). Similarly, human tonal patterns and "speechlike behaviour" are extremely effective in eliciting reactions from hearing infants (Eisenberg, 1970). Mothers of children who had "talked" to them less at one year of age were more rejecting and less responsive to their babies' signs of distress during the second year of life (Clarke-Stewart, 1973).

Thus, many of the deaf infant's characteristics which interfere with an attachment to a caregiver may also interfere with the caregiver's attachment to the infant. Mothers of deaf infants appear to experience great frustration and feelings of incompetence as a result of the infant's unreponsiveness (Schlesinger, 1978). Thus, deaf children may be "limited or atypical particpants in the social exchange with the parent" (Harris, 1978), leading to a disruption of attachment long before diagnosis occurs. In this regard, it is interesting to note that deaf children of deaf parents often seem to fare better than deaf children with hearing parents (Meadow, 1975), possibly because they are better able to establish the necessary mutuality.

In sum, the deaf child is challenged with the task of becoming "a part of life without hearing the sound-patterns of living" (Levine, 1970). It seems probable that this limitation on the part of the infant, and the repercussions it has on the caregiver, make the development of trust and attachment more difficult for both. These findings imply that the habilitation of the deaf infant needs to consider the infant-caregiver relationship and focus on parental reactions to infant deafness.

<u>Holistic Intervention and Parent Counselling</u>. Over the last ten or fifteen years, many habilitation and rehabilitation professions concerning themselves with children have become aware that one cannot treat a child's sense, function, or limbs in isolation (Friedlander, Sternart and Kirk, 1975). Indeed, the concepts of the holistic approach have been generally accepted as the only way to successfully habilitate or rehabilitate children. The concept of working with a child's ears, ignoring the rest of that child's functions or developmental struggles, almost seems absurd at this time. Professionals have come to recognize the interrelationship between locomotion, vision, hearing, cognition, and social-emotional development in such a fashion as to understand that children, not functions, develop and grow. Such a conceptualization has had two effects upon the fields: to create interdisciplinary diagnostic and habilitation settings, and to broaden the scope of the training of professionals working with hearing impaired children. Such thinking has been the impetus behind both research and clinical application of the early intervention concept with hearing impaired children. Earlier intervention increases the involvement between professionals and the parents of deaf children.

Unfortunately, not all settings have yet incorporated holistic concepts of how a child develops and what is needed for a child's total habilitation. Professionals have quickly discovered that the necessary cooperation, as well as the attainment of such broad knowledge, does not come easily. Specifically, one of the areas of repeated concern is related to parent counselling: that is, the interactions between parents and those professionals who are primarily trained to work with their children. Generally, a primary stumbling block for the professional is the emotional states that many parents manifest while trying to deal with the impact of having a deaf child. Such emotional states are often a manifestation of grieving (Buscaglia, 1975; Gordon, 1975; Kubler-Ross, 1969; Moses, 1977, 1979; Stewart, 1978; and Webster 1976).

Hearing Impairment, Parenting and Grief. In the course of anticipating the birth of a child, parents generate dreams, fantasies, and projections into the future of who or what that child is to be for them. Such dreams are often of a extremely personal nature and hold much promise for the parents' future. The experience of anticipating the birth of a child is a primitive one that stirs people deeply. Unfulfilled needs, yearnings into the future, wishes to have deficiencies corrected, and desires to have fantasies maintained are often attached to who or what that parent needs that yet-to-be-born child to be. Parents are generally deeply attached to these dreams.

Grief is that process whereby an individual can separate from someone or something significant that has been lost. Grieving stimulates a re-evaluation of one's social, emotional and philosophic environment. Such shifts often lead to positive values and attitudes. Grieving facilitates growth. Without the ability to grieve, a person cannot separate from a lost person or "object" and, thereby, in essence, "dies" with whatever or whomever is lost. These people lose a present and future orientation and focus only on the past; that is, only on the "good old days" before they sustained the loss. Grieving, therefore, is the catalyst of growth, for with all growth, there is loss, and continuous growth requires successful grieving.

Grieving is a primarily affective or emotional process. The affective states are not epigenetic: that is, they have no specific order; one is not a prerequisite for another, and indeed, some can be felt simultaneously. Grieving starts spontaneously and appears to require no learning. The effective states seem to be intrinsic, cross-cultural, and even evidenced in some animals (Lewis and Rosenblum, 1974).

Most parents find disability to be the great spoiler of their dreams and fantasies around who or what thair impaired child was to be for them. Most dreams require an unimpaired child. Therefore, the initial diagnosis oftentimes marks the point when a cherished and significant dream had been shatterad ~~for~~ tha parent. It is that dream that must be grieved. Unfortunately, the loss of the dream is such a personal and illusive loss that few people concerned with the parent of a deaf child understand the nature of the loss sustained. Indeed, the parent oftentimes does not understand that it is a dream that he has lost, and therefore, he is frequently confused by the grief process that follows.

Successful grieving seems dependent upon significant human interactions: that is, one cannot grieve alone. The support that the parent of an impaired child needs to successfully grieve ofttimes can come from the professional who is working with her child, as well as from her spouse, friends, religious group, community, and/or parent organizations. Unfortunately, many of the prevalent cultural injunctions evidenced in Western society are contrary to the spontaneous grieving process. The affective states associated with the process are often difficult to accept by both the grieving individual and by those offering support. Ironically, often the people that bereaved individuals need to facilitate grief, discourage it instead. Rather than accepting the denial, guilt, depression, anger and anxiety which are a natural part of the grieving process, those closest to the bereaved individual may view these affective states as psychopathological. They may respond with diagnostic labels, expressions of rejection, or behaviour connoting fear. Those wishing to offer support may fail to recognize that each of these affective states serves a specific function which allows the parent to separate from the shattered and cherished dream. The separation then permits the generation of new dreams which incorporate the hearing impairment, and then stimulates the emergence of the coping process. Understanding the value of the emotional states associated with grieving is crucial to offering parents the acceptance they need in order to grieve successfully.

(a) Denial

Denial is perhaps the first affective state seen in the process of grieving. Parents of deaf children deny in a number of different ways. They may reject the diagnosis itself, the permanence of the diagnosis, or the impact of the diagnosis. The parent who has difficulty accepting the diagnosis itself ofttimes argues with the professional diagnostician. This is the parent who refuses to accept what the impaired children need time to constructively incorporate what has occurred.

That the denial process is not a stagnant state which freezes parents into purposeless immobility, is evident when one compares two parents, one whose child was born unimpaired and one whose child was born deaf. The parent denying the deafness would differ emotionally from the parent of the unimpaired child. Denying parents feel distressed and agitated (to the point often of experiencing sleep difficulties). They are commonly guarded in their interactions with others. These behaviours are a sign that the denial process, far from being passive, is an active process in which much is occurring underneath the surface on both the preconscious and conscious levels. The parent is accumulating information and searching for inner strength, even while consciouly fending off the reality of what has occurred.

Parents of impaired children use denial to buy the time needed to find the inner (ego) strength and the external mechanisms to deal with what has occurred. External mechanisms might include acquiring information, skills and support from family, friends, organizations and professionals. When the denial process was assaulted, and the parent of an impaired child was somehow forced to understand the impact of what had occurred before having the inner strength and the outer mechanisms, that parent would collapse emotionally.

For early intervention to employ a holistic approach the child must be seen within the context of a family unit (which includes the parents). To exclude the parents in the child's habilitation is like ignoring the influence of the child's auditory functioning on his cognitive development. Professionals working in early intervention, therefore, must be skilled in recognizing and facilitating the grieving process in parents. In particular, they must find ways to not merely tolerate, but to accept parental denial while still offering, to the best of their abilities, those services needed directly by the child.

Parents who are denying are not suffering from a logical deficiency, nor are they usually unable to understand what is being presented to them. An early intervention clinician can rest assured that there are many people telling the parents that he is stupid, diagnostician offers, thereby creating an atmosphere that can either prompt the diagnostician to feel insecurity around the accuracy of the diagnosis, or to feel some anger toward the parent. In either case, an adversary relationship may be the end result. The more polite parent, of course, does not confront the professional with denial, but rather simply does not follow through on recommendations or cooperate with attempts to habilitate the child.

Other parents who are denying the impact of the handicap rather than the diagnosis per se, might seem like ideal parents. Such people, in essence, say that they do not understand all the to-do about having a deaf child because "what's the big deal?" They might state that they know that special education has come a long way, that cultural attitudes have shifted, and that, further, federal legislating has been enacted that offers support for parents of impaired children and insures equal rights for handicapped people. Professionals concerned with the field are quite aware that deafness is, indeed, a "big deal" and that these parents are likely denying its impact.

Perhaps the process of denial is the most frustrating one for professionals in the communication disorder field, because all evidence points to the efficacy of early intervention for child habilitaton. To the professional, denying parents might appear to be in a nonproductive, passive state, which serves no positive function and often interferes with parental cooperation in early intervention.

Denial is neither a random, purposeless state, nor a passive nonproductive one. Denial serves a distinct and important purpose. For individuals to function within an environment fraught with danger, each person must establish a mechanism that keeps him from believing that he is in any real jeopardy. We cannot live day to day with the fear of cancer, or death, or dismemberment, or with the fear of having an impaired child. Such fears would keep human beings from functioning spontaneously. Therefore, most people have within them a mechanism that makes them feel special and invulnerable to the actual dangers about them. As a consequence, when something ghastly occurs, and many parents of deaf children see having an impaired child as a ghastly event, they are wholly unprepared to deal with such an occurrence. Parents of destructive, inappropriate or shirking responsibility by denying. Instead, the parent needs someone whose attitude conveys an acceptance that embraces the validity of denial. Implied in the management or counselling of such parents is an avoidance of countless repetitions of the professional's opinion which leaves the parent feeling foolish, ignorant, illogical, or stupid. There are few people who are able to give denying parents what they most need: recognition that the individual is likely a loving parent who, for good reason, cannot currently engage actively in his own child's habilitation.

A case comes to mind of a parent who brought her 5-year-old child for an initial assessment to a multi-disciplinary audiology center. With the support of other professionals the audiologist determined that this child was profoundly deaf. Upon presenting this information to the mother, the audiologist met with strong resistance. The mother repeatedly claimed that the child could hear her name whispered behind her back. The audiologist decided to have the mother demonstrate this seemingly impossible feat. The clinic was in an old building with wood slatted floors. The mother placed her child on that floor and then stood behind her, and with one stamp of her foot, whispered "Mary". Responding most adequately to the vibration in the floor, the child crisply turned around to her mother with a smile. No explanation of how the floor vibrated to stimulate such a response convinced the mother at that moment that her judgment was incorrect. It indeed turned out to be a most frustrating experience for clinician and parent alike, until the battle was relinquished and the clinician could turn to the mother and say:

> "It must be most frustrating for you to hear me presenting something contrary to what you believe. The idea of Mary being deaf seems almost impossible for you to accept. Can you tell me a little bit about what it would mean to you if, somehow, my assessment were correct?"

Although the audiologist's manner of relating did not reverse the denial, it did precipitate a long-standing, positive parent/professional relationship. It is such a relationship that is as much a cornerstone of a child's habilitation as are the actual "hands on" early intervention techniques.

Since denial affords the parent the opportunity to find the inner strength and the external mechanisms to deal with having a deaf child, it ultimately ceases when the parent attains such strengths. At that point, the mechanism of denial will have served its purpose.

(b) Guilt

Guilt, as an affective state associated with grieving, is generally the most disconcerting of the grief states for both the parent and the professional confronting it. Parents of deaf children might manifest guilt in any one of three general ways. The first is evidenced through parents who have actual stories documenting that they indeed caused their child's handicap. Such stories often involve the taking of drugs during pregnancy, the hiding of known genetic disorders in the family, the contraction of an avoidable disease, or other such occurrences that the parents felt were in their control. This first manifestation of guilt is the most logical, and the least common. Because of its logical nature, it seems the least difficult to accept by the professional, although it still is disconcerting. The second way that parents of hearing impaired children might manifest guilt appears less logical. It is reflected through the parents' belief that the impaired child is just or fair punishment for some specific and awful action that they have committed in the past. There need not be any logical connection between the nature of the past "transgression" and the nature of the impairment. The third manifestation of guilt common in parents of deaf children is of a de facto philosophic nature. This is reflected in the parent who basically states, "good things happen to good people; and, therefore, bad things happen to bad people". Such a general belief leaves the parent feeling guilty simply because the impairment exists.

It is hard for many professionals to accept that so painful and debilitating an affective state can have any positive, growth facilitating elements. In the context of grief, guilt is the vehicle that allows parents to re-evaluate their existential beliefs. Seemingly each person holds within himself a personal belief system that acknowledges control over certain events, while allowing other occurrences to be comfortably attributed to the whims of chance. How and when one defines certain events as "his fault" while attributing other occurrences to fate, is an individual and internal process. The goal is to develop a system that allows one to be comfortable with classifying events as within one's own jurisdiction of control, or outside of it. It permits, in effect, avoidance of the absurdity of assuming full responsibility for all life events, and the equally absurd position of disclaiming any responsibility. The guilt which parents of deaf children experience precipitates their re-evaluating the parameters of their accountability.

The case of a young couple exemplifies the professional issue concerning guilt. Both spouses in this couple worked. When their first baby was conceived, the husband encouraged his wife to stop working. He argued that she was in strenuous work with children who often times become ill. He went on to say that women in his family never worked when pregnant. His wife argued that she felt fine and saw no reason to discontinue her work, especially since her work tenure and her pregnancy term coincided.

She continued to work and was unfortunate enough to be one of the mothers who contracted rubella during the epidemic. When telling her story, she would plaintively present the idea that she had caused her child's handicap. Her child, indeed, was born deaf and brain damaged as a result of maternal rubella.

If is most tempting for professionals to try to explain to such a mother that her exposure to rubella was unpredictable, that she could have as easily contracted rubella from her next door neighbor's child as from the children with whom she worked. But logic is as ineffectual with guilt as it is with denial. Professionals in early intervention need to be aware that guilt does not yield to argument, cajoling, coercing, or even irrefutable scientific evidence. This mother's logical system was as viable as that of the professional, but within a different context. She might well have countered that her husband had accurately predicted what would happen if she continued working.

For guilt to be effective in helping the individual sort out why she has an impaired child, she must be able to share those feelings with an empathic, significant other. The professional who fulfills such a role might do so by offering acceptance through an attitudinal framework exemplified by the following possible response: "If you truly believe that you caused your child's hearing impairment, no wonder you feel so badly. Tell me more about it." The prevalent temptation on the part of most professionals is to try to take away the guilt. Indeed, parents will have many other people attempting to argue with them and "fix" the unfixable feeling. It wil be the very exceptional person who is able to validate the legitimacy of the parent's feeling without seeming to confirm his judgment of fault. To offer such a relationship is to offer a unique opportunity that facilitates the growth.

Nothing will make guilt run its course more quickly than it needs to move. There are events, however, that can perpetrate this difficult phase. It is a significant other person that can make the difference. If the professional can accept guilt as part of a normal, necessary and facilitative process more substantial and ultimately constructive relationship with guilt as psychopathology, or who has a condescending view towards parents who maifest guilt, will impair the relationship between the parent and the professional. As guilt successfully offers the vehicle for the re-examination of parent's existential values, it will cease on its own.

Incidentally, the manner in which the parent manifests the guilt often reflects the nature of the particular handicap. Many parents of deaf children feel that their child's disability is a specific punishment in the area of communication (Mindel and Vernon, 1971). Again, it is the emphathic professional who can offer the most to a parent presenting such a feeling. There is nothing to be cured or fixed. There is only an affective state to be facilitated.

(c) Depression

Depression, interestingly in Western culture, is almost always seen as psychopathological. Although it is one of the affective states most commonly identified with grief, most professionals attitudinally relate to a depressed individual as being one who must be treated with special deference and care. Unfortunately, such attitudes are usually contradictory to what is needed by the parent who is depressed through grieving precipitated by the impact of having a deaf child.

For the purposes of understanding the processes of depression in grief, depression is defined as being anger turned inward: that is, anger toward oneself. This simple definition has general clinical acceptance, although the etiologies, dynamics, and characteristics of various depressions are obviously far more complex than such a definition might convey. Nonetheless, this definition is useful in understanding the dynamics of depression as a grief state. For what reason are parents of hearing impaired children angry with themselves, one might ask? The answer to a such question leads one into the area that depression serves: that is, the area of potency versus impotence or competency versus incompetence.

Parents can view their potency as existing somewhere between two extreme vantage points. One can feel that they were impotent to prevent whatever occurred to their child and feel anger toward themselves for their "useless impotent state"; or they can feel that they were always potent enough to have prevented what occurred, and, therefore, are self-enraged that they did not act before it was too late.

In the face of a negative and permanent occurrence, adults in this culture are forced to re-evaluate the nature of their potency and competence. Their personal definitions concerning self-value and productivity become threatened. Depression offers the vehicle that encourages this re-evaluation. Depressed people assume the vantage point that they are impotent, incompetent, incapabile, and of little value, given that they can have no impact on something so close to them -- something that they want so very much to change.

A woman who dramatically exemplified the dynamics of depression was one who had always been the mainstay and strength of her family. She had been through many struggles, and had emerged as the support of everyone around her. She was widowed fairly early in life, and left to raise her only son. At age eight, that son became seriously ill with a kidney disease that required the risky use of a potentially ototoxic drug. Unfortunately, he was deafened overnight. Months after this necessary and self-sufficient process of grieving that allows parents to separate from the dreams and fantasies that they have generated around their child, and the loss that they have sustained around the impairment. There is, indeed, value in "wallowing in the self pity", and "crying over spilled milk." Since what constitutes reality for each individual is reality as he perceives it, life truly is "as bad as he thinks it is."

As parents are permitted to experience depression with an environment of acceptance, they will likely re-evaluate how they define competency. Such re-definition permits self acceptance in spite of not being able to "fix their child". Again, it is the significant other that can offer the atmosphere facilitating this facet of grief.

(d) Anger

Anger (or rage) is an integral part of grieving. Each person has an internalized concept of justice that permits him to move within society and the laws of nature without undue anxiety or fear of being mistreated. Such a conception is flexible and changes with maturity. An unpredictable event, such as having an impaired child, threatens the feelings of security around such a belief system. Whenever one's sensibilities about order and fairness are disrupted, one feels frustrated. Frustration, agitation, aggravation, irritation, annoyance, etc., are all words that parents of impaired children find on their lips at one time or another along with anger and rage. Long ago, psychologists noted that frustration leads to aggressive feelings. Parents who are frustrated by the birth of an impaired child, feel anger towards the deaf child who has intruded upon their lives and disrupted it in many realms. It is expensive, embarrassing, time consuming, energy consuming, exposing, and shattering to have a hearing impaired child in your family. On a more psychologically primitive level, most parents feel that all this disruption and pain has emanated from the child.

Since anger toward their child is considered heinous by most parents, they often displace these angry feelings upon others; most commonly, spouses, the deaf child's siblings, and, of course, professionals. Such displacement of anger is most unfortunate since parents are ofttimes in need of support from the very people whom they may be alienating through their anger. As an alternative, parents may direct their anger and feelings of injustice toward God, science, or "the general order of things". They may also find solace in directing their anger into fertile areas concerned with methodological controversies (e.g., oral/aural versus total communication). This type of displacement can usually elicit empathic understanding more easily from the people around them. Yet, it too, prevents the parents from confronting the real root of their anger, which is the feelings towards the deaf child.

A note of caution here. Professionals are ordinary human beings and, therefore, liable to make errors. Indeed, there are some professionals in the habilitation fields whose own personal motives prompt them to often behave insensitively. Parental anger generated under such circumstances seems to have no basis in reality and/or the prolonged maintenance of a feeling of anger associated with a justified circumstance that prompts one to become suspicious of anger associated with grieving. Thus, not all anger represents displacement. It is parental anger that seems to have no basis in reality and/or the prolonged maintenance of a feeling of anger associated with a justified circumstance that prompts one to become suspicious of anger associated with grieving.

The function of anger within the grieving process is that it allows the parent to reassess and reconstruct the internal conception of justice which has been disrupted by the birth of a deaf infant. The parent needs to maintain an internalized sense of justice in the face of this traumatic occurrence. Anger, like the other affective states of grieving, serves a practice role in the growth of the parent. The development of an internal sense of justice changes with maturity. Consider, for example, what a teenager sees as being fair, compared to the more flexible and complex view of justice often held by a 40 year old. The parent of an impaired child who is able to incorporate the seemingly unfair circumstance of "having an impaired child without just cause," will have generated a new internal sense of justice which will allow him to cope competently with any future losses. Crisis and its concomitant disruption (in this case anger re: injustice), is the impetus for attitudinal changes that foster competency. The more reality-based one's inner sense of justice, the more competently one encounters life's unpredictable occurrences.

It is crucial for parents to recognize and deal with anger they feel towards their impaired child. Professionals can help by accepting and relating to that anger when it is presented to them. That is difficult. Parents who are manifesting feelings of injustice in a general fashion are usually more easily accepted by professionals than parents who express feeling of anger toward their children. Professionals have often chosen the habilitation fields because of their sensitivities and their humanitarian attitudes toward people with special problems. Many professionals become quite attached to the children they work with and, indeed, recognize the illogical nature of parents being angry at their deaf children for having disrupted their lives. Nonetheless, this anger appears to be both a common feeling, and one that facilitates the grief process. Professionals who offer parents the opportunity to talk openly about their angry feelings towards their children are providing a kind of support which the parent rarely encounters.

Unfortunately, professionals are typically affected profoundly by an angry parent, and may act in ways which do not aid the grieving process. The reaction of each professional often depends upon his own self-confidence. The most confident professional may become annoyed with the angry parent, sometimes countering with his own anger. In contrast, the less secure professional can become quite easily frightened by the angry parent. Such professionals are often thrown into an anxious questioning of their own competence since the parent appears so dissatisfied and, indeed, might be vociferously questioning the professional's capabilities. In either case, the professional is unable to provide the sort of response to parental anger which would facilitate the grief process.

A description of a particular parent can serve as a good example of the anger engendered through grieving. This particular father was a technician in the electronics field, who himself, suffered from a moderate handicap (not related to audition). He knew the suffering that it had caused both him and his parents. As fate might have it, he fathered two children who had hearing impairments that required numerous interventions from professions (surgeries, therapies, special education, and prostheses). The etiology of the impairment was genetic in nature. This father held as a primary value (along with his wife) having a large family. It was very clear to him that the financial pressures he was already suffering, because of the services required by his first two children, prohibited his considering more children. He knew the blunt financial reality -- if he had another hearing impaired child, he would be bankrupt -- a very disagreeable prospect for this proud, competent man. As he saw it, life had dealt him a triple-headed blow: by giving him a handicap, by giving him "bad" genes that caused him to have handicapped children, and therefore, by depriving him of having the family of which he had dreamed.

He had become irrascible, critical, demanding, and generally resistive toward "habilitation" professionals. The school personnel feared him, and medical professionals fought with him. The status quo of parent/professional communications that included this man were strained at very best. In a group experience (that he had reluctantly decided to attend) he began to actively criticize and attack the group facilitator (after having passively resisted any and all issues for the first half of the process). He detailed all the ways that he saw such a group to be useless, and further, all the ways that he saw the facilitator to be a person who could offer very little. He went on to say that he resented participating in an "obvious waste of time", and that he, for one, was going to file a complaint to the administration that was responsible for the professional conducting the group. When the group leader invited him to share more of his feelings by asking him if he felt cheated and, if so, how he generally dealt with feelings of being cheated, the conversation became animated and ultimately moved into the realm of disability, fathering children, and his life dilemma. That conversation, in turn, stimulated discussions about fairness and justice that moved other people to talk about their feelings of being cheated.

This father did not change radically through exploring and discussing his feelings, but he continued to come to the group and never filed a complaint. Ultimately, he came to successfully adopt two more children. In talking with the group facilitator years later, he shared (with humor) that his adoptions were his way of "beating the system". As he put it, "you can't keep a good man down". He also shared that he was no longer feeling anger indiscriminately, but that he had channeled it in such a fashion as to become moderately effective in influencing local legislators to back legislation that facilitated the handicapped and their families! It was obvious that this man had grown in such a manner as to have a remarkably different internal sense of justice. The anger he had felt effectively prompted change.

It is the rare professional who will be able to recognize that parental anger is part of grieving and warrants acceptance and facilitation. Yet if the professional can tolerate the displacement of anger and/or the parent talking negatively about the child, such an interaction would be facilitative. Parents who are able to talk with significant others about their anger are less likely to become "abusive" parents. Abuse, incidentally, can range from overprotection (denial of the existence of anger) to extrapunitiveness within a socially acceptable context (for instance, the parent who structures an almost inhumane environment to work on language development every waking hour of the child's life).

If allowed expression, if seen as acceptable, if indeed incorporated as part of the normal process of grieving, parents of deaf children will come to use the affective state of anger to restructure their internal sense of justice and thereby, will move to yet another affective realm.

(e) Anxiety

Generalized feelings of anxiety are evidenced by parents of impaired children who are grieving the loss of a dream. This anxiety is related to how one balances responsibilities for the welfare of another human being with the right to have an independent life of one's own. This balance requires most personal and internal adjustment. The event of having a deaf child disrupts this internal adjustment.

Parents often report their shock and dismay at being their child's own medical manager. The child seems so vulnerable; the professionals often send messages that reek of emergency; there are conflicting messages. There is so much to be learned, and so much seems to hinge on learning it properly. All this new pressure and responsibility is heaped upon the already existing pressures and responsibilities of daily existence.

A parent once aptly described this state of grieving as feeling like one is juggling an overwhelming number of precious glass balls. The feelings of reponsibility are overwhelming and the temptations to become a professional parent of a deaf child are very strong. This opposes the alternate temptation to run away and feel terrible guilt and pressure for not having acted in a fully constructive fashion. All of those pressures and pulls create a circumstance rife with anxiety. Of course, the attitudes of professionals and other parents of the hearing impaired can strongly influence the amount of pressure that a given parent feels and the amount of concrete responsibility one believes must actually be assumed. In truth, however, definitions of responsibility are an internal psychological process.

Parents who are experiencing anxiety as part of the grieving process are in need of significant others who will be accepting of such feelings. It is not helpful at all to give a parent an injunction requiring that he "calm down". This is a period when calming down is not only impossible, but maladaptive, for the anxiety itself facilitates a restructuring of one's attitudes concerning responsibility. It is, therefore, also a time when realistic expectations need to be clearly spelled out along with an understanding that parents have lives beyond their hearing impaired children, and further, that an unwillingness to do certain habilitative activities is acceptable and not indicative of destructive or non-caring parents. An overstressed, overwhelmed parent ends up doing nothing, while appearing intensely involved with doing everything. A parent who can build within his system a comfortable space to minister to himself and permission to skip or reject certain aspects of the habilitative process, will, in the long run, be a more effective child growth facilitator. Often a professional's overzealousness in saving the child will frustrate the parent's ability to comfortably come to resolve the anxiety phase of grieving.

(f) Grief Counselling

The grieving process as described, is an affective process that permits the parent of a deaf child to separate from the dreams and fantasies that the parent cherished for this child. The inability to successfully separate from such a dream is devastating to both parent and child. If the parent does not generate new dreams that the child can fulfill, each day the child will be experienced as a disappointment and failure in the eyes of the parent. This parental disappointment will ultimately be communicated to the child, leaving the child feeling as though he is indeed a disappointment and a source of pain to his parents. If, however, the parent is able to separate from the dream, there is the distinct possibility that the child will be accepted for whoever he or she actually is. Such acceptance is an important prerequisite of attachment. Such acceptance is an important prerequisite of facilitating emotional development and growth. It is within this context of attachment and emotional development that the concept of facilitating grief becomes an important tool in the intervention and habilitation of very young hearing impaired children.

It is the role of the significant other, a role that can be fulfilled by a professional, that can facilitate or frustruate the normal grieving process. Professionals who have negative opinions or difficulty with the affective states of denial, guilt, depression, anger, and anxiety are likely to become inhibitors of the grief process and, thereby, detriments to the ultimate habilitation of the child. The professional who is able to convey an attitude of acceptance towards such affective states will have a positive effect upon the parents' role in attachment and in creating an atmosphere for the internalization of a sense of security on the part of the child. Without this, children cannot go on to develop in the other areas (for example, language) that are seen as tantamount to the successful habilitation of a deaf child.

There is no point in a professional trying to become a "grief diagnostician", since the affective states previously described do not go in any order, nor are they mutually exclusive. That is to say, people feel what they're going to feel when they're going to feel it, and ofttimes have two or more feelings simultaneously. Moreover, an attitude of acceptance aimed at facilitating grief would be damaged by an attempt to diagnose a person's grief state, since diagnosing is by definition, a process of labelizing.

The grieving process is far from a one-time occurrence. Parents of deaf children repeat and rework the affective states associated with grieving, even as the child matures. Obviously, all parents seem to experience it at the point of initial diagnosis. However, each time the child comes to a major milestone that impacts the parent in a new way, grief will once again, be experienced. Common developmental points when grieving reoccurs, are:

1) when the child becomes "regular" school age (for that is a time when much comparison between children goes on);

2) when the child becomes pubescent (and offers all the dilemmas that puberty generally offers, plus the complexities of a handicapping condition);

3) when the child becomes high school graduation age and the disability negatively affects his ability to move on in a more independent manner of functioning;

4) when the child come to an age where the expectation is that he or she would indeed live totally independently (working on his own, perhaps married, etc.); and

5) when the parents come to retirement age and the nature of the disability is such that the child might interfere with their retirement and requires that arrangements be made beyond the lives of the parents.

It is positive to note that success with earlier grieving facilitates later grieving. Also, each new process of grief brings with it new insights and new strengths which were not previously realized.

(f) Coping

Since grieving is an almost entirely affective or emotional process, it is clear that there are other processes that occur simultaneously, or in tangent with grieving. The general rubric of "coping" covers most of the remaining activities that require interaction between the parent, the child, the child's environment, and the systems that serve him. Although much has been written since 1960 about the coping process, the most succinct and clear descriptions and definitions of the process were offered by a rehabilitation psychologist named Beatrice A. Wright (1960). In her book which focused on the psychological processes of disability, Wright highlighted four major coping processes. Each of these impact the parent in such a manner as to precipitate a change in one's value system. The four coping mechanisms are as follows: containing the disability effect, devaluing physique, enlarging one's scope of values, and converting from comparative values to asset values.

When parents first begin to deal with the impact of having a deaf child, their tendency is to generalize the effects of the disability. They are prone to see the entire life of the child (and often of themselves) as ruined. It is not uncommon for parents to say things like: "My child will never marry, my child will never work, or my child will be dependent on me for the rest of my life." They conceptualize the worst, and then deal with reality. Confrontation with reality is facilitated through the process that prompts one to contain the effects of the disability. Such containment is done attitudinally. That is, the parent does not permit the concept of disability to contaminate those aspects of his child that need not be (nor are not) affected by the deafness. The professional can be extremely helpful during this facet of coping by offering as clear and concise an assessment (or diagnosis) as possible, particularly, an assessment that emphasizes the competencies and assets that are not affected by the disability. Parents who can be exposed to ordinary deaf adults are also helped with this coping process.

The devaluing of physique, as a coping mechanism, attacks one of the more painful blocks to successfully dealing with handicapping conditions. Western culture seems to place high value on appearance, ofttimes judging people according to what is seen. Unfortunately, most handicapping conditions are seen as ugly. Specifically, "deaf speech", hearing aids, the use of sign language, and behaviours unique to deafness, are ofttimes viewed negatively. The coping mechanism of devaluing physique deals with this issue. "Physique" is broadly defined here as any detectable manifestation of the disability which might be judged negatively. One has seemingly successfully coped with the issue of physique when one had adopted a value system that focuses on those qualities and competencies we associate with being human, and ignores or devalues surface qualities.

Enlarging the scope of values works on the premise that most people narrow their value system, experiences, interests, and associations as they age. This appears to be true for a great many people. Such narrowing poses a special problem when one has a deaf child whose disability precluded participation in the particular confined life style that the parents have chosen. If that is so, then to cope, thereby facilitating the child's growth, the parent must be able to enlarge his scope of values enough to genuinely accept whatever life style the child might persue. Such an exploration requires parents to examine their own values, often precipitating discomfort around what constitutes "the good life". If such coping does not occur, then both the parent and the child will feel as though the child's life style is, at best, second rate and unacceptable.

The last coping mechanism involves the issues of comparison and competition. Western culture seems to put an enormous amount of emphasis upon winning, doing better than the next person, and comparing one person's performance to another. Such a comparative atmosphere can be uncomfortable for many non-impaired people. It becomes quite evident, however, that a comparative atmosphere is devastating to the impaired individual and his family. The parent must come to understand that how one does, compared with others, is far less relevant than the mastery of a skill or the demonstration of a competency. In the fields of hearing impairment, it is interesting to note that there are many measures (of a comparative nature) concerned with reading levels. Far less evident are measures (or even notations in reports) that speak to how the child uses his reading skills to enhance his everyday life.

The attitudes fostering these different views toward reading reflect substantively different value systems. The former emphasizes comparative values, the latter asset values. Ultimately, to cope with the child's deafness, the parent comes to value the child as he is, respecting each new achievement as an asset, without comparison to other children.

It is through such coping that the parent comes to primarily appreciate the child, and focus on the handicap secondarily.

Summary. The growth and development of infants requires reciprocal interaction with caregivers to establish trust, and to both initiate and maintain attachment. Parents are, most commonly, the caregivers who can offer this nurturing and stimulating relationship.

The identification of deafness in an infant precipitates grief in the child's parents. The process of grief can allow the parent to constructively incorporate the emotional impact of hearing impairment, and, thereby, cope with the demands required for trust establishment and attachment. This, then, allows the parent and child to engage in the many other tasks concerned with growth in the context of deafness. Thus, the successful habilitation of the deaf child is dependent upon the parent's ability to grieve and cope. Professionals in communicative disorders can have a powerful impact upon how a parent traverses these important processes.

It is the unconditional acceptance of denial, guilt, depression, anger, and anxiety that constitutes the most facilitative attitude that a professional can offer to a parent. Such an atmosphere fosters parental coping which, in turn, effects positive value changes which then strengthen the competence of the parent, and facilitate child development.

The parent who is actively gaining from the processes of grieving and coping, shifts attitudes in ways best exemplified by the following parent's change around describing her child: "I once could only see him as a deaf boy; now I see him as a boy who is deaf".

DISCUSSION

DOCTOR IN THE AUDIENCE. The most common cause of congenital deafness is genetics. Many of these deaf infants have deaf parents. Would you comment on that?

DOCTOR MOSES. Often times parents who are deaf, who have a deaf infant, deal with it better than parents who are not deaf, if, indeed, they have worked through these issues for themselves. The impaired individual grieves also and must cope in the same fashion. If they come to accept their own values within the limitations of the deafness, they are more likely to accept deafness in their own children in more comfortable fashion than those parents who are not deaf.

DOCTOR JOHN EADIE. In many respects people "shop around" for a diagnosis when they have a problem like deafness. Could you fit this into your grieving process for me? Is it part of the anxiety? Is it a sign that maybe things are getting towards the end of the problem? How does this particularly affect the deaf child and the parents?

DOCTOR MOSES. It's an excellent question because this is, indeed, a very common issue. I hear a bit of hope. "Is the shopping around indicative of the coming to an end" (I hope, I hope). It's most interesting, we humans are terribly creative and, therefore, just to confuse people like myself, we seldom take a particular behaviour and have it be consistant to a given grieving state. So that anything like "shopping" can fit into any one of them. For instance, shopping around can be denial of the existence of the deafness, and you're looking for a diagnosis that will confirm that indeed, it doesn't exist. It can be undoing of guilt. "Now that I have this child and I feel the guilt, I'm going to do everything I can and shop the world over to undo the guilt." It can be depression, a sense of impotence, and a sense of failure in dealing with the impotence.

... I hope you're getting the flavor of what I'm saying. We could go through all the grieving stages and "shopping" can fit. Its effect upon the child, of course, can be ghastly. I'm reminded of a family that took a 12 year old, just pubescent, deaf daughter to a psycho-surgeon in the Philippines. A psycho-surgeon, if you don't know what one of those is (I didn't), is a person who does surgery by opening one's chest in a total septic environment, without any anesthesia, and without any knife or anything, just with their thumb. They find "yucky stuff" in there that they throw away and that cures the people. Then they close the patient without scars, and barely any blood. Now that may be remarkable at first blust. Until, you decide that it is total chicanery. It was written up, indeed, in a book on quackery. They run their thumbs down and give the illusion of opening the chest. They get some chicken liver that they throw around a little bit, close up, and it works very nicely for historical conversion reaction. However, it does not work well for congenital, sensory-neural hearing loss. The unfortunate thing, of course, was that these parents took a very sensitive, just pubescent, adolescent girl and had her go through this process, getting all the messages that go with it. It's extremely difficult to find the balance between accepting what a parent has to do, at the same time protecting the child. It takes, I think, a particularly sensitive and empathic person to be able to somehow send out that message that says, in essence, "look, I know you as a parent have to do whatever you have to do, and I respect that. But, while you're going through your struggle to do what you have to do, let's also look simultaneously at the struggle your child might be going through and let's see if, somehow, we can find things that will work for both of you." Perhaps taking the psycho-surgeon off the list might be one of them.

MARY PAT MOELLER. I wonder if you'd comment about the working mother. We professional mothers are under some pressures from society. I think when there's a deaf child, the problem must be even more complex. I just wondered if you'd comment about that?

DOCTOR MOSES. My wife is a working mother and, as some of you know, I have a 2 year old impaired child - which was a bit of a surprise after working in this field for over 10 years. There is no place your are going to find a piece of research that absolutely confirms that is the wrong thing to do or the right thing to do. The types of complex things that one is working with are as follows. Is it better for a child, impaired or not, to have a mother out of the house, doing what she needs to do, fulfilling herself, having a fairly good quality period of time with the child, but one that is very limited in terms of quantity. Or, is it better to have more quantity, however, have a mother that feels thwarted, perhaps resentful and limited? Well, which mother would you like for yourself? I'd like a third option, if somebody could offer it to me. The complexity becomes obvious. What often times being felt is the last area of grieving that I was talking about, anxiety. Where each person has to --for themselves, internally -- restructure the limits of their responsibility. To know how much you're going to cater to yourself and how much you're going to cater to your child and what you feel -- it's that redefinition (yourself within yourself) of those issues of responsibility that must occur.

DOCTOR GEORGE MENCHER. You referred to the fact that the child is also going through a tough time. Is there any clue as to at what stage the child becomes aware of the fact that it is, in fact, different than the other people around it? Does it go through the same kinds of grieving and adjustment patterns that the parents do?

DOCTOR MOSES. The last part I can answer quickly. Yes, the child goes through exactly the same kinds of processes. Incidentally, their displacement of anger is often times at the parent. "How could you do this to me? Why didn't you save me? Why did you have me if I was going to be this way?" That's a real zinger. After you struggle for a number of years to get a kid language, that's what comes out with the language!

There is no specific point at which we can specifically say, that, the "child" is aware of his differences. It depends obviously, on how much the child is going out into the environment, getting the feedback that other people perceive a difference. One of the points when that seems to happen fairly commonly is at entering school. So that, if you haven't seen it in a child by around age 5 or 6, you're likely to start to see it then. Often times you will get it with very angry stories, or very angry jokes. It will come out indirectly. Hostile jokes toward hearing people, making fun of the hearing, etc. That can come as early as 5 or 6. It does not come until the child is confronted with the culture, and the culture begins to do terribly mean and rejecting types of things that make them feel different. Before that they're perfectly happy, the parents are not.

ANDRE LAFARGUE. I was wondering if you could give us some idea how much time you would allow for those stages. For instance, I'm thinking of a case of a parent whose child has been diagnosed as having a hearing problem and before action can be taken on behalf of the child, how much time would you allow the parents to go through that denial, or whatever stages .... .

DOCTOR MOSES. I'm very pleased that you asked that question, because I think that there's a thought in there that you implied from what I said that I did not intend. I do not think that action should be delayed 2 minutes. I think that you have a responsibility as a professional to do what you feel is correct, and to continue doing it. I'm merely asking you to do it sensitively, without rejection of what the parents feel and how the parent deals with it. There is no "fixed" time because there are a number of very complex variables included. How significant is this loss to the parent? Has the parent previously had a significant loss and successfully grieved it? What is the support system around the parent to facilitate grieving? Does it inhibit it, or does it facilitate it? etc., these things will have more to do with how long it takes than anything else. But people do become arrested, and an arrest is not so much identifiable with time as it is with the quality of grieving. A person who's arrested is stagnant. There's a dead quality to them. A person who is grieving is acting and affects the people interacting with them -- either moves them emotionally, or you want to get away form them because they disturb and frighten you. If that's going on, you've got a person who's actively grieving, they're not stuck. If the person you're working with does not affect you, and yet they're saying things you think would, you've got a person whose arrested.

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Family Support Programs
A Vital Service
For Hearing Impaired Developmentally Disabled Persons

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INTRODUCTORY GUIDELINES FOR COUNSELORS
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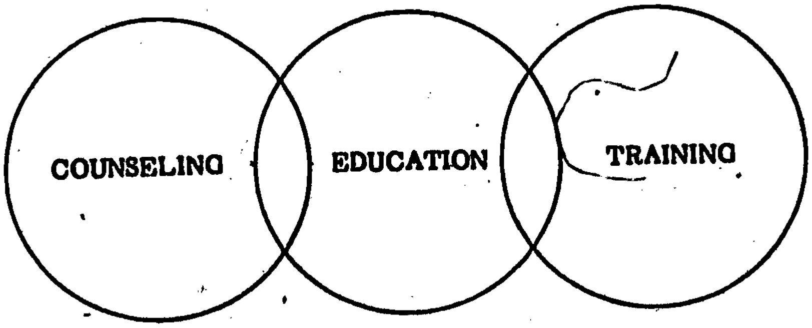
INTRODUCTION

Counselors working with severely handicapped persons can frequently facilitate change by modifying the client's environment. Cooperation between parents and professionals can often be the key to improving a client's total environment. Hence, development and implementation of a comprehensive family support program is an important ancillary service to severely handicapped persons.

The Need for Family Support Programs as an Ancillary Service

Children and adults with severe handicaps need comprehensive programming if education and rehabilitation are to be maximized effectively. Inherent within the concept of comprehensive programming is the involvement and participation of the family. The development of the total child or adult does not occur exclusively within the classroom or rehabilitation center, but also takes place within the family environment. Recent legislative emphasis on deinstitutionalization and community integration supports the concept of comprehensive programming with strong family participation. Parents need to increase their knowledge, understanding, and acceptance of the handicapped person before participating in comprehensive programming. To develop these qualities in parents, a family support program should consist of COUNSELING – EDUCATION – and TRAINING.



Counseling

Beginning with diagnosis and continuing throughout the life of a severely handicapped person, counseling can provide emotional support to the family. Parents have differing needs and must have an opportunity to express their feelings. To facilitate parent expression of feelings and to help them experience acceptance of their feelings and a reduction of any sense of isolation, counseling may include individual, family and group therapy approaches.

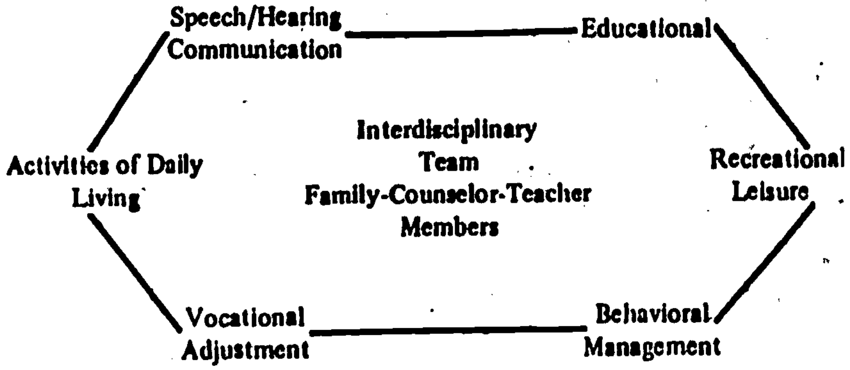
Education

Parents can also benefit from receiving information on handicapping conditions, child development, and long term services for disabled persons as well as other educational materials on child care and communication techniques. This information increases parent understanding of the child and prepares the parent for becoming an effective member of the child's habilitation team. This information is best presented to parents through one to one home visits by the counselor and a teacher, structured parent education groups and the distribution of written materials specifically related to the parents' needs and skills.

Training

Training the family of the severely disabled person to use techniques that are consistent with the educational and rehabilitation program is important if a technique is to be effective. In-home training using demonstration along with group classes can facilitate success in areas such as language stimulation, behavior modification, and self care skills. These skills are frequently listed as priority skills by parents. Training in these areas should be coordinated with child's teacher.

Chart 1



Counselor Competencies

Counselors, parents, and a vast array of other professionals must work cooperatively to meet the needs of the multiply handicapped person. The counselor may be the main coordinator of the various support services. To successfully implement this role a counselor should possess certain competencies.

- A knowledge of deafness and the developmental disabilities and the ability to orient others to these disabilities.
- An understanding of basic legal rights for this population and advocacy techniques.
- An ability to communicate effectively with families and HIDD clients. This may involve using alternative communication methods such as sign language and pantomime.
- A knowledge of theories and techniques for individual and family counseling.
- An awareness of community resources for HIDD persons and their families, and a knowledge of appropriate materials to orient parents to available resources.

Considerations for Counseling

Few families can react to having a child without some stress, pain, and change in personal family dynamics. Therefore, most counseling sessions with parents stem from their needs to talk with a professional concerning their child's handicap. Love (1970) found that although parental reactions to the discovery of a handicapped child may vary due to the family's environmental and personality factors, there are some emotions that commonly appear in varying degrees. The characteristic initial emotions include shock, denial, guilt, bitterness, envy, and rejection. Wright (1960), Roos (1963), and Ross (1964) describe stages of guilt, loss of self esteem, ambivalence of sorrow, depression, mourning, defensiveness, and anger as more or less typical reactions. Alpiner and Amon (1974) cautioned that without some professional assistance these emotions may interfere with stable, warm parent-infant relationships.

Hence, the importance of counseling to assist parents in accepting their child's limitations and strengths must be emphasized throughout programming. The emotional response to having a handicapped child varies in duration, intensity, and sequence with each individual. At times a person may experience one of the above stages repeatedly, or may not progress to the next healing stage. This is especially possible for parents of severely handicapped children considering the long term nature of diagnostic studies for the severely handicapped. However, a counselor providing support services to families should understand these stages as a general guideline for recognizing emotional responses in parents.

Hints for the Homebound Trainer/Counselor

1. Remind the parents of the scheduled visit and arrive on time. Parents have busy schedules and appreciate a reminder and promptness.
2. Greet the child you are working with – modeling appropriately.
3. Bring books or toys for the siblings.
   Then you can work specifically with the parents and handicapped child and the siblings will have little, if any, reason to interrupt.
4. Explain why each activity and technique is important and relevant. Parents are more likely to follow through if they know the concept behind a task.
5. After demonstrating techniques, involve the family with specific tasks to be practiced until your next visit. If the family knows their progress will be monitored, they will be prompted to practice during the week.
6. Provide the family with a simple record keeping system so they can chart progress. Progress is a reinforcement for parents as well as for the handicapped child.
7. Be an active listener, parents may need to ventilate their frustrations with you.
8. Provide parents with additional support systems by offering information on community organizations for handicapped children.

IMPLEMENTATION OF A FAMILY SUPPORT PROGRAM

Planning is the key to implementing a family support program. The components that are included within a support program will vary with the agency and client population to be served. Typically, the program will be developed and implemented by a counselor, with the support and involvement of agency administrators and other professionals.

The counselor's role may encompass

1. Counseling
   - family planning and adjustment
   - obtain background and case history data
   - counseling for acceptance to the child's disability
   - group counseling
2. Parent Training and Guidance
   - orientation to deafness and developmental disabilities
   - education groups for training in child management techniques
3. Home Visitation
   - crisis intervention for home management
   - educational guidance in appropriate home learning techniques
4. Advocacy Services
   - planning and implementation of improving services for clients
   - training and educating professionals and community members to needs of this population.

Conceptually, a Family Support Program can be seen as a continuum beginning with an initial suspicion of an infant's disability.

Community Based Continuum of Services for Parents of Severely Handicapped Persons

Diagnostics initiated on Infant with Suspected Disability	Disability Confirmed	Parents Ready to Participate in Programming	Child Begins Community Pre-School or Day Care Program Outside of the Home Environment	School Placement or Day Treatment Program Placement
Individual counselor support provided as needed during diagnostics	Continue counseling during adjustment process; begin offering educational information through verbal and written materials	Continue counseling; begin home-bound training and infant stimulation programs. Institute therapeutic and educational group services. Make community resources available, such as family counseling.	Counseling and group services continue — expand availability of community resources and develop the awareness and understanding of the community. Encourage parent participation in local chapters of national parent organizations.	Counseling and group services continue; institute periodic home-monitor visits. Emphasis on advocacy training for on going access of community resources.

Support Groups

The overall purpose for a parents' group is to enable parents to gain a fuller understanding of their disabled child so they can enhance and stimulate the development of the child's full potential. To facilitate this, groups are designed to provide emotional support, educational information relating to the implication of the child's disability and training in specific parenting techniques.

With the trend of increasing parent involvement in special education, many guidelines for developing and implementing parent groups have been established. Studies have shown that parent group training is an efficacious method for improving the adjustment of retarded and emotionally disturbed children.

Parents as Advocates

Parents tend to be natural advocates for their children and with some training they can be effective, long term allies of handicapped individuals. As consumers parents should be aware of their child's basic human rights and the services that should be available for their child's education and development. As parents of children who have special communication problems, their responsibility as advocates may extend into adulthood.

The Education of All Handicapped Children Act (Public Law 94-142) has had an impact on the dissemination of information on child and parent rights. This law clarifies parents' rights and responsibility to be actively involved in their child's education. Since the Law was passed in 1975, legal advocates have become involved with special education services by activities such as writing articles and pamphlets for the education of parents. Each school district should have clearly written information available for parents so that they can effectively participate in the implementation of PL 94-142. The family counselor can assist the parents by sponsoring parent discussions groups if such are not already offered by the school.

One extremely important outcome of PL 94-142 is in the change it implies for attitudes towards disabled persons. No longer must disabled children accept a second class education. Parents can demand and expect quality services. If parents are trained as advocates and aware of the rights of disabled persons, then the attitudes they exhibit will serve in part as a model for the disabled child and other members of the community.

Group Advocacy

Although parents are typically thought of as individual advocates in relation to PL 94-142, general advocacy efforts tend to succeed through organized "power". This means joining forces with other consumers and following a specific advocacy plan. Consumer groups of disabled citizens illustrate group cooperation. Working cooperatively can provide a situation of mutual support, increase credibility and stimulate discussions about tactics for change.

Such an advocacy plan can serve as a guideline for parents of both children and adults who are hearing impaired developmentally disabled. When advocating for the rights of a child under Public Law 94-142, there is specific information published by federal, state, and local school districts that can be helpful in understanding the child's rights, the parents' rights, and possible courses of action.

For adults with special needs, specifically the hearing impaired developmentally disabled, rights are stated in the Disabled Assistance and Bill of Rights Act (PL 94-103).

Once aware of the applicable legal rights, a parent/advocate can articulate a specific purpose and continue to develop an individual advocacy plan. Professional advocates offer some helpful hints which include joining forces and involving other people in the community. Working cooperatively with others can provide mutual support, increase credibility, and facilitate discussions about tactics for change. Parents tend to be natural advocates for their children and with some training they can be effective, long-term allies of handicapped individuals.

Application of the Metapsychological Profile to the Assessment of Deaf Children

PAUL M. BRINICH, Ph.D.

THE METAPSYCHOLOGICAL PROFILE DEVELOPED BY ANNA FREUD (1965) and her coworkers at the Hampstead Child-Therapy Clinic has been applied to different age groups (A. Freud et al., 1965; Laufer, 1965; Meers, 1966; W. E. Freud, 1967, 1972), to different diagnostic groups (Michaels and Stiver, 1965; Thomas, 1966), and to children with organically based handicaps (Burlingham, 1975).

The utility of the Metapsychological Profile lies in the fact that it attempts to bring together in an organized framework many different facets of an individual personality. The framework is one which stresses intrapsychic structure and functioning rather than overt symptomatology. As such, it yields a much more dynamic and true-to-life picture of the personality than the more usual nosological categories such as the Diagnostic and Statistical Manuals promulgated by the American Psychiatric Association.

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In this paper I attempt to organize several diagnostic sessions with a latency-age deaf child, whom I shall call Arthur Smith, around the Profile headings. When one applies what is by now a familiar tool used by many child psychoanalysts to a new kind of patient, some peculiarities emerge which highlight characteristics both of the tool and of the deaf child. Thus, in my introductory comments to each section of the Profile, I emphasize the special information and considerations that are peculiarly necessary for the assessment of deaf children—that is, the areas in which the tool needs to be adapted and expanded. It is my hope that the peculiarities that emerge not only will stimulate our thinking about a particular deaf child but will go beyond to highlight aspects of the psychological development of prelingually deaf people and to illustrate the parts which language and communication—as distinct from speech and hearing—play in that development.

PROFILE OF A DEAF CHILD

I. REASONS FOR REFERRAL

Most deaf children (and also deaf adults) have been referred to many different medical specialists, clinics, social service agencies, and educational facilities. The deaf children and their parents have usually experienced a great deal of frustration in these contacts as the diagnosis was gradually established and as recommendations for treatment (often contradictory recommendations) were presented to the parents by the "experts."

I have often found it useful to consider the deaf child and his parents as a family which has been doubly traumatized—first by the child's handicap, and second by the various and often contradictory interventions proposed. This traumatization means that the diagnostician needs to spend a good deal of time discussing past frustrations with the parents. It also means that the diagnostician may find it difficult to pull together the reports of the various agencies' previous contacts with the family. Yet, such a consolidation of information is crucial in the assessment and treatment of a deaf child, as it is with any handicapped child.

Frustrations related to multiple agency contacts played a part in the background of Arthur Smith. He was referred for assessment by his school, his audiologist, and his parents. Arthur's teachers had tried to pressure Arthur's parents into seeking help for their adopted son since he was 4 years old. Now, 7 years later the school administrators were threatening to exclude Arthur from school. They described a boy who was incapable of conforming to the normal restrictions of the classroom. He had difficulties in maintaining attention, learning, and remembering school material, and he was constantly in trouble with both teachers and peers because of his provocative behavior and his aggressive outbursts.

Arthur's parents saw things quite differently, however. They believed that Arthur's difficulties were entirely the fault of his school; they accused the teachers and administrators of being unwilling to accommodate sufficiently to Arthur. The Smiths made it quite clear that they would not have sought help for Arthur without pressure from the school; they maintained throughout the diagnostic period that Arthur presented no problems at home. However, Mrs. Smith did respond to my statement that I was exhausted after a diagnostic session with Arthur by telling me, "You ought to try him 24 hours a day!"

II. DESCRIPTION OF CHILD

The description of the deaf child should include an audiogram which describes the child's hearing loss in terms of its amplitude at different frequencies, both with and without the child's hearing aids. Different "shapes" of audiograms have vastly different implications for the ability of the child to make use of his residual hearing for the perception of human speech. The "type" of hearing loss, i.e., "conductive" versus "sensorineural," also is crucial information because the former can often benefit markedly from surgical intervention and prostheses, while the latter can usually get no benefits from surgery and only limited benefits from hearing aids.

The age of onset of deafness is another very important factor in this section, for a child who has had some experience with sound in communication prior to becoming deaf is a vastly different child from one whose hearing has always been impaired.

The etiology of the child's deafness is also important, for many of the causes of childhood deafness are associated with other damage to the body (e.g., rubella in the first trimester of pregnancy often affects the heart, vision, and the central nervous system, as well as the auditory nerve). In fact, as new medical techniques enable more and more handicapped children to survive their infancy, the population in schools for the deaf is gradually becoming one that includes a very large proportion of multihandicapped children.

The etiology of the handicap is also significant insofar as it may be related to one or the other of the parents of the child or to their families. Recent studies (Moores, 1978) suggest that about 30 percent of all childhood deafness may be genetic in origin; the defect, while usually recessive, is sometimes "blamed" upon one side of the child's family or the other, with predictably disastrous effects upon the parents' marriage.

Arthur's case illustrates the importance of audiological information in the assessment of a deaf child. The audiologist outlined the functional implications of Arthur's hearing loss and, at the same time, emphasized the role that denial played in the attitude of Arthur's adoptive mother toward his handicap.

Arthur had a profound hearing loss. Recent audiological testing had shown no measurable responses in Arthur's right ear and very minimal responses in his left ear (70 dB loss at 125 Hz, 80 dB loss at 250 Hz, 110 dB loss at 500 Hz, and no measurable responses above 500 Hz). When his hearing was checked with his hearing aids, Arthur was able to detect sounds somewhat better (sound field responses showed a 30 dB loss at 250 Hz, 45 dB loss at 500 Hz, 45 dB loss at 1000 Hz, 55 dB loss at 1500 Hz, and no measurable responses above 1500 Hz); however, Arthur's audiologist still summarized his evaluation of Arthur by saying, "The fact is that he cannot process auditorily, and neither hearing aids, speech ability if he possessed it, nor mother's love can erase his deafness."

As far as the etiology of Arthur's deafness was concerned, his case is atypical in that he was adopted after the diagnosis of deafness. Thus neither parent "blamed" the other for the defect. Arthur's adoptive parents reported that they knew nothing of the etiology of Arthur's deafness. Careful medical investigation revealed no other physical anomalies at the time Arthur was referred to me for assessment.

Arthur was an attractive, slender, tow-headed boy of average height for his 11 years. From his behavior during the diagnostic assessment it appeared that Arthur was quick to make new acquaintances; he managed to communicate a surprising amount of information via a combination of mimicry, gestures, and some not very well-developed sign language. He was very curious and eager to understand how things worked. At the same time he was very provocative and quickly began testing the limits in the diagnostic setting by trying to play with typewriters and other office equipment.

In my diagnostic work with Arthur I used a variety of communication techniques: speech, sign language, gesture, mime, writing, and drawing. Despite this multimodal approach, there were many times when I did not feel confident that Arthur understood me as well as many times when I did not understand Arthur. These problems in communication certainly colored the diagnostic picture; they led Arthur to use provocative actions rather than words, and they made it difficult for me to assess the degree to which verbal interpretation of the provocative behavior might have helped Arthur to limit it.

III. FAMILY BACKGROUND AND PERSONAL HISTORY

I will confine my comments under this heading to (1) events surrounding the diagnosis of the handicap; (2) the resources available to the family; and (3) the presence or absence of other, healthy children in the family.

It is important to learn when and by whom the diagnosis was made. Deafness results in relatively subtle disturbances in the behavior and interactions of the deaf infant, and many parents of congenitally deaf children report that their own early concerns about their child were repeatedly dismissed by pediatricians and other experts until a point when the child's speech development was quite obviously retarded (i.e., often until 18 months of age or even older).

Parents of deaf children often report that they were told of their child's deafness by someone who expected them to comprehend and to accept the diagnosis as a simple matter of fact. Diagnosticians often are unwilling to deal with the shock, the feelings of loss, the anger, and the mourning which hearing parents of a deaf child usually experience at the time of diagnosis. It is therefore important to discover how the parents were told of their child's deafness and what resources were made available to them to help them deal with their profound reactions to this news. I have found in several cases that parents of a deaf child who was now in his teens had never been able to discuss with anyone their reactions to the diagnosis of deafness. This is a sad reflection upon the professionals involved with the family at the time of diagnosis.

A further consideration of which the diagnostician working with a deaf child must be aware is the extent to which the child's parents have been able to find and to make use of special medical and educational resources relevant to their child's deafness. As with other handicaps, there is a strong tendency on the part of parents to deny as much as possible the reality of the deafness. Perhaps because of the "invisibility" of deafness, this denial seems particularly prevalent in parents and educators of the deaf. Offered a choice between an educational program that promises to make their deaf child "just like" a hearing child and an educational program that is founded on the use of special techniques (such as sign language) which make their deaf child obviously different from hearing children, there are few parents who would not be tempted to opt for the former.

The diagnostician should also attempt to find out what special resources the individual deaf child and his parents bring to their interactions. Personal resources—such as flexibility, or the ability to "read" nonverbal cues, or excellent intelligence—will all help to modify the impact of the handicap.

Finally, it is also important for the diagnostician to take into account the presence or absence in the family of other, healthy children. In my experience, parents who have experienced themselves as successful parents with other children are in a better position to respond to the special needs of a handicapped child than are parents for whom the handicapped child is their first child, or who have had another handicapped child precede the deaf child.

Arthur was reportedly born at 35 weeks gestation and weighed 4 lbs. 9 oz. at birth. He was given up for adoption at birth; Mr. and Mrs. Smith reported that they knew very little about Arthur's biological parents. Arthur was placed for adoption at about 1 month of age but was returned to the adoption agency when, at the age of 5 months, he was found to be deaf. The etiology of Arthur's deafness remains unknown, as do the details of his first half year of life.

Arthur was adopted by the Smiths when he was 6 months old. They had specifically requested a deaf child because they believed that they could do a better job raising a deaf child than the parents of the deaf children whom Mrs. Smith taught (she was a professional educator of the deaf). Arthur was the fourth child in the family; the other three children, all hearing, were natural children of Mr. and Mrs. Smith and were between 5 to 10 years older than Arthur.

The Smiths recalled Arthur being easily upset as a child. The family made two moves while Arthur was young, and he found these very hard to take. The first move occurred when he was 1½ years old, and the second when he was 2½ years old; Mrs. Smith recalled that Arthur suffered through weeks of disturbed sleep and a great deal of anxiety after each move. She herself wondered if Arthur was afraid of being "rejected" and linked this to the fact that he had been rejected twice before.

Arthur began school at age 3; he was placed in a program for hearing-impaired children which emphasized the development of speech, giving this a higher priority than the development of meaningful communication.[1]

The first school placement did not work well; after little more than a year the school suggested that the Smiths obtain a psychiatric evaluation of their son because of behavioral problems which were already visible in Arthur. Unfortunately the Smiths did not follow through on the recommendation but instead decided that Arthur's problems were the result of the school's inability to adapt to his special needs. The Smiths moved Arthur into a new special education program for the deaf when he was 5 years old, but the new school quickly reported the same difficulties with Arthur as had been obvious in the first school.

Mr. and Mrs. Smith were particularly aware of what was going on in school because Mrs. Smith was herself a teacher in Arthur's school. This was unfortunate, for this emphasized an already strong symbiotic trend in Mrs. Smith. While the school administration consistently recommended that Arthur be transferred to a school which would provide Arthur with both oral and manual communication, the Smiths rejected this advice because such a move would prevent Mrs. Smith from being able to keep an eye on what happened to her son.

IV. POSSIBLY SIGNIFICANT ENVIRONMENTAL INFLUENCES

A. For the Timing of the Referral

A handicap such as deafness has different effects upon the child and his family at every developmental step. In most cases

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[1] This is an important distinction since most deaf children in the United States and Western Europe have been enrolled in special education programs which attempt to teach speech before the children have learned the purpose of speech, i.e., communication. This bias in educational philosophy goes back to an international congress on education of the deaf which was held in Milan in 1880. There it was decided that all deaf children should be educated by "oral" training and that manual communication should be used only if oral training failed. There has been a dramatic shift away from this position in the United States during the past 10 to 15 years as educators have found that deaf children who can communicate via sign language are in a much better position to learn to use what oral skills they are able to develop than are children who receive oral training with no previous experience of linguistic communication (Meadow, 1975).

the deaf child will be referred for assessment at a time when his handicap is interfering in some overwhelming way with his development, thereby putting him in severe conflict with his environment.

Arthur's disturbance had been obvious to outside observers for many years, though his parents consistently insisted that the problem lay in Arthur's school and not in Arthur himself or in their handling of him. At the point of referral the school was demanding that Arthur be removed and seemed willing to make this move despite the parents' objections. This increased external pressure motivated Arthur's referral for evaluation.

B. For the Causation of the Disturbance

In an outline of the environmental factors which may have contributed to the creation of a child's disturbance, it is important to bear in mind that a deaf child's environment is significantly different from that of other children. Deafness creates unusual frustrations for the child and puts unusual demands upon both him and his parents. Among these are the various medical procedures, prostheses, special educational regimens, and so forth, which may have been experienced by the child not as helps but as traumatizing events.

As a twice-adopted (and thus twice-rejected) child Arthur certainly experienced important discontinuities in his early care, which produced a special sensitivity to changes in him. Mrs. Smith described clearly how upset Arthur had become when the family had moved house.

Arthur's deafness was, of course, involved in his being returned to the adoption agency after his first adoption. His deafness was also involved in his second adoption, for not only had the Smiths specifically requested a deaf child, but they believed that they would be able to help this deaf child become like a hearing child. This simultaneous acceptance of and denial of Arthur's handicap led the Smiths to a series of inconsistent and mutually contradictory attitudes and expectations. On the one hand, the Smiths expected Arthur's teachers to make special efforts to overcome the communicative deficit associated with Arthur's deafness; on the other hand, the Smiths insisted that Arthur was able to communicate with them easily with little or no adaptation of their own communicative efforts. They simply spoke to Arthur loudly and clearly, believing that he comprehended much more of their speech than he did.

C. Possible Favorable and Stabilizing Factors Contributing to Present Development

Here, too, it is important to consider the medical, educational, social, and personal resources available to the deaf child and to his family. Even technological advances may play a part as hearing aids are developed which can be adjusted carefully to match the "shape" and amplitude of a specific child's hearing loss and as other devices become available which allow the deaf child to circumvent the blocked auditory channel via vibrotactile sensations (Edmondson, 1974).

Several factors can be seen as favorable and stabilizing contributors to Arthur's development. First, Arthur was of better than average intelligence. Second, he made good use of his talent for mimicry in his attempts to communicate with others. Third, the Smiths were a stable family who, with all their faults, were very committed to each other. They fought vigorously to get what they believed was proper treatment for their son. Fourth, the Smiths had three other physically intact children who were important to them; they did not have to prove their ability to be parents with Arthur.

Aggression. While deaf children are not different from hearing children in the quantity, quality, or direction of their aggressive impulses, they do tend to express these impulses in action more frequently than do hearing children. Here Anny Katan's (1961) paper on the importance of verbalization in early development outlines the issues better than I could hope to do.

One speculative point I might make, however, relates to the part played by the perceptual apparatus in the stimulation of a child's aggressive impulses and in the direction of those impulses away from the body and toward the environment. A.-M. Sandler (1963), Burlingham (1964), and Fraiberg and Freedman (1961) have described how blind infants seem in danger of a kind of passive withdrawal from, or failure to engage with, the world around them. Hearing, like sight, calls the infant's attention to things outside of and at some distance from his own body. Anecdotal reports of the early behavior of deaf infants (Schlesinger and Meadow, 1972) suggest that they, like the blind, may be more passive vis-à-vis the world around them than normal children and may be in need of special efforts by the caretakers to elicit their active engagement in their environment.

Ego Development

Ego apparatus. This section of the Profile requires a careful description of the child's physical status (past and present). It is particularly important that the extent of any handicaps and their functional implications be carefully described.

Arthur's ego apparatus appeared to be intact, with the exception of his hearing loss which was described earlier. No evidence of the neurological and heart defects which often accompany deafness caused by rubella (the suspected etiological agent in Arthur's deafness) were found despite careful medical examination.

Ego functions. Deafness may be associated with many different limitations in ego functions. Motor functions may be poorly developed because of restrictions imposed by the deaf child's parents in an effort to protect the child from unheard dangers. Problems in the normal development of speech are often associated with problems in the development of reciprocal communication (unless, of course, the deaf child is offered communication via sign language). Problems in communication, in turn, often lead to problems in the development of many other ego functions, such as memory, synthesis, reality testing, and secondary thought processes. These problems may be either on a primary or on a secondary level; i.e., they may reflect real (primary) failures in the development of a particular function (e.g., the ability to remember a past event) or problems encountered when the deaf child tries to communicate about the internal states which are the basis for these ego functions (secondary interference). It is very important that the diagnostician of a deaf child keep this distinction in mind. There have been a great number of cases reported in which a deaf child's poor speech development resulted in a diagnosis of mental retardation despite what was later found to be normal intellectual potential.

Arthur's ego functions were at widely varying levels of development. From my observations of Arthur and from psychological testing it seemed that he was of at least average intelligence; his scores on the Performance section of the Wechsler Intelligence Scale for Children (Revised) were:

Picture Completion	14
Picture Arrangement	12
Block Design	12
Object Assembly	14
Coding	4
Mazes	7
WISC-R Performance IQ =	102

In addition, there was little question that Arthur's memory, reality testing, and control of motility were within normal limits. Nevertheless, it was not possible to administer the Verbal section of the WISC-R to Arthur because of problems encountered in communicating the verbal tasks to him. This difficulty emphasizes the fact that Arthur's speech, language, and communication (the distinctions between these three are often crucial in the assessment of deaf children) were very poorly developed. Arthur's speech was almost totally unintelligible even given my familiarity with "deaf speech," and his written language did not go beyond two-word combinations of stereotyped vocabulary.

These deficits in speech and language left Arthur with only a repertoire of mime and perhaps 200 signs which varied in their level of abstraction to serve his communicative needs. Arthur did not appear to have any better command of syntax in his use of signs than was evident in his spoken or written communication. In addition, he was only rarely able to use his rudimentary sign language skills because both his parents and his teachers avoided using signs.

Cognitive development generally precedes linguistic development, and thus linguistic deficits need not necessarily lead to cognitive deficits (Furth, 1966; Sinclair-de-Zwart, 1969; Moores, 1978). Nevertheless, there are some concepts, especially those involving probability and temporality (and, hence, links between cause and effect), which are very difficult to master without a linguistic medium of exchange (Blank, 1974). In addition, socialization depends heavily upon language for the communication of the whys and wherefores of social rules (Meadow, 1975).

Arthur had very serious developmental deficits in terms of speech, language, and general communicative skills. These were associated with a rudimentary sense of time and an uncertain appreciation of cause and effect that made secondary process thinking, in the usual sense of the word, a very unstable acquisition. Here I must emphasize that Arthur was not functioning via unmodified primary process thinking; were this true, I would be describing a psychotic child rather than a child whose deafness has led to a series of developmental deviations. However, Arthur's secondary process thinking was certainly not at the level expected of an 11-year-old child.

In addition to, and related to, the deficits in speech, language, communication, and secondary process thinking described above, Arthur also showed problems in concentration, attention span, and short-term memory. These were certainly strongly affected by Arthur's insistence upon approaching both the

psychological testing sessions and the general observational sessions strictly on his own, anally tinged terms.

Before leaving this section devoted to ego functions I must mention, however briefly, something about Arthur's affective states and responses. Affects of pride, pleasure, pain, surprise, curiosity, defiance, triumph, and anger all had a place in Arthur's repertoire. Affects such as sadness, shame, and hopelessness were notably absent—but not, I think, because they were outside of Arthur's experience. Rather, they were highly defended and observable only very briefly and occasionally.

Defense organization. Just as problems in communication lead to problems in the development of other ego functions, so problems in communication affect the development and use of defenses by the deaf child. If the deaf child, because of problems in communication, remains relatively ignorant of the relationship between events in the external world and the internal world of the people around him, his defensive strategies will reflect that ignorance. Some defenses, such as denial and externalization, may appear to be particularly prominent; here again, however, the diagnostician must differentiate between a child who *denies* the effect of his actions upon others and the child who *does not understand* the effect of his actions upon others. It is equally important to differentiate between a child who does not use fantasy for purposes of denial and a child whose fantasy life remains relatively inaccessible to the outside world because of problems in communication.

Arthur's defenses consisted mainly of denial, externalization, reversal, and the conversion of passive experiences into active ones. In our sessions Arthur showed me how other things were hurt or damaged or defective, not he. Other things were angry or sad, not Arthur (who, when he had such feelings, giggled in a silly manner). And other people were bossed around, not Arthur. Arthur's difficulties with control led to his demand that he decide when our sessions started and stopped. He also occasionally ran ahead of me into my office and sat in my chair; from that position he announced that *he* was the boss or teacher and thus avoided the passive role which he feared. An underlying anxiety motivating much of Arthur's defensive activity was, I believe, a fear that he would be rejected by his parents. This fear was undoubtably founded in the two circumstances of Arthur's deafness and his adoption.

Superego Development

Many authors have commented on what is sometimes described as the etiquette-book morality of deaf adults (Levine, 1960). Again, deficits in communication leave their mark as the deaf child often receives only the "yes" or "no" of parental approvals or prohibitions; he does not comprehend the reasons for the "yes" or "no." Thus there is a special danger that the superego will become particularly rigid.

There is also the opposite danger—that the deaf child will reject such proscriptions entirely. Such rejection may be based upon problems in communication which make the prohibitions seem completely unpredictable; or it may be based upon a view of oneself as one of the "exceptions" described by Freud (1916) and Jacobson (1959). In this case, the narcissistic injury of the handicap is converted into a kind of grandiosity which exempts the handicapped person from the usual social rules.

Arthur's behavior, while provocative and disruptive to those around him, contained many indications that he had developed some sort of superego. He was aware of many of the usual social rules of behavior, which he had taken over from observation of his parents' behavior. He also showed some anxiety when confronted with tasks that taxed his cognitive abilities; he seemed to feel badly when he could not succeed and quickly began to try to divert attention from his failure. Arthur's parents described how, when he had done something bad and was upset, he sometimes hung a "For Sale" sign on his bedroom door.

At this point in the Profile we can return to familiar ground. It now remains for us to integrate our observations regarding the deaf child into psychoanalytic formulations which express our comprehension of the fixation points, the regressions, and the conflicts which the child brings to the assessment. There is no special metapsychology for deaf children or for any other group of children. If we have carefully taken account of the child's handicap in the earlier sections of the Profile, the metapsychological view expressed in this section and in that on dynamic and structural assessments will include the handicap as an integral part of the child.

VII. ASSESSMENT OF CONFLICTS: DYNAMIC AND STRUCTURAL ASSESSMENTS

The conflict which appeared to be central to Arthur's current functioning was one between himself and his object world; Arthur seemed bent on showing that he would be in charge of his own actions and those of the people around him. This external (or rather, reexternalized) conflict was paralleled by an internal conflict of ambivalence toward his love objects. In addition, some of Arthur's behavior could be seen as a normal response to a pathological environment (i.e., Arthur's resistance to the intrusive and possessive trends in his adoptive mother).

However reactive they may have been in their formation, at the time of diagnostic assessment Arthur's conflicts posed a clear threat to his ability to form successful new relationships. It was partly concern about this interference with Arthur's ability to form new relationships, and with his ability to use such relationships for educational and social ends, that led to my recommendation for treatment.

A second problem which I saw in Arthur's behavior at the time of referral centered around what appeared to be narcissistic injuries associated both with his deafness and with his adoption. It seemed that Arthur had great difficulty in maintaining an image of himself as a wanted child. This led to repeated testing of his adoptive parents' love for him, testing which took the form of provocations which (unfortunately, but not surprisingly) fit in with the conflicts regarding autonomy outlined above.

tempted to prohibit his behavior, Arthur fought back to assert his own autonomy and control.

A third problem, related to the issues of autonomy, ambivalence, and narcissistic injury, was that of communication. While Arthur had developed excellent mimetic skills, his use of sign language for communication was not adequate to meet the communicative needs of a child of his age. This deficit reflected the attitudes of Arthur's parents toward sign language, with which Arthur had probably identified himself. To sign was to be different and to be rejected. Arthur's poor sign language skills represented a compromise between ego capacities which were searching for an expressive outlet and ego ideals which denigrated signed communication.

VIII. ASSESSMENT OF SOME GENERAL CHARACTERISTICS

The frustration tolerance of many deaf children is notoriously low, as is their sublimation potential. These characteristics are consequences of the communicative deficit which is largely responsible for the deviations in ego and superego development which I have outlined earlier. These limitations require special consideration in the planning of treatment.

Arthur's frustration tolerance was low by almost any measure, and his inner conflicts were frequently expressed in impulsive activity. At the same time, Arthur was not without sublimation potential. He was particularly interested in how machines work and in what men do when they work.

Faced with an anxiety-provoking situation (i.e., one in which he feared rejection or loss of love) Arthur would quickly attempt to take control of the situation. At times this led Arthur to attempts at mastery; at other times he created diversions which removed him from the situation. This relatively active stance toward the world led me to believe that, in Arthur, the progressive forces outweighed the regressive forces.

IX. DIAGNOSIS

This section of the Profile requires no special modification for the deaf child, but a cautionary note is in order. Deafness is different for each child and thus has a different impact on the communicative abilities of each child. In addition, each deaf child is provided with different medical, social, educational, and personal resources which may modify the impact of deafness upon his development. It is my experience that while many deaf children can be placed in Anna Freud's fifth category—"there are primary deficiencies of an organic nature or early deprivations which distort development and structuralization and produce retarded, defective, and nontypical personalities" (1965, p. 147)—it is important not to overlook the fact that some deaf children incorporate into this picture conflicts which fit into Anna Freud's third category—"there is permanent drive regression to previously established fixation points which leads to conflicts of a neurotic type and gives rise to infantile neuroses and character disorders" (p. 147).

Because of this mixed diagnostic picture, it is frequently the case that a combination of educational and psychoanalytic interventions will be required in the treatment of deaf children.

In this diagnostic assessment Arthur appeared to be exhibiting—in some ways—a permanent drive regression to a previously established fixation point; this regression appeared to be related to conflicts of a neurotic type. Furthermore, these conflicts had, at the time of assessment, already made a significant impact upon Arthur's character formation. However, such a formulation does not take into account the impact of Arthur's deafness and of the communication deficits associated with it.

It was clear that Arthur's deafness had led to a deviation in development which left him without some of the ego functions which are extremely useful in establishing the supremacy of the ego over both id and superego. Thus it appeared that the analysis of conflicts would not be sufficient to get Arthur back onto the developmental track. Such analysis was necessary, but it had to be complemented with efforts to increase Arthur's level of ego functioning, particularly in the area of language. This was, in fact, a prerequisite to the analysis of conflicts, for such analysis requires a relatively unimpeded flow of communication between therapist and patient; this was certainly not possible in Arthur at the time of referral.

Because Arthur's difficulties in the areas of autonomy, ambivalence, narcissism, and communication interlocked with active conflicts in his parents, it was clear that work with his parents would be a necessary adjunct to Arthur's treatment.

DEVELOPMENTAL LINES

From Dependency to Emotional Self-Reliance and Adult Object Relationships

During the phase of "biological unity" the hearing mother and her deaf child find themselves occasionally out of tune as the child does not respond to the mother's auditory stimuli in the way the mother expects. It is this subtle but important disruption of the normal mother-infant relationship and reciprocity which usually leads to the diagnosis of deafness.

The mother of a deaf child does not gradually appear and disappear in the child's perceptual field as she ministers to her child. Instead, the mother is present only when she can be seen or when she is in bodily contact with the child. The sounds which the hearing child uses to anticipate his mother's appearance and which allow him to remain aware of her presence in a darkened room are unavailable to the deaf child. Thus the deaf child's achievement of libidinal object constancy involves some special problems not faced by the hearing child.

Other difficulties become apparent if one looks at the final stages of this developmental line. The deaf adolescent often has special problems in shedding his tie to his parents, who have functioned throughout his life as mediators and interpreters of the hearing world around him. The deaf child is thus poorly equipped to strike out on his own, away from his parents.

From Egocentricity to Companionship

This developmental line, like the first, highlights the importance of communication in the development of children. Without smooth communication between himself and his peers and parents, the deaf child has great difficulty in developing internal representations of those people which allow him to interact with them as "partners and objects in their own right" (Anna Freud, 1965, p. 78).

Arthur certainly managed to include me as a partner in his activities throughout the assessment sessions and in subsequent treatment. This argued in favor of his ability to respond to other people as partners and objects in their own right. However, in his progress along this developmental line the deaf child encounters a special obstacle that is very similar to one he encountered in his movement toward adult object relationships: in order to interact with someone as a partner, it is necessary to have built up some internal models of both one's own and the partner's thoughts, feelings, and motivations. The creation of such models is dependent upon smooth communication between the deaf child and other people (peers and adults). It thus seems likely that if Arthur in fact was able to respond to other people as partners, they were partners with quite a restricted set of expected thoughts, feelings, and motivations (as seen from Arthur's point of view).

From Irresponsibility to Responsibility in Body Management

Insofar as deafness interferes with communication and therefore interferes with the comprehension of the relationships between cause and effect, the deaf child will experience some unique difficulties along this developmental line. In addition, if prosthetic devices such as hearing aids are used, the deaf child may be asked to take responsibility for the management of these devices at a very early age because he is in the best position to monitor the functioning of his hearing aids: whether they are properly adjusted, whether the batteries are adequate, whether the ear mold is comfortable.

Arthur appeared to be at an age-appropriate level on this developmental line. While he sometimes threatened to do dangerous things, it was clear that he recognized them as dangerous and could limit his behavior accordingly. He was also apparently reliable in his use of his hearing aids—a particular and constant body-management issue for most deaf children.

From the Body to the Toy and from Play to Work

While Anna Freud does not specifically address the issues of language and communication in her description of this developmental line, it is obvious that many of the steps along this developmental line assume the child's ability to communicate easily with others (e.g., in agreeing upon the rules of various cooperative or competitive games). Insofar as games can be seen along a continuum which demands organization and foresight for success, the deaf child with poor communication skills and poor language will be at a disadvantage when compared with his hearing peers.

Arthur showed some interest in cognitively complex toys, and he also showed pleasure in his own accomplishments with such toys. He appeared to be at an age-appropriate level on this developmental line, and he was clearly interested in increasing his sphere of competence. His major difficulty in this area was a communicative one; he often could not understand a task or game, could not comprehend the explanations given him, and thus remained frustrated by them. He then retreated to less mature activities; but this seemed to be a response to frustration rather than an indicator either of his interests and ego ideals or of his location on this developmental line.

Correspondence Between the Lines

The fact that a particular child's positions on the various developmental lines are in or out of harmony with each other is often of greater diagnostic and therapeutic importance than the child's position on any one of the several developmental lines.

In Arthur's case, there was a good deal of correspondence between the various developmental lines listed above; most were at an age-appropriate level, with two important qualifications. First, there appeared to be a fixation at, and perhaps a characterological incorporation of some features of, the anal-sadistic phase—particularly the provocative, demanding, and torturing aspects of that period of life. Second, while Arthur appeared to be at an age-appropriate level on the developmental line of companionship, it was difficult to assess this accurately because of the restriction in his interpersonal world.

The Need for a Developmental Line of Communication

It is clear that communication plays a crucial part in many of the developmental steps expected of the growing child. I believe that the assessment of children whose disabilities interfere with communication should include some specific description of their communicative skills. Such a description implies the usefulness of a developmental line of communication—a line which has intruded itself into several developmental lines. This is a line which extends from what might be termed autistic noncommunication to shared linguistic communication. While movement along such a line is generally taken for granted in the assessment of hearing children (except in cases with severe ego defects), it cannot be overlooked in children with sensory disabilities (including both deafness and blindness), children with certain physical anomalies which deprive them of motility or of the coordinated use of their voices (e.g., cerebral palsy), and children with neurological impairments (e.g., receptive or expressive aphasias, dyslexia).

While this developmental line needs careful elaboration, it is clear that as far as progress in the development of communication is concerned, Arthur was well behind his age-mates despite his inventiveness in the use of mimicry. This deviation in development was the result of many interacting factors. Primary, of course, was Arthur's deafness. Secondary to this were his parents' fantasies of changing Arthur into a "normal" (i.e., "hearing") child and their associated resistance to Arthur's use of sign language. A further contributor to the failure of development along this line was the inner, ambivalent battle about communication and control; he did not make full use of his communicative abilities because he was not at all sure that he wanted to communicate with the people who were important to him. Here the link between object relations and linguistic development made itself felt; for a child will learn to communicate with a loved object much more easily than with an ambivalently cathected object.

COMMUNICATION AND THE DIAGNOSTICIAN

I will bring this paper to a close on a practical note. As more and more deaf children in the United States are learning to communicate at an early age via the simultaneous use of oral and manual languages (so-called Total Communication), some of the deviations in development I have described in this paper should become less frequent. At the same time more and more diagnosticians will meet deaf children whose communicative abilities rely heavily upon one or another variety of sign language. It is crucial that a psychological diagnostician faced with a deaf child be able to communicate smoothly and effectively with that child. This means that the diagnostician must be skilled in the specific sign language used by the child; lacking this, he must (as a second-best alternative) involve an interpreter in his work with the child. Without such skills or assistance, the diagnostician would be in the same position as he would be in assessing a child who speaks a language with which the diagnostician is only vaguely familiar. His diagnosis would be imprecise and uncertain; both he and the child would leave the assessment feeling that they had not understood what had taken place between them.

Burnout in Professionals Working with Deaf Children

Kathryn P. Meadow

Burnout has become the new code word and fad among educators and other helping professionals. Suddenly, everyone is concerned about the diagnosis, prevention, and treatment of stress among teachers (Hendrickson, 1979; Mace, 1979, Sparks, 1979). In this current clamor of excitement about the negative personal and institutional consequences of stress, there has been little if anything in the journals related to deaf education that reflects similar concern. This is true despite the fact that most observers would probably agree that the factors creating stress in the normal educational environment are exacerbated in special education settings serving deaf children. For example, the work milieu of a residential school for the deaf was characterized by a school superintendent as early as 1902 as breeding "provincialism and despair" (Schlesinger & Meadow, 1972, pp. 200).

Despite the changes in deaf education over the years, this depressing commentary may still reflect reality in some sense. According to several consultants, despair in deaf education settings can stem from the low levels of achievement attained by students. The discrepancies between anticipated and actual educational achievement levels often create feelings of guilt and anger among professionals trained to work in deaf education. The many conflicts within the field of deaf education—around methodology and communication—also create a great deal of stress.

Researchers working to identify sources of job satisfaction among community mental health workers identified four sets of factors related to frustration and work alienation. These might be transferred to a consideration of the situation in deaf education as well:

> (1) a feeling of inadequacy in performing many activities, especially those for which the staff had received poor training and supervision . . . (2) a lack of direct and immediate feedback concerning results in many work activities; (e) excessive paperwork; and (4) role conflicts, poorly defined objectives, sudden changes in personnel and roles, the need to consider constantly and deal with "politics," and other organizational issues (Cherniss & Egnatios, 1978, pp. 311).

Where other groups of teachers and helping professionals are concerned, a good deal of information has by now been accumulated about the extent of burnout and the consequences. It was in the hope of adding some data in the field of deaf education that the present survey was undertaken.

METHOD

Subjects

The subjects participating in the research were 240 persons associated with deaf education in a professional capacity. Most (N = 183) were persons attending the Annual Eastern Regional Conference for Educators of the Deaf held at the Pennsylvania School for the Deaf in November 1979. The remainder (N = 57) were professionals associated with the Kendall Demonstration Elementary School at Gallaudet College. Characteristics of the survey participants are summarized in Table 1. This shows that three-quarters of the respondents were women. Average age was about 33 years, and

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Table 1. Characteristics of Survey Respondents: Sex, Age, Hearing Loss, Marital and Family Status, Type of School, Job Classification, Years in Current Job, Years at Current School, Years in Current Career (N = 240).

Sex:	
Male	25%
Female	75
Age:	
Mean	32.6 years
s.d.	9.2 years
Hearing loss:	
None	83%
Some	17
Marital status:	
Married	60%
Unmarried	40
Family status:	
Children at home	34%
No children at home	66
Type of school:	
Residential	50%
Demonstration	29
Day	8
Religious	3
Non school	8
No response	3
Job classification:	
Classroom teacher	43%
Special subject teacher	9
Supervisor-admin.	11
Support specialist	22
Aide or dorm worker	13
Other or no response	2
Time associated with deaf education:	
Average time in current position	4.25 years (s.d. 4.1)
Average time in present school	5.0 years (s.d. 4.7)
Average time teaching HI students	7.0 years (s.d. 5.9)

17% had some degree of hearing loss. More than one-half were married, and about one-third have children living at home. Half the respondents are associated with residential schools; about 30% work in demonstration schools (either the elementary or the secondary schools at Gallaudet College); 8% work in day schools or programs; 3% are associated with religious schools for the deaf; and 8% are associated with noneducational agencies or institutions. Almost half the respondents are classroom teachers; other job classifications include special subjects teachers (such as physical education and home economics), administrative positions, support specialists (such as audiologists, counselors, social workers), and teacher aides or dormitory workers. The average time respondents had been in their current position was 4.25 years, although they had spent an average of 5 years in their present school and had been teaching hearing-impaired students for 7 years.

Instrument

Persons attending the conference were asked to complete the Maslach Burnout Inventory as well as a sheet containing demographic information and four supplemental questions related to career motivation and job satisfaction.

The Maslach Burn-out Inventory (MBI) consists of a series of 25 statements designed to reflect experienced burnout. Based on responses collected from 1,025 persons in a variety of occupations, four factors or scales were identified and labelled as follows: Emotional Exhaustion (EE); Depersonalization (DP); Personal Achievement (PA); and Personal Involvement (PI). (See Maslach & Jackson, 1979, for a detailed description of the construction of the Inventory and for information on validity and reliability measures. I am indebted to these authors for giving their permission for the use of the MBI in the present study and for providing unpublished data for comparative purposes.)

Respondents are asked to define the frequency with which they experience the states described in each statement (from "never" to "daily") and the intensity of their experience (from "very mild, barely noticeable" to "major, very strong"). In an effort to simplify the Inventory and to shorten the time required for completion, only the frequency measure was included in the version distributed to the present group of respondents. In addition, the word "recipient" employed by Maslach and Jackson was changed to the more specific "student" for this study.

Table 2. Burnout-Inventory Scores: Teachers of Deaf Children and Teachers of Nonhandicapped Students.

	Teachers of deaf students		Teachers of nonhandicapped			
	X	s.d.	X	s.d.	*t*	*p*
Emotional exhaustion	2.83	1.35	2.21	1.26	2.83	<.01
Depersonalization	1.21	1.08	1.02	.88	1.08	n.s.
Personal accomplishment	4.60	.96	4.74	.64	.98	n.s.
Personal involvement	3.08	1.25	2.80	1.21	1.36	n.s.
(N)	(103)		(56)			

FINDINGS

Comparisons of Teachers of Deaf Children and Other Teachers

Are teachers of deaf students more likely to experience burnout than teachers of nonhandicapped students? Table 2 indicates that this is, indeed, the case. It will be seen that the teachers of deaf students scored significantly higher on the scale reflecting Emotional Exhaustion (p<.01). Differences on the other three scales were not significantly different, although teachers of deaf students gave responses to Inventory statements indicating a greater tendency to "depersonalize" the children in the classrooms, to have less sense of personal accomplishment, and a greater sense of personal involvement, when compared to the teachers of nonhandicapped students participating in the Maslach/Jackson study.

Job Classification and Work Environment

It would be expected that an individual's work role or job classification and the type of work environment would influence the degree of job-related stress. Table 3 shows that this is indeed the case for the deaf education personnel who participated in the survey. Part A of Table 3 shows that classroom teachers experience the greatest emotional exhaustion in connection with their job, followed in turn by spe-

Table 3. Burnout Inventory Scores, Deaf Education Personnel in Various Jobs (Part A) and Work Environments (Part B).

	(N)	EE	DP	PA	PI
A. School role					
Classroom teacher	(103)	2.83	1.21	4.60	3.08
Special subject teacher	(21)	2.52	.89	4.56	2.29
Supervisor	(12)	2.25	.94	4.32	2.84
Administrator	(15)	2.34	1.33	4.78	3.06
Teacher aide/dormitory	(31)	2.16	1.27	4.95	3.13
Support personnel	(53)	2.11	.86	4.20	2.37
F (6,227) =		2.19	1.34	1.13	2.78
p <		.04	N.S.	N.S.	.01
B. Work environment					
Demonstration school	(69)	2.73	.97	4.33	2.59
Residential school	(119)	2.51	1.25	4.53	2.98
Day school/program	(20)	2.37	1.24	4.41	2.41
Nonschool setting	(18)	2.06	.93	4.58	2.96
Religious school	(7)	1.42	.11	4.92	3.43
F (4,228) =		2.28	2.93	.79	1.94
p <		.06	.02	N.S.	(.11)

cial subject teachers, administrators, supervisors, teacher aides and dormitory personnel, and support staff (e.g., audiologists, counselors). These differences were statistically significant (p = .04) as were the differences on the "personal involvement" subscale (p<.01).

In the latter scale, teacher aides and dormitory workers score highest for involvement with students, followed by classroom teachers, administrators, supervisors, support personnel, and special subject teachers. Differences among the various groups on the scale measuring personal accomplishment are not significant. However, it is interesting to note that teacher aides and dormitory workers score highest on this scale, followed by the classroom teachers. One might speculate about the similarities and differences in the job roles and relative scoring patterns of dormitory/aides and classroom teachers. Of the six personnel groups, these two have the most intensive day-to-day contact with students. They have the top scores for both personal involvement with students and for a sense of achievement in their work. However, they fall almost at opposite ends of the continuum in their sense of job burnout (as defined by the scale labelled emotional exhaustion).

What might be the reason for these apparently different responses to intensive student contact? Perhaps dormitory personnel are able to see more results from their work efforts in terms of the student "improvement" that is the definition of their job, compared to the classroom teachers. The social development, self-help skills, independent living skills, and behavioral adjustment that trained child care workers aim for can improve dramatically for students in good residential programs. These skills also develop through the maturation that comes with age. For classroom teachers trained to deal primarily with the improvement of academic skills however, deaf students present a challenge that often seems overwhelming. The well-known and often-cited slowness of growth in educational achievement in deaf students can discourage their teachers and lead to the frustration and self-doubt that may well be reflected in high rates of burnout or emotional exhaustion.

In Part B of Table 3, it will be seen that personnel in the two demonstration schools (Kendall and Model Secondary School for the Deaf at Gallaudet College) appear to experience the greatest degree of emotional exhaustion. These are followed by those working in residential schools, those in day schools or programs, and those in nonschool work settings. The seven respondents in religious school settings had extremely low scores and ranked last in the five work environment categories. These persons from the religious setting also showed the least tendency to "depersonalize" their students felt the greatest sense of personal achievement and the highest degree of personal involvement of any of the work environment grouping

Personnel in the two demonstration schools who responded with the highest feelings of job-related stress also showed the least personal accomplishment in their work (differences on this dimension were not statistically significant, however). Demonstration school personnel did not show the same tendency to depersonalize students, particularly compared to residential school personnel who had the highest scores on that dimension, reflecting a comparatively greater tendency to depersonalize (p = .02).

Demonstration school personnel at Gallaudet tend to feel that the requirements of their jobs are very diffuse. They are expected to perform many functions in addition to those of their primary job descriptions. In addition, they often express stress related to the actual demonstration function of their school setting, feeling that the entire profession of deaf education is inspecting their efforts and their results. In spite of administrative efforts to smooth the effects of "living in a goldfish bowl," the stress of the situation continues to be expressed.

Age and Job Experience

"Common sense" tells us that the longer a person experiences a stressful situation, the more felt stress would be expressed. Table 4 shows the mean scores for "emotional exhaustion" of respondents in four different age groupings. Differences among the four groups are, indeed, highly significant (p<.001). However, it is not the youngest age group that expresses the least emotional exhaustion but rather the oldest age group—those respondents who were older than 35 at the time of the survey. Those ages 21 through 26 had the next lowest mean scores, those ages 31 through 35 ranked third, and respondents aged 27 through

Table 4. Age and Length of Time in Deaf Education in Relation to Inventory Score for Emotional Exhaustion.

	Emotional exhaustion	
A. Age	$(\bar{X})$	(N)
Ages 21–26	2.17	(56)
Ages 27–30	3.02	(53)
Ages 31–35	2.72	(51)
Ages 36–61	2.09	(56)
F (3,212) =	6.59	
p <	.001	
B. Number of years associated with deaf education		
1 or 2	2.10	(51)
3 or 4	2.56	(40)
5 or 6	2.65	(42)
7 to 10	2.90	(49)
11 or more	2.38	(49)
F (4,226) =	2.59	
p <	.04	

30 expressed the highest degree of emotional exhaustion, as measured by the Maslach Inventory. (Differences in scores on the three other scales did not approach significance either for age groups or for respondents with differing job tenure.)

Part B of Table 4, showing the relationship of number of years of association with deaf education in relation to feelings of emotional exhaustion, reflects essentially the same information as does the "age" table, with a slight variation: Respondents who have been in the field for only a year or two express the least emotional exhaustion, and those who report between 7 and 10 years of experience express the most. (Those with 11 or more years of experience rank second, next to the neophytes.)

Again, we can only speculate about the reasons for the unexpected (low) scores of respondents in the older age and more lengthy tenure groups. We might guess, however, that this group represents those staunch souls who remain in the field after their more exhausted colleagues have retired or have changed careers. We should be tapping the experiences of these more senior teachers and administrators to learn what kinds of resources have enabled them to maintain their equilibrium and continue to work with minimal feelings of stress. An additional notion that comes from examination of Table 4 is the importance of working with teachers and others during the "critical period" in their careers. This would appear to be the group between the ages of 27 and 30.

Personal Associations with Deafness

It might be assumed that past and present associations to deafness that are personal rather than professional in nature might make a difference in an individual's response to a job that is inherently stressful. That is, if a teacher is deaf or has deaf parents, there are several ways in which the level of felt stress might be lower in working with deaf children than for an individual who had no associations with deafness prior to graduate school or job training. For example, it is likely that the former group had prior knowledge of sign language and is perhaps more fluent and more comfortable in that communicative mode. Thus, there would be less strain in communicating bimodally throughout the day: The motivation and therefore the rewards of working with deaf children might be somewhat more personal for individuals from backgrounds that include deafness.

Analysis of the survey data indicated that there were no differences in these subgroups of respondents for three of the four MBI scales (Emotional Exhaustion, Depersonalization, Personal Involvement). Differences on the Personal Accomplishment scale did not reach statistical significance but the trends were in the predicted direction. These data are presented in Table 5. Thus in Part A of Table 5, we see that personnel with mild or moderate hearing losses have considerably greater feelings of personal accomplishment from their jobs than do those either with normal hearing or with profound deafness. Part B of Table 5 shows that respondents with deaf parents have somewhat higher scores on personal accomplishment than do other respondents and that those with other deaf family members have slightly higher scores on this scale than do those respondents with no deaf family members. (It would be of interest to collect interview data to test this relationship and to attempt to learn about the derivation of this "support" should additional data confirm these trends.)

Table 5. Personal Association with Deafness in Relation to Inventory Score for Sense of "Personal Accomplishment" in Work; (A. Individual Hearing Status, B. Deaf Family Members).

	Personal accomplishment	
A. Hearing status	$\bar{X}$	(N)
Normal hearing	4.48	(196)
Mild or moderate loss	5.16	(14)
Profound loss	4.59	(26)
$F(2,233)$ =	2.16	
p =	.09	
B. Hearing status of family members		
No deaf family members	4.46	(188)
*Deaf parents	4.93	(17)
Other deaf family members	4.57	(33)
$F(2,235)$ =	1.74	
p =	.18	

*Subjects with deaf parents were included in this category whether they did or did not have other deaf relatives.

Sources of Support from Family Life and Personal Values

An attempt was made to examine the possible influence—either positive or negative—of factors in the personal situations and value systems of respondents that might be related to the degree of stress felt in connection with their jobs. Variables that were examined in this context were:

1. Marital status;
2. Presence or absence of children at home;
3. Identification with an organized religious group;
4. Degree of expressed religious belief;
5. Expressed motivation for entering the field of deaf education;
6. Degree of expressed job satisfaction.

None of the first five of these variables were found to have significant relationships with the four scales so the data are not included in this paper. (Persons with a particular interest in this topic may have copies of the tables by writing to the author.)

The sixth variable included in this conceptualization of "personal values" (degree of job satisfaction) was highly related to each of the burnout scales, as will be seen in Table 6.

Table 6 reflects responses to a question on the survey form: "Have your expectations for job satisfaction been met?" Four response choices were given: "Yes! I am content;" "Yes, to some extent;" "No, not completely;" and "No! I am disappointed." The first thing that should be noted about responses to this question is that fully 80% of the respondents indicated that they were to some extent satisfied with their jobs. Only 3% gave the most negative response to the question. Within the context of these responses, however, it will be seen that job satisfaction or contentment is related in a linear way to mean scores on each of the four scales of the MBI. For example, those who are most content with their jobs have a mean score of 1.60 on the scale reflecting "Emotional Exhaustion," compared to a mean score of 4.61 for those indicating the greatest disappointment with their job. Similarly, those who indicate job contentment have a low-mean score for the Depersonalization scale and have a strong sense of personal achievement in their work. The scores on the scale labelled Personal Involvement show a reversal for the first two groups.

Table 6. Burnout Inventory Scores, by Degree of Job Satisfaction.

Responses to question: "Have your expectations for job satisfaction been met?"		(N)	EE	DP	PA	PI
Yes! I am content		(71)	1.60	.62	4.80	2.85
Yes, to some extent		(120)	2.67	1.12	4.50	2.70
No, not completely		(38)	3.17	1.63	4.19	3.27
No! I am disappointed		(7)	4.61	2.80	3.31	3.38
	$F(3,232)$ =		27.50	18.89	6.62	2.21
	p <		.001	.001	.001	.09

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Table 7. Burnout Inventory Scores, by Sense of Power in Work Situation.

Responses to question: "Are you given the opportunity to influence your own work situation or assignment?"	(N)	EE	DP	PA	PI
Yes! Quite often	(106)	1.89	.77	4.74	2.75
Yes, occasionally	(89)	2.71	1.16	4.40	2.83
No, not very often	(22)	3.68	1.80	4.05	3.05
No! Hardly ever	(12)	3.99	2.10	3.90	3.08
F (3,225) =		26.41	13.58	5.17	.49
p ≤		.001	.001	.002	N.S.

Sense of Power in the Work Situation

Finally, respondents were asked about the degree to which they felt capable of influencing their own work situation or job assignment. Table 7 shows that this was an extremely significant correlate of scores on three of the four MBI scales. Respondents were asked: "Are you given the opportunity to influence your own work situation or assignment?" The forced choices were: "Yes! Quite often;" "Yes, occasionally;" "No, not very often;" and No! Hardly ever." Forty-six percent of the 229 respondents answering this question said that they influence their work situation "quite often." These persons also expressed the least emotional exhaustion, the least tendency to depersonalize students, and the greatest sense of personal job accomplishment. Those who responded that they had "occasional opportunities" ranked second on each of these three scales, followed in turn by those who said "not often" and finally those who felt they "hardly ever" influence their work situation.

Scores on the fourth subscale—personal involvement—are of some interest. It will be seen that positive responses to job influence are inversely related to mean scores on this subscale, indicating that a lesser degree of personal involvement may be more desirable. Another way of phrasing this notion is to say that positive answers to the questions included in this subscale may reflect over-involvement with students of a quality; i.e., perhaps, negatively related to the mental health of the teacher or specialist. This kind of over-involvement is illustrated by an author discussing burnout among child-care workers:

> Potential burn-out can be signaled by the worker who begins to merge himself and his life with the institution. This is a particular danger for the young worker. The staff member may begin to spend increasing amounts of off-duty time at the agency. He may volunteer to perform special functions with children that are omitted in normally understaffed daily programming . . . there may be frequent requests to invite children home. These can be signs that the appropriate boundaries between a caring worker and his agency and clients are beginning to break down . . . (and) that the worker is beginning to rely on the institution or agency to meet personal needs beyond those one usually anticipates from occupational involvement (Mattingly, 1977, pp. 133).

While some degree of personal involvement in one's job seems necessary for optimum performance, the extent of the involvement, the form it takes, and the individual's ability to distance himself or herself from the job after working hours are questions deserving of concerted thought in addition to additional systematic study by professionals in deaf education.

DISCUSSION

It would seem that the problem of stress and burnout among professionals working in educational settings for deaf children is one that needs serious attention. Throughout the general educational establishment there has been accelerating concern for this phenomenon. Our data indicate that the problem may be even more severe in the special educational institutions serving deaf children.

The survey reported in the preceding pages was limited in scope and coverage and is based on a very brief questionnaire that does not allow for indepth analysis of some of the important issues that are raised. However, based on the limited data, it would seem that there is a "critical period" in the career of teachers of deaf children when they are likely to experience particular feelings of stress. Teachers and others with the most intensive day-to-day contact with students are most likely to succumb to burnout, as do those personnel located in demonstration schools and residential schools. Attempts were made to determine possible factors in home or family situations leading to greater or lesser ability to cope with job stress but none of the attempts lead to promising information. It is impossible to say whether this is a function of the quantitative nature of the data collection making degrees of meaning of various situations untapped, or whether there are few nonjob factors that alleviate stress that is experienced in relation to work.

A number of questions are raised by some of the data collected. For example, the relationship between original motivation to seek a career in deaf education, level of personal involvement in work, and feelings of burnout and personal accomplishment would appear to be extremely complex and are probably not amenable to the brief survey questions that were used here. They are, however, questions that are worthy of additional study. A few persons in the field have raised the issue of the effect of "missionary zeal" on the educational process. I have suggested elsewhere (Meadow, 1980) that the motivation for missionary work with the deaf may be partly responsible for the "religious zeal" with which many persons in the field approach questions related to educational methods and communication modes.

These are questions with important implications for understanding personnel who work with deaf children, and they can lead to changes and improvements in the field. However, the data with the most immediate implications are those related to feelings of power to change or to influence one's own job situation or setting. This is an area that should be amenable to administrative action in a variety of ways. The encouragement of democratic organizational structures may be one way of alleviating stress and burnout among professionals in deaf education.

Measures for the Prevention and Cure of Stress and Burnout

The major key to the prevention and cure of stress is the provision of support systems. Professionals need to work toward building their own support networks, and administrators need to be available to help in the process. (Administrators, too, need support—they are not immune from the various stress-building influences that affect educational institutions. In some ways those who feel most powerless can be those who know "the buck stops here.")

There are steps that can be taken to reduce stressful situations. Most of these steps involve change of some kind: a change in pace, a change in pattern, a change in place, situation, or approach. It is somewhat paradoxical that "rapid change" is listed as a possible factor contributing to stress and that change is also listed as a preventive measure. However, before any program can be instituted, burnout must be recognized as an existing or a potential problem.

It also is necessary to recognize the degree of potential danger burnout poses for the individual and for the school and that it is possible to take constructive measures to reduce stress. Teachers need opportunities to remember their reasons for originally entering the field, to find ways of maximizing their achievements, to feel pride in past successes, to know that feelings of frustration and discouragement are shared by many colleagues. Conscious, school-wide efforts by administrators to help teachers and staff members to build these feelings can yield rich rewards in terms of increased morale and generate renewed enthusiasm for jobs. (See Hendrickson, 1979; Miller, 1979; Sparks, 1979 for additional practical suggestions for combating burnout.)

Schools where staff development is ongoing can utilize time and personnel devoted to that process for building support. School-wide activities that lead to enriched interaction, to group exercise activities, to opportunities for sharing can be a good investment if they are viewed as "mental health" activities in order to give teachers a new perspective on their careers. Some schools have a policy of "mental health days" that faculty and staff can take when they truly feel worn out from the classroom.

Change in job assignment can do much to create new attitudes about work. This can present some administrative problems but it may be worth the degree of disruption caused. The Kendall Demonstration Elementary School has experimented with temporary 1-year appointments for classroom teachers to different kinds of nonclassroom activities. These appointments include assignment to the Research Division to work on a specific project and to the Outreach Unit to develop ideas for teaching materials that can be disseminated to the field. A teacher exchange program has also been started: one Kendall teacher spent a year in Trinidad, another a year in Hawaii, with teachers from those programs participating in the Kendall program for similar periods of time. Most schools may be unable to consider such long-distance exchanges but less ambitious exchanges might be arranged.

The need for recognition of teaching achievement is a real one. Teachers need to hear from their colleagues, their students, parents, and administrators that someone knows and cares about the time, effort, and creativity that go into lesson planning, field trips, and projects.

Teachers need time out from classroom interaction during the day. Lunch duty may be a necessary chore for some teachers, but there also are other kinds of solutions to this task. For example, older students could be asked to serve as lunchroom monitors for younger children; parents might be asked to organize a volunteer squad to relieve teachers during the day.

Staff meetings can be important morale-builders, particularly if they are designed with this specific purpose in mind. Self-determination of activities by faculty and staff help in creating a feeling that they exert some control over working conditions.

School personnel should be encouraged to watch themselves and each other for signs of burnout. Sudden irritability and negativism on the part of a generally good-natured colleague are danger signs. This kind of behavior may surface either at school with students and colleagues or at home with children and spouses. Physical exhaustion and poor exercise, diet, or sleep habits can contribute to, as well as being symptomatic of, stress that leads to burnout.

Finally, the enlistment of a mental health consultant, either for short-term workshops or for ongoing meetings with small groups of school personnel, can benefit the overall climate of a school. Most schools and programs for deaf children have resources and specialists at their command that could be channelled to "burnout prevention" if school administrators see these activities as high priority. It is usually worth the effort. One author, writing about burnout in a free clinic setting, says, "It is precisely because we are too dedicated that we walk into a burn-out trap. We feel a pressure from within to work and help and we feel a pressure from the outside to give" (Freudenberger, 1974, pp. 161). It is the most dedicated, talented, hard-working teachers who are most likely to suffer from burnout but they are certainly worth saving for long years of work to benefit deaf students.

Shifting attention back to the parents of deaf students, it appears possible that we can do a better job of orienting those parents to returning to the teachers some of the support that teachers have given to them, especially in the early years of their experience with deaf education. Parent-teacher organizations could well devote some time to devising mutual support systems where each group realizes the frustrations and contributions of the other. The joys of parenting and of teaching special children match the difficulties that exist. Too often stress leads participants to lose sight of the benefits and rewards of their parent/teacher roles.

The fact that educators and parents of deaf children survived the difficult decade from 1970 to 1979 augurs well for the coming decade as well. Reduction of stress can lead to fewer battle scars.

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Sign Language, Power, and Mental Health

by Raymond Trybus

What I present in this paper is really only a metaphor and symbol, a way to recall yet one more area in which Bill Stokoe has led the rest of us. For in this matter of Sign Language and mental health, Bill has opened the major highways and drawn the initial maps, as he has in so many other realms. We who come after him can pave and smooth, build secondary roads, and add the color coding to the maps, but the main features are already there.

Power and Significance in Mental Health

The major issue that I would like to discuss has been raised and studied by Bill Stokoe and his co-workers in a very broad and basic

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way. Perhaps the best and simplest statement of this issue, however, can be found in Schlesinger (1978), who was building on earlier work by Coopersmith (1967): *power* and *significance* are major ingredients in self-esteem, and thus in mental health or well-being. Schlesinger takes the point of view that mental health is something more than the absence of mental illness. Instead, it is a condition of well-being which is related to a set of feelings about oneself, about the world, and about other people. A sense of one's power, that is, one's ability to influence and control others, is one of the major ingredients in Schlesinger's positive concept of mental health. Another major component is a sense of significance, which means the ability to obtain acceptance and affection from others simply because one exists.

Psychologists and psychiatrists, especially those who engage in clinical practice, look for the roots of well-being or of illness in an individual person's background and experiences in life. Certainly this is valuable and necessary, particularly for clinical purposes. However, I believe it is useful also to consider these same issues of power and significance on a collective or social basis. In other words, apart from any specific individual, what are the social conditions of deaf people's lives which provide them with the sense of power and significance needed for mental health and well-being? In this paper we shall look at social issues, at the position of deaf people as a group in contemporary society, and at ways in which the position of deaf people as a group affects the mental health and well-being of the individuals within the group. As we will see later in the paper, the language of a group, and the way in which that language is treated by the group itself and by others, is one of the most significant factors in the position of a group of people within society at large. Following the broad leads of Bill Stokoe, then, this paper will examine issues of the signed languages of Deaf communities, the communities' sense of power and significance, and consequently, the mental health and well-being of individuals within those communities.

The Meaning of Language in a Community

How much difference does a language really make to a community? Some historical examples show that it makes all the difference in the world. Kelman (1972) speaks of "individual and group needs for finding roots and a deep appreciation of the emotional, esthetic, and practical significance of a group's unique cultural products—

and particularly of its language—in confirming its sense of rootedness." Similarly, Fishman (1972) notes, "the view that a people's individuality resides in its language is very old . . . language has been regarded as a defining characteristic of a nationality, within the sphere of the Judeo-Christian tradition, since Biblical days." Fishman goes on to explain that a language has traditionally been considered one of the absolutely essential characteristics of a group which is trying to achieve recognition as a legitimate entity, as a nation. A language and a history, he says, are the two first needs of a people. In fact, he goes so far as to say that, "the essence of a nationality is its spirit, its individuality, its soul. This soul is not only reflected and protected by the mother tongue but, in a sense, *the mother tongue is itself an aspect of the soul*, a part of the soul, if not the soul made manifest."

If a people's language is so central to its very being, then the loss of its language must be among the worst disasters that can befall it. This point of view has been held for a long time. Davies (1945, originally written in 1845) said:

> To impose another language on . . . a people is to send their history adrift . . . to tear their identity from all places . . . to lose your native tongue, and learn that of an alien, is the worst badge of conquest—it is the chain on the soul . . . a people without a language of its own is only half a nation. A nation should guard its language more than its territories—'tis a surer barrier, a more important frontier than fortress or river.

Many more examples could be presented. I think it is clear at this point, however, that communities of all sorts down through the ages have considered their language to be one of their major assets, and often their most precious possession.

Language Control as Power: External Forces

If a language is such an essential part of a community, then clearly the control of that language must be one of the major ways of controlling the community and the individuals within it. To the degree that individuals define themselves as parts of such a community, control of the community constitutes control of the individuals who form that community. Control of a community through control of its language can occur from within a community or from outside of it. If control comes from outside, then the community and its members are subjected to external power, and will develop a corresponding sense of powerlessness themselves. On the other hand, to the degree that the control of a community through its language occurs within the community, the community and its members experience a feeling of self-direction, power, and significance in controlling their own destiny.

There has been considerable study of power and significance with respect to language, as these issues concern nations and the impact of nationalist movements throughout the world. O'Barr (1976) says, for example, "Those involved in the formulation and realization of language policies are quick to recognize the enormous power over people which stems from the ability to manipulate their language." It is not by accident that powerful or conquering groups down through the ages have sought, with varying degrees of success, to impose their own language on minority people. One of the prominent ways of enforcing such control of language is through the educational system, which forms and influences children during their most impressionable years. Leibowitz (1976) says directly:

> The thesis to be presented here is simple: language is primarily a means of control. I believe this proposition is generally true, as true as 'language is a means of communication' or 'language is a means of social intercourse' or the host of other definitions which come to the fore when language is discussed . . . when politics and language relate most openly, we can see more clearly the use of language as a means of expressing power, as a way of controlling and manipulating people in society . . . language designation was almost always coupled with restrictions on the use of other languages; it was also coupled with discriminatory legislation and practices in other fields . . . .

In reviewing the history of education in the United States, Leibowitz indicates that in the early years, official policy was mostly neutral on the issue of language of instruction in school, with large numbers of German language and other non-English language schools flourishing in the middle 1800's. He then shows that, beginning in the 1880's, there was a shift to a heavy emphasis on English in the schools and in official policy generally. This shift was part of a movement which was largely intended to exclude new immigrants from participation in schooling, voting, and a variety of other rights ot citizenship. As an example of this period, Leibowitz cites the establishment of boarding schools for American Indian children that were located off the reservations, and had instruction in English:

> The purpose of this school became clear in the succeeding decades: to separate the Indian child from his reservation and family, strip him of

> his tribal lore and mores, emphasize industrial arts, and prepare him in such a way that he would never return to his people. Language became a critical element in this policy. English language instruction and abandonment of the native language became complementary means to the end.

Leibowitz concludes that this emphasis shifted again, beginning after World War II, to a new period of increasing tolerance of linguistic difference, and to some extent, even of encouragement of the use of languages other than English.

Language Control From Within: Language Planning

We have seen that a people's language is central and all-important, and that control of a people's language by outsiders is a disaster and a tragedy. And yet languages are living realities, not eternal, mystic entities. This fact leads to the need for what is called "language planning," which means the systematic development and expansion of a language to suit new times and circumstances, new challenges. When people are proud of their language, they try to ensure that it is used more and more widely. However, natural changes occur in all languages, as their users adapt to changing demands and to other languages used in the locale. Therefore, as a community takes charge of its language and attempts to promote its greater use, it is also setting forces in motion which will certainly change the language in a variety of ways.

But changes of this kind may be debasement of the original, "pure" strain of the revered language. One of the common problems when attempts are made to develop or rejuvenate a language, is that certain intellectually and culturally elite groups within the language community typically use an expanded and therefore "contaminated" version of the language. The language patterns used by such elite groups simultaneously define "high" culture and those who are its custodians. In the late 1700's, some of the leading scholars in Germany argued that their language had been debased because it included many foreign (especially French) expressions and constructions, when used by the educated people. They felt that to use such foreign expressions was to claim that the German language in its pure form was not capable of expressing learned and higher thoughts. Similar complaints have been made about many of the major languages as they incorporated words, expressions, and constructions borrowed from other languages.

Because languages are used by real people in real situations, new emphasis on the development and expanded use of a language is almost inevitably a part of a broader rearrangement of social roles and social structures. Therefore, the rejection of foreign borrowings in a language is also a rejection of the educated elite, who were the primary users and developers of such foreign borrowings. At a time of social upheaval, when the movement was to unseat the powerful and prestigious elite groups, and to place greater emphasis on the power of *all* the people, people frequently rejected the educated form of the language with its foreign borrowings, and called for a return to the purity of the language as it once was. In these situations, people frequently focused on studying the national language as it had been in the past, before foreign influences and models had begun to spoil the authentic linguistic heritage from past generations. More and more, then, the leaders of the community seeking to reestablish its authenticity would locate groups of users of the national language who have been least exposed to recent developments and foreign borrowings, and to define their usage of the language as the pure form, to which all members of the community should return. Many nationalist movements were therefore accompanied by extensive study of the national language as it had been used in the past, and as it is used in the present by those groups of people who have had the least contact with modernizing and therefore "corrupting" influences.

There is a significant contradiction here. On the one hand, those who are leading the community to a new self-definition and a new awareness of their own power emphasize the need to rediscover the "natural" and historic state of their language and attempt to return current linguistic practice to those roots. At the same time, as Fishman (1972) notes:

> The users of developing languages are particularly aware of their lexical shortcomings . . . the developing language is always relatively impoverished when it comes to the more abstract subtleties of imported or recently innovated higher learning and fashionable society. One sign of the development of the language is its growth in exactly these respects.

Within communities striving for self-definition and power, therefore, one can expect to see evidence of this contradiction. On the one hand, there is an emphasis on return to the pure sources of the community's language; on the other hand, there is a need to adapt and enrich the language to handle new social and intellectual needs which did not exist when the community's language originally developed.

Deaf Communities and Their Languages: Unique Communities

One of Stokoe's major contributions has been his convincing argument that deaf people can be usefully studied as linguistic and cultural communities, and not only as unfortunate victims with similar physical and sensory pathologies. This definition of deaf people as being those who belong to the Deaf community, the chief badge of which is the use of its own language, American Sign Language, is a view which is in substantial agreement with very ancient traditions. We saw, earlier in this paper, evidence of many historical parallels. It is clear, however, that the Deaf community is a different sort of entity than are most ethno-cultural communities. Although the Deaf community possesses its own language and other characteristics of such groups, it exists to a much greater extent as the result of "voluntary" affiliation rather than birthright. The most recent available information indicates that less than 3% of deaf children are descended from two deaf parents (Karchmer, Trybus, & Paquin, 1978). Only this tiny minority, whose parents are largely users of ASL, have ASL as a native language and are members of the Deaf ethno-cultural community as a matter of birthright. Extrapolating the figures obtained by Karchmer *et al.* to the national population, one would expect to find 2,200 to 2,500 deaf children in this situation. There is a larger, though still small, group of deaf children who have one hearing and one hearing impaired parent. This group constitutes 10% of the group studied by Karchmer, Trybus, and Paquin, and would suggest that there are about 7,500 such children nationally. However, the available data indicates that these families with one hearing and one hearing impaired parent are socially and culturally more similar to families with two hearing parents than they are to families with two deaf parents. The overwhelming majority of hearing impaired children, numbering approximately 65,000 nationwide, have two hearing parents. The vast majority of deaf people, therefore, have not had two deaf parents and could not therefore have ASL as a "native" language. Such persons have become members of the Deaf ethno-cultural community by a process of choices made over a lifetime. To say that this majority does not have ASL as a native language is not to imply that they do have English as a native language. The communication difficulties between deaf children and their parents are very well known, and it may well be that such individuals, or a large proportion of them at any rate, cannot be said to have any language as truly a native language. It is also true that a significant proportion of this majority may learn ASL fluently through peer interactions at school and elsewhere, and consider and use ASL as their "primary" language. The point is simply that the process of acquiring a primary language at age 4 or 6 or 8 from peers is not the same as the process of acquiring the language of one's parents from the day of birth.

What does it mean to call membership in the Deaf community "voluntary"? It does not mean that the choice to affiliate with the Deaf community is made easily or without significant influences and consequences. But it does suggest that the process of affiliating with the Deaf community is not identical with the process of becoming a member of the Black community, for example: that affiliation is given, not chosen, irrevocably from birth and even before. In the past, the choice to affiliate with the Deaf community was substantially influenced by attendance at special schools for deaf children. Even though many of these schools did not use Sign Language in instruction, they still provided a conducive social atmosphere in which the native ASL minority could, through peer influences, encourage the development of a "Deaf identity" and provide a ready replacement for the native language many deaf children never experienced. At present, however, the majority of deaf children do not attend such special schools, but receive their education in local public schools. At the same time, the large majority of those deaf children who have two deaf parents continue to attend the special schools for deaf children. Their peer influence of socializing deaf children into the Deaf community, therefore, is being limited to a smaller and smaller proportion of deaf children as time goes on. Although deafness imposes the need for a visual-gestural communication system and is not itself a matter of choice, as time goes on affiliation with the Deaf community will be more and more a matter of conscious choice during childhood, adolescence, or young adulthood.

Because deaf people do not belong to the Deaf community in the same automatic and irrevocable way that Black persons belong to the Black community, it is probably not surprising that the Deaf community has developed a sense of cohesiveness, power, and significance so slowly. This issue of "voluntary" affiliation, influenced by educational and childhood history, may also account largely for the multiplicity of schisms and internal disagreements over the very central feature of language. For example, consider the group which identifies itself as "oral deaf adults," and which makes rejection of the cultural language its defining characteristic. Consider also how a number of better educated deaf adults reacted to Stokoe's initial claim that ASL was an entire language of its own: "We do not use some foreign language, but use proper English in a form that is appropriate for our sensory capacities."

Deaf Communities and Their Languages: Parallels With History

Although deaf people form Deaf communities which are unique in many respects, let us see what the parallels are to the language situations in other national groups.

As Leibowitz indicated, the period since World War II has seen an increasing tolerance and even encouragement of linguistic differences in education and in society at large in the United States. Thus the current emergence of American Sign Language as an accepted and legitimate language of a cultural minority is one of many similar developments that fit into a background of increasing general tolerance of cultural and linguistic diversity in the United States. This is certainly a hopeful situation, since it indicates that the general social climate is likely to support, rather than hinder, the further emergence of the Deaf community and its American Sign Language as a legitimate and respected group.

It is clear that the current revitalization of interest in ASL is part and parcel of a broader "deaf power" movement, which is seeking expanded power, significance, and self-determination for members of the Deaf community. This closely accords with Fishman's finding that nationalist movements are usually accompanied by extensive periods of study and renewed interest in the language, literature, and culture of the emerging group. The work of Stokoe and the others who have followed thus parallels the work on French, German, Gaelic, Tagalog, and many other languages at comparably critical periods in the development of those national groups.

Considering Leibowitz's example of the boarding schools for American Indians, it is easy to see similarities in the schools for deaf children: separating the child from his family, eliminating identification with tribal customs, emphasizing industrial arts, and preparing them in such a way that they would never return to their people. In the schools for deaf children, as in the American Indian schools, language has been a critical element in this policy. However, because of the "voluntary" nature of affiliation with the Deaf community, this example cuts both ways, and has therefore generated significant emotion in two opposite directions. For those children who came from a native ASL background or who adopted this language early on, the school's emphasis on English and oral communication prevents or removes the child from identification with the Deaf community, its ways, and its language. At the same time, as these schools began to use Sign Language, or to the extent that signing flourished unofficially as a means of communication among the children, the vast majority of hearing parents could see the school as separating their deaf child from them, and enculturating him into a language and community which was not theirs.

And so, much of what we see occurring now with the Deaf community and its American Sign Language is the repetition, with relevant modifications, of processes that have occurred again and again at other times and in other places with other languages. This broader historical context does not belittle these processes, but gives us a perspective from which to view events as they pass before our lives.

What Will The Future Bring?

Looking back through this brief review of the place of language in political and nationalist movements, and making the appropriate "translations" from the struggles of nationalist groups to the struggle of Deaf communities within the United States and other countries, what can we expect to see in the years ahead as the recognition of Sign Language and the development of deaf awareness rapidly proceed? We will continue to see repeated expressions of the beauty, the grace, and the ingenuity of signed languages, as the unique expression of the particular "soul" of deaf individuals and Deaf communities. Because of the visual rather than auditory nature of signed languages, we will see expanded examinations of the ways in which knowledge about signed languages expands the human consciousness, understanding, and appreciation of the rich variety of human communication.

We can expect to see more emphasis on codifying and creating a history and folklore of deafness, as evidence that the Deaf community has a past, and that much of what is best in the past is conveyed and preserved in the signed languages used by Deaf communities. This has, in fact, already begun. At the 1975 meeting of the World

Federation of the Deaf in Washington, D.C., and subsequently at the 1977 Special Conference of the World Federation of the Deaf in Copenhagen which focused on families with deaf members, there was a call for the preservation through video-taping and filming of jokes and folktales of Deaf communities from around the world. More recently, Gallaudet College has requested and received a planning grant to consider developing an encyclopedia of deafness and deaf people. The parallels with nationalist movements in Europe and throughout the world are incredibly close.

We can expect to see continued studies of American Sign Language among those groups of users who have been the least influenced by contact with users of English. The study of these relatively isolated groups will be part of the process of documenting the language in its purest and least contaminated form. At the same time, the signed language of more educated communities where the contacts with the products of other cultures and in particular with the English language have been much more extensive and intense, will be described as a "pidgin" Sign Language (a term which often carries pejorative connotations), rather than as a blend or as a natural evolutionary step in the history of the language. We will see, and are seeing, an increasing emphasis on the use of the older, "more authentic" Sign Language, rather than signing as it has been modified by the natural process of interaction with hearing culture and spoken English. This can be expected to produce some confusing and potentially divisive issues, bearing in mind the "voluntary" nature of membership in the Deaf community, and the fact that the vast majority of deaf children cannot claim Sign Language as a native language. We can expect to see a particularly concerted effort to define American Sign Language in such a way as to exclude those borrowings from the English language which are seen as prostituting the soul of Sign, and as adopting the speech of the invader. At the same time, borrowings from other foreign signed languages will be welcomed as a more authentic means of enriching the language and shaping it into a vehicle for high culture, literary discourse, and international exchange.

As all of these developments occur in Sign Language itself, and as Deaf communities throughout the United States see themselves increasingly as communities worthy of respect and self-determination, we can expect to see deaf people increasingly viewing themselves as having power and significance in the world, both as individuals and as collective groups.

Sign Language, Power, and Mental Health

And what has all of this to do with mental health? As I indicated at the beginning of this paper, a major element in mental health or well-being is a sense of self-esteem, a sense that one has some control over one's life and destiny; and a sense of power and significance is a major component of the feeling of self-esteem. Although psychologists and other mental health practitioners have traditionally looked within the individual for the sources of health or illness, and have focused on the internal psychic transactions of an individual, it is becoming more and more clear that both biological and social determiners have a major impact on the psychic state of the individual. We shall pass over the question of biological determiners for the present; our interest here is in the social determiners.

Epidemiological studies in the past, and careful attention to the mental health needs of ethno-cultural minorities more recently, have emphasized again and again that the relative status, power, and prestige of a group of persons within society at large has a major impact on the mental health and well-being of individuals within the group. Therefore, mental disturbance, depression, and the like are more often found among economically disadvantaged groups and among others who have at least partially internalized societal evaluations of themselves as inferior in one or more ways to the societal norm or ideal. As a group breaks out of its disadvantaged status and achieves societal power and recognition, mental disturbances within individuals decrease correspondingly.

A case study may give one example of how this dynamic may be expected to operate among deaf persons. Among the patients with whom I worked clinically some years ago was a young deaf woman who complained of anxiety and nervousness about the future, and an inability to make personal vocational decisions or progress. As our initial sessions probed into this problem, the young woman began to explain that a major component of her difficulties was that, as a result of her deafness, she was unable to comprehend or follow instructions in the English language. This, she indicated, meant that she was unable to profit from reading instructional and self-development manuals in her vocational specialty of accounting, as well as in a variety of other areas. For example, she could not understand written materials on the basic workings of automobiles and thus could not diagnose and remedy minor difficulties with her own car. In the course of our discussions, she acknowledged frequently that she was very fluent and respected as a master of Sign Language, and was in constant demand as a teacher and tutor of signing. However, she dismissed this as "kid stuff," and indicated that all that really mattered in life was the ability to perform linguistically in English. What became more and more apparent as our sessions continued was that her English language abilities were in fact very adequate. By all the formal and informal measures I was able to devise, she was perfectly able to read, understand, write, and speak perfectly grammatical, idiomatic English. There was, in fact, not the slightest factual basis for her complaint of inadequacy in English. It finally became clear that the source of the difficulty was that she had internalized a message which she had heard frequently during her years growing up: deaf persons depended for success on their mastery of English, but that at the same time deaf persons were very unlikely to be able to master the English language. At the same time, she dismissed her competence in American Sign Language as of secondary importance at best, as a kind of "crutch" for those benighted souls like herself who were unable to achieve mastery in the *proper* language, that is, English. This young woman's difficulty, in other words, was at root a deficiency in her sense of power and significance as a deaf person, which expressed itself most pointedly in her complaints of linguistic inability. God alone knows how many other deaf persons, to one or another degree, have experienced comparable feelings of personal failure, frustration, and inadequacy, with little or no factual basis for their self-deprecations. This is one of the clearest examples I know of the potential mental health consequences of a lack of power and significance, as symbolized linguistically. It is a situation which I expect to diminish rapidly and then disappear as Deaf communities struggle for and begin to achieve self-determination and linguistic self-respect.

Such effects to not occur automatically, of course. Several actions which can be taken by special education programs for deaf children and by their families may reduce and eliminate the kind of psychic situation described in the example. For one, school programs and school personnel will need to keep in mind a clear distinction among interpersonal communication, Sign Language, and English language. As for the two languages, it is entirely possible for children to learn both Sign Language and English, just as children in many other bilingual situations learn two languages side by side. Implied in the very meaning of learning a language is that there are beginning and intermediate steps which occur prior to full mastery of the intricacies of the languages. Therefore, deaf children learning Sign Language, English, or both, will by the very nature of things acquire each language over a period of time, and will therefore use neither language in its full and perfectly grammatical form during the developmental period. It is even probable that the rate of linguistic development will not be equal in the two languages, and therefore parents and teachers need to be aware of the child's developmental level in each of the languages. Equally important is remembering that *human communication is not limited to any language*. The need of children at all ages to communicate with their parents, their peers, and their teachers must take precedence over their learning of any and all languages. None of the people in the deaf child's environment can afford to focus so exclusively on language development, whether Sign Language or English, as to require that communications with the child be in a grammatical form appropriate to either of the languages in its finished adult form. Human communication includes action, demonstration, gesture, facial expression, body language, and the like. While learning to speak and learning to sign are both of great importance, neither must be permitted to stand in the way of free and easy interpersonal communication, occurring by whatever means.

A second major consideration for parents and teachers is that deaf children have some sense that there are others who are "deaf like me." Whether or not the child tends to identify with a Deaf community, and regardless of whether the child's parents and teachers do or do not wish to see the child identify with a Deaf community, it should be made possible for the child to know that there are Deaf communities and deaf persons of all ages who identify with these communities. The point is that the child should know that there are many ways of being human, many ways of being a deaf human, and that the mastery of the English language desired by hearing parents and teachers is not the only route to success, self-determination, and self-esteem. Certainly deaf children should learn to master English and feel proud of their accomplishment in doing so. Just as certainly, they should not be led to feel that this is the only accomplishment worthy of them, or the only accomplishment which matters.

At the same time that we expect developments in Sign Language to improve some of the basic conditions for the mental health and well-being of deaf persons, we can expect the very same process to create increasing difficulties in the technical process of providing psychotherapeutic and psychodiagnostic services to deaf persons. As members of the Deaf community gain an increasing sense of power and significance, they are likely to become increasingly critical of mental health services provided by practitioners who know little or nothing of the culture and language of the Deaf community. Deaf clients are likely to increasingly demand that practitioners substantially improve their understanding of the culture of deafness and their Sign Language ability as an emblem of that understanding. This can be expected to be much like the rejection by Black Americans of services provided by white therapists. These therapists did not have, or did not seem to have, sufficient appreciation of the Black life experience, as revealed in the therapists' inability to understand or to "talk Black," This may result in hard times ahead, since studies such as those of Levine (1974) have indicated again and again that the large majority of mental health practitioners working with deaf clients are hearing persons who rate themselves as having very minimal competence in Sign Language. Presumably, the evaluation by deaf clients of such practitioners' competence will show an even more dismal picture. What we can expect to see ahead, then, is increasing criticism and rejection of mental health services offered to deaf clients by hearing practitioners so removed from the Deaf ethno-cultural community as to be considered simply foreigners. These practitioners, in turn, can be expected to respond with resentment, confusion, and some bitterness, when their attempts to be of service are rebuffed or criticized by their actual or potential clients. There are, of course, a few deaf clinicians now in practice, for whom the issue of familiarity and identification with the Deaf ethno-cultural community should not present the same problem faced by hearing practitioners. This is not to suggest that all deaf clinicians are therefore competent or successful, but simply to indicate that their membership in the Deaf community should reduce the significant issues to those of competence, without the additional difficulties of social identity and affiliation.

What can be done about this state of affairs? A number of very useful directions are suggested in the excellent paper by Stokoe and Battison (1975), in which they offer several specific examples of how communication between patient and therapist can be misinterpreted because of differences between the hearing culture and English language of therapists and the Deaf culture and Sign Language of the clients. The remedy to this situation is, in many ways, obvious. On the one hand, native signers and members of the Deaf community should have access to the training programs in which they can acquire professional credentials in psychology, psychiatry, and other mental health fields. On the other hand, hearing professionals in these fields who wish to serve deaf clients effectively will need training programs which focus heavily on understanding the cultural and linguistic patterns of the clients they propose to serve. Doing either of these in practice is, of course, not an easy matter.

The future, then, of Sign Language and the mental health of deaf persons is not entirely rosy or without difficulties. However, thanks to the "nationalist" feeling developing among deaf people in the United States and elsewhere, the future can be expected to be productive. To change from a past in which not all has been well to a more productive future means that a variety of circumstances and relationships must change. Such changes are by definition disruptive and very often difficult for the parties involved. Fishman (1972) offers us this plea for understanding: "This is happening again today. It will happen again in the future. It is part of the social drama of humanity. Would that we could help it happen with less wear and tear and with more mutual acceptance among all concerned."

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Programmatic Options

The Programmatic Options chapter addresses some of the major service issues affecting HIDD individuals. Stewart's 1971 article "Problems of Severely Handicapped Deaf: Implications for Educational Programs" outlines major problems encountered by this population as they attempt to enter the world of work and recommends steps for improving educational and rehabilitative services and opportunities for these individuals. Since this article was written, P.L. 94-142 - The Education for All Handicapped Children Act - was enacted resulting in the expansion of infant and school age educational programs for HIDD children and youth who were previously often excluded from programs. Stewart's 1982 Commentary cautions that although there have been many positive developments in the last 11 years, continuing insufficiencies in administrative commitment, program options, and trained staff reduce the potential impact of this legislation. Virgil Flathouse's article echoes many of Stewart's concerns and further elaborates problems of definition and sampling bias that impede monitoring of the extent and quality of services to this subgroup. (See Jones' article in the Demographics chapter for further considerations of the problems of definition.) Flathouse suggests a 'multi-continua' model for conceptualizing the service needs of this diverse population. Additional factors deserving attention in a comprehensive program design include parent support, vocational and career education, community living skills, and academic skills/knowledge.

Educational programs, through history, have changed in response to the changing needs of society, the nature of the student body, the availability of financial and creative resources, and the drive and vision of educators, parents, and students alike. The requirements promulgated by P.L. 94-142 reflected grassroot developments across the country to end the practice of excluding students who required greater than average structure and assistance to participate and learn. Five years after passage of this legislation, many programs are still adapting to meet the educational needs of HIDD students and their families. (See Organizing for Effective Change in Campbell and Baldwin's Severely Handicapped Hearing Impaired Students: Strengthening Service Delivery for an overview of organizational impediments to change. Strategies useful for insuring that innovations well suited to specific groups of HIDD students will be implemented and survive beyond the efforts of a single person are suggested.) As an example of one strategy for securing needed services, Martinson's article "Interagency Services: A New Era for an Old Idea" outlines the issues involved in developing collaborative agreements and identifies obstacles to the successful implementation of such arrangements. The short article by Stewart amplifies Martinson's points and presents suggestions that would foster broad-based coordination of services to HIDD persons.

Through the mechanism of State Special Education Plans required by P.L. 94-142 and with pressure to use limited resources wisely, greater attention is being paid to planning a continuum of educational and community support services that include HIDD individuals. While much work remains to truly effect a community based''zero reject' model of services, important steps are being taken. David Denton describes steps taken within the State of Maryland to plan services for HIDD as a matter of right. This article examines the concept of least restrictive environment, challenging a tendency to use these terms superficially.

In designing programs that truly meet the needs of HIDD individuals in the 80's and 90's, careful scrutinity of ideas and a willingness to advance beyond beliefs and service models that no longer meet the needs of today's citizens are crucial. Self-renewal provisions can enhance the vitality of human services organizations. Periodic internal and external evaluation are generally ackowledged to be important for continuing organizational effectiveness. The Arizona Model Demonostration Program, through the efforts of Michael Milone, Joseph Perine, and Larry Stewart, developed the Vital Information Form to collect data necessary for the analysis of services provided by education, rehabilitation, and other community service agencies for HIDD persons. This tool has been included to assist others in conducting a qualitative analysis of services to HIDD individuals in their region.

The remaining articles provide a small sampling of current residential and educational programs for this group. Haag's article describes the residential program for multihandicapped deaf children at California School the Deaf-Riverside. Problems in providing appropriate services to the many HIDD individuals living in state institutions for the mentally retarded are outlined in the Brannan et al. article. (For an example of a community based living arrangement for severely/profoundly handicapped infants and preschoolers, some of whom have hearing impairments, see the description of Somerset Home School in Achievements in Residential Services for Persons with Disabilities edited by T. Apolloni, J. Cappuccilli, and T. Cooke. This setting is a rich alternative to larger, less personalized environments.)

During the life of the Arizona Model Demonstration Programs, many improvements in services to HIDD children and adults were instituted. One component of the service system was the use of a Mobile Diagnostic Unit to provide much needed audiologic and educational diagnostic services throughout a sparsely populated rural state. Interestingly, a high percentage of referrals to this service were for individuals who were in some type of program but whose special audiologic needs had not been assessed or treated. Another component in the continuum of services was the Arizona Diagnostic, Treatment, and Education Center whose services are described in brief. This service model provides a link between short-term residential placement and community based education and family support services. With its follow-up/outreach component, this program effectively serves children in both rural and urban settings and provides support and training to teaching and support staff in the home school districts to which these students return. By contrast, Hymowitz et al. describe a multi-service program for young deaf autistic children in an urban day school setting. They outline the roles and functions of team members with both children and their families.

Adequate career and vocational training are essential to successful entry and continuation in the working world. Vocational, independent living, and community participation skills are crucial for the HIDD adolescent. "An Educational Model for Hearing Impaired Mentally Retarded Adolescents" and the decription of the APT program describe two different approaches to education and vocational training. The last article "Assisting Employers of Hearing Impaired Developmentally Disabled Workers" provides guidelines for vocational educators, work-study coordinators, and placement specialists to consider when assisting HIDD employees and their prospective employers in developing fruitful working relationships.

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Problems of Severely Handicapped Deaf

Implications for Educational Programs

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A study of multiply handicapped deaf adults at the Hot Springs project revealed that communication inadequacies and behavioral problems were central obstacles to rehabilitation. Despite average intelligence and an 11 year average of prior schooling, the subjects progressed slowly at the center and experienced an extremely high attrition rate (55%). Special staff training was fundamental to success with the population, as well as relatively flexible standards for student conduct and in-depth services such as personal adjustment training, counseling, and work adjustment training. The findings suggest need for increased attempts at preschool education for young deaf children, parent education and counseling, strengthening dormitory programs in elementary and secondary schools, stronger counseling and guidance programs, and greater involvement in total education from teachers. Total communication is viewed as one possible solution to the communication problems, when initiated at an early age and used by parents and teachers. A special rehabilitation facility for severely handicapped deaf people can fill the need for appropriate training and adjustment following secondary school. Such a center, staffed by competent and dedicated personnel, should be able to make significant progress in efforts to educate and rehabilitate this population segment.

In recent years the literature dealing with the education and rehabilitation of deaf people has given increasing attention to those who are referred to as either multiply handicapped, severely handicapped, or seriously disadvantaged. Several recent publications, in fact, focused exclusively on the problems and needs of these low achieving deaf people[1-4]. Generally, this literature made a definite contribution in that it uncovered the size and magnitude of the problems involved in educating and rehabilitating severely handicapped deaf people. Yet, as one reviews the scene it becomes abundantly clear that the field has yet to mount a concerted, systematic attack on the problems that beset these people and the lack of effective teaching methodology.

There are several central obstacles that impede our work with severely handicapped deaf people. The first is that of vague nomenclature. The terms used in reference to the population with which we are concerned have been inadequate if not actually misleading. For example, under the broad rubric "Multiply Handicapped" come such multiple handicaps as deafness/blindness, deafness/cerebral palsy, deafness/minimal brain dysfunction, deafness/emotional disturbance, deafness/paraplegia, and, of course, various combinations where the individual has three or more handicaps. Thus, the term "Multiply Handicapped" tells little more than that two or more handicaps are involved. Development of a nomenclature that permits good communication among other workers is the only hope for reaching a better understanding of our work.

Second, the literature suggests we have given adequate attention to describing the physical bases of multiple handicaps[4], but comparatively little attention has been given to the socio-cultural and family interaction variables that possibly may account for the severity of impact of many disabilities. I suggest that much greater attention should be given to these variables since they are amenable to early therapeutic intervention.

Third, a sampling of the literature[5-8] reveals that systematic teaching methods based upon principles of behavior modification yield gratifying results with deaf children having emotional problems and learning disabilities. Yet, many schools and rehabilitation programs do not apply this knowledge with their deaf

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students and clients. Instead, many continue to use a strict disciplinarian approach based on the view that the child or client is stubborn or "just doesn't want to work."

Fourth, the work of Media Services and Captioned Films and other media production facilities amply demonstrates the great contribution of specially designed instructional media in working with deaf people. Yet, educators and rehabilitation workers with severely handicapped deaf people face an almost complete absence of instructional media appropriate for application with those having very limited verbal skills. At this time there appear to be no plans for a large scale attack on this most serious problem.

Finally, educational and rehabilitation programs for severely handicapped deaf people have gained important knowledge concerning the problems and needs of these people. However, only minimal attempts are made to synthesize this knowledge and make it available to other educators and rehabilitation workers with the deaf. This cross-exchange of information is vital to progress, and yet the gap between research and dissemination of findings remains great.

This report identifies some of the problems and needs of a selected group of severely handicapped deaf adults and discusses their implications for educational and rehabilitation programs. Hopefully, it is a step forward in closing the gap between research and practice.

The Population

The problems and needs discussed were identified through a rehabilitation program for multiply handicapped deaf adults at the Hot Springs Rehabilitation Center, Hot Springs, Ark. This program, initiated in June, 1968, is jointly sponsored by the Social and Rehabilitation Service, U.S. Department of Health, Education, and Welfare, and the Arkansas Rehabilitation Research and Training Center. It is a five-year research and demonstration project designed to evaluate the feasibility of a program for multiply handicapped deaf adults within an ongoing comprehensive rehabilitation center.

A total of 106 clients constituted the sample from which the data were obtained; of these, 73 were males and 33 were females. Ages ranged from 14 to 43 years, with an average age of 20.3. They were referred to the Center by State Vocational Rehabilitation Agencies from throughout the country. Eligibility requirements for enrollment included: (1) a hearing loss in the better ear judged to render hearing nonfunctional for the ordinary purposes of life; (2) intelligence quotient of 70 or above as measured by a standardized performance-type intelligence test; (3) a reading achievement grade level of 4.0 or *less;* (4) a history of, or the strong prospect of, unemployment or serious underemployment, and; (5) freedom from physical mobility restrictions and emotional or behavioral patterns that would make it impossible for the individual to participate in Center activities.

The Hot Springs Rehabilitation Center provides evaluation services, dormitory living facilities, medical services, counseling, and vocational training in 34 different occupations to a daily enrollment of 450 handicapped clients. Approximately 30 to 35 of these are multiply handicapped deaf people. The latter avail themselves of many of the services of the Center, and additionally are served by specialists with the deaf in the following areas: vocational and psychological evaluation, counseling, tutoring or special education, personal adjustment training, and work adjustment evaluation and training. In vocational training areas, some instructors are fairly adept with manual communication while others rely upon gestures and writing with their deaf students. From time to time specialists with the deaf interpret classroom lectures for deaf students.

The Findings

The findings of the project with multiply handicapped deaf people are summarized in the following order: Communication Problems, Behavior Problems, Motivational Problems, and Program Limitations.

Communication Problems

As might be expected, seriously impoverished communication skills emerged as the most common problem of the 106 subjects. With very few exceptions, they were quite limited in their ability to speak and speechread. For most, speech as both an expressive and receptive communication tool was practically useless. Their communication with other students and staff was most often through manual communication, gestures, and demonstration. Writing with pad and pencil was of some value at a very simple level, but most interaction did not permit the slow pace involved in writing.

The reading skills of the subjects were at an extremely low level considering their intelligence. The average I.Q. score on the Wechsler Adult Intelligence Scale, Performance Scale, was 91, which indicates low average intelligence. However, the average reading grade level scores, as measured by the Stanford Achievement Test, Intermediate Battery, were 3.2 (Word Meaning) and 2.8 (Paragraph Meaning).

An interesting and quite significant finding was that *only one of the subjects came from a family where one or both parents were deaf.* This finding suggests that the nature of early family interaction may be one of the most important correlates of level of achievement. It has been generally accepted that deaf parents communicate much more with their deaf child than do hearing parents. If family interaction is in fact a great contributing factor to the severity of a handicap, then this could account for the fact that only one subject had deaf parents.

Another aspect of the low reading skills of the subjects concerns prior education. Surprisingly, *the average age at beginning school was 6.5 years, and the average number of years in attendance was 11 years.* A large majority of the subjects attended state residential schools for the deaf (N-85); 12 attended special classes within public schools; and the remainder attended public school regular classes or special classes in parochial schools. The average age at completing secondary school was 17.6 years. Forty-nine subjects completed school with an academic or vocational certificate, 20 dropped out of school, and 31 were discharged for disciplinary reasons. Of the 79 subjects on whom this information was available, *53 attended regular academic classes and and only 26 were placed in special classes for multiply handicapped deaf children.*

The impact of the communication problems of the 106 subjects at the Hot Springs Rehabilitation Center was severe. The center is primarily oriented toward vocational training, but the low communication skills of the deaf subjects prevented satisfactory participation in vocational training activities. This necessitated special tutoring and personal adjustment training to strengthen communication skills, but as might be expected such efforts required extensive periods of time during which it was difficult for the subjects to sustain their initially high level of interest in their training activities. It may be stated that the communication problems of the subjects contributed significantly to the high dropout rate at the Center, which totaled 55% through January, 1971.

Behavior Problems

"Inappropriate", "inadequate", and "impulsive" best describe the behavior of a majority of the 106 subjects in the Hot Springs Rehabilitation Center milieu. In fact, the behavioral characteristics of most of these subjects were such that 17 were given disciplinary discharges and 29 either dropped out or were withdrawn because of poor progress in training. Behavioral problems included temper outbursts, fighting with students and staff, intoxication, refusal to obey orders of staff members; social naivete and unruliness, and being late for classes consistently. Most of these problems disappeared for individual subjects as they learned appropriate ways of behaving, but those who demonstrated poor impulse control along with hostile, aggressive behavior were invaribly discharged.

Two aspects of the behavior of the subjects warrant brief discussion. First, there was a noticeable tendency among many of them to view their training and future employment as meaningless. They seemed to lack an understanding of why they should learn a vocation, how their training was related to future employment, and their responsibilities as productive workers. These seem to suggest that the subjects had poor or underdeveloped concepts concerning work and themselves as workers, and because of their communication deficiencies it was difficult for them to learn proper concepts without extensive exposure to work experiences and verbal discussions with staff members.

The ratings of performance of the subjects in their secondary school education, when contrasted with their actual behavior of the subjects at the center, raises a question con-

Selected Ratings of Secondary School Personnel on Behavior of Multiply Handicapped Deaf Students

Variable	Ratings Good	Fair	Poor	No Ratings Made
Motivation for Learning	17	39	22	28
Behavior in Class	32	37	12	25
Relations With Students	28	32	7	41
Relations With Staff	36	27	7	36
Conduct in Dormitory	25	31	8	42
Vocational Training Performance	15	31	15	44

cerning the behavior standards applied in secondary schools as opposed to the expectations of vocational training schools and employers. By way of illustration, the Table shows that most subjects rated fair or better in their vocational training while in secondary school, and also rated high in their relations with other students and staff in class as well as in the dormitory.

These ratings suggest that secondary school personnel have either lower standards of behavior for their multiply handicapped students or at least rate them higher than warranted. Regardless of the reason, *it seems possible that some of the ineffective behavior of the 106 subjects was more or less accepted by secondary school personnel, and that efforts were not directed toward modifying behavior that is not acceptable in the world of work.*

Motivation. As already discussed briefly low levels of interest or motivation characterized many of the 106 subjects. This was expressed in disinterest in vocational training, withdrawal from social activities, limited participation in recreational activities, and generally depressed or withdrawing behavior. The poor communication skills of the subjects, their frustrations from past failures, and their somewhat greater dependency explains the low motivation level. However, the fact remains that they perceived little that interested them in their environment, and seemed to lack knowledge of how to pursue new activities in their leisure time.

Program Limitations

Serving multiply handicapped deaf adults requires a rehabilitation service program designed to meet their unique needs. This does not imply that the problems of this group of people are not shared by other handicapped and disadvantaged populations. However, the multiply handicapped deaf are unique in that they have other significant handicaps in addition to deafness and its associated communication problems. Thus, while many elements of a general rehabilitation program can be useful to multiply handicapped deaf people, their problems are such that special services are mandatory if their adjustment and training needs are to met. These special services are not so much different from those provided to others. However, they are required in unique combination, and provided through staff members who understand their varied problems and communicate effectively with them.

Multiply handicapped deaf people need exposure to the same kinds of experiences all people encounter in the developmental process. They need to learn to care for themselves; to get along constructively with others; to conduct themselves in a manner acceptable to others; to work productively in employment that gives them satisfaction, and to develop skills that will enable them to use their time well. These skills can be taught through a work adjustment center; through dormitory and recreational activities; through counseling, guidance, and vocational training activities; through classroom instruction; through exposure to the broader community outside the training facility; and, most importantly, through opportunities to try out new behavior.

The Hot Springs Rehabilitation Center is one of the better comprehensive rehabilitation centers. Its combination of training and adjustment services are offered in only a few other settings across the country. Nevertheless, its success with multiply handicapped deaf people is limited in important ways. First, and perhaps foremost, it is unable to recruit sufficient numbers of staff members trained in a professional discipline who understand the needs of multiply handicapped deaf people and have expertise in meeting these needs. This has meant that many of the underlying needs of the 106 subjects went unrecognized and thus unmet. Having to confront peripheral problems daily, it has not been possible to move rapidly and decisely toward more effective diagnostic and treatment approaches.

Second, the center is able to offer only a limited number of vocational training opportunities to multiply handicapped deaf clients.

Many of its 34 training areas are automatically closed to them because they either lack the communication skills necessary to succeed on their own or the instructors do not possess the communication skills to impart knowledge. Even in the training areas the clients have entered, benefits have been limited because of their communication problems and personal or social needs.

The special services provided by special workers with deaf clients — counseling, tutoring, and personal adjustment instruction — are unnecessarily limited because of inadequate resource materials. Textbooks, workbooks, visual media, and the like, with a level of language and content appropriate for the needs of the clients, are either unavailable or in short supply.

Finally, in a very real sense some of the unusual needs of multiply handicapped deaf people have conflicted with the needs of other center students and staff. The center places strong emphasis upon vocational training, and expects students to conduct themselves in a mature and socially acceptable manner. Behavioral problems are expected and dealt with to a reasonable extent with all students, but when certain rules against fighting, use of alcohol, and the like are broken, the student must be discharged if his case is judged serious enough. This policy is followed by most training schools, as well as by most schools for the deaf. In fact, 31 of the 106 subjects were discharged from secondary schools for disciplinary reasons prior to their enrollment at the Hot Springs Rehabilitation Center. Yet, *it must be firmly stated that programs for multiply handicapped deaf people should be able and willing to deal constructively with the behavioral problems that are a natural outgrowth of their life circumstances.* This suggests that elementary, secondary, and post-secondary educational and rehabilitation programs should adopt new, more constructive approaches in dealing with behavioral problems. While discharging the student may solve the school's problem, it does not meet the individual student's needs.

Implications for Educational and Rehabilitation Programs

The findings reported in the preceding sections may be given tentative interpretation, and implications suggested for educational and rehabilitation programs serving multiply handicapped deaf people.

Pre-School and Elementary Education

The findings point rather strongly to the important role played by social, cultural, and family interaction variables in determining the severity of the handicaps of multiply handicapped deaf people. The subjects in the Hot Springs project were definitely not limited primarily by diagnosed physical disabilities but, rather, by communication deficits and maladaptive interpersonal relations skills. While the average subject entered school at the age of 6.5 years, and spent 11 years in attendance, communication deficits and behavior patterns were not remedied to the point where he could benefit fully from vocational training at the post-secondary level.

This suggests that attention must be given to fostering better family interaction patterns where the young deaf child is involved. This would seem to involve parent education and counseling aimed at helping parents to understand deafness and how they can help their child, including how to communicate with him. It would also include pre-school education for the deaf child, which is not readily available to many, many deaf infants and young children throughout the country.

These findings offer convincing evidence in favor of the use of total communication in family interaction as well as in elementary school. Oral communication methods have been used with young deaf children in the home and in elementary schools for many years. The large numbers of deaf people who are either severely handicapped vocationally or in terms of their communication skills give ample evidence that we have fallen short. Perhaps total communication from an early age will be the answer we are seeking for the severely handicapped deaf person.

Dormitory or residence hall living has been one of the most neglected areas in the education of the deaf. Certainly no one giving the matter serious thought can question the vital contribution dormitory living can make in fostering independence in the deaf child. Dormitory living replaces normal family life for about nine months of the year. The child's deafness along with his frequent absence from home in most cases make the other three months of the year less than normal. The dormitory thus is given the awesome task of providing the deaf child with the experiences and opportunities required for the development of attitudes, skills, and knowledge required for later adult living. Yet, in most schools dormitory life is regimented in nature, offering the child little opportunity for exploration, trial and error learning, and carrying out various responsibilities later required of him as an adult. In too many cases this was amply demonstrated by the subjects at the Hot Springs Center, who exhibited unusually dependent behavior. Their use of leisure time in a constructive manner was an especially weak area, leading me to speculate on what they would be doing with their spare time throughout the years of their adulthood.

The foregoing suggest that each elementary school should attempt to develop dormitory programs designed to foster the development of attitudes, skills, and knowledge that will enable the deaf child to grow into a fully responsible individual. Provisions should be included for teaching the child hobbies and recreational activities he can pursue during adolescence and adulthood.

Secondary Education

In addition to carrying the heavy responsibility of providing a strong academic program, secondary schools for deaf youth carry the burden – perhaps at times an unrecognized one -- of providing the deaf adolescent with information and problem solving skills he needs to achieve a successful adjustment in adulthood There appears to be a serious need for increased efforts in counseling and guidance activities that provide experience in living independently and opportunities for independent behavior.

In the past the deaf graduate had relatively few choices open to him after leaving school. It was either Gallaudet College, a local trade school or a job. Today, the young deaf man and woman have an almost bewildering range of opportunities before them. In addition to the three mentioned, they have available to them the National Technical Institute for the Deaf, three regional vocational-technical schools for the deaf, San Fernando Valley State College, a host of junior colleges offering training to the deaf, the Hot Springs Rehabilitation Center, and many others, including the Model Secondary School for the Deaf. On what basis are they to make their choice? Who is going to inform them of all these opportunities?

Another area of need concerns community involvement and participation. How many schools provide opportunities for deaf staff members and deaf laymen to meet informally with the students to talk about child raising, dealing with doctors and lawyers, getting along with the neighbors, handling personal emergencies such as an accident or serious illness? How many deaf children and youth fully understand what their deafness means, why it is difficult for them to speak normally and how they can improve their speech? Why other people do not always understand, how to relate to them? The Junior National Association of the Deaf is playing a very important role in helping to fill this need, but there is great need for much more effort. Teachers, as well as dormitory personnel, must go beyond the traditional role of academician with their deaf students but, unfortunately, there are many teachers and houseparents of deaf children who have no idea what life as a deaf adult is like. Such teachers should feel an ethical obligation to interact socially with deaf adults and learn as much as they can about their lives, their problems, and how they solve their problems. If we can but remember that most parents have very little knowledge of deafness and have had little interaction with deaf adults, we can better appreciate the importance of the teacher.

A growing number of schools have special programs for their multiply handicapped deaf children. An example of one of the better such programs is that at the California School for the Deaf in Riverside[5]. There, teachers are given special training in working with their students and use teaching methods based upon principles of behavior modification. It would be ideal if each school for the deaf would establish a similar program, for in that manner multiply handicapped deaf children would be able to obtain greater benefit from their education and would achieve a higher degree of readiness for subsequent vocational training.

Post-Secondary Education

At the present time there are very few post-secondary training opportunities for severely handicapped deaf youth. The Hot Springs Rehabilitation Center offers perhaps the most comprehensive program, although there are others less comprehensive scattered throughout the country. These programs are helping to fill the void in training opportunities for low achievers, but the limitations previously mentioned in relation to the Hot Springs program are common to all. Existing post-secondary training centers such as Gallaudet, NTID, the three regional vocational-technical schools, and some of the junior college programs serve some multiply handicapped deaf youth who have high motivation and relatively strong communication skills, but students such as those served at Hot Springs would not be able to function in these centers.

The unique combination of services required to prepare the severely handicapped deaf youth for gainful employment can perhaps best be met in a rehabilitation center designed specifically for them. The high attrition rate at Hot Springs (55%) can be expected to be duplicated at other ongoing comprehensive centers because of the communication and behavioral problems involved. However, a facility designed to provide the types of services these individuals need, staffed by personnel who have been trained to work with their particular problems and determined not to let them fail, can conceivably succeed to the point where the attrition rate approximates that of other schools.

A special rehabilitation facility for severely handicapped deaf people should provide a comprehensive range of services. Included should be medical services, physical and occupational therapy, vocational and psychological evaluation, counseling, and guidance, personal adjustment evaluation and training, work adjustment evaluation and training, supervised and independent living facilities, recreational and physical education activities, instruction in hobbies and leisure time activities, vocational training in areas suitable for the skills and abilities of the students, and job placement provisions. The facility should have an active case finding program and should be active in publicizing the assets of deaf people. There should be an instructional media development component, and a research staff. Cooperative agreements should be developed with appropriate universities in the training of personnel to work with severely handicapped deaf people. The development of communication and interpersonal skills should be a basic objective of the center.

At the present time a bill is before the U.S. House of Representatives to provide for authorization and funding for such a center. This bill, H.R. 5610, was introduced recently by Rep. Wilbur Mills, (D) Ark. Hopefully, educators and rehabilitation workers throughout the country will become active in pressing for the passage of this crucial legislation. In view of the large numbers of low achieving deaf people leaving secondary schools each year — approximately 2,000, according to one estimate — the time for such a facility is now.

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Severely Handicapped Deaf Persons in 1982

A Commentary 11 Years Later

Larry Stewart

Eleven years ago, an article entitled "Problems of Severly Handicapped Deaf: Implications for Educational Programs" appeared in the June 1971 issue of the American Annals of the Deaf. In mid-1982, the American Speech-Language-Hearing Association approached me, as author of that article to prepare a commentary on the current status of severely handicapped deaf persons and their educational circumstances. This brief commentary is the result. It represents an informed professional opinion - no more, no less, and is offered as a perspective of sorts for interested readers to ponder.

Educational and rehabilitation resources for multiply handicapped deaf children and adults were not good in 1971, nor were they adequate in quantity. A few very good programs were available, but for the most part severely handicapped deaf children and adults were destined for benign neglect, if not superficial token services. The problem then was essentially one of priorities; severely handicapped persons constituted a minority group. No boilerplate law existed to mandate appropriate services for them in the midst of agencies and schools that had responsibilities for either deaf persons without other disabilities, or for developmentally disabled persons with adequate hearing. In fact, program limitations within schools for the deaf, and in other disability programs, were in some ways inadvertently contributing to the problem and, in effect, adding to the severity of handicapping conditions for many multiply handicapped persons.

The situation for severely handicapped deaf persons in 1982 has improved in many ways. A host of enabling legislation has mandated more and better services for this population as well as for handicapped children in general. Graduate teacher preparation programs are now available to prepare specialists for working with multiply handicapped deaf children and adults. More special units are in operation for these children--such as those at the California School for the Deaf, Riverside, and the Arizona State School for the Deaf and the Blind, Tucson. More sophisticated diagnostic and prescriptive teaching systems are being applied with severely handicapped deaf learners, and there are improved teaching and learning media. A number of the agencies and schools that serve other disability groups (mentally retarded, cerebral palsied, etc.) now have programs for deaf multiply handicapped students. Increasing attention is being given to parent education, and to pre-school education. There are more sophisticated community agencies in existence that serve the deaf community.

Administrators of schools for the deaf are increasingly acknowledging their school's reponsibility to serve the severely handicapped deaf child, and administrators of other disability schools are accepting their school's responsibility to serve those of their children who are also deaf.

Even with these improvements however, there are still many barriers to an appropriate education and necessary rehabilitation services for severely handicapped individuals. Some of these barriers include:

1. Insufficient Numbers of Programs
   There are not enough programs for the severely handicapped deaf child and adult. The parents of such children and adults must still look far and wide for comprehensive, quality level programs.

2. Inadequacy of Existing Programs.
   In many instances, available programs consist merely of window dressing to pacify parents and authorities. Often program staff are poorly prepared and ill-qualified for their roles. Program underfunding is usually a major, persistent problem.

3. Substantial Services
   While not denying the many benefits of P.L. 94-142 (the Education for All Handicapped Children Act of 1975) and Section 504 of the Rehabilitation Act of 1973, the reality has been that, in too many instances, "mainstreaming" and attempts to serve the severely handicapped deaf person by general agencies through the use of interpreters have

resulted in services grossly inadequate and far from professional. Thus, while there has appeared to be a beehive of new activity for the severely handicapped deaf, in too many cases this activity has not resulted in real, tangible benefits to the individual because of lack of appropriate expertise among staff members who have not been prepared to deal with the special problems involved.

4. Insufficient Attention to Total Needs of This Population

There appears to be a continuing, perplexing neglect of the scope and magnitude of the problems of severely handicapped deaf children and adults among national and state authorities charged with the education of the deaf. Today, in 1982, there is still no national post-secondary educational/vocational training facility for severely handicapped deaf adults. Instead, there are several small-scale "rehabilitation centers' that attempt to serve the population with problems of underfunding, small staff, and limited resources. Thus, severely handicapped deaf young adults leaving the school for the deaf at graduation face the prospect of very, very few opportunities for adding to their vocational skills and independent living skills. Continuing dependency and reliance on welfare and Social Security Disability Income are end results of this neglect.

5. Lack of Qualified Professionals

Lack of qualified professionals to serve the severely handicapped population. Too many of the new programs are staffed by personnel who are not qualified for their roles. The "Programs and Services for the Deaf in the United States" (April 1980). American Annals of the Deaf reported:

A. Among 3,226 instructors in the 62 public residential schools, only 1,896 had CEASED or CED certification.
B. Among 123 instructors in 22 programs for the multiply handicapped, only 18 had CEASED or CED certification.

C. Among 129 instructors in 26 Specified Handicap Facilities having an enrollment of 797 multiply handicapped deaf children, only 23 had CEASED or CED certification.

6. Confusing and Inadequate Statistical Reporting

Confusing and inadequate statistical reporting on the severely handicapped deaf population remains, thereby generating a misleading picture concerning the magnitude of the problem. Uniform nomenclature has yet to be developed for describing and reporting this population, and variation in the skills and knowledge of persons reporting on the population reduce the validity of the reported data. Some of the important data is hard to interpret. The distinction between "disability" and "handicap" often goes unattended. Many deaf individuals who have no observable or measurable secondary disability are nevertheless severely handicapped, yet are not reported as "multiply handicapped." The reported percentage of multiply handicapped deaf children varied from 1.4% at one school during 1977-78 to 42.5% at another school for the same year. Until there is clearer, more reliable and valid reporting on the deaf population having additional disabilities <u>and</u> handicaps, our field will continue to have an unclear picture of the nature and scope of the problems of these children.

These appear to be the main isues to be faced by the field of deafness on the heels of the past decade. The road ahead appears quite rocky in the face of current national economic problems and cutbacks in Federal assistance to the states, but much can be done even with current resources. This is perhaps well-illustrated by an incident that occurred not long ago when I was visiting a new and quite substantial program for multiply handicapped deaf children. The director described a very elaborate, futuristic system of prescriptive teaching based upon the results of computerized diagnostic process. Suitably impressed, I asked to see the computer equipment and a sample diagnostic/ prescriptive print-out. At this the director blushed mightily and stammered, "The computer won't be in operation for several months. We don't have all the components yet." What we need in the future, then, is to put all the parts together, and get on with business of serving severely handicapped deaf children and adults. The parts are here; let's do it. The year 1992 is but a decade away, and at that time we can look back and see whether we have finally "put it together" for this population.

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Multiply Handicapped Deaf Children and Public Law 94-142

VIRGIL E. FLATHOUSE

DESPITE the passing of the September 1, 1978, deadline for free appropriate public educational services to all handicapped children ages 3 through 18, as detailed in The Education for All Handicapped Children Act of 1975 (Public Law 94-142), there exists a compelling population of handicapped children who apparently remain largely unserved due to their diverse disabilities. This unserved population is the multiply handicapped deaf (also labeled by numerous other monikers; e.g., multiply disabled deaf, mentally retarded deaf, crippled/cerebral palsied deaf, emotionally disturbed deaf, severely handicapped/hearing impaired, hearing impaired/developmentally disabled, etc.).

The problems the multiply handicapped deaf pose are complex in nature and broad in scope, for not only are the problems definitional in the matter of handicaps and the combinations thereof, they also involve the need to identify what constitutes service and what contributes to the uniqueness of this population. While deafness itself is a complex and multifaceted handicap, the severeity of which is dependent upon the functional relationships among a combination of factors and influences, the involvement of one or more additional handicaps creates challenges that sharply impact upon teacher training processes, assessment procedures, cross modal or multidisciplinary considerations, service delivery models, and fiscal responsibilities.

Who Are These Children?

Identification of multiply handicapped deaf children is difficult, since definitions frequently fail to delineate the interacting implications of the handicaps or their degree of severity. While numerous definitions have been proffered in previous years in valiant efforts to construct acceptable parameters around this diverse population, the majority of these definitions have sadly fallen far short of specifically designating the group to be served. Issues involving primary versus secondary handicaps have also clouded and confused delineations or designations for service. Since this article is concerned with identification, placement, and programing implications as a result of Public Law 94-142, it is appropriate that attention be directed to the following definitions contained within that legislation:

> "Deaf" means a hearing impairment which is so severe that the child is impaired in processing linguistic information through hearing, with or without amplification, which adversely affects educational performance. (Section 121a.5(b)(1))
>
> "Multihandicapped" means concomitant impairments (such as mentally retarded-blind, mentally retarded-orthopedically impaired, etc.), the combination of which causes such severe educational problems that they cannot be accommodated in special education programs solely for one of the impairments. The term does not include deaf-blind children. (Section 121a.5(b) (5))

These definitions, while essential, simply cannot do justice to expressing the formidable barriers to learning imposed by the concomitance of deafness and other handicapping conditions. Congenital deafness by itself is a complex and generally misunderstood handicap, with continua of significant variables such as age of onset, type of loss, etiology, degree of impairment, prior education, level of intellectual functioning, communication patterns, and social acceptance seldom intersecting at common points. This lack of commonality in the interaction of these variables results in a highly heterogeneous population. The early loss of hearing and the resulting language delay deal a devastating blow to the learning process. Without a comprehensible language and communication system, progress is minimal past

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the lowest forms of language development; and social, emotional, behavioral, motoric, and perceptual developmental deficits become increasingly pronounced. The determination of strategies to enable early diagnosis and the development of effective communicative exchange, regardless of the mode, become critically important for deaf children. Further compounding and complicating the learning process for these children are the confusion surrounding the initial diagnosis and the frequent inappropriate or inadequate educational placements.

The interacting problems presented by an additional handicapping condition are not simply additive in nature (i.e., the sum of the problems of deafness plus the sum of the problems of the other handicapping condition), but are synergistic due to the dynamic interaction of the handicaps. This interaction results in unique and qualitatively different behavior patterns than would otherwise be attributed to a single or even multiplicative effect. For example, communication complications resulting from the hearing loss of a mentally retarded child drastically restricts input and contribute to further depression and delay of functional abilities. This, in turn, further impairs the full use of the child's residual hearing. Thus a grim, debilitating cycle is often experienced by these children, with the diminished opportunities for learning in a noncommunicative environment becoming the consequences of their failure to learn.

The movement of this failure cycle is actively accelerated by a reluctance of disciplines to accept responsibility for providing appropriate services to multiply handicapped deaf children. Unfortunately, operating here is not only the "proclamation of territorial imperatives" that Silverman (1977) referred to as being fairly common in disciplines associated with special education (i.e., certain disciplines should serve only certain children), but the concept of "reactive versus proactive" discipline postures as well (i.e., take a defensive stance on the issue when it surfaces instead of planning ahead for its appearance).

While it has been conservatively estimated that approximately 25% of all deaf children in the United States have another disability, it has also been emphasized that it is dangerous to generalize from reported incidence figures (Power & Quigley, 1971). The discrepancies extant in reported incidence figures for this population are clearly exemplified in Table 1 when certain factors associated with the collection of the information contained therein are considered:

1. The figures indicate children who, by virtue of their being enrolled in educational programs for the deaf, were generally the less severely involved.
2. The figures do not include those multiply handicapped deaf children in other state supported programs (e.g., state hospitals or mental institutions), private agencies, or other traditional educational programs that may be providing services.
3. The figures were collected from the programs without the benefit of a consistent definition for each educationally significant handicapping condition.
4. The figures do not include those children who have not been identified as multiply handicapped and are not being served.

Due to the low incidence of this population in relation to other handicaps and the failure to designate service responsibilities, some effective efforts and implementation programs have not been widely disseminated to the field. This in itself is a variational factor affecting identification, evaluation, and programing data.

No doubt a significant percentage of the incidence figures presented represents the bulge of the rubella children: those whose handicaps have been attributed to the 1963–1965 insidious rubella epidemic. The multihandicapping conditions associated with these children re-

TABLE 1

Multiply Handicapped Deaf Children Enrolled in Schools and Classes in the United States October 1, 1977

Category	*Number*
Deaf-blind	690
Deaf-mentally retarded	2.584
Deaf-blind and mentally retarded	684
Deaf-learning disabled, including aphasia	3.574
Deaf-socially/emotionally disturbed	1,482
Deaf-other multiply handicapped	1,604
Total deaf multiply handicapped	10.628

Note. From *American Annals of the Deaf*, W. Craig & H. Craig (Eds.), April 1978, p. 197.

ceived early documentation (Vernon, 1967). What is not so well documented, however, is how the physiological and psychological changes related to puberty affect these children, not only in social and emotional developments, but in academic areas as well. The majority of these children are now in their early teens and need, among other services, extended counseling and prevocational programs. Services of this nature are often inadequate or nonexistent.

While little consensus may exist as to the parameters of the population of multiply handicapped deaf children, there is agreement that this population is not declining but increasing (Moores, 1978). The reasons for this can be attributed to such basic factors as the reduction of infant mortality, improved prenatal care, and improved identification and diagnostic procedures. The rising level of incidence underscores the need for definitive probes to locate these children and to relegate appropriate programing responsibilities.

Where Are These Children?

Because of the controversy regarding service designations, some multiply handicapped deaf children are still harbored at home or have been placed in institutions incapable of rendering comprehensive programing to meet their needs (Anderson & Stevens, 1969; Calvert, 1970; Power & Quigley, 1971). Hardship placements have also been made in programs that are either protective or operating under the guise or pretense of providing appropriate programing. An analysis of schools and classes and their respective numbers of multiply handicapped deaf students enrolled as identified by the *American Annals of the Deaf* (Craig & Craig, 1978) is presented in Table 2. While these figures provide some insight into the educational placements of these children, they fail to identify those who are inappropriately placed (underserved) or those for whom no appropriate placement is currently available (unserved).

TABLE 2

Schools and Classes in the United States for Multiply Handicapped Deaf Children October 1, 1977

Schools and classes	*Number*	*Number of multiply handicapped deaf served*
Public residential schools	67	4,038
Private residential schools	9	76
Public day schools	70	1,739
Private day schools	16	40
Public day classes	420	3,167
Private day classes	31	72
Multiply handicapped only	31	584
Specified handicapped facilities	37	902
Total	681	10,628

Note. From *American Annals of the Deaf*, W. Craig & H. Craig (Eds.), April 1978, p. 197.

How Can These Children Be Served?

An ominous void exists in the provision of appropriate public education for *all* multiply handicapped deaf children. How best to fill that void is open to conjecture; however, to facilitate considerations a framework of critical reference points consistent with Public Law 94-142 is proposed. These reference points include the essential phases of identification, placement (evaluation), and programing.

Identification

A continuing emphasis must be placed on the early identification of hearing losses in children with other disabilities, as these losses are frequently overlooked when occurring in combination with multiple physiological anomalies. Minimum components of early identification strategies should include (a) a core of diagnostic personnel and medical specialists trained to function as an integral team; (b) community awareness and an emphasis on language and hearing evaluations conducted in community agency programs for handicapped children; (c) preservice and inservice training of a basic interdisciplinary character for professionals and providers of direct care services unfamiliar with the combination of deafness and other handicapping conditions and the resulting degrees of functional handicaps; (d) a coordinated involvement of agencies that provide educational, vocational rehabilitation, physical, mental health, or social services; and (e) continuing research to perfect identification procedures.

Placement

Effective multidisciplinary assessment must be considered the key to the placement process and the major contributor to the identification and appropriate placement of multiply handicapped deaf individuals. The assessment procedures for these children should by necessity consist of a developmentally oriented, multidisciplinary observation and process conscious clinical assessment approach. Just as "no single procedure shall be the sole criterion for determining an appropriate educational program for a child" (Public Law 94-142, Section 612(5)), no single discipline can provide the diverse experience and expertise necessary for the effective assessment of multiply handicapped deaf children. The process of assessment must move from the testing booth or cubicle to functional and adaptive behavior considerations in a variety of settings. Thus it should include information from a multitude of disciplines, representative examples of behavior in numerous situations, and both subjective and objective data from parents, educators, psychologists, specialists from such disciplines as medicine, audiology, and speech pathology, and other providers of direct child care services for handicapped children.

Diagnoses in the past have all too frequently led to such incorrect classifications for these children as retarded, emotionally disturbed, aphasic, brain damaged, learning disabled, et cetera, on the basis of poor communication skills and low academic achievement, which have subsequently led to inappropriate placements. Quite often, placement and programing resulting from such inappropriate assessments have resulted in excluding these children from all but the most restrictive placements, a practice that is clearly antagonistic to the purposes of Public Law 94-142.

Programing

Effective programing for the multiply handicapped deaf child involves a complex intertwining of service delivery arrangements, curriculum areas, and variable staff-student ratios as the child progresses toward independence and increases performance to move from the more restrictive placements to the less restrictive. Although there is some controversy as to the application of the concept of least restrictive environment to deaf children in view of their unique learning problems (Craig & Craig, 1977), the severity and diversity of the multihandicapping conditions lend themselves to a multicontinua model. While such a model illustrates the least restrictive environment as being the one closest to the regular classroom, this is an impractical consideration for most multiply handicapped deaf children. For the most part, these undefinable individuals are relegated to being either unserved or underserved in programs designed for single handicapping conditions, including residential programs.

The clear need for structure in programing for these children prompts the model depicted in Figure 1 of a modified delivery of instructional placements in conjunction with suggested developmental curriculum areas in a nonhierarchical arrangement. The model's ability to facilitate programing flexibility is evidenced by the accommodation and encouragement of individualization and independence in functioning, as the child may progress in each of the curriculum areas from an individualized to a group setting as well as move vertically into a placement designated as less restrictive. Consideration within each of the curriculum areas for optimum communication development would be essential.

Applying this model to a multiply handicapped deaf child, determinations of placement, curriculum areas, communication skill needs, and level of independent functioning must first be made. This could result in the child being placed full time in a special class on a special campus to receive individualized programing (one to one) in communication and language training until attending skills and appropriate behavioral controls could be established. Self help skills, requiring less structured training, could be accomplished successfully in a small group setting that would include peer interaction.

While some alternative instructional placements, suggested curriculum areas, and the concept of functional independence are represented in Figure 1, other major factors remain to be considered when designing or modifying programs to serve multiply handicapped deaf children. One of the most significant would be the types of communication strategies developed to work with these children in order to overcome the barriers to communication that deafness imposes. Other factors warranting consideration would include (a) the development of specialized curricular offerings con-

← less Independence more →

Restrictiveness: least → / ← most

Placement \ Curriculum areas	Self help skills	Perceptive-cognitive skills	Gross motor skills	Fine motor skills	Personal-social skills	Speech/language skills	Auditory communication skills
Regular classroom, support services							
Special class, regular campus							
Special class, special campus							
Home instruction		Staff-student ratios					
Hospital instruction							
Public residential (day only)							
Nonpublic residential (day only)							
Public residential (full time)							
Nonpublic residential (full time)							

FIGURE 1. Programing model for multiply handicapped deaf children.

sistent with the exceptionality, including behavior management strategies, life skills curricula, prevocational and vocational training, and diagnostic work evaluation facilities and equipment; (b) lowered staff-student ratios in classrooms and residential living situations; (c) expansion of diagnostic capabilities to determine least restrictive placements and assist in the development and implementation of individual educational plans and prescriptions; (d) expansion of the range of services available from professional specialists and therapists to meet population needs; (e) the design of inservice training components to increase and expand skills of existing direct care staff; (f) modification and adaptation of health care and food service provisions; and (g) the addition of specialized adaptive/assistive devices to enhance student functioning and mobility.

Summary

The diversity within the population of multiply handicapped deaf children is the major contributor to the problems associated with the provision of appropriate educational ser-

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vices. In recognition of this diversity, any implementation efforts to serve this population must consider the following three interacting variables critical to program design and destiny: (a) a designation or definition of the population to be served; (b) the availability of capable personnel to serve the designated population; and (c) the financial commitment to accomplish such a merger. The absence or unclear delineation of these variables and their interrelationships in a program design presents a prognosis for ineffectiveness and perpetual failure in appropriate service provisions.

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POINT OF VIEW

Interagency Services: A New Era for an Old Idea

M. C. MARTINSON

Abstract: Interagency planning and service delivery has been a long-term goal of professionals concerned with handicapped individuals. Efforts to achieve collaborative service bases have been given higher priority and sharper focus due to major shifts of emphasis and requirements in the design and implementation of service delivery systems. This discussion is intended to: (a) summarize precedents and developments affecting current efforts in developing collaborative service systems; (b) identify basic processes essential to current efforts; (c) summarize basic interorganizational models relevant to interagency planning; (d) provide an illustrative planning model; (e) suggest basic problems associated with complex interagency negotiations, and (f) propose priorities for research, demonstration, and development

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Editor's Note: In response to a survey conducted by CEC regarding its publications, the following four articles focus on information especially requested by the readers of *Exceptional Children*.

■ The basic impetus for collaborative interagency service linkages is the history of specialization common to agencies and disciplines serving handicapped individuals. In essence, the greater the degree of specialization, the greater the need for linking services (Demone, 1978). Interorganizational dependency is a logical corollary of organizational autonomy and specialization. The general tendency to attempt remediation of service system deficiencies via agency-specific authorizations generates the need for interagency program models.

The capacity of agencies to respond to this symbiotic relationship between autonomy and dependency is compromised by an unwillingness to enter into inherently conflict-oriented arenas. They are more likely to participate in multiagency relationships but resist interagency service delivery systems (Aiken, Dewar, DiTomaso, Hage, & Zeitz, 1975). The striving for autonomy and specialization within agencies is frequently not supported by an equivalent concern for integrating among agencies.

Current conditions in the field of special education illustrate both successes and problems in responding to specialization and service integration relationships.

Special educators no longer take sole responsibility for handicapped individuals. Relationships to general education and related service agencies have changed as new practices and procedures are mandated by law. Many previous common practices are now illegal or contrary to current regulation; for example, Public Law 94-142, the Education for All Handicapped Children Act of 1975.

Interagency planning was previously approached on a voluntary basis, to be under-

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taken after the more essential business of the day was completed. The "more essential business" was frequently the protection of agency and disciplinary territories. However, comprehensive planning and service implementation has been markedly affected by developments at both state and national levels in statutory, judicial, fiscal and policy areas. The combined effect of these developments has been to establish a mandatory base for interagency program planning.

BASIC PROCESSES AND RELATIONSHIPS

Five basic processes are instrumental in defining state and national commitments to handicapped individuals. The combined effects of these basic processes determine the general status of services and more specifically, dictate the levels and types of interagency relationships or processes which evolve. These basic processes are as follows:

1. *Constitutional law*—Fundamental protections for all citizens at national, state and local levels.
2. *Legislation*—Political processes necessary for enactment of statutory law and fiscal authorization and appropriation.
3. *Administration*—Processes which define statutory intent via policies and regulations necessary for program implementation.
4. *Legal interpretation*—Interpretive opinions from legal counsel, e.g., the Attorney General, regarding statutory intent to further define basis for administrative procedures.
5. *Case law*—Formal litigative procedures obtaining judicial decision rather than interpretive opinion.

Selective use of these basic processes is essential to resolving complex issues related to program and fiscal aspects of interagency planning. This task is complicated by the intermingling of the processes; e.g., substantial aspects of policy and regulation may be included in statutory law. Mutually satisfactory resolution of differences among agencies and identification of commonalities are complicated by an accumulation of laws and regulations frequently designed to specify autonomous domains of responsibility. Legitimate differences of philosophy and mission among disciplines and agencies contribute to problems in affecting singular decision processes.

GENERAL INTERORGANIZATIONAL MODELS

The difficulties inherent in selective and effective participation in these complex negotiations suggest the need for organized approaches to relating the effects of basic decision processes to interorganizational relationships. The professional data considered within these processes should be as focused and ordered as possible. This need is noted by Cohen, March, and Olson (1972), in characterizing educational organizations as having problematic preferences, unclear technology, and fluid levels of participation.

Interorganizational models may provide a basis for conceptualizing processes necessary for negotiating interagency agreements. Though such agreements may vary in regard to levels of formality and extensiveness of the collaborative efforts, the basic dynamics of interorganization relationships appear helpful in developing effective planning and implementation processes.

The *exchange model* (Levine & White, 1961) assumes voluntary relationships motivated by the expectation that unique and common goals will be more effectively achieved via collaborative activities. This model further assumes an economic base in that organizations lacking in resources will be more likely to develop interactive service arrangements. The lack of resources leads to exchanges in accessing program components essential to an organization but not available within it. The perceived or designated domains for the respective organizations provide the basis for identifying internally available or externally needed program elements. This voluntary, mutual problem-solving model has generally characterized much of the collaborative program development over the past several decades.

The *political economy model* (Benson, 1975) focuses more straightforwardly on interrelationships motivated by intended acquisition of authority and financial support. This model suggests that intergency development relates to the use of authority to accrue resources within the context of political economics and more general conditions affecting the related organizations.

The *dialectical model* (Zeitz, 1980) proposes interorganizational relationships as a process of constant renegotiation based on "antagonistic cooperation," i.e., resolution of immediate conflicts leading to new points of issue. This model assumes that organizations are concerned with production of resources to establish their domains and stresses control of interaction networks. Interorganizational conflict is both system integrative and system disintegrative; e.g., conflict resolution leads to new conflicts. Internal status and external interactions are both constrained by resource structures and relationship networks. The dialectical model departs significantly from the assumptions of consensus and mutuality common to the historically accepted exchange model.

CHARACTERISTICS OF INTERAGENCY PLANNING PROCESSES

Effective response to the requirements for interagency planning demands the use of a mutually agreeable planning model and process. Figure 1 depicts a general process for use both within and among agencies. Such a process is helpful in complex negotiations requiring public specification of related and unique agency responsibilities.

Use of such a process requires extensive knowledge in negotiating for agreement on specific procedures and information formats, because the problems which complicate this negotiation are frequently both technical and political in nature. Regardless of the particular model used, each participating agency must be convinced that its mandated responsibilities will be respected in the planning process. The stages of this illustrative process include:

1. Identification of the statutory mandates, state and federal, which specify agency responsibilities and service requirements. A summary matrix organizing these data is very helpful. This exercise makes basic information regarding needs and requirements visible for mutual review and negotiation.
2. Translation of the mandated responsibilities and authorities into statements of objective(s) for each agency, permitting review by individual agencies and identification of interagency gaps or overlaps.
3. Planning to consider the specific program functions and operations projected by each agency. This step is essentiel for organization of data for interagency agreements and management of related program units.
4. The identification of necessary resources (fiscal, human, and physical) to specify the minimum of support necessary to implement program operations. Negotiation of these resource requirements on an interagency basis is difficult due to the inherent competitive nature of the process.
5. Negotiation of the procedures for administering jointly shared responsibilities. This step is essential but complicated by the

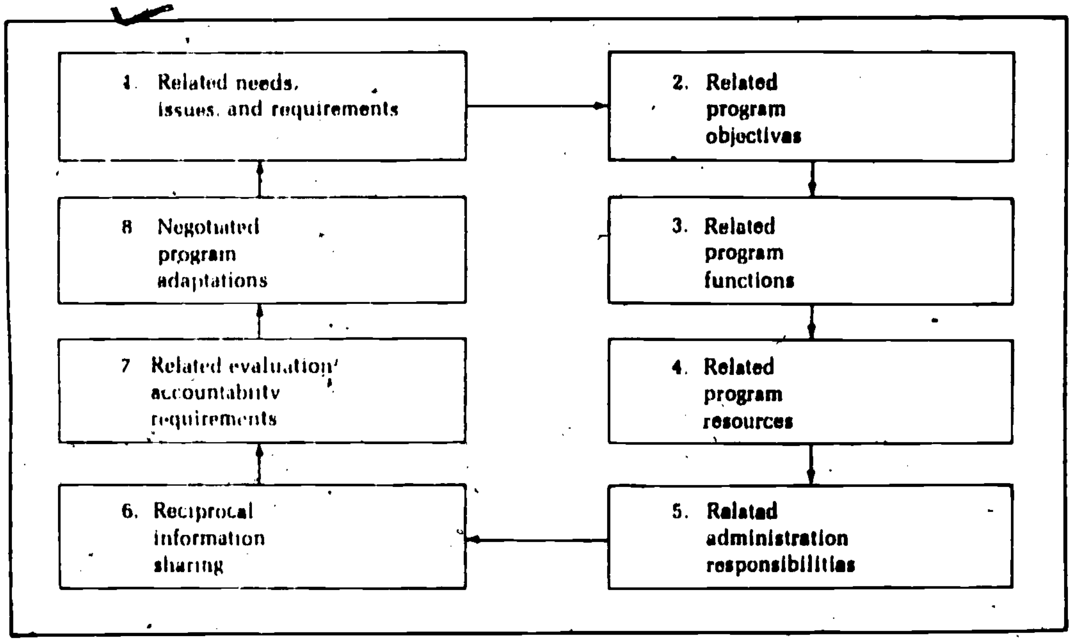

FIGURE 1. Planning model for use in formulating collaborative processes within and among agencies.

common requirement to designate one agency as having final program authority, particularly since the underlying legislative mandates usually establish the basis for single agency primacy. The evolution of the Department of Human Resources illustrates the difficulties involved as well as providing a model for review.

6. Integration of individual agencies' specific evaluation and accountability needs with those of related agencies. Specific reciprocal procedures must be developed to minimize duplicetive or conflicting data bases. Many agencies are becoming increasingly resistant to random uncoordinated requests for data.
7. Establishing procedures to assure processing of planning, management, monitoring, and evaluation data among participating agencies.
8. Procedures for use of program monitoring and evaluation data for negotiation of program revision(s) among the participating agencies. This component provides the basis for ongoing program adaptation and improvement.

The process assumes that no fixed model will accommodate the diversity of needs identified by the respective agencies or obtained from interagency analyses. The current state of the art suggests that a flexible process orientation is more appropriate. Any such process must provide for participant identification of need(s) rather than assuming preordinate requirements. It should recognize that the success of the process will be determined by the degree to which the respective participants perceive collaborative activities as relating directly to their priority needs and responsibilities (Molner & Rogers, 1979).

The planning process should differentiate among client, program, or systems level interagency coordination. Client level coordination is illustrated by integration of separate services for an individual to eliminate service gaps or duplication. Program level interagency collaboration involves integration of administrative structures or functions to facilitate operational coordination. Systems level planning focuses on broader systems of services beyond the administrative constraints of particular agencies (Magrab & Elder, 1979). The relationship between programmatic planning and policy development must also be considered.

PROBLEMS AND PITFALLS

As suggested, the factors affecting the negotiation of complex interagency service agreements are technical, fiscal, political—and human. The following hypothetical "syndromes" illustrate problems inherent in developing complex multi-agency relationships.

1. The *"Competition/Cooperation Paradox" Syndrome.* History suggests that cooperation is basically "coordinated competition." Agencies will commonly cooperate to more effectively compete with other groups for program and resources. This syndrome is particularly acute during fiscal austerity periods.
2. *The "Poker Chip" Syndrome.* This behavior is based on the assumption that a finite number of chips (status, power, or funds) exist. Practitioners believe that no one will voluntarily lose "chips" and cooperation must be arranged to force "winning." Conversely, some people assume an infinite number of chips and everyone can win by generating more chips to be shared. Only the very optimistic adhere to this latter view.
3. *The "Inability to Escape the Penalties of Preliminary Success" Syndrome.* Such an attitude is based on immediate pain reduction, e.g., "I don't need you any more now that my immediate problem is solved!" The result is a series of sporadic relationships based on the notion that "Now that *I* have improved my position in cooperation with you, *I* can compete on my own."
4. *The "Tower of Babel" Syndrome.* This condition relates to the compulsive efforts of each agency or discipline to develop a unique language of terms and acronyms to describe who they are and what they do. Ready communication is precluded by the need for translation of these diverse languages.
5. *The "Professional Preservation" Syndrome.* These symptomatologies relate to the hazard to individuals of generating new, innovative program objectives supported by a reordering of functions designed for other purposes. Simplistically, innovative program functions may produce innovative results. Descriptions of innovative program goals based on reordering old functions will not.
6. *The "Agency Incest" Syndrome.* The notion of territorial imperatives provides a basis for

a high level of agency partisanship. The need for professional separateness and identity is augmented by an interagency or intradisciplinary caste-system. This condition affects interagency "trust relationships" and the capacity to engage in individual or collective risk behavior.

7. The "*Divide and Defeat Ourselves*" Syndrome. This is an intermediate stage of the preceding syndrome, evidenced by the position that "Unless I get what I want, no one is going to get anything." The condition has basis in the excessive, overly rigid attempts to achieve visibility and status for particular agencies.
8. The "*Snatching Defeat from the Jaws of Victory*" Syndrome. Such a syndrome represents the most advanced stage of the "Agency Incest" and the "Divide and Defeat Ourselves" Syndromes. It occurs when subgroups or units of the enterprise take action to compromise general program objectives to achieve specific, individual advantages. The lack of cohesiveness and the level of interunit competition become evident to external control agencies. The problems become acute when legislative and associated resource control bodies are involved. This syndrome tends to generate autonomous but fragmented program support and negates the potential for continuity in comprehensive, long-term planning. Common responses to the absence of self-initiated regulations are: (1) "Since you can't regulate yourselves, we'll do it for you" and (2) "When those of you having specific program responsibilities can coherently define and document your needs, we will consider priorities for support."

RESEARCH, DEMONSTRATION, AND DEVELOPMENT NEEDS

Initiatives at the national, state, and local levels have achieved significant support and requirement(s) for integrated, interagency service delivery systems for handicapped individuals. Documentation for these are provided by joint interagency policy statements, related service requirements of P.L. 94-142, diverse types of state and local interagency memoranda of agreement, and an array of formal and informal approaches to collaborative service implementation. Areas of proposed action in extending these processes of collaborative planning include the following:

1. The design and field testing of generic processes and procedures for planning and implementing interagency service structures (Crosson, Feltner, Foley, Grayson, Grigsby, Johnson, Justice, & Martinson, 1979).
2. The design and demonstration of evaluation models and procedures specifically relevant to interagency service systems.
3. The design and demonstration of management information systems appropriate to the administration and monitoring of interagency programs.
4. Development of procedures for coordination of school-related interagency structures with preschool and postschool services.
5. Development of models and procedures for increased private sector involvement in comprehensive service systems.
6. Design and implementation of fiscal cost-sharing models for support of interagency services.
7. Increased consideration of child or client referenced case management systems in the development of collaborative services.
8. Continued efforts to reduce the conflicting or duplicative definitions, requirements, and jurisdictions among federal and state agencies.

POSITIVE RESPONSE POTENTIAL

Interagency planning has shifted from a permissive to a more mandatory base. This transition is closely related to the general shift to mandatory compliance in many areas of program development. The combined effect of statutory, judicial, fiscal, and policy developments on a national basis is to increase required development of an integrated service base. The prerogative to consider the problem at personal convenience no longer exists.

Fortunately, an increased capacity to respond to these requirements is reflected in the following:

1. Development of more appropriate planning and management models.
2. More effective information dissemination systems regarding state of the art practices.
3. A broader authority base to initiate and maintain comprehensive planning procedures.

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4. An increased cadre of personnel with competence in interagency planning and program design.
5. Increased fiscal support for interagency planning.

The coordinated use of such positive increased capacities can do much to reduce the effects of syndromes related to hanging separately instead of working together.

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COORDINATION – A PROBLEM AND A CHALLENGE

A persistent, nagging problem in the delivery of human services is that of poor or mediocre coordination of services. We all know of myriad instances of duplication of effort, of clients being "dropped between the cracks" in the identification and referral process, and of frustrating delays as the client moves "between" agencies. Indeed, the Rand Corporation, and the General Services Administration (GSA) of the federal government, have identified "poor coordination of available services" as THE major barrier to the effective delivery of human services. This problem appears to be especially severe with the mentally ill and the developmentally disabled who, because of the seriousness of their needs, often cannot effectively advocate for their own rights to get through the red tapes so frequently associated with applying for assistance.

This problem of inadequate coordination of services is especially severe for HIDD clients/students, and in fact poor coordination of services for this group may be viewed as the epitome of agency service coordination problems in the U.S. Although, by law, both services for the deaf and services for the developmentally disabled should be available to HIDD persons, it is far too often the case that each service group assumes the other group is the major source for this population. That this assumption exists partially reflects the fact of poor coordination of efforts, for if these schools and agencies truly communicated and coordinated their efforts they would know their present assumptions are invalid.

The Problem

There are two basic types of coordination in the human services area. One is interagency coordination, and the other is intra-agency coordination.

1. *Interagency Coordination.* In this type of coordination, means and processes of interaction between two or more agencies are effected to facilitate the delivery of appropriate and timely client/student services by each agency.

When these means and processes are not specificied and monitored, coordination becomes incoordination. The resources of each agency are weakened due to delays, conflicts, omissions, and untimely commissions. The client/student "bounces from pillar to post," waiting, often in vain, for the appropriate services at the appropriate time.

2. *Intra-agency Coordination.* Even small, two- or three-person agencies may fall victim to problems with coordination. Incorrect assumptions may be made about the who, what, when, how, and where of client services. Poor communication, inexperience, lack of knowledge, and the absence of planning may foster incoordination whenever as few as two people work together. This being the case, the likelihood of poor coordination increases with the number of personnel involved and the complexity of the task. Hence, poor coordination occurs not only between agencies but within agencies. And, the larger the agency the greater is the possibility for intra-agency incoordination.

Again, only deliberate planning and clearcut lines of responsibility, coupled with careful monitoring of results, can eliminate the inefficiency and even active harm that stems from poorly coordinated service delivery efforts.

The Challenge

The coordination of services for HIDD persons requires placement of responsibility for services at all levels, local, countywide, statewide. Accountability must be defined and monitored.

The question of "who insures coordination" on behalf of HIDD persons within given service systems (education, rehabilitation, etc.) represents the basic issue here. Unless this question is answered, coordination will not occur.

Several mechanisms are available to foster coordination of efforts on behalf of HIDD persons.

1. *Interagency Coordinating Council.* A special statewide committee may be established by concerned schools and agencies for the specific purpose of fostering communication, client/student referrals, and exchange of information as well as long-range planning activities. One individual from each concerned agency can serve as a member of the committee. Typical agencies/schools to be represented on this committee might be:

- School(s) for the hearing impaired
- School(s) for the developmentally disabled
- Community agencies serving the hearing impaired, the developmentally disabled, or both groups
- Vocational rehabilitation agencies
- Post secondary educational facilities serving hearing impaired and/or developmentally disabled people
- Health planning agencies
- The State Department of Education
- The State Developmental Disabilities Department
- The State D.D. Council

A monthly or bimonthly meeting of such a statewide council can do a great deal to foster effective interagency coordination and cooperation.

2. *Statewide Coordination of Services for HIDD Persons.* A second potentially effective mechanism for fostering improved interagency coordination of services is the appointment of one individual to serve as a "Statewide Coordinator of Services for HIDD Persons." Although such a person would be limited in terms of authority due to his/her placement within one department of state services, his/her advocacy efforts need not be stifled.

The coordinator position might be located within a super agency and be one duty of a present staff member or be the single role of a new or existing staff member.

This approach would permit an ongoing effort on a broad scale on behalf of HIDD persons, and would counter trends that result in small minority groups being overlooked for lack of ongoing advocacy.

3. *State D.D. Council Subcommittee.* A third, useful option available to the states is for the State D.D. Council to establish a subcommittee from among its members, charging the subcommittee with the task of maintaining up-to-date information on services for HIDD persons. The resulting information could be periodically shared with service providers via a newsletter. Also, subcommittee meetings could be held with appropriate agency representatives invited to attend and give presentations. This process would do much to foster greater coordination.

4. *Other Options.* No state is exactly like any other state in terms of agency organization, personnel, funding availability, interest, and political dynamics. The three options described above do not exhaust available concepts for improving coordinating efforts on behalf of HIDD persons. New, unique approaches are encouraged and should be sought, ranging from advocacy groups to citizen's information centers. The actual delivery of timely, appropriate services to HIDD persons is the goal; the "How" of achieving this goal must be an individual, state-by-state decision. The decision, however, is overdue; action is needed now.

Intra-agency coordination involves issues and problems similar to those discussed for interagency coordination. Committees and coordinators are encouraged within agencies to bridge the gap that so often develops between and among other departments within one agency.

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Statewide Planning in the Education of the Hearing Impaired

David M. Denton

This article was originally presented as the principal paper at the Annual Regional Teacher's Institute hosted by the Maryland School for the Deaf Friday, October 14, 1977. This regional meeting of educators involved persons from Maryland, Virginia, West Virginia, Pennsylvania, New Jersey, Delaware and District of Columbia.

At a time of turmoil regarding educational programs for the hearing impaired, there is a crucial need for the development of a comprehensive state plan. Such a plan must consider first, the realities of hearing impairment and deafness; second, the roles and responsibilities of educational programs at the state, district and county level. In the absence of a statewide systematic plan which has the understanding and concurrence of the key professionals heading state programs, territorial prerogatives often take precedence over the educational and other human needs of hearing impaired and deaf children (Bellefleur, 1974). Perhaps to a greater degree than with other fields of special education, the area of deafness has been plagued historically by disputes or controversies which have tended to divide educators into polarized groups: e.g., oral versus total, day versus residential, oral versus aural, or mainstreaming versus special schools. The ultimate tragedy is that deaf children and their parents are the victims of the on-going controversy. They become the heirs of the educational devastation resulting from professional prejudice. An examination of certain key issues can contribute to a reduction of past non-productive debate and confusion.

A major aim of this paper is to examine the educational needs of a variety of hearing impaired children and to examine a variety of educational programs developed for these children in a way that will avoid the appearance that one kind of program is favored over another kind of program. Children are more important than programs and the central concern of this paper is to seek an understanding of what is best for each one.

The author of this paper recognizes, understands and respects the differing responsibilities and differing points of view of the major agencies involved in the education of hearing impaired children in Maryland, and it is the aim of the author to present a balanced statement, but a statement that does not compromise children. Public Law 94-142 addresses very clearly the responsibility of public schools in the education of all handicapped children including the hearing impaired. The education of the hearing impaired in the public schools in Maryland represents a fundamental responsibility of the Maryland State Department of Education. The public schools become a major resource in the education of the hearing impaired and the viability of such programs is recognized. It is also recognized that the services of schools for the deaf, both day and residential, represent an essential component in a statewide plan for the education of the hearing impaired.

ISSUES

Degree of Hearing Impairment

One obvious factor of fundamental significance is degree of hearing loss (Brill, 1976; Vernon and Prickett, 1976). The child with a 95dB loss in the speech range perceives the world quite differently than the child with

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a 45dB loss. With a 45dB loss amplification may make speech understandable, whereas the youngster with a 95dB loss will probably never be able to learn language through hearing alone. Thus, degree of hearing loss plays a major role in determining the type of educational program appropriate (Hehir, 1975). A child with a mild hearing impairment may be expected to successfully mainstream if the essential support services are provided within the school system. On the other hand, even with the kind of support services that would be adequate for a child with mild to moderate impairment, the child with severe to profound impairment is placed into an extremely high-risk situation when mainstreamed. Similarly, the probability for academic success may be reasonably good for many children with mild to moderate impairment if mainstreamed in an educational program utilizing the oral/aural modes of communication, assuming essential support services are included (Holcomb and Corbett, 1975; Vernon and Athey, 1976). By contrast, almost all children with severe to profound impairments require a total communication system in order to be given a fair chance for academic and personal success (Vernon and Prickett, 1976).

Etiology

Cause of deafness and the age at onset should be basic considerations in the educational placement of hearing impaired children. The student populations of educational programs for the hearing impaired can be divided into two groups—those who are deaf or hearing impaired from hereditary causes and those who are deaf and hearing impaired from accident and/or disease. Margaret Kent (1971) noted that "deafness due to heredity presupposes an intact central nervous system except for a few genetic syndromes involving the auditory and brain mechanisms. Since it is assumed deafness is transmitted in the genes, learning for most of the hereditarily deaf children in a school for the deaf would not be expected to be unusually difficult, all other factors being equal, except for the limitations imposed by the hearing impairment." Concerning deafness due to accident or disease, Miss Kent further states that "the etiology suggests a greater probability of central nervous system involvement in varying degrees; thus, language learning may be complicated by behavioral deviations such as hyperactivity, distractability, and disinhibition. Diversified programs with a wide range of educational goals are needed to meet the varied needs of such a school population." In the Maryland School for the Deaf those students whose deafness is due to accident or disease account for two-thirds or more of the school population.

Age at Onset

Strongly related to etiology and of comparable importance concerning the selection of educational programs is the age at onset of hearing impairment (Kent, 1971). Over the past generation there has been a tremendous shift or change in etiology and onset. Referring to the Maryland School for the Deaf, Margaret Kent stated that "analysis of our school population indicated that nine in ten are born deaf in contrast to five in ten 30 years ago. This means that most of today's deaf children never had an opportunity to acquire language normally as contrasted to one-half of the school population of past years with normal language experience before the onset of deafness." Regarding the significance of age at onset, Kent further stated that "it is logical to assume the earlier the onset the more diffuse and, therefore, more severe the handicap." For example, an accident or disease such as prenatal rubella, which attacks the fetus, is apt to be accompanied by more pervasive complications than an illness which occurs in childhood. A careful analysis of a school-age population of hearing impaired children across our country today suggests that the vast majority of these children suffer hearing impairment resulting from accident or disease; that the impairment was present at or before birth and because of changing etiologies there is a higher than ever risk of the presence of other handicapping conditions. Etiology and age at onset are factors of grave importance when decisions are to be made by parents and educators regarding the placement of children in educational programs. (The change in the basic causes of deafness is in part due to the presence of antibiotics and the elimination of diseases such as scarlet fever and others.)

Low Incidence Handicap

Deafness is so rare in the general population that it is not feasible for many local boards of education to maintain viable educational programs for children with profound losses (Brill, 1974; Holcomb and Corbett, 1975). This problem has been compounded in recent years by increases in the density of the inner city and the attendant shortage of economic resources necessary to maintain sound educational programs. The other dimension of the population shift is the loss of rural populations to the cities. In both situations the local board of education may face staggering odds in attempting to provide a comprehensive, sequential, educational program for hearing impaired and deaf students.

In years past the public and private residential schools for the deaf were the primary source of educational services for deaf children. The creation and continuation of residential programs was in direct response to the low incidence characteristic of hearing impairment. It was not until the post World War II era that our profession witnessed the widespread emergence of day schools and day class programs for the deaf. The "day-residential" dispute became a volatile issue much as the oral/total dispute had been, and in some cases continues to be. The rationale for the creation of residential schools for children representing a low-incidence handicap has validity (Brill, 1974; Vernon and Prickett, 1976).

It is unfortunate that arguments have tended to ignore the central issue which is the need to provide a comprehensive, sequential, educational experience for a scattered population of children. Instead they have focused on the day-residential aspects of the program. The issue of comprehensive, sequential, education remains central in 1977. It must be given the very top priority consideration in the development of a comprehensive state plan. Programs must be evaluated on the quantity and quality of comprehensive services they offer and on their relationship to the needs of the population (Brill, 1976; Griffing, 1977). More specifically, every deaf child should benefit from a long-term, sequential program in appropriate facilities designed with respect to the child's deafness (Vernon and Prickett, 1976).

Least Restrictive-Most Restrictive

Since a basic goal of education is the ultimate social, cultural and economic integration of the individual "into the mainstream", the concept of providing an education "in the mainstream" for handicapped persons has assumed major significance today. In considering the concept of mainstreaming, as it is used in contemporary literature, the general contention that many handicapped children can and should be educated in the local school system is supported. Again, it is the aim of the author to avoid the tendency to state or to imply preference for a particular philosophy. Whether the child is fully integrated into a program with non-handicapped children, taught in a special class, or placed in a residential school should be determined by the extent of need on the part of the child and the ability of the program to appropriately address that need rather than on the basis of preference for a particular kind of program or a particular philosophy.

In recent years there has been increasing emphasis placed on the use of the terms *least restrictive environment* and *most restrictive environment*. The superficial and confusing use of these terms in the education of deaf children has resulted in far more confusion than enlightment. Labels of "least restrictive" or "most restrictive" have come to be identified with certain kinds of educational programs. This, in turn, has caused professional educators to retreat into entrenched positions from which their specific kind of programs can be defended and promoted. The erroneous labeling of programs as "least restrictive" or "most restrictive" has prevented an objective analysis of the characteristics of the respective educational environments for deaf children. There is a crucial need for sound judgment and clear thinking about what is restrictive and non-restrictive for hearing impaired children.

Another term frequently misused in our field is "institutionalization." Its use in contemporary special education literature generally refers to placement of the handicapped individual in a residential program. In its most negative sense, the term conjures up visions of mentally ill patients warehoused in the back ward of a psychiatric hospital essentially forgotten by their families and receiving only minimal services from those responsible for their care and treatment. The institutionalization of these patients results at least in part through the loss of the individual's will and ability to function in the "real world" or in the "mainstream." Educators of the deaf face the risk of a form of institutionalization which is far more insidious and subtle than the kind of dehumanization sometimes experienced by mental patients. Institutionalization can occur through the perpetuation of a state of dependence on the part of a student. Without care, planning and thought this can occur in a school where too many of the child's needs are cared for by other persons. The child is, thus, robbed of the need to develop independent thought and a sense of personal responsibility. In effect, the child is smothered with well-intended but misdirected care and, to some degree, both isolated from and insulated from the real world. This kind of institutionalization can occur in a residential school for the deaf. Thus, there is a critical need on the part of educators in residential schools to avoid the creation and perpetuation of programs which foster dependence upon the institution at the expense of the development of independent thought and self-reliance.

The other form of institutionalization occurring in the education of the hearing impaired is probably much less understood by the profession-at-large even though it is more common and of greater danger than the first type. The second form of institutionalization occurs when hearing impaired children are placed in situations in which failure is inevitable. The kinds of programs which face the greatest risk of this kind of institutionalization are those in which deaf children are indiscriminately integrated into a regular school program even though they may be functionally unable to initiate or maintain social, psychological, or educational contact with their seatmates. In this kind of situation the deaf child's sense of differentness is compounded rather than reduced (Craig, 1965; Schroedel and Schief, 1972). Even though he is geographically in the same class with hearing students, his ability to integrate socially and culturally as an equal is irreversibly damaged. Ultimately integration into the mainstream is measured by economic independence on the part of the adult who is free to move socially and culturally among those persons whom he chooses, including those who are deaf and those who are hearing. Integration occurs on the basis of competence and competence is acquired on the basis of early and continued success both in school and out.

Another popular misconception regarding the most restrictive-least restrictive concept for deaf children is that the deaf child is in a least restrictive environment when (1) he lives at home, (2) goes to a public school, and (3) is placed with hearing children. The most restrictive environment occurs when he is placed (1) out of the district, (2) in a residential school, and (3) with other deaf children (Vernon and Prickett, 1977). This simplistic view of the problem can and often does result in the indiscriminate placement of hearing impaired children in programs which do not address themselves to such fundamental considerations as degree of hearing impairment, etiology and age at onset, and the presence or absence of essential educational services. Some children with a mild to moderate impairment and strong support on the part of the family may very well be in a least restrictive environment when placed in a local school setting with hearing children given these essential support services which are provided by the school. On the other hand, such place-

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ment for most children with severe to profound hearing impairment would be placement in a most restrictive environment. Obviously no one model fits all hearing impaired children.

The critical factor in the education of hearing impaired children is the relationship between the extent of need (determined by such factors as degree of hearing loss, age at onset) and the extent of services. A child with a mild impairment may be able to function with a hearing aid, a program of auditory training and a program of speech and language therapy provided within a public school setting with consideration being given to such things as preferential seating. By contrast, the child with a profound hearing loss will probably need the services which can be provided only in a comprehensive school program with an enrollment of a hundred or more deaf children and a faculty of trained and experienced professionals who are able to provide the broad range of support services that the child requires. A school then, in effect, comprises an environment; an environment of people and things in which the child must be free to move and to grow. An environment which lacks this is restrictive in the most essential sense.

For every deaf child growth and development occurs along a continuum. Again the provision of services must occur in relationship to the extent of need at all stages along the continuum. In the beginning the deaf child who is essentially without educational, social, or language skills will require a massive outpouring of educational services. In no other way can the deprivation of early profound hearing loss be overcome. As the child acquires skills and amasses knowledge there can be, without risk to the child, a reduction in the degree of educational support. Contact with hearing people can become more meaningful. Again, as the child's skills and knowledge broaden and deepen his need for the support and nourishment on the part of the educational program can and should be reduced. The child is, thus, being led and directed toward self-dependence through the use of appropriate support services and new found skills. The greatest amount of educational support is provided at the time of greatest need. This kind of educational model can and should provide ever-increasing contact with hearing persons both in school and in other aspects of the community. Under this model there is a meaningful relationship between the degree of integration and the degree of personal and social skill.

The Multiply Handicapped Deaf Child

A major responsibility faced by educators of the deaf today is the increasing number of multiply handicapped deaf children (Kent, 1971). The additional handicaps include mental retardation, visual impairment, emotional disturbance, orthopedic problems, learning disabilities and others. In recent years there has been a move in some places, namely California and Maryland, toward the development of appropriate programs for such children (Brill, 1976; Griffing, 1977). A major problem is the reluctance of local programs for the hearing impaired to serve them. They have tried to transfer their responsibility for these children to the state residential schools for the deaf (Griffing, 1977). Unfortunately, educators have ignored the need for a statewide approach to the education and habilitation of such children . . . an approach which should involve other agencies than education, such as the departments of health and mental hygiene, divisions of vocational rehabilitation and others.

Changes in major etiologies suggest that the responsibility to serve multiply handicapped deaf children will not only remain a major one but possibly increase in the years ahead (Kent, 1971).

ESSENTIAL EDUCATIONAL SERVICES

An educational program for hearing impaired or deaf children should be judged on the basis of the quantity and the quality of educational services provided. Once the criteria for these essential services have been established, objective judgments about programs and their appropriateness or inappropriateness for a particular child can be intelligently made (Brill, 1976; Vernon and Prickett, 1977). The evaluation and the selection of programs on the basis of services provided also helps avoid the problem of selection on the basis of professional bias or irrational personal preference. The following services are basic to a comprehensive program.

Audiological/Psycho-educational Evaluation

Every hearing impaired child must have the benefit of a comprehensive audiological and psycho-educational evaluation. This should be accomplished in clinically appropriate facilities by competent well-trained and well-qualified professionals who are able to communicate comfortably and effectively with hearing impaired persons regardless of their level of linguistic development or skill.

Comprehensive Educational Program

The school system is under an obligation to provide the hearing impaired or deaf child with a comprehensive, sequential, long-term, educational program from preschool through the secondary level. It may not be possible or necessary that such a comprehensive program be provided within one school. There is, however, a responsibility on the part of school systems setting up educational programs for the deaf to ensure that children enrolled in such programs are served all the way through the secondary level. For example, if a county board of education decides to establish a preschool and elementary program for the deaf, it should also plan for the provision of educational services at the junior high school and high school level somewhere within the system so that movement through the program by the child can be orderly and without undue stress to the child or his family. Too many educational programs for hearing impaired and deaf children are open-ended and result in the repeated movement of pupils into-and-out-of schools occurring in a number of different places within a district or state. Programs must be broad enough to ensure that all areas of the curriculum are adequately treated in a sequential manner permitting an individualized or developmental approach toward learning and instruction.

Parental Counseling

A comprehensive, educational program presupposes the availability of on-going parental counseling. Parents should be helped to understand and to accept the basic realities of deafness and should be equipped to work effectively with their child. To help parents seek an appropriate program for their child, information should be provided concerning all types of programs available and parents should be free to make judgments without being subjected to professional bias. Parental counseling should also include opportunities for parents to meet and to interact with deaf adults. Every school system having educational programs for the deaf should provide instruction and training in manual communication for parents of deaf children.

Faculty and Staff

Since the instructional program is the very heart of a school system, a basic requirement is that the faculty and staff have the benefit of appropriate professional training in the education of the hearing impaired. Such training presupposes the development and possession of communication skills on the part of the faculty permitting communication with hearing impaired children and adults at a variety of levels of linguistic development.

Clinical, Supportive Services and Personnel

In addition to the basic program of instruction an educational program must provide a broad range of clinical and supportive services to the student population, and to the faculty and staff. These services include the following:

(1) **Audiology and Auditory Training:** In addition to competent audiological evaluation, which has already been mentioned, the school must provide periodic re-evaluation of pupils, services regarding the fitting and maintenance of individual hearing aids, a program of auditory training reinforcing and supporting the efforts of regular classroom teachers and a program to ensure that auditory equipment including individual aids and group systems is serviced and kept operational.

(2) **Speech:** Speech development and speech therapy should be provided on an in-

dividualized basis to supplement and reinforce the on-going academic and speech instruction program occurring at the classroom level.

(3) **Psychological and Social Services:** The services of a team of psychologists, social workers and counselors who have the benefit of professional training not only in their particular discipline but training and experience as well in the education of deaf children is needed. These professionals must be able to communicate fluently with hearing impaired children and their families functioning at a variety of educational and linguistic levels.

(4) **Communication Services:** Since deafness is a communication disability, the educational program is under a heavy obligation to provide training in basic communication skills not only for its faculty and staff but for parents and pupils as well.

(5) **Facilities, Equipment and Materials:** Hearing impaired and deaf children are entitled to be educated in safe and pleasant facilities designed in so far as possible to reduce the isolation that deafness imposes upon children. It is clearly recognized that not all hearing impaired children can be enrolled in an appropriately designed and constructed school for the deaf, but serious attention and consideration must be given to the appropriateness of facilities with particular attention being given to such factors as lighting and acoustics.

The educational program must provide a broad program of auditory training and support. Such a program requires the availability of top quality group amplification systems and individual hearing aids. In addition, an educational program for the hearing impaired must provide a variety of other essential equipment and materials, such as: projection equipment and materials, video tape and television, appropriate library and media services and materials including captioned films.

Student Population

The cost involved in providing all of the services that are essential for hearing impaired children is prohibitive where there are only small numbers of children (Vernon and Prickett, 1977). Yet, anything less than the provision of a broad program of direct and supportive services is harmful to the child.

The relationship between cost and the size of the student population is clearly illustrated by the difference in the per capita cost of the two campuses of the Maryland School for the Deaf. Both schools provide essentially the same range of services, yet the per capita cost on the Frederick campus is considerably less than that at Columbia because of the substantially larger enrollment. This problem becomes magnified when efforts are made to serve small numbers of children in local programs. In addition, the presence of only a few classes of hearing impaired children within a given program prevents grouping on either the basis of age, developmental level, or degree of impairment.

Physical Education and Athletics

A secondary program for hearing impaired or deaf youth must be able to provide an on-going program of physical education and athletics permitting maximum participation by students at all levels both on an intra-school and an inter-school basis. Hearing impaired children are entitled to an opportunity to compete and to excell in athletics. They deserve the program and the equipment necessary to guarantee such participation.

Social-Recreational Program

Again, because deafness precludes the development of so called normal communication skills, there is a need on the part of the educational program to respond to the child as a person and to provide maximum opportunity for social development. Healthy social development presupposes a freedom and an ability to interact comfortably with one's peers and to participate freely in a variety of activities which tend to foster social, cultural growth (Schroedel and Schief, 1972). The social-recreational program of the school must be broad enough to permit hearing impaired children to enjoy the same kinds of experiences as normally hearing students including such typical activities as Girl Scouts, Boy Scouts, student council, literary societies, cheerleaders, 4-H, Junior NAD, and others.

Prevocational-Vocational Services

There is a growing awareness in American education of the necessity for prevocational and vocational-training not in lieu of but alongside a regular academic program. This need is particularly acute in the education of the deaf. A school program must be prepared to provide this essential service. Exploratory opportunities should be made available to students at the middle school level with opportunities for specific job related training at the high school level. Prevocational and vocational training should be offered in concert with the services of a vocational rehabilitation counselor and in keeping with a career education program which involves the school, the student's family, vocational rehabilitation services, and the community.

Philosophy and Educational Methodology

Every educational program should not only embrace but reflect through its people and programs a philosophy which recognizes and addresses the worth of the deaf or hearing impaired child. Further, the educational methods and practices employed by the school must be maintained with respect to the needs of the student population considering such fundamental realities as the degree of hearing impairment, and so forth.

IMPACT OF PUBLIC LAW 94-142

Public Law 94-142 is one of the more far-reaching pieces of legislation affecting special education and cannot be given adequate treatment in this paper. However, the impact of one or two aspects of this law must be given attention. In brief, the law says that every handicapped child must be provided a free and appropriate educational program in the least restrictive environment, and that the local board of education has the ultimate responsibility to see that such free and appropriate educational programs are indeed provided (Keogh and Levitz, 1976). A factor of major importance to us today is how the local board of education will carry out its ultimate responsibility. The drafting of federal regulations, the interpretations and counter-interpretations concerning the law and the regulations, and the inch by inch move toward the implementation of the law has created unparalleled activity and unprecedented tension in special education all over the country (Brill, 1974). There has been particular interest and concern in the education of the deaf regarding Congress' intent in passing Public Law 94-142. If ever there was a time for people to sit down and reason, it is now. The last thing our profession and the last thing that deaf children need is a series of territorial skirmishes. The real losers will be the children!

There are professional persons here representing every aspect of the power structure in the education of the deaf including the Committee on Education and Labor—United States Congress, a federally supported institution of higher education designed exclusively for deaf persons, state departments of education, state residential and day schools for the deaf, semi-private residential schools for the deaf, federally supported model high school and elementary school, countywide programs for the hearing impaired, private educational agencies, the division of vocational rehabilitation, university training programs for professional personnel and others. There is adequate responsibility and abiding responsibility for everyone to maximize the effectiveness of all agencies and all types of services in order to carry out what we might logically and reasonably assume was Congress' intent in the enactment of this piece of legislation.

RECOMMENDATIONS FOR THE COORDINATION OF EDUCATIONAL SERVICES TO THE HEARING IMPAIRED IN MARYLAND

The statements set forth here do not represent a comprehensive nor detailed statewide plan. These statements do, however, set forth a series of fundamental recommendations designed to result in maximum and appropriate utilization of existing educational services for hearing-impaired children with a variety of needs. The major concept in these recommendations is the recognition that educational programs for the hearing impaired in Maryland vary considerably from county to county regarding the quantity and quality of educational and supportive services feasible. These recommendations further recognize that the range of services provided by a specific program must be considered in concert with the needs of individual hearing impaired children to be placed in such programs. A major issue is the relationship between and among the Maryland School for the Deaf, the several county programs and the Maryland State Department of Education to ensure that hearing impaired children are placed in educational programs providing services commensurate with the needs of the children. The following recommendations are offered:

(1) A central registry for the hearing impaired be established for the State of Maryland so that optimum benefits of an early educational opportunity for every hearing impaired child can be realized. The creation of a central registry would facilitate the development of appropriate services for hearing impaired students not being adequately served at this time and would encourage the placement of hearing impaired children in programs providing *all* needed services. Basic data maintained by the central registry would be shared by the county, the Maryland School for the Deaf and the State Department of Education. The availability of such basic data to all responsible agencies would make possible the kind of dialogue essential among parents and professionals to ensure appropriate placement.

(2) Comprehensive information about all programs be provided every parent. Parents have a right to know the full range of services available for hearing impaired children in Maryland to ensure that appropriate placement is made. At present many are not given this information.

(3) The definition of "local program" be expanded to include not only county classes and services but facilities and services of the Maryland School for the Deaf. All of these programs and service systems are feasible within the public school network since their financial support is from the same ultimate public source. This recommendation is supported by the analysis of Public Law 94-142 done by the National Association of State Directors of Special Education, Inc., and has the benefit of legal precedent (National Association of State Directors of Special Education, Inc., 1976).

(4) The Maryland State Department of Education, the Maryland School for the Deaf and the several counties work together in the development of a statewide curriculum to help ensure that all hearing impaired children are being provided a comparable program. It is further recommended that the resources and services of the Maryland State Department of Education and the resources and services of the Maryland School for the Deaf be made available to local programs who may be in need of such resources and services. Such resources could include audiological and psycho-educational evaluation of hearing impaired children and consultation regarding curriculum, consultation regarding education and management of multiply handicapped deaf children, consultation regarding prevocational and vocational education, and so forth.

(5) In order for the State of Maryland to make the best possible use of existing educational programs it is recommended that the programs of the Maryland Schools for the Deaf, Frederick Campus and Columbia Campus, continue to be utilized as major educational services for children with severe to profound hearing impairment.

Because the Maryland School for the Deaf is funded as a separate Agency of the State, such utilization of its services would permit the counties, particularly those with small populations of hearing impaired students, to concentrate their educational resources toward the development of programs for children with mild to moderate impairment.

This kind of plan could alleviate, to a substantial degree, the tragic but growing problem of the transfer of a large number of students with severe to profound impairment into the Maryland School for the Deaf after they have experienced failure in other programs for the hearing impaired. A few of

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the larger, more heavily populated counties can, if they wish to make the financial commitment, provide quality programs for both groups, that is, those with mild to moderate impairment and those with severe to profound hearing impairment. One condition for this is that the numbers be sufficient to permit comprehensive programming in a cost effective manner.

(6) All programs for the hearing impaired in Maryland should consider the need for the provision of appropriate educational and supportive services for multiply handicapped children. The number of multiply handicapped deaf children in need of education services today is on the increase but there remains a critical shortage of appropriate programs. The Columbia campus of the Maryland School for the Deaf offers a small program for elementary age multiply handicapped deaf children in a separate self-contained facility specially designed for that purpose. In the drafting of this recommendation, consideration was given to the possibility of developing a comparable program for adolescent multiply handicapped deaf children in the Phase II stage of development of the Columbia campus. These programs, however, address only a small percentage of multiply handicapped persons needing services in Maryland. Other appropriate programs must be developed. Concerning this need for additional services for multiply handicapped persons, it is further recommended that the Maryland State Department of Education, the Maryland School for the Deaf and the counties work in cooperation with the Department of Health and Mental Hygiene, the Division of Vocational Rehabilitation and other appropriate agencies to ensure that all multiply handicapped deaf persons of school age are receiving the benefits of an educational program. Such cooperation would permit the development of educational services for multiply handicapped individuals who may be placed in psychiatric institutions, hospitals centers maintained by the Department of Health and Mental Hygiene, or perhaps, even persons maintained in correctional institutions. This kind of interagency cooperation may also result in the creation of group homes and halfway houses for multiply handicapped deaf persons who have not yet achieved full self-dependence. It is essential that there be interagency collaboration if the needs of multiply handicapped deaf individuals are to be recognized and met.

SUMMARY

In recent years the education of the deaf has experienced considerable change. Today a variety of programs are available for the education of hearing impaired children, whereas only a few years ago most of these children were educated in schools for the deaf. These changing patterns in education have sometimes resulted in confusion on the part of parents as to which program should be selected, and these changing patterns have sometimes resulted in unnecessary competition and conflict among educators. Since there are a variety of programs available for the education of hearing impaired children, educators need to pay particular attention to the appropriate placement of children whose individual needs vary considerably depending upon such factors as degree of hearing impairment, age at onset, presence or absence of other handicaps, etc.

Public Law 94-142 which mandates a free and appropriate education for every handicapped child has brought into very sharp focus the role of the local school system in providing services for handicapped children which may have been traditionally provided elsewhere. The implications of this law in the education of the hearing impaired are significant. As the profession gears up for the ultimate implementation of Public Law 94-142 across our land, there is a critical need for all responsible agencies and professionals to engage in comprehensive planning to ensure that every hearing impaired child is placed in a program that best suits his educational, social and other human needs. Thoughtful statewide planning which maintains a constant focus on children will bring professionals with differing responsibilities and differing points of view together. The result can be not only improved educational services for hearing impaired children but a whole new era of cooperation among educators.

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Analysis of Services to Hearing Impaired Developmentally Disabled Persons
VITAL INFORMATION FORM

Developed by:
Model Demonstration Program
The Rehabilitation Center
College of Education
The University of Arizona

Updated by:
HI-DD Grant Project
American Speech-Language-Hearing Association

Introduction

This document is an instrument for analyzing services to hearing impaired developmentally disabled (HIDD) persons. The principle purpose of this instrument is to structure the data required to conduct a formative analysis of school or agency services to HIDD persons. The Vital Information Form provides a means for systematically collecting the data that will consequently be used by program personnel to improve the services they are providing. The original intention of the MDP staff was to use the data gathered during a pilot stage to establish standards by which to evaluate services in various settings, thus allowing analysis in accordance with the evaluation model proposed by Robert Stake (1967). Standards had not been established by the end of the MDP project; this task remains to be done.

Nature/the VIF. The Vital Information Form (VIF) is the heart of the "Analysis of Services". Several characteristics of the VIF may affect its utilization by agencies. This process required a time commitment from agency staff. The VIF is lengthy. All of the required data are descriptive, necessitating a good deal of narrative information. This means that completion of the document is both time-consuming and qualitatively demanding. One cannot simply check an appropriate box or mark a sense cell and move quickly through the process. Each response requires thought and the periodic acquisition of information from agency files. Release of some of information may be perceived as a threat to the agency because the process requires documentation related to funding, efforts at deinstitutionalization, program accountability, etc. Although the agency may be working hard in all these areas, they may perceive themselves as vulnerable to criticism and, therefore, be reluctant to put themselves on record in an evaluative situation.

It is important to remember that this information is used to improve services where improvement is needed. Voluntary participation in this process is a sign of willingness to look closely at a service system, with a focus on providing success-oriented programs for persons who are hearing impaired and developmentally disabled.

Administrative concerns. An administrative commitment is important to successful internal and external evaluations. Many agencies maintain an operational format which does not include regular internal evaluation. In the conduct of a comprehensive review it is not unusual that no one person in an agency can immediately provide all of the information that is necessary. Many of the agencies participating in the pilot stage of the "Analysis of Services" found this to be true. To expedite the data collection process it is valuable to convene a small group of people whose collective expertise will be sufficient to complete all information on the VIF. Use of a team approach often proves to be the most effective and efficient use of resources; it often avoids the unevenness that often results when questions are parceled out to different individuals with minimal coordination.

Process. During the life of the MDP project, personnel from agencies throughout the country completed the VIF, sending their completed VIFs to the project staff for analysis—a service which is no longer available. This phase of the evaluation might now be arranged through the use of a local or regional evaluation team with expertise in program evaluation and services for HIDD persons.

With some modifications in forms and process this instrument can be used to conduct a multi-agency analysis of services to evaluate the availability of a continuum of services within a community, to identify service gaps and insufficiencies, to identify fruitful areas for collaboration, and to formulate a plan to remove barriers of exclusion, thus strengthening services for all who require them.

The following section contains the information asked for on the Vital Information Form. There are four sections of this form: Identification of Agency and Evalution Team, Program Antecedents, Program Transactions, and Program Outcomes. For reasons of space these sections have been condensed, eliminating the space for responses.

I IDENTIFICATION

School or agency ____________________

Address ____________________

____

____

Phone ____________________

Individual(s) completing Vital Information Form

Name	Position	Date (s)

II Program Antecendents

Instructions

Item 1 through 9 of this portion of the analysis are general questions concerning the nature of the school or agency. To complete these items, input from other staff members may be requested, and program documents may be consulted to supplement individual experience. There is no need to respond to these items in great detail; they are merely intended to provide an overview of the antecendent factors on which a school or agency is based.

The remaining items that fall under the heading of "antecedents" are essential to the success of the analysis, and should be answered carefully and thoroughly. As was the case with other items in this section of the document, staff input or program documents can serve as the supplementary data sources. Be sure to follow the guidelines associated with each item, since adherence to these guidelines will result in uniform and complete responses. The guidelines follow each item and are enclosed in parentheses.

Please keep in mind that the information supplied in this section is the first step toward improving services.

Program Antecendents

1. Briefly describe the purpose of your organization.

2. Describe the physical plant with respect to the following characteristics: 1) general appearance, 2) space, 3) accessibility, 4) maintenance, 5) equipment, 6) ventilation. This description should focus on the quality of each of the characteristics.

3. What specific provisions have been made to adapt the physical plant to the health, communication, and safety needs of hearing impaired developmentally disabled (HIDD) persons?

4. Identify the formal relationships that the school or agency maintains with other schools or agencies on behalf of HIDD clients. These relationships should be stated as a specific policy, a contractual agreement, etc.

School or agency	Description of relationships

5. Describe any informal relationships that the school or agency maintains with other schools or agencies such as access to consultative services, use of information resources, etc.

Program Antecendents

6. What relationship exists between the school or agency and organizations of and for hearing impaired persons, cerebral palsied persons, autistic persons, mentally retarded persons?

7. What is the funding base for the school or agency?

8. Describe any difficulties encountered in obtaining funds to serve HIDD persons. (Include funding limitations, inter-agency communication problems, lack of coordination, lack of clear responsbilitity, or problems specific to a school or agency).

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9. Does the school or agency have an advisory board? ________ If so, what is its composition, and is there a mechanism for consumer input from HIDD persons or their advocates?

10. Describe the characteristics of the HIDD clients served by the school or agency.

10.1 Number (Include the number of HIDD persons being served and the total client population.)

HIDD ____________________ TOTAL ____________________

10.2 Age distribution (Respond to this question by indicating the number or percentage of HIDD clients in each age range. If this information is unavailable, simply indicate the number of children and adults)

Program Antecendents

1. ~~Briefly describe the purpose of your organization.~~

0 - 5 ____________ OR Children (0-18) ____________

6 - 12 ____________ OR Adults (19-up) ____________

13 - 18 ____________

19 - 59 ____________

60 and above ____________

10.3 Handicapping conditions	Number or Percentage
Hearing Impaired Mentally Retarded	______
Hearing Impaired Autistic	______
Hearing Impaired Cerebral Palsied	______
Hearing Impaired Epileptic	______
Hearing Impaired Mentally Retarded/Autistic	______
Hearing Impaired Mentally Retarded/Cerebral Palsied	______
Hearing Impaired Mentally Retarded/Epileptic	______
Hearing Impaired Mentally Retarded/Autistic/Cerebral Palsied	______
Hearing Impaired Mentally Retarded/Autistic/Epileptic	______
Hearing Impaired Mentally Retarded/Cerebral Palsied/Epileptic	______
Hearing Impaired Mentally Retarded/Autistic/Cerebral Palsied/Epileptic	______
Hearing Impaired Autistic/Cerebral Palsied	______
Hearing Impaired Autistic/Epileptic	______
Hearing Impaired Cerebral Palsied/Epileptic	______

10.4 Racial/ethnic composition	Number or Percentage
Caucasion	______
Native American	______
Black	______
Hispanic	______
Oriental	______
Other/Mixed	______

Program Antecendents

10.5 Average length of time service is rendered (in months) ________

10.6 Average cost of serving an HIDD client. ________

10.7 Average cost of serving non-HIDD client. ________

10.8 Indicate any other characteristics that may be of interest, such as financial status of clients or their families, religious affiliation necessary for service, parental or family status, etc.

10.9 Indicate the difficulty associated with retrieving the information relating the items 10.1 through 10.7. Was it readily accessible, or was a great deal of effort necessary to obtain it?

11. Describe the characteristics of the professional staff of the school or agency.

11.1 Total professional staff (including administrators) ________

11.2 Specializations (include administrators)

Area of Specialization	Number or Percentage	Professional Certification (Yes or No)

11.3 In service training opportunities

11.4 Continuing education opportunities

11.5 Racial/ethnic composition	Number of Percentage
Caucasion	________
Native American	________
Black	________
Hispanic	________
Oriental	________
Other/Mixed	________

Program Antecedents

11.6 Identify staff positions held by disabled persons

11.7 Describe the turnover rate of the staff in each area of specialization (Precise figures, though helpful, are not absolutely necessary; approximate percentages are acceptable).

11.8 Describe any other relevant staff characteristics that may contribute to analyzing the services of the school or agency.

12. Describe briefly the administrative structure of the school or agency. (include a chart of organization/operation if possible)

13. Additional comments or information.

III Program Transactions

Instructions

This portion of the analysis is one of the most essential, but is also one that is comparatively difficult to complete. Two factors contribute to the difficulty related to obtaining information on program transactions. First, in addition to staff input and document reviews, the data sources for this portion include extensive observations. A second factor is the magnitude of the undertaking; some programs comprise so many activities that evaluating each one will be very time consuming. As a consequence of these factors, a great deal of effort will go into gathering the data pertaining to program transactions.

Instructions (continued)

In obtaining the data pertaining to program transactions, it is important to record what actually exists. Therefore, attempt to corroborate the statements made by other informants and the information obtained from program documents with individual observations of program transactions, and document any discrepancies among these data sources. Discrepancies related to each item should be indicated at the conclusion of the response to each item.

This portion of the analysis is of tremendous importance in developing recommendations in a realistic context. Improving client progress is, quite often, a matter of altering the transactions within a system in order to align them more closely with client needs.

Program Transactions

1. Listed on the following pages are services that are often provided to HIDD persons. Identify those services provided by the school or agency, and answer the questions on the following pages as they relate to that particular service.

   1.1 Are there services offered to non-HIDD persons that are not offered to HIDD persons? _____Indicate which services they are, and why they are not offered to HIDD persons.

Answer the following questions as they relate to the general delivery system of the school or agency. Note any descrepancies between services offered to HIDD persons and those offered to non-hearing impaired clients.

2. How does the school or agency determine whether or not its services are provided in the "least restrictive environment"?

Name of Service	Availability of service (x)			By Whom? (Title)	Explanatory Remarks
	Often	Sometimes	Never		
Audiological Screening					
Audiologic Assessment					
Speech and Hearing Services					
Counseling and Guidance					
Parent Counseling and Guidance					
Parent Education					
Information and Referral					
Protective/Legal					
Advocacy					
Education Services					
Psychological Assessment					
Pre-School					
Infant Stimulation					
Medical Services					
Physical Therapy					
Occupational Therapy					
Residential Living					

Name of Service	Availability of service (x) Often	Sometimes	Never	By Whom? (Title)	Explanatory Remarks
Recreation					
Supervised Community Living					
Transportation					
Activities of Daily Living/ Personal Care					
Material Development					
Material Distribution					
Technical Assistance					
Training					
Manual Communication Training					
Vocational Training					
Work Adjustment					
Sheltered Workshop					
Job Placement					
Job Readiness					
Job Development					
Prevocational Training					
List any additional services offered					

Program Transactions

3. Does it appear as if HIDD persons are being served in the least restrictive environment?______If not, discuss briefly why services are not offered in this way.

4. Does the school or agency cluster HIDD persons together or are they dispersed throughout the general client population? Discuss briefly the rationale for this choice.

5. Describe the due process procedures available to HIDD persons.

6. What are the precautions taken to guarantee the confidentiality of HIDD clients' records.

7. Attach a copy of the individual habilitation or education plan for one client and return it with your evaluation. Please be sure to delete all identification.
   - 7.1 Does this plan serve as the basis for treating or educating HIDD clients?______(yes or no)
   - 7.2 Is an individual plan available for each HIDD client? ______(yes or no)

8. Are specialized materials and resources available for HIDD clients? ______(yes or no)

Explain:

Program Transactions

9. How is the progress of HIDD clients monitored?

10. Describe the nature of the communication that exists between HIDD clients and the staff of the school or agency.

    Oral Communication

    Manual communication

    Total communication

    Other (Specify)

11. Describe the opportunities for and quality of interaction between HIDD clients and persons outside the agency.

12. How is information pertaining to your school or agency made available to consumers, parents, and/or advocates of HIDD persons?

13. What process is used to refer HIDD clients to your school or agency?

14. List the sources of referrals of HIDD persons to your school or agency.

15. How do other schools or agencies monitor HIDD referrals to your school or agency? (Basically, how do these schools or agencies find out if you are doing your job?)

Program Transactions

16. What process do you use to refer HIDD persons to other schools or agencies?

17. List the places to which you refer HIDD clients.

18. How do you monitor HIDD referrals to other schools or agencies?

19. How are services to HIDD persons coordinated within your school or agency?

20. Additional comments pertaining to program transactions.

IV. Program Outcomes

Instructions

This portion of the Analysis of Services—Vital Information Form provides the opportunity to describe the outcomes of your agency's attempts to serve the HIDD population. Regardless of the nature of the outcomes, it is worth noting that an organizaton that serves, attempts to serve, or is willing to serve this group of individuals is moving forward in the human services area.

The recommendations resulting from this analysis will attempt to help create, modify, or reinforce current services to persons who are hearing impaired and developmentally disabled.

Program Outcomes

1. What subjective criteria are available by which client progress can be assessed?

2. According to these criteria, the performance of what percentages of HIDD clients:

Improved ________
Remained the same ________
Regressed ________

3. How easy was it to obtain this information? (Check one)

No problem ________
Relatively easy ________
Fairly difficult ________
Very difficult ________
Impossible ________

4. Select an HIDD client at random, and using the subjective and objective criteria described previously, summarize the changes in that client's behavior since that client entered the school or agency.

5. What materials, publications, etc. are produced by your school or agency regarding HIDD clients and made available to the professional community? Include copies where available.

Program Outcomes

6. Is cost/benefit information available concerning the services offered by your school or agency to HIDD persons?______If so, summarize this information, and indicate if there is a discrepancy between this information as it pertains to HIDD clients and the same information on non-hearing impaired clients.

7. In the space below, indicate the percentage of HIDD clients that enter each setting as they complete the program being offered by your school or agency.

Residential

Natural or adoptive parents ________
Foster parents ________
Institution for the mentally retarded ________
Residential school for the hearing impaired ________
Group home ________
Supervised apartment ________
Independent living ________
Other (Specify) ____________________ ________

Vocational or educational

Competitive employment ________
Adult workshop ________
Vocational training/evaluation center ________
Institution for the mentally retarded ________
Residential school for the hearing impaired ________
State hospital ________
Public school ________
Other (Specify) ____________________ ________
None ________

Program Outcomes

8. What percentage of HIDD clients leave your school or agency but eventually return?______ How does this compare with the same figure for non-hearing impaired clients?

9. What percentage of HIDD clients were deinstitutionalized or mainstreamed last year?______ What percentage do you expect will be deinstitutionalized or mainstreamed this year?______.

10. Additional comments as they pertain to program outcomes.

Summary

You have just completed a rigorous review of your program as it relates to persons who are hearing impaired and developmentally disabled (HIDD). The information that you have supplied will serve as the basis for formulating a series of needs-based recommendations designed to improve programs for the HIDD population currently being served by your organization. These recommendations will be developed by your designated evaluation team and presented to key members of your agency for their use in program review and planning. Thank you for your cooperation with this effort on behalf of every person who is hearing impaired and developmentally disabled.

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A Residential Program for Deaf Multi-Handicapped Children

Richard F. Haag

A comprehensive residential program for deaf multi-handicapped students has been developed at the California School for the Deaf, Riverside. This report describes the program including the type of students served, the physical plant, staff distribution, student assessment, the "Student Profile," progress reports, lesson plans, recreational activities, assessment, teacher/counselor relations, and communication with parents.

The Deaf Multi-Handicapped Unit at the California School for the Deaf, Riverside serves the needs of deaf students who cannot function in a regular classroom or residence hall for deaf or hard-of-hearing children. These children may have emotional, behavioral, or academic problems which require specialized programs. This paper focuses on the residential program in the Deaf Multi-Handicapped Unit, and in particular in the residence halls serving younger children, ages 5 through 13.

Students from all over Southern California are enrolled in the Deaf Multi-Handicapped Unit, with the majority of the children coming from the San Diego, Los Angeles, and Orange County areas. The children go home each weekend, and spend Sunday evening through Friday afternoon at school.

The total population of the Deaf Multi-Handicapped Unit averages around 100, 45 in Unit I for younger children and 55 in Unit II for those children ages 13 and up. Approximately two thirds of the population is male. In order for a student to be accepted in the unit his primary handicap must be deafness. Additional handicapping conditions range from hyperkinesis to autistic like behavior with the most prevalent being mental retardation and emotional behavioral problems.

Unit I of the Deaf Multi-Handicapped Unit has four residence halls, three for boys and one for girls. Each dormitory houses approximately 12 students, with two children sharing a bedroom. Staffing consists of two counselors and one Instructional Counselor in each dormitory with the Instructional Counselor functioning as the lead or coordinating counselor. A Supervising Instructional Counselor is responsible for the over-all program. The staff is scheduled to work in shifts arranged so that all three are on duty each afternoon, Monday through Thursday. Night Attendants are on duty during the night time hours to insure the students' safety.

Students entering the Unit are assessed for a 12-week period. The two basic areas covered during assessment are behavior and living skills. In order to develop an individual program for further growth and development, the student must be assessed to determine his entry level behaviors. Each child is pretested in areas such as eye contact, attention to task, accepting consequences for his actions, toileting skills, gross and fine motor skills, and personal hygiene. There are a total of 25 categories in each of the basic areas that are evaluated. At the end of each month of the three-month evaluation the student is reassessed in each of the categories to determine whether there has been any regression or improvement. Weak areas are worked on with the student either individually or in a small group. The appropriateness of the student's placement in the Deaf Multi-Handicapped Unit is determined on the basis of findings during this three-month assessment.

Another tool developed and implemented by the counseling staff is the Student Profile. This is a comprehensive working guide for each student which is used to trace his development in most of the major aspects of residence hall living. It is also used by the counselors to derive yearly behavioral objectives for each student. The Profile accompanies the student as he progresses from one residence hall to another so that the staff of the new dormitory will not inadvertently repeat previously learned objectives.

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The following areas are covered in the Student Profile: personal hygiene, eating and drinking, communication and language, time, money, measurements, homemaking skills, health knowledge, personal safety, community services, sex education for adolescents, physical activities, self and self-identification, social skills, and responsible behaviors.

The student is assessed in all of the appropriate categories in the Profile to determine whether he can accomplish each objective without assistance, with assistance, or not at all. From this assessment the counseling staff determines which areas will be worked on in small groups or individually with the students. The staff then develops a lesson plan describing how the specific objective will be met. A task analysis is done on the objective so that the staff can plan a sequence of learning activities that will lead to the achievement of the objective. These are then recorded on the lesson plan along with a brief description of the preparation and aids that will be required. The individual problems of each student must be taken into account when these plans are devised. For example, if shoe tying is taught to a student with cerebral palsy there are certain types of procedures normally used that would be physically impossible for him, therefore, alternate methods would have to be utilized. It is for this reason that a file is kept of all lesson plans for staff reference. An evaluation of the effectiveness of the plan is also included on the form itself so that other staff members will know how effective the activity has been (see Appendix I).

Progress reports are done on each student three times each school year in November, February, and June. Yearly objectives for each student are established in the Fall and the student's progress is evaluated on the progress report. Also described in the report is the status of the student's individual behavior modification program. In addition, the student is evaluated on 102 objectives taken from the Student Profile in the areas of personal hygiene, dormitory living skills, social skills awareness, eating and drinking, self-identification/concept, and responsible behaviors. Parent conferences are held in November and June at which time the staff discusses the student's progress with the parents, utilizing the progress report as the basis of discussion.

Every other week meetings are held with the staff of each residence hall and the Psychoeducational Consultant. The behavioral progress of each student is discussed and behavior modification programs are devised or revised as needed. These range from lowering the frequency of aggressive acts to increasing the frequency of expressive communication.

Also discussed with the Psychoeducational Consultant is the status of the over-all behavior modification program. Basically, these programs reward students for positive behaviors, usually with tokens which may be exchanged for tangible rewards. Negative behavior is ignored unless it is harmful to the student or to others. Then it must be dealt with through some sort of disciplinary action.

All of the students' time is not spent in highly structured small group and individual programs. In order for children to become independent individuals they must learn how to utilize their leisure time effectively. Various groups are designed to teach activities that can be used in later life. These include sports, cooking, woodworking, basic electrical shop, hiking, and arts and crafts.

Field trips are also planned about twice a month for the students in each residence hall. The Southern California area has many points of interest that are within easy driving distance.

The area in which the students need most work is communication. Most come from homes where manual communication is used on a limited basis or not at all. For the most part, they have never learned to express themselves through language. When frustrated they often resort to aggressive or destructive acts because they cannot release their feelings appropriately. Total communication is practiced by all staff members virtually every minute of the day in hopes that the children will learn the advantage of social communication. We have found that once a student learns to say that he is angry or that someone is teasing him, the frequency of emotional outbursts drops drastically and a more positive self-image is developed.

Good communication has developed between the teachers in the classrooms and the counselors in the residence halls. Formal meetings are called frequently to discuss the progress of individual students with the teachers, counselors, P.E. teacher, Psychoeducational Consultant, Principal, Supervising Instructional Counselor, and parents involved. As often as possible, counselors are scheduled to work alongside the teachers in the classroom. This not only permits them to see the students in a different environment but the overtime they accrue is used to enable them to have Chrismas and Spring vacations with pay. We have also had counselors and teachers exchange roles for a day or two on a voluntary basis. The counselor spends an entire school day as a teacher. This includes the planning for what is to be taught during that time and preparation of materials. The teacher works a complete shift in the dormitory, and also does the planning necessary for the activities that are scheduled during that time in the dorm. This has been an especially informative experience for teachers as they often have little understanding of what is involved in being a dorm counselor. These conferences and exchanges have helped to develop a feeling of teamwork between the teachers and counselors. They also have helped to put things in proper perspective so that staff members can see that others are doing important things too.

One area in which progress has been difficult is the parent-school relationship. The size of the geographic area served by the unit causes great limitations on the communication between school and parents. One effort to improve this has been through short accounts of the child's weekly progress written by both teachers and counselors in a composition book which is sent home every weekend. The parents return the composition book with comments about weekend activities in which they have been involved with their children.

The newest effort to assist parents is the development of a set of regional directories. These directories include listings of services available in various areas throughout Southern California along with names and addresses of students residing in that area so that parents can get together and exchange ideas. A parent handbook is in the planning stages. This handbook will be designed to acquaint the parents with the people and activities their children are involved with at school. Included will be pictures of all relevant personnel, maps of various points on campus, and descriptions of everyday schedules.

It is clear that learning cannot stop when a student leaves the classroom at the end of the day, especially in the case of the deaf multi-handicapped child. The student must be enveloped in a learning environment during all of his waking hours. It is for this reason that this comprehensive program has been developed. To carry out a program of this scope requires a highly dedicated staff of loving individuals willing to give their all for the betterment of the students.

ACKNOWLEDGEMENT

Special thanks to Dr. Robert Lennan for giving importance to the residence hall program and for helping me write this. Of course, nothing could be accomplished without the staff including Mitzi Carver, Nanette Brown, Bill Beardsley, Carolyn Jo Langdale, Carolyn Olley, Virginia Malzkuhn, Pat Gotcher, Veronica Blake, Donna Charbonneaux, Virginia Young, Jim Adams, Arlene Shults, Janet Gallagher, and Priscilla Vermilya.

Appendix I: Lesson Plan

Whitney I
Counselor(s) M. Carver

Group: Small

Starting Date 11-75
Ending Date ______

ACTIVITY: Children will tie the red/green strands on practice peg-board into a bow using Pull-through Method as instructed by counselor. Then they will tie their own shoe laces using this method.

OBJECTIVE: Personal Hygiene #23
Ties shoe laces into a bow.
(Pull-through Method)*
*This method is helpful for children with finger dexterity or hand coordination problems.

TASK EXPERIENCES:

1. Children will sit at a table with practice peg-boards in their laps.
2. Children will lace practice peg-board, cross red/green strands, and tie red/green strands together.
3. Counselor will slowly demonstrate pull-through method of tying a bow:
   a. Form one loop near face of board in one hand—using middle and index fingers and thumb to form and hold the loop.
   b. Wrap second lace around middle and index fingers first, coming around the thumb second (lace has now encircled all three fingers).
   c. Slide lace between middle and index fingers until lace is secured, and drop the end of the lace.
   d. With free hand, take hold of the loop, and lift the thumb away from the fingers.
   e. With loop in one hand and the other lace still between the two fingers, pull hands holding both laces in opposite directions simultaneously.
   f. Continue pulling laces until bow is tightened.
4. Children will do the above steps one at a time, while watching the counselor demonstrate each step on a separate practice peg-board.
   a. Children will then do all above steps in one motion with counselor assistance, but not a counselor model, several times.
   b. Children will continue practicing in this way until they can tie a bow using the Pull-through Method on a practice peg-board independently.
5. Children will repeat all the above steps on their own shoes until they can do so independently and securely with shoes on their feet.
6. Counselor will glue the final blue ribbon on the child's now completed Achievement Chart.

PREPARATION:

1. Unlace practice peg-board except for bottom two holes.
2. Adjust the Achievement Chart for the steps in Pull-through Method.
3. Make an Achievement Chart for each child in this group.

AIDS:

1. Practice peg-boards.
2. Table and chairs.
3. Student's own tie shoes.
4. Individual Achievement Charts.

Initials

Comments—Evaluation

Date

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The Hearing Impaired in State Institutions for the Retarded:
II. Services and Programs

by A. Clark Brannan, Ed.D., Carol Sigelman, Ph.D., and Gerard J. Bensberg, Ph.D.

Services and programs for hearing impaired residents of state institutions for the mentally retarded were studied through a mail survey. It was found that slightly less than half of the reporting facilities have distinct programs for the hearing impaired, almost none of them grouping hearing impaired residents in special living quarters. Approaches to therapy, instruction, and communication varied from facility to facility. Limitations in vocational programming, equipment, and staffing were identified. The article concludes with recommendations for improving services to the nearly 10% of the institutionalized retarded who were identified as hearing impaired.

In order to determine the size and characteristics of the Hearing Impaired/Mentally Retarded (HI/MR) population, the procedures used in diagnosing and evaluating HI/MR residents, and the types of services and programs geared to the needs of HI/MR residents, the Research and Training Center in Mental Retardation at Texas Tech University recently undertook a mail survey of state institutions for the mentally retarded. In a preliminary report[1] and a fuller report on the scope of the problem in this journal,[2] we concluded that the HI/MR population is a sizable one, with 7.2% of the institutionalized population reported to be hard of hearing (HOH/MR) and 2.3% functionally deaf (DEAF/MR). Surveys of hearing impaired students across the country reinforce our assessment of the prevalence of mental retardation and hearing impairment as dual handicaps.[3,4] We also noted that HI/MR residents of institutions for the retarded, like their hearing peers, tend to be over 18 and severely or profoundly retarded. We pointed out that a lack of standardization in diagnostic techniques and criteria of hearing loss partially explains variability in estimates of the percent of residents who are hearing impaired, and poses an obstacle to accurately identifying HI/MR residents and their needs. We now turn to the task of describing what is currently being done to meet the needs of HI/MR residents in public institutions for the retarded.

As many scholars have noted, the multiple disability of mental retardation and hearing impairment poses special problems. Teachers and trainers of the mentally retarded may not be prepared to cope with the communication barriers caused by hearing impairment, while deaf educators may not be equipped to adjust their teaching style and pace to the level of the mentally retarded child. Anderson and Stevens[5] argued that teachers—whether they specialize in hearing impairment or mental retardation—tend to look at the HI/MR student through their own particular professional frame of reference rather than responding to the whole person who is multiply disabled. Few professional or paraprofessional workers have had the benefit of training in both hearing impairment and mental retardation.[6] We find very few teacher preparation programs or curricula and methods developed specifically for the HI/MR student. The HI/MR adult has been similarly neglected, largely because vocational rehabilitation agencies have traditionally rejected multiply and severely handicapped applicants as clients.

Dr. Brannan is Assistant Professor of Education at Hardin-Simmons College in Abilene, Texas. Dr. Sigelman is Director of Research and Dr. Bensberg, Director, of the Research and Training Center in Mental Retardation at Texas Tech University in Lubbock, Texas.

In the past, institutions for the mentally retarded have not been adequately prepared to work with hearing impaired residents. As recently as 1971, Darnell reported that within the fifteen state schools for the retarded in New York, there were no special programs for the deaf retarded. What is the status of programming for HI/MR residents today? What gaps in service exist? The HI/MR Survey was designed to explore these questions, among others. Given the size of the HI/MR population, the questions take on a special significance.

The HI/MR Survey

As described in our first report, the HI/MR Survey was constructed with the aid and advice of several organizations concerned with hearing impairment and/or mental retardation. In this report, we focus on sections of the survey dealing with services and special equipment for HI/MR residents.

The survey was mailed to the 212 state facilities for the mentally retarded listed in the 1973 directory of the National Association of Superintendents of Public Residential Facilities for the Mentally Retarded. Of the 212, 181 responded in some fashion, although only 158 returned the survey more or less complete, representing a usable return rate of 75%. For the section on services for HOH/MR residents, 155 respondents provided usable data. The response rate fell to 145 for the section on the DEAF/MR because a few facilities had already described combined programs for the deaf and hard of hearing in the HOH/MR section and a few others reported having no deaf residents. We will report results pertaining to HOH/MR and DEAF/MR residents separately.

Based on respondents' answers, we will focus on the following six questions: (1) Do institutions have distinct programs for HI/MR residents? (2) What types of therapy, instruction, and communication techniques are used with HI/MR residents? (3) What additional services such as workshops and community living facilities are available? (4) What vocationally-oriented programs serve HI/MR residents? (5) What types of special equipment, including hearing aids, are used with HI/MR residents? (6) What staff members work with HI/MR residents and how are they trained?

Findings

Given the fact that almost 10% of the institutionalized retarded were reported by our respondents to be hearing impaired, we might expect to see special programs designed to meet the needs of this substantial segment of the population. Respondents were asked whether their facility has a distinct program for the (1) hard of hearing, (2) deaf, or (3) deaf and hard of hearing in a combined setting. Of the 158 institutions returning surveys, only 76 (48%) checked one or more options. Slightly over half of the institutions, then, did not perceive themselves as having a distinct program for any hearing impaired group. Of the 76 which reported having distinct programs, the majority (59%) have a single program serving both the deaf and the hard of hearing. Another 16% of these have a distinct program for the deaf and a distinct program for the hard of hearing, while 9% have a distinct program for the deaf only. A few facilities (12% of the 76) checked all three options, and a few spontaneously mentioned that they operated specially-funded Deaf-Blind programs.

Placing HI/MR residents in separate living quarters—which is indicative of special concern for their training—is an extremely rare practice. Only five facilities reported that living arrangements for the HOH/MR are separate from those for other residents, and only seven separate the DEAF/MR from the hearing population. Thus, not only do fewer than half of the institutions perceive that they operate "distinct" programs for HI/MR residents, but a distinct program typically does not entail physical grouping of HI/MR residents on campus.

Therapy, Instruction, and Communication

The fact that few distinct programs operate does not necessarily mean that HI/MR residents receive few special services. What is available?

Respondents were asked to check the types of specialized hearing therapy offered to HOH/MR and DEAF/MR residents. As Table 1 demonstrates, several facilities did not respond to the question or indicated "None." Large majorities—70% or more—offer each of the following: auditory training, speech therapy, hearing aid orientation, and language

TABLE 1.
SPECIALIZED HEARING THERAPY FOR HOH/MR AND DEAF/MR RESIDENTS

Therapy	HOH/MR Frequency	HOH/MR Percent of Facilities (N=155)	DEAF/MR Frequency	DEAF/MR Percent of Facilities (N=145)
Auditory Training	108	70%	85	59%
Speechreading	78	50	78	54
Speech Therapy	110	71	75	52
Hearing Aid Orientation	116	75	86	59
Language Training	115	74	96	66
Other	17	11	20	14
No Response or None	20	13	30	21

training. Speechreading is available in half of the facilities. Similarly, DEAF/MR residents are offered a wide range of therapies, although only 115 of 145 respondents checked one or more option. Table 1 suggests that DEAF/MR residents are not offered quite as much as HOH/MR residents are offered, but the majority of institutions provide a relatively broad range of therapies. The average responding facility checked four of the five options.

Involvement of HI/MR residents in classroom instruction is more difficult to assess. In response to a question about hours per day spent in special instructional settings (e.g., classroom, tutorial, or therapy work), 80% of the respondents indicated that capable HOH/MR residents were spending at least some of their time in instruction. But estimates of this daily involvement varied widely, ranging from an hour or less to six or more hours. Reports on the educational involvement of DEAF/MR residents were almost identical, but again there was no clear standard as to daily hours of instruction. For the HOH/MR resident, tutorial instruction is available in 47% of the institutions; for the DEAF/MR resident, it is available in 43%.

Pupil-teacher ratios also fluctuate widely from institution to institution. Only 55% of the institutions provided an estimate of pupil-teacher ratio affecting HOH/MR residents, largely because many of the respondents who do not offer distinct programs for the hearing impaired had difficulty estimating such ratios. Among the facilities which provided estimates, the vast majority (73%) reported ratios of six or fewer pupils per teacher. Reports on pupil-teacher ratios affecting the DEAF/MR were very similar.

A critical element of any program for HI/MR persons is the method of approach to communication. Respondents were asked to indicate the primary method of communication used with the HOH/MR and the DEAF/MR. As Table 2 suggests, most respondents checked at least two options. Indeed, several checked all five, indicating that facilities find it useful to have an arsenal of communication methods at their disposal. In working with HOH/MR residents, most respondents rely heavily on oral communication, followed by total communication—the flexible use of combined manual and oral communication techniques. As expected, DEAF/MR residents require a somewhat different approach. Total

TABLE 2.
PRIMARY METHODS OF COMMUNICATION USED WITH THE HOH/MR RESIDENT AND THE DEAF/MR RESIDENT

Communication Method	HOH/MR Frequency	HOH/MR Percent of Facilities (N=155)	DEAF/MR Frequency	DEAF/MR Percent of Facilities (N=145)
Oral	96	62%	36	25%
Fingerspelling	17	11	16	11
American Sign Language	26	17	43	30
Total Communication	62	44	73	50
Other	21	14	23	16
No Response or None	14	9	16	11

communication is the preferred method. Only 30% of the facilities use the next most frequently mentioned communication approach —American Sign Language. Fingerspelling is rarely used with either HOH/MR or DEAF/MR residents, perhaps because of its difficulty level.

Additional Services

Although it was impossible to determine from the survey data how many HI/MR residents actually receive supplementary services available to the institutionalized retarded respondents were asked to check services available to HOH/MR and DEAF/MR residents. With respect to the HOH/MR, 14% of the respondents checked no options. Sheltered workshops are available in 72% of the institutions, and volunteer services are available in 68%. Foster homes, group homes, and community programs are each offered in slightly fewer than 50% of the institutions. The additional services available to DEAF/MR residents are almost identical. Again, sheltered workshops and volunteers are the only additional services available to HI/MR residents in a majority of state institutions. In both the HOH/MR and DEAF/MR sections of the survey, facilities which reported any additional service checked, on the average, between three and four of the options.

Vocationally-Oriented Programs

Given the fact that approximately two-thirds of the HI/MR residents in the institutions surveyed are over the age of eighteen, what is being done to encourage their vocational development? Respondents were asked to describe any vocational rehabilitation services available to HOH/MR and DEAF/MR residents. The responses are summarized in Table 3.

A sizable number of respondents indicated —by writing in "None" or by leaving the question blank—that they do not provide such services. This was the case for 23% of 155 facilities completing the HOH/MR section and 34% of 145 completing the DEAF/MR section. The type of program that is most frequently offered to both HOH/MR and DEAF/MR residents is prevocational instruction, the only option available in at least half of the institutions. Generally, vocational rehabilitation services are not accessible to HI/MR residents.

This gap in service becomes even more apparent when we consider the numbers of HI/MR residents who are served by Vocational Rehabilitation. When asked to indicate the number of HOH/MR residents so served, only 71 of 155 facilities provided an estimate. Among the 71, the average number of residents served by Vocational Rehabilitation is eleven per facility. Only 57 of 145 facilities indicated that one or more DEAF/MR resident is served by Vocational Rehabilitation, and among the 57, only five clients per facility are served. Although vocational services are more available to HOH/MR residents than to DEAF/MR residents, neither group is receiving a great deal of vocational rehabilitation services.

Special Equipment

Special programs often require special equipment. When facilities were asked to indicate the number of residents with individually prescribed hearing aids, 139 of them (88%) provided an estimate. These institutions reported a combined total of 1,536 residents with aids, an average of only eleven residents per facility. In view of our earlier analysis of the size of the HI/MR population,[2] this suggests that the majority of HI/MR resi-

TABLE 3.
VOCATIONAL REHABILITATION SERVICES AVAILABLE TO HOH/MR AND DEAF/MR RESIDENTS

	HOH/MR		DEAF/MR	
Services	Frequency	Percent of Facilities (N=155)	Frequency	Percent of Facilities (N=145)
Special Rehabilitation Counselor	65	42%	55	38%
Pre-vocational Instruction	93	60	80	55
Work-study Program	48	31	31	21
Other	31	20	25	17
No Response or None	35	23	50	34

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dents who could possibly benefit from hearing aids are not so equipped.

Furthermore, not all residents with prescribed hearing aids actually wear them. According to the respondents who provided figures, 1,201 or 78% of the 1,536 persons reported to have individual aids actually wear them. It is no surprise, then, that 67% of the respondents claimed in response to another question that HI/MR residents have difficulty caring for hearing aids.

Respondents were also asked whether soundproof audiological testing booths and group auditory training units are available to their facilities. Testing booths are apparently accessible, for 68% of the respondents reported that one or more is available. Rooms equipped with a group auditory training unit are scarcer. Only 56 facilities (35% of the respondents) claimed to have at least one room equipped with a group auditory training unit.

Staff and Staff Training

An attempt to characterize personnel involved primarily with HI/MR residents was largely unsuccessful, in large part because most institutions do not operate distinct programs for HI/MR residents and, as a result, had difficulty describing allocations of staff time. It became quite obvious, however, that only a handful of institutions employ teachers trained in the dual handicaps of hearing impairment and mental retardation.

The HI/MR Survey does offer some information about staff training and the involvement of colleges and universities in programming for HI/MR residents. When respondents were asked whether they provided specialized in-service orientation and/or training for staff members working with HI/MR residents, 59% responded "Yes". When asked whether any colleges or universities are involved in services for HI/MR residents, 44% responded "Yes." In decreasing order of frequency services offered by institutions of higher learning are practicum, consultation, training, and research.

Discussion

It is risky to evaluate programs on the basis of a mail survey. Nonetheless, the HI/MR Survey results raise several questions about the current status of programs for HI/MR residents in state institutions for the retarded. As noted in our first report, there is considerable confusion as to who the Hearing Impaired/Mentally Retarded are. Understandably, there are also wide differences among institutions in approaches to meeting the needs of HI/MR residents. Here, point by point, are what we as researchers perceive as areas of concern in programming.

1. *Distinct Programs Are Needed.* HI/MR residents in a majority of institutions are not offered "distinct" programs suited to their needs. Answers to questions about program and staff suggest that most HI/MR residents are invisible—receiving the same programs as other residents of the same general age and level of intellectual functioning. While needs vary as a function of extent of hearing loss, degree of retardation, and age, all HI/MR residents share a need for intensive communication training and, beyond that, they require activity and educational programs, along with vocational training, appropriate to their specific level of functioning.

Programs for HI/MR residents have typically not entailed physical grouping or clustering of HI/MR residents on campus. We believe that thought should be given to the potential advantages of grouping. For one thing, grouping would make it possible to train staff intensively, to the extent that cottage personnel could contribute to communication training with an emphasis on both oral and manual approaches. Vernon[8] argued on the basis of research that an earlier and stronger emphasis on manual communication might erase many of the academic deficits of the deaf. If HI/MR residents are scattered across campus, as they are in most institutions for the retarded today, it is almost impossible to train cottage personnel to serve as communication trainers.

2. *Educational Services Should be Developed and Coordinated.* The education of HI/MR residents in state institutions for the retarded must take into account characteristics of HI/MR persons. The most difficult task is identifying the needs of each individual. The HI/MR Survey suggests that most institutions offer a broad array of hearing therapies, but we do not know whether such therapies are organized into a

planned sequence for the individual resident. Our findings suggest that few standards exist for daily instruction of capable HI/MR residents, that tutorial instruction is available in fewer than half of the institutions, and that teachers prepared specifically to serve HI/MR residents are rare. Moreover, we suspect that teachers of the hearing impaired are rarely involved with HI/MR adults beyond the typical age cutoff for inclusion in educational programs.

The first priority should be staff recruitment and staff training designed to make special educational opportunities more accessible to HI/MR residents. A strong teacher aide program, along with intensive inservice training for cottage personnel working with the HI/MR, would multiply the impact of one teacher of the deaf or teacher trained in dual impairments. The pervasive problem of lack of coordination between class activities and afterclass activities must be solved, with the teacher extending beyond the four walls of the classroom or activity program and the cottage attendant becoming more involved in resident training. Even if HI/MR residents are not clustered on campus, the teacher and the speech and hearing specialist can offer basic orientations to hearing impairment and suggest activities which would reinforce formal training programs in daily cottage life.

Coordination between the teacher, cottage staff, and speech and hearing specialist is essential if a total approach to communication is to permeate the lives of HI/MR residents. We cannot be sure exactly what respondants mean when they indicate use of a "total communication" approach, but our findings suggest that manual communication is not heavily used, in part because staff – including cottage personnel – are not equipped with manual communication skills. We know of a few institutions which have developed their own simplified sign languages because they found the American Standard Language of Signs inappropriate for the mentally retarded. More research is needed to determine the capabilities of the mentally retarded for various manual communication systems and the benefits derived from their use. In the meantime, institutions might consider grouping HI/MR residents, training staff members in total communication, and collaborating to develop a sign language appropriate to the retarded. We are not advocating exclusive use of manual communication, but we are suggesting that manual communication is not widely enough used in institutions for the retarded.

3. *Vocational and Supplementary Programs Should Be Strengthened.* At present, vocational rehabilitation appears to be the weakest area of programming for HI/MR residents. Most notably, very few HI/MR adults are served by vocational rehabilitation agencies. While over half the institutions offer pre-vocational instruction, and over two-thirds provide sheltered workshops, relatively few programs are clearly aimed at competitive employment in the community. In order to foster the vocational development of HI/MR residents, institutions must develop working relationships with vocational rehabilitators. By the same token, vocational counselors, aware of the emphasis in the new Vocational Rehabilitation Act on the severely and multiply disabled, must begin to extend their roles inside institutions. Vocational placement can also be facilitated by movement to extended living facilities such as group homes, which at present are an option for HI/MR residents in fewer than half of the institutions. Group placement of HI/MR clients in the community may enhance social opportunities and the feasibility of training house parents and work supervisors in manual language.

4. *Special Needs Require Special Equipment.* Individual hearing aids, according to our respondents, are provided for only a minority of HI/MR residents. Even when individual aids are prescribed, they may not be worn because of difficulties in wear and care, or they may be retired to a drawer when the resident returns to the cottage from training programs. The first step is to convince all staff of the importance of hearing aids. Assuming that funds for break-resistant aids can be obtained, the next important task is to develop programs to teach residents to wear them and care for them – possibly through a behavior modification approach. Finally, someone within the institution – possibly cottage personnel should be responsible for monitoring resident use of hearing aids and referring individuals for special retraining or refitting.

The value of group auditory training units should be explored through research. At present, such units are scarce in institutions for the retarded; yet many deaf educators believe that they are useful because they transmit a stronger, less "noisy" signal than do individual aids and can therefore capitalize on the residual hearing of even the deaf student.

Finally, we should reemphasize the shortage of special training materials for the Hearing Impaired/Mentally Retarded. Several respondents, in evaluating their own programs, pointed to the paucity of special materials, and the impracticality of developing their own, as serious problems.

The Hearing Impaired/Mentally Retarded are a significant segment of the institutionalized retarded population. They need special programs, particularly those which provide for and expand their capacities for communication. Our findings suggest that institutions for the retarded have gone part of the way toward meeting the challenge, but that many institutions can increase their efforts to give HI/MR residents the special attention, educational services, supplementary training, and equipment which will optimize their progress. We would hope to see colleges and universities play a stronger role in research and training designed to improve services for the Hearing Impaired/Mentally Retarded, as well as closer collaboration among institutions for the mentally retarded.

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Arizona Diagnostic, Treatment and Education Center

What Is ADTEC?

The Arizona Diagnostic, Treatment and Education Center (ADTEC) is an educational/residential center, employing an entry/exit model, for the diagnosis and evaluation of sensory impaired multiply handicapped children.

ADTEC is a divisional affiliate of the Arizona State School for the Deaf and Blind (ASDB) funded by and/or cooperating with the State of Arizona, Southwestern Region Deaf Blind Center (SWRDBC), Title I, Local Educational Agencies (LEAs), University of Arizona (U of A), The Eyes Right Foundation, The Foundation for Blind Children (Phoenix) and various public and private service organizations.

Whom Does ADTES Serve?

ADTEC serves children, from birth through age 21, living in the state of Arizona who have visual or hearing impairment and at least one other educationally handicapping condition (e.g., mental retardation, physical handicap, severe emotional or learning difficulty, or other severe handicapping condition).

What Does ADTEC Do?

ADTEC provides an assessment and understanding of each student and his capabilities. This is accomplished through: outreach and follow-up services provided "in the field," daytime educational placement of students in ADTEC's diagnostic classrooms, and residential placement in ADTEC's "24-hour" educational program.

Program Components

Diagnostics and assessment. Diagnosis and assessment involve systematic evaluation of each student's current level of intellectual functioning, academic achievement and daily living skills. This is accomplished by review of existing records (educational, medical, and social), parent consultation, professional consultation and formal diagnostic testing procedures. ADTEC provides the following assessment services: Audiological, Psychological Assessment, Educational Assessment, Visual Screening, and Psychiatric Evaluation. Other available services that are co-ordinated but not funded through ADTEC/ASDB are : Ophthalmological, Neurological, Dental, and other Medical specialty consultation.

Educational placement. Students requiring a classroom setting are enrolled as day students in ADTEC. All ADTEC classrooms are diagnostic classrooms for gathering information related to understanding current levels of functioning, optimal modes of learning, and determining an appropriate post-evaluation educational setting. In addition to these educational opportunities, the following support services are available: Recreational Therapy, Orientation and Mobility Training, Pre-Vocational Assessment and Training, Student Counseling, Parent and Family Counseling, Parent Training, General Medical (Student Health Center), Local Transportation, Physical Education, and Physical Therapy.

"24-Hour" program. Residential placement is available for students whose families do not live in the Tucson area and/or students who might benefit from a more intensive program. The "24-hour" program provides integrated, non-custodial educational services outside the classroom, particularly in the areas of living skills and social interaction.

Outreach/follow-up. ADTEC's outreach/follow-up program is called Keep-In-Touch (KIT). KIT provides: 1) Consultative and diagnostic testing services to referred students. These services may be provided in the student's current placement, (e.g., school, home or other agency). 2) Post-evaluation rereferral for placement in other programs. 3) An active advocacy and "follow-up" on each student with post-exit contacts at regular intervals.

Student monitoring system (SMS). The SMS is ADTEC's set of procedures for insuring that all of the goals and objectives described above are fulfilled.

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A Therapeutic Multi-Service Model Program for Young Deaf Children Manifesting Severe Personality/Behavioral Dysfunctions

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The presentation describes a therapeutic program for young hearing-impaired children with severe personality/behavioral dysfunctions. The predominant goal of the program is the amelioration of the latter so that learning and socially acceptable behavior can be facilitated. A multi-service model, incorporating varied professional expertise and involving both the home and the school, was developed to achieve this goal.

INTRODUCTION

In 1974, St. Francis De Sales School for the Deaf, Brooklyn, N.Y., instituted a therapeutic program for young hearing-impaired children with severe personality/behavioral dysfunctions. Initially, five children exhibiting a highly specific set of symptoms were admitted to the program. These symptoms, based on Kanner's (1966) criteria for a diagnosis of autism, included self-stimulatory behaviors, self mutilating behaviors, perseverative and repetitive behaviors, non-relatedness, and an abnormal reliance on "sameness." The presence of the unique behaviors in these children excluded them from regular classes for the hearing impaired and distinguished them from the mentally retarded and learning disabled. In addition, these behaviors interfered with the acquisition of communication skills and the development of cognitive functions.

The predominant goal of the program was and is the amelioration of the aforementioned symptoms, thereby facilitating the learning process and inculcating more socially acceptable behaviors.

Additional objectives included effective and reliable diagnosis, behaviorally planned and therapeutically designed learning experiences, and ongoing and systematized family participation. An expanded multiservice model was developed to achieve these goals.

The focal point of the model was the child. The highly specific and unique nature of his or her symptomatic behaviors had in the past often resulted in conflicting opinions and misdiagnoses. Consequently, the child was either excluded from existing programs or placed in an inapprorpiate setting.

CRITERIA FOR ADMISSION

In order to be admitted to the therapeutic class, the children had to manifest some of the symptoms described in Kanner's (1966) criteria for a diagnosis of autism. While these symptoms were (a) exhibited in inconsistent patterns, (b) were not necessarily present in each child, and (c) were not sufficient to label the children "classically autistic," they were present nevertheless and had been since early infancy. One of the most obvious symptoms noted in each of the children was the failure to relate to other people. Eye contact was never or rarely made and imitation, so vital for the establishment of communication, was refused. People in the environment were perceived as objects, and if any contact at all was made, it was on this basis alone. Another predominent symptom, self-stimulatory behavior, included rhythmic jumping, arm flapping, leg kicking, mouthing objects, crossing eyes, staring at lights, and making hand movements at the periphery of the visual field. Also interfering with adequate functioning were repetitive and perseverative behaviors. Examples noted in some of the children included spinning objects, as well as suspending material in mid-air and flicking or blowing it for hours. Related to the repetitive behavior was an abnormal reliance on sameness. Thus, the children might become upset at even minute environmental changes such as the rearrangement of furniture or the alteration of a familiar route. One of the more disconcerting symptoms was self-destructive behavior. This was manifested by headbanging and hand biting, among other things. Additional symptoms used as criteria for acceptance into the therapeutic class included visual-perceptual problems, cognitive and motor abnormalities, and bizarre motor and sensory behavior.

THE MULTI-SERVICE MODEL

The practice of interdisciplinary team work formed the basis of the program described herein. The integration of competencies was an invaluable component of the psycho-educational experience of the child. Equally imperative was the establishment of a comprehensive family education-counseling program to meet the needs of the family on a regular basis and to make the home an effective extension of the school. The multi-service model therefore incorporated the skills of a teacher, a paraprofessional, a home-school coordinator, a psychologist, a social worker, a psychiatrist, and an audiologist, supplemented by medical and administrative services.

The Teacher and the Paraprofessional

The key members of the multi-service team, to be described, were the teacher and the paraprofessional. Their main responsibility was the establishment of a curriculum adapted to the individual needs and abilities of each child. Prerequisite to the effective implementation of the curriculum was the achievement of control over interfering behaviors. The reduction of interfering behaviors has been shown to facilitate learning and the acquisition of social skills. Therefore, all learning tasks were behaviorally planned and therapeutically designed, based upon the specific strengths and weaknesses of the child. Instruction was carried out in one-to-one situations with the exception of one short period a day reserved for group participation. The goal of group instruction was the acquisition of skills necessary for adequate functioning in a regular preschool class for hearing-impaired children.

The classroom functioned on the principles of behavior theory, utilizing primary and secondary reinforcers contingent upon appropriate behavior. The primary reinforcer was gradually faded as social motivational factors were internalized. The teacher and the paraprofessional were essential not only to the planning of interventions and their implementation, but also to the evaluation of the efficaciousness of these interventions.

Critical to the efficient functioning of the classroom program, and to the best advantage of the children, was a high degree of structure. It must therefore be recognized that scheduling was a strategic component of the teacher's job.

It is an unavoidable consequence of grouping according to disability that peer modeling is inadequate. This is not a problem with the child whose behaviors severely interfere with his or her awareness of the environment. However, as awareness begins to emerge, it becomes necessary to provide opportunities for interaction with intact peers. Therefore, as each child demonstrated a readiness for this interaction, he or she was integrated into the regular preschool for short periods each day. The teacher chose the recipient classroom with the utmost care and consideration. Successful integration was contingent upon both the personality and style of the recipient teacher and the socio-academic makeup of the recipient class. The former had to be thoroughly familiar with behavioral techniques and be willing to implement them, the latter had to have a certain level of social sophistication in order to both tolerate and encourage the participation of the therapeutic class child in classroom activities. It was also extremely important to maintain an effective liaison between the therapeutic and regular class teachers to allow constant evaluation of positive and negative changes in the integrated child's behavior.

The teacher was also responsible for the classroom phase of the family participation program. The classroom program for families was hierarchical. During the first phase, the teacher relayed information regarding the child's disability and pertinent management techniques. This was followed by opportunities for structured observation in the classroom and finally by actual implementation of management techniques under the teacher's supervision. The teacher was able to extend this program into the home through the home-school coordinator.

The Home-School Coordinator

The function of the home-school coordinator was to act as a liaison between home and school and to insure that the same principles and techniques were applied in both environments. The coordinator visited the home of each child on a regular basis and assisted the family in implementing management techniques devised to achieve these goals. He also provided assistance in handling routine situations according to behavioral techniques acquired by the family in the classroom.

Precedent to each home visit was a conference between the teacher and the home-school coordinator, the purpose of which was to evaluate family performance during the last home visit and to plan realistic goals and activities for the next visit. Essential to the efficient functioning of the home-school coordinator was regular periodic observation and participation in the classroom to insure thorough familiarity with techniques and the continuing progress of the children.

The Psychologist

The psychologist served as another integral member of the team. She observed, examined, and tested each child both at intake and following admission to the program in order to establish a base line for growth studies and comparative achievement levels.

Due to the severity of symptomatic behaviors, conventional testing procedures often provide an inadequate measurement of the child's potential. Therefore, inevitable adaptations are required, and flexibility and insight are critical requisite qualities without which the psychologist cannot operate.

The psychologist contributed to the maintenance of the integrity of the therapeutic program through consultation and sharing of expertise with other team members concerning psycho-social and psycho-educational problems. She provided invaluable assistance in both the planning of goals and interventions and in evaluating their relative merit and success according to each child's functioning. She was also instrumental in the establishment of a therapeutic mother's group and continues to colead this group with the social worker.

The Social Worker

In addition to conducting the therapeutic mother's group in conjunction with the psychologist, the social worker maintained a liaison between home and school with regard to psycho-social and socio-educational matters. It was her responsibility to offer appropriate assistance to each family with respect to fiscal matters which were consequent to the child's disability. She received referrals (from other team members) of severe social problems which adversely affected the management, care, and consequent functioning of the child in the home. She oriented the family to and assisted the psychologist in the intake screening process.

The Psychiatrist

The inclusion of the psychiatrist in the multi-service team model is indicated by the severity of the disability of the child who is at its center. He therefore participated in the intake screening process when a child with questionable behavior was being evaluated. He dealt with the behaviors which were consequent to the disability and the resultant problems posed for the school and family through regular observation and consultation, and through the prescription and monitoring of medication for selected children. The school nurse assisted in giving the medication if a child was to receive it during the school day.

The Audiologist

The audiologist performed the same service for the therapeutic class children as he did for the rest of the school. He conducted a complete audiological evaluation at intake and ongoing evaluations after the child was admitted to the school. Although conventional methods of assessment were used whenever possible, these methods frequently do not result in a reliable audiogram due to behaviors which interfere with the child's attention and responses in the testing situation. In such cases, impedance audiometry was relied upon and in addition, evoked response audiometry was sometimes indicated and pursued.

TECHNIQUES OF INTERVENTION

Although the children in the therapeutic class did not attempt to communicate and, in effect, were locked into their own worlds, several behavioral techniques were used to effect change. Underlying these procedures was the belief that the consequence of a behavior will often have an effect on it. Something positive and rewarding will tend to increase the probability that the behavior in question will recur, while the absence of a reward or the presence of a negative reinforcer will tend to decrease the frequency of occurrence. A second principle kept in mind was that what precedes a behavior (the antecedent) can also have an effect on whether a behavior will occur or not. Thus in working with the therapeutic class children, an attempt was made to analyze factors that might be eliciting certain behaviors (antecedents) as well as those that might be maintaining them (consequences). Specific behavioral procedures were then prescribed to either increase positive behavior, to decrease negative, unwanted behavior, or to build in behaviors that were either not present yet or were present in a very rudimentary form.

The first step in changing any behavior, whether to increase it or decrease it, was to define the behavior specifically, concretely, in observable and measurable terms. Following this, an attempt was made to pinpoint situations which seemed to elicit the behaviors (the antecedents) as well as those which might be maintaining them (consequences). The frequency of occurrence of the behavior in question was important to know for it served as a baseline against which to evaluate the effectiveness of subsequent interventions. To increase the frequency of desirable behavior, positive reinforcers or rewards were used following the occurrence of the appropriate behavior. The choice of reinforcer, however, was critical for to be effective it had to, by necessity, be appropriate and meaningful for the child. The principle guiding the choice of reinforcer had its basis in the reinforcement hierarchy. The latter describes several levels of rewards, ranging from intrinsic reinforcement, social reinforcement, activity reinforcement. taken down to biological reinforcement. The choice depended on the child's level, although the ultimate aim was to bring the child to the point where he or she could respond to rewards from higher parts of the hierarchy. Just as important as the choice of reinforcer was the timing of when to reward. The guiding rule in the early stages of increasing a positive behavior was to reward each time it occurred as immediately after the occurrence as possible. When the positive behavior became stronger and well established, intermittent rewarding then helped to maintain it.

Several techniques were used to decrease negative behaviors. For those bothersome and aversive behaviors not severe enough to warrant punishment yet requiring intervention because of their interference with effective functioning, the behavioral principle of extinction guided the procedure used. This principle states that when a reward does not follow a behavior, the ultimate result will be a weakening of that behavior. Thus, nonsevere disruptive behavior was consistently ignored, for adult attention was frequently found to maintain behaviors. In addition, for the planned ignoring to have maximum effect, attention or a reward was given to a positive behavior that was inconsistent with or could not be performed at the same time as the disruptive behavior. Thus, for example, sitting quietly at one's desk was rewarded, while rocking on one's chair back and forth was ignored. When the negative behavior to be decreased was too severe to be ignored, either because it involved possible harm to the child himself or to others or because it involved destruction of property, several other behavioral techniques were used. These included time out, response cost, and direct punishment.

The term *time-out* means time out from rewards or reinforcement. The basic principle is as follows: The consequence of the child's deviant behavior is removal from the situation where he or she is receiving many reinforcers, and placement in a new situation where few if any rewards are given. This is an extension of the principle of extinction, but it is extended in a way which leads to a faster decrement in the frequency of problem behavior. In using time-out, several factors must be clearly delineated including (a) the place for time-out, (b) when it is to be used, (c) the duration for which the child will remain in time-out, (d) clear procedural steps for setting the child in time-out, and (e) how to handle any problems should they arise in the use of time-out.

Another procedure used was that of *response cost*. This involves the loss of a highly valued privilege or activity or the failure to earn a reward. Sometimes, however, these mild forms of punishment are not effective with very disturbed children. In the research literature, several authors have reported that more intense forms of punishment were required to eliminate some very disruptive or dangerous behavior. For example, Risley in 1968 found that the only way he could reduce the dangerous climbing behavior of a 6-year-old brain injured child was by using electric shock. Lovaas (1977) and his colleagues found that when teaching Social Skills to autistic children, electric shock was essential in reducing some of the childrens' disruptive behavior.

Just a word of caution, though, about using *direct punishment*: If punishment techniques are necessary, the ones used should be those which are most efficient, without producing side effects. For example, ignoring has fewer side effects than does physical punishment or time-out. There's little point, however, in using time-out with a child who is socially unresponsive; a child for whom adult attention is not reinforcing. One then comes to a decision point and must consider which is better for the child, to receive a brief physical punishment, for example, which would eliminate a behavior, or to allow the child to continue doing something which is interfering with his or her functioning and well being.

Up to this point, this section of this paper devoted to "techniques" has dealt with behaviors, whether appropriate or inappropriate, which are present in the child's repertoire. At this time, the establishment of desirable behaviors and responses which are not part of the child's repertoire will be discussed.

To cue these behaviors and responses a prompt may be used. The prompt is given in association with a given situation to assist the child in behaving or responding appropriately. It may take a variety of forms—physical, verbal, or serving as a model for the child's behavior. For example, if the desired response consists of touching an object, the child's hand may be placed on the object. If the child is able to imitate, he or she may be reinforced for imitating the action of touching the object. When the behavior or response is occurring consistently with the aid of the prompt, the prompt is gradually eliminated. This is referred to as *fading the prompt*. To continue with the example cited above, instead of placing the child's hand on the object to be touched, one may gradually progress through a series of steps, first moving the hand only 3/4 of the way toward the object, then only halfway, to simply touching his or her hand until the response is independent. Once the prompt has been entirely eliminated and the child continues to perform the desired behavior, it may be said that the child is responding correctly. The rate of fading is contingent upon the learning rate of the child. In general, the correct number of prompts is the minimum number required for the establishment of the correct behavior or response.

EVALUATION INSTRUMENTS

The design for the evaluation of pupil academic achievement is shown in Table 1. Mastery of a particular concept or content area was measured in two diverse situations. The first situation, described in column 4 of the evaluation form, was an extremely structured one. In this testing situation, the children's interfering behaviors were controlled by the use of aforementioned behavioral techniques, while their attention was constantly directed and redirected to the task. Once the child proved mastery in this structured situation by responding correctly 3/3 times on three separate days, he or she was evaluated in the second testing situation. This was an unstructured situation during which evaluation materials were present but interfering behaviors were not dealt with.

The diversity of these two testing situations served as a measure of spontaneous functional use of previously mastered concepts. The width of the gap between the two testing situations, in addition to that between columns 2 and 3, the imitation and mastery dates of the task, provided

Table 1

CHILD'S NAME ______________________________ D.O.B. ______________________

TASK	Approx. age for task	Date task initiated	Date task mastered	% correct in 3 attempts	Date	% correct in 5 min.	Date	Teacher Comments

an individual pupil profile. This presented a clear picture of the manner in and extent to which each child's disability affected learning. It was helpful to know the approximate age of mastery of each task by an average intact child. These ages were listed in column 1 according to statistical data The final column on the evaluation grid allowed the teacher to make any pertinent comments in anecdotal form. The children were evaluated on a curriculum consisting of communication skills, visual-motor skills, gross motor skills, and cognitive skills. It should be noted that column 1 was not appropriate to the section entitled communication skills.

In addition to an evaluation form to measure each child's academic development, there was a corresponding evaluation form to measure social-emotional development, as shown in Table 2. While it was the teacher's responsibility to record data regarding academic achievement, the psychologist was responsible for recording data regarding social-emotional development. Each behavior was formally monitored three times a year and recorded with regard to frequency of occurrence and duration. There was also an opportunity for the psychologist to make any pertinent comments with respect to each behavior. Behaviors appearing on this evaluation form corresponded to the symptoms and criteria for admission and to the appropriate counterparts of these inappropriate symptomatic behaviors. In order to supplement these two evaluation instruments, the teacher kept detailed anecdotal records on each child.

DISCUSSION

The effectiveness of the therapeutic program can in part be measured by the present placements of some of the children who have received its services. Of the eight children who have participated or are presently participating in the therapeutic class, three have moved gradually toward, and have now been fully integrated into regular classes for the hearing impaired (after having spent 2, 1, and 4 years in the therapeutic program, respectively). In varying degrees, their interfering behaviors have either been eliminated or are controlled through the continued use of behavioral techniques. Some differences continue to exist in their levels of academic achievement and socialization, as compared to the children in the regular preschool or primary grade classes. Whether or not a class can be found in which the child can be integrated homogeneously from the outset remains questionable It is our hope, and we have seen some evidence, that the academic and social gaps do lessen with time. The rate and extent of that reduction greatly depend on the individual child and the severity of his/her symptoms

In three other cases, partial integration for specific learning tasks for limited time periods has been attempted on a daily basis. These children have been in the program for 5, 3, and 3 years, respectively In all three cases, however, this was discontinued because of the unsettling effect it had upon the child being integrated and/or the disruptive effect it had upon the functioning of the regular class. We are continuing to monitor the progress of these three children for future opportunities at partial integration. It is imperative to control the number of new adults and children to whom they are exposed at any given time.

In addition to the three children who have remained in the therapeutic class, one new child has just been admitted to the group, bringing the present class total to four. This teacher/pupil ratio, two pupils to one teacher or paraprofessional, provides the maximum opportunity for 1:1 interaction and instruction (an absolute must).

The one child unaccounted for has moved to a different geographical area and is presently enrolled in a similar "therapeutic" program. (As an aside, it is interesting to note that of the total number of children treated, there have been seven boys and only one girl.)

In looking objectively at the program, it can tentatively be concluded that the use of behavioral techniques has had a definite effect on (a) the reduction of inappropriate behaviors, (b) the adoption of more socially acceptable behaviors, and (c) the overall facilitation of the learning process in the children treated In addition, regular, systematized family participation has proven to be an absolute necessity and asset for the program.

Ongoing communication among the various professional services is an essential ingredient for any program of this nature. It is a never-ending process and presents many more problems in its coordination than for any one class within the preschool department. The services of the depart-

Table 2

SOCIAL EMOTIONAL DEVELOPMENT

BEHAVIOR	Frequency of Occurrence	Duration	COMMENTS

ment supervisor, have been instrumental in channeling information to the appropriate professionals. This has also helped to avoid role duplication, facilitated program assessment, and expedited necessary change.

The extension of the program to include other age groups is heavily dependent upon the number of children in need of its services. To date, although some of the children no longer fall within the normal preschool age range (3-6), there have not been enough cases to form a second class. It is important to note, however, that the levels of cognitive and social skills presented are based entirely on the abilities and needs of the individual child (an Individualized Educational Plan in the true sense of the word). As long as the children continue to be the focal point, their needs, problems, and successes will dictate the continuation of the Multi-Service Program.

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AN EDUCATIONAL MODEL FOR HEARING IMPAIRED-MENTALLY RETARDED ADOLESCENTS

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The identification and subsequent education of hearing impaired-mentally retarded (HI-MR) children is an important concern of special educators today.

The problems inherent in accurately assessing the intellectual functioning of deaf or hearing impaired individuals are generally recognized. Vernon and Kilcullen comment on the major causes of misdiagnosis of mental retardation in the deaf population in their 1972 article. Although the degree of retardation is difficult to determine, it is known that a high incidence of mental retardation exists in a deaf or hearing impaired population. The Annual Survey of Hearing Impaired Children and Youth reported that 7.7% of hearing impaired students enrolled in special education programs in the United States during the 1972-73 school year are also reported as mentally retarded (Annual Survey, 1972-73).

Conversely, the definitions of hearing impairment and deafness in incidence reports tend to be variable and inconsistent. According to Moores (1976), "the definition of what an 'educationally significant' hearing loss for a retarded individual entails is unclear and criteria vary from study to study". Lloyd (1973) has addressed this problem and defines hearing impairment as "a deviation in hearing sufficient to impair aural-oral communication". Whatever the criteria applied, however, it has been shown that hearing impairment frequently accompanies the mental retardation disability. In one comprehensive study, Lloyd and Moore (1972) concluded that 15% of children in schools for the retarded have educationally significant hearing losses. Lloyd (1973) states that "approximately 10% to 15% of retarded children have a communicatively and/or educationally significant hearing impairment".

Once an individual is identified as possessing this dual handicap, the problems of placement and specialized program development become obvious. Moores (1976), referring to the state of

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The authors are with the Suburban Hennepin County Joint Independent School District Number 287, Minneapolis, Minnesota affairs for deaf retarded individuals, comments that "educational programs (for these individuals) are low on the list of priorities, are poorly staffed, and receive limited administrative support".

Recognizing that there were a considerable number of children possessing "educationally significant" hearing losses in conjunction with an "educationally significant" degree of mental retardation, Suburban Hennepin County Joint Independent School District Number 287 (District 287) developed a plan to serve these students within its existing structure by providing specialized support personnel.

The students served are described as HI-MR which is defined as the presence of hearing impairment and mental retardation to such a degree as to be an "educationally significant" handicapping condition for that child.

The need for special programming for these students became acutely obvious during the 1972-73 school year. At that time, the Cooperative School Rehabilitation Center (CSRC), a District 287 special public school for trainable and low educable mentally retarded students, was serving nine HI-MR children and twenty more were being referred for the next school year.

Since the Center (CSRC) was designed to provide a high school equivalent educational-vocational program for mild to severe mentally retarded students, it was not prepared to program for a large number of hearing impaired students. Therefore, in 1973 the District applied for and received Title VI-B funds to provide specialized support services for HI-MR students who were to be integrated into regular CSRC classes.

DECRIPTION OF SCHOOL DISTRICT 287 AND THE COOPERATIVE SCHOOL REHABILITATION CENTER

In order to better understand the Title VI-B project, it is helpful to understand the role of District 287, CSRC, and the participating school districts.

District 287 is comprised of thirteen school districts in the west metropolitan area of Minneapolis with the purpose of providing vocational education to the residents of the thirteen districts and special education services for students with a low-incidence handicapping condition. Educational services are also offered to nearby school districts on a tuition basis. The District presently sponsors eight special education programs for over 1,000 preschool to post secondary level students with varied handicaps.

The program at CSRC serves mild to severe mentally retarded adolescents who cannot be appropriately educated in the special education programs of their home school districts. Students are bussed to CSRC from their homes each day. During the 1975-76 school year, 380 students were served representing 38 school districts. The program emphasizes individual planning to achieve educational growth, community competence, and vocational readiness. Particularly in the latter years, the program stresses vocational and subsequent placement. Students who attend CSRC range in age from fourteen to twenty-one.

PURPOSE OF TITLE VI-B

There were three primary reasons why District 287-CSRC was chosen to provide service for HI-MR students (Title VI-B, 1973): (1) It served the mild to severe mentally retarded adolescents of the west metropolitan area of Minneapolis; (2) There was no other agency in the west metropolitan area serving HI-MR students; and (3) In 1970, District 287 was given authority to expand its programs to provide special services for students with a low incidence handicapping condition.

Important impetus resulted from the fact that several hearing impaired students had already been enrolled at CSRC. These students were unable to receive full benefit from the existing program options at CSRC due to the communication handicaps resulting from their hearing impairments. The profoundly hearing impaired students had been excluded from four of the program options and had shown poor participation in all other program areas. These experiences impressed upon staff and administration the need for additional services.

The Title VI-B Project was approved on July 1 of 1973 and the program began in the fall. Initial goals were to (1) improve the students' communication skills, (2) integrate hearing impaired students into the regular CSRC program and (3) improve the quality and extent of service options to these students from their entrance into the program, during their training and with placement, and follow-up.

To accomplish these goals, the project planned to provide staff to support the hearing impaired student in the general training program within CSRC. The project's focus was to expand the options in services for the students, thereby providing alternatives for students who were unable to meet the demands of a regular junior or senior high program for hearing impaired students. It also provided an option for those hearing impaired students in institutional settings for mentally retarded individuals by enabling them to return to the community.

STUDENT SUPPORT PROGRAM FOR HEARING IMPAIRED STUDENTS

In the initial year of the project, 1973-74, three full-time staff members and one half-time staff member were employed to serve the hearing impaired students — a casemanager, two interpreters and one half-time teacher. The experience of this year demonstrated a need for a full-time teacher of the HI-MR students who was subsequently hired. Support services have been provided by this team for the past two years. Each member of the team has a particular function in providing the support services needed by the individual student. The roles of the team members are as follows:

Casemanager for hearing impaired students

The casemanager directs initial referrals, maintains communication between home and school, provides day to day counseling, plans students' schedules with their assistance, helps the students develop vocational plans, and makes subsequent vocational placements upon graduation. Through these activities, the casemanager serves as the student's advocate and liaison to all other agencies working with the student.

Teacher of hearing impaired students

The teacher of the hearing impaired students operates a resource room where facilitation in language development is provided. The emphasis is on expanding the students' sign vocabularies in conjunction with improving the usage and understanding of connected language in written and signed/spoken English. Preparatory training prior to integration into other program options as well as on-going tutoring in these areas is provided when necessary. Instruction in total communication is stressed for a group of students who lack a receptive and/or an expressive means of communication.

A basic sign vocabulary is taught along with the understanding of connected language. Use of signs is facilitated both at school and at home. To accomplish this objective the team provides sign language instruction to interested staff members at CSRC and to parents, siblings, relatives, and friends of the students with excellent participation

Interpreters

To achieve the major goal of integration, the interpreters provide interpreting and tutoring services to the HI-MR students, enabling them to participate in the various program options and extracurricular activities at CSRC. Additional responsibilities of the interpreters are to provide sign language classes to peers of hearing impaired students and to compile sign language manuals which correspond with specific program areas

POPULATION SERVED

During the first three years of operation, the secondary program for HI-MR students at CSRC served 53 students. All of these students were classified as being mildly to severely mentally retarded, and the majority possessed hearing impairments ranging from moderate to profound losses (30dB-90dB). However, several students with no hearing loss were served in the program because of their severe communication handicap. Even though these students demonstrated no discernible hearing loss, total communication was taught as an alternative mode of communication. In addition to hearing and mental disabilities, some of the students have other handicaps. These handicaps include cerebral palsy, emotional involvement, vision impairments, orthopedic handicaps, and health impairments.

Of the students involved in the program, ten had been in state institutions for mentally retarded, two were from private schools for the deaf, one was from a public school for the deaf, two were from hearing impaired programs in public schools, and the remainder had been in public school classes for trainable mentally retarded students.

The students served by this special program are classified in three major categories which define the type of service needed by the students. These categories are: Deaf, Hard of Hearing, and Communication Handicapped.

Deaf

During 1975-76 there were nine deaf mentally retarded students who received support from all four members of the team. All of the students depended on total communication and used an interpreter in most classes.

Hard of Hearing

Twenty-eight students were served who had a moderate or greater (30dB-90dB) hearing loss. Within this category two types of students were defined, each requiring differing services. The majority of these students (23) possessed oral expressive communication and used speech as their primary means of communication. These hearing impaired students were served on a "maintenance" schedule; i.e., teacher contact regarding implications of students' loss, updating audiological information, and casemanager support services. The other five hard of hearing students were instructed in the use of total communication because of their lack of intelligible speech.

Communication Handicapped

Five students who had no identified hearing loss were served because they were nonverbal and total communication was chosen as an alternative means of communication. They were included in the program after parent conferences, gathering of case histories, and an in-depth speech and language evaluation.

INDIVIDUAL STUDENT PROGRAMMING

In achieving integration, the hearing impaired students are offered any combination of 35 specific program options at CSRC. Individual programming from these options is based on the need of each student.

Throughout the three years of the program, hearing impaired students were integrated into all of the program options. During the first year of funding, interpreters provided service to students in ten program options. As the students' needs changed, provision of interpreter services expanded to nineteen of the program options. Attendance in certain classes did not require interpreter involvement either because of the nature of the class or because the teacher possessed total communication skills. The program areas are as follows:

Academics

Montessori class
Edmark Class
Reading center
Phonetic reading
Money class
Math
Time

Physical Education

Boys physical education
Girls physical education
Corrective therapy
Mini-gym

Home Economics

Home economics class
Family life
Supervised living
Sewing

Communication

Language development
Speech
Hearing impaired class
Sign class

Prevocational

Industrial arts
Industrial training
Food service training (in school)
Food service training (out-school)
Food service training (formal program at Vo-Tech school)
Maintenance training
Nurse's aide training
Job stations
Vocational-Technical training (provided at Vo-Tech school)

Miscellaneous

Crafts, group counseling, music, science, photography, total resource, Duso (social improvement group)

Hearing impaired mentally retarded students are also able to participate in other school related activities such as the following:

Competitive Athletics

Special Olympics
Wrestling

Touch football
Floor hockey
Swimming
Bowling
Track and field

Homecoming Activities

CSRC Scout Troop #331

Graduation Exercises

Parent-School Carnival Nite

Student Council

Field Trips

Transportation Training

Summer Camp

Apartment Living

School, Store & Bank

Friendship Program

A hypothetical example can best illustrate the process involved for a HI-MR student referred to the District 287-CSRC program. Upon receipt of a referral, the casemanager interviews and tours CSRC with the parents, and assesses the student. After assessment, and with input from staff and parents, an educational plan is developed. The student attends five class periods daily, and, as an example, may attend reading, physical education, home economics, industrial training, and hearing impaired classes. She may also participate in swimming or any of the other extra-curricular activities. If she uses total communication, an interpreter would accompany her to most classes.

As the student matures and continues through her school program, her progress is constantly monitored, emphasis changed when appropriate, and the focus becomes more vocational. She may be exposed to various vocational training opportunities and experience working on job stations, training in the District 287 Vocational-Technical school, and, possibly, part-time competitive employment depending on her ability level. When she reaches 'graduation' age or demonstrates readiness for other work, the casemanager assists in placement outside of CSRC, often in her home community and typically either in competitive employment, sheltered work, or in a work activity center.

OUTCOMES

Follow-up services are provided for the graduates of CSRC who participated in the hearing impaired support program. This includes monitoring and supportive services by the casemanager, and an evening class held weekly focusing on their current responsibilities. The class also provides a social outlet (i.e., organized trips to various restaurants, Christmas shopping, and participation in winter sports). Of the 28 students served during the 1973-74 school year, two graduated in the spring of 1974. In the 1974-75 school year, 39 students were served and 3 students graduated. During the 1975-76 school year 4 students graduated with 42 students being served.

The outcome of the nine graduates are as follows:

Competitive Employment

Three graduates – two are earning $2.40/hr in food services work. One is earning $2.30/hr as a micro-film machine operator.

Sheltered Employment

Two graduates – one is earning $1.30/hr and the other $.90/hr. One graduate is in work adjustment training with the goal of sheltered employment.

Work Activity Center

Three Students – These students participate daily and are on the work activity pay schedule.

These outcomes reflect the dispersion of other CSRC graduates. Typically, about 1/3 of CSRC graduates are competitively employed, 1/3 are in sheltered workshops, and 1/3 attend work activity centers (follow-up, 1975).

IMPACT

The project at its inception was designed to facilitate the support of severe to profound loss hearing impaired retarded students in a larger program for mentally retarded adolescents. The effect of this program has impacted on several District 287 procedures and policies as follows:

1. A systematic hearing screening is planned to occur annually for all of the mentally retarded students in District 287.
2. A consistent follow-up medical and audiological service provision for this 'special' population is developing.
3. Further educational support services attending to unique needs of HI-MR students are emerging.
4. Alternate communication form usage (Bliss, Rebus, signs) with low functioning and multiply handicapped students is becoming formalized.
5. Referrals of students previously placed in residential centers for only hearing impaired or mentally retarded individuals continue to be received.
6. The program offers a potential model for other systems serving similar populations.

CONCLUSIONS

The project has demonstrated effectiveness in providing an educational service option for HI-MR students within the framework of a broader program designed for trainable and low educable mentally retarded students. It offered a visible alternative for HI-MR individuals from a variety of programs and especially for a number of HI-MR individuals from state institutions for mentally retarded individuals.

Critical components of the program included (1) an existing well designed educational program for trainable and low educable mentally retarded students; (2) a well qualified and skilled support service staff; and (3) a cooperative and involved general staff.

Without any one of these components, a student support program for HI-MR students could not be successful.

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ASSISTING EMPLOYERS OF HEARING IMPAIRED DEVELOPMENTALLY DISABLED WORKERS:

GUIDELINES FOR PLACEMENT SPECIALISTS

INTRODUCTION

Little has been written about on-the-job assistance to employers of the severely handicapped hearing impaired. However, with the Rehabilitation Act of 1973 (Public Law 93-112) and its amendments, and the Disabled Assistance and Bill of Rights Act (Public Law 94-103), services to the severely handicapped have been emphasized and expanded with a focus on providing a full array of services to handicapped individuals. Progress has been made in many areas of preemployment training but too often, little or no support is available to employer or employee once on-the-job. Instead of preparation-oriented goals, the task becomes that of maintaining a job and developing effective working relationships. Professional staff persons need to be sensitized to the needs of specific groups within the total handicapped population so that realistic, success-oriented programs can be designed and implemented for each individual.

These guidelines represent a general introduction for rehabilitation counselors, job developers, and secondary level educators in their efforts to assist hearing impaired developmentally disabled (HIDD) persons toward effective job placement via employer education. Although the HIDD population is a relatively small one, its special problems and needs must be addressed since these are critical to the lifetime success of each handicapped person. Handicapped individuals are often a silent minority; persons who are hearing impaired and developmentally disabled are a minority within that minority. Without a strong commitment, we may overlook them because of the very nature of the group.

POPULATION DEFINED

The following terms are used frequently in this brochure.

Hearing Impairment: The inability to hear and understand speech (Schein and Delk, 1971).

Developmentally Disabled: Those individuals who are autistic, cerebral palsied, epileptic, mentally retarded, or have a similar disability; have been thus handicapped prior to the age of 18 years; can be expected to continue to be handicapped; and the disability is a substantial handicap (Stewart, 1978).

Hearing impaired developmentally disabled (HIDD) Those persons who have a hearing impairment in combination with a disability which had its onset prior to the age of 18 years and is attributable to mental retardation, cerebral palsy, epilepsy, autism, or any other condition of a person found to be closely related to mental retardation, and which is a substantial handicap that can be expected to continue indefinitely." (Stewart, 1978).

In order to establish an information base upon which to build a set of guidelines, staff at Arizona's Model Demonstration Program interviewed job developers who placed or tried to place HIDD clients. The findings have been categorized using the questions that were asked of job developers with regard to HIDD persons.

1. How do you perceive the employers' needs and wants?

Employers do not know the meaning or implications of HIDD. Quite often, the main concern of the employer is knowing how to communicate with this worker. Frequently this need for improved communication with a client is based on the expressed desire to decrease the discomfort that accompanies unfamiliar situations.

Considering the severity of some expressive and receptive communication limitations, an interpreter at the job site is usually essential at first. When the HIDD worker has adjusted to the job situation, individual communication, without the aid of an interpreter, needs to be established. Gesturing, writing, drawing, informal signing, miming, and demonstrating should be encouraged. A job developer or a counselor should be available to facilitate such communication between the employer and the HIDD worker periodically if the two people are unable to communicate sufficiently on their own.

Communication between an employee and an employer is often the key to successful ongoing placement. As employers achieve some form of direct communication with the client, they are usually more comfortable. If the employer cannot initially achieve effective one-to-one communication with the client, then it is important for the placement personnel (counselor or job developer) to help the employer and the client to develop comfortable means of dealing with their communication problems.

2. Who can meet these needs? To where are the referrals made? And by whom?

The main concern or need is for communication strategies to facilitate good employer-client communication. Ideally, it is the HIDD worker's responsibility to identify and express his needs. To foster this situation, several approaches can be used. Before the job placement, the counselor can explain to the HIDD worker the importance of self-initiated discussions of job-related problems or concerns with his or her counselor or job developer. Previous to placement, many rehabilitation centers sponsor job groups where clients discuss worker responsibilities and attitudes with the counselor and job developer. In these groups, employee responsibilities should be emphasized through discussion and role playing so that the employee can identify and express his/her needs.

Often, due to communication problems, the HIDD worker may not be able to express pressing personal concerns that affect job performance. Additionally, language limitations may prevent him from understanding his responsibilities to voice these concerns. For these situations, one particular follow-along person should be designated to help communicate the worker's needs and make referrals when necessary. If all the people involved with the worker know this follow-along person, then all referrals can be coordinated, and unnecessary communication gaps can be eliminated.

In the event the client's needs cannot be met by either the employing agency or the rehabilitation agency, specialized community resources need to be tapped. These include centers for the deaf and agencies that provide interpreting services. When possible, the rehabilitation agency should provide the employing company with information on these support services in the community, including how to contact the appropriate service. If the employer knows how to call upon these community resources, then support will be readily available to the client on a long-term basis. Using communication problems just as one example, the task of locating an interpreter, enrollment of staff and/or client in sign language classes offered in the community, or basic sign language instruction by a volunteer to the staff could be coordinated by specialized community resources.

3. What have been significant problems in the past following placement?

Most HIDD workers adapt well to the work environment and make valued employees. A few, however, encounter special problems that challenge the resources of the employer and placement personnel. These special problems warrant attention since awareness will help prevent or reduce such problems.

According to counselors and job developers, there appear to be three major special problem areas, which include

1. Inadequate client pre-employment preparation which may result in employer dissatisfaction with the employee;
2. Inappropriate job placement which may result in worker dissatisfaction and/or undue frustration;
3. Insufficient employer orientation which may influence both employee and employer satisfaction in a negative direction.

4. Are these special problem areas for HIDD persons different from those of other clients? If so, how can these problems be avoided?

Although these special problems may be experienced by individuals within other populations, it appears that there are unique reasons why these problems occur frequently among the HIDD persons.

1. **Difficulties resulting from inadequate client preparation can be attributable to deficits in educational programming for pre-vocational training and work experiences. These occur not because of the client's limitations, but as a result of educational programming constraints.**

Frequently, physical limitations (e.g. cerebral palsy) and communication difficulties between the client and education personnel play a major role in reducing the quality of vocational training opportunities that are available. This may be complicated by the fact that remedial academic education is commonly a priority over vocational and social training areas in many post-secondary education settings.

Premature placement into competitive employment can also result in inadequate client preparation. Taking into account limited educational experience in pre-vocational and social maturity areas, compounded by the complexities of multiple disabilities, extended sheltered training experiences may be necessary. Therefore, placement personnel are cautioned against using similar timeline expectations for HIDD clients and clients with less severe handicaps.

The following ideas may be useful in avoiding potential problems that could result from inadequate client preparation:

1. Expand the work experiences available for HIDD persons during educational training.

2. Provide on-the-job training experiences prior to placement in competitive employment.

3. Increase client understanding of the social expectations of a work environment. This may be facilitated by discussions in job groups, on-the-job training experiences, and orientation to the job.

4. Foster realistic expectations for the job duties and responsibilities of the client during orientation to the job. This can be done in cooperation with the employer.

5. The length of follow-up support can also influence client success on the job. The intensity and duration of follow-up should be determined on an individual basis according to the client's needs.

2. **The second identified problem area -- inappropriate job placement -- is likely to occur if placement personnel as well as the employer, are either misinformed or uninformed about the worker's assets and limitations. For example, if the worker is placed without consideration of his assets, he or she might find the duties and responsibilities boring and tedious. Should a client's limitations not be taken into careful account before placement, frustrations may arise for the employer and client because of unsatisfactory job performance. An employer is in business to make a profit, and it is important that the HIDD worker be seen by the employer as an asset to the company in achieving this goal.**

Suggestions to the placement worker for avoiding inappropriate job placement might include:

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1. Proper utilization of vocational evaluation reports and situational assessment findings.

2. Determination of client's functioning outside of the sheltered rehabilitation workshop by on-the-job training experiences.

3. Exposure to various job opportunities to help communicate the choices available to the client with minimal language skills and allow participation in decision making. This may be facilitated through the use of site tours, video tapes, and exposure to additional resources.

4. Consideration of factors other than vocational assets and limitations. For example, the worker's transportation and living situation, as well as his or her level of social maturity, influence his chances of getting and maintaining a job.

3. **The third area, insufficient employer education, can greatly influence the success of placement. The education of employers should be the responsibility of placement personnel. This education should focus primarily on the client's assets but should explain any special considerations so that the employer can develop realistic expectations and know in advance what to do about special problems.**

To avoid insufficient employer education, it is important that placement personnel consider the following:

1. Employers must be aware of alterations that are available for having special visual and auditory warning signals for hearing impaired employees. This helps to reduce any fears employers have about employee safety. It also protects the worker from injury.

2. Information on communication methods and an orientation to deafness and the developmental disabilities can alleviate any anxiety the employer may have regarding handicapped persons. This information should be available to any other co-workers, if the employer so desires.

3. Finally, if there is to be a probationary period following placement, it is advisable to delineate who is responsible for support and follow-up during the client's adjustment to the job. For example, if the employer wants the direct area supervisor to fulfill these responsibilities, then the placement personnel need to provide information on rehabilitation resources available in the community to the area supervisor.

SUMMARY

These guidelines are offered as an introduction primarily to enable placement personnel and secondary level educators concerned with post school work opportunities to implement effective job placement plans, using available community resources. Persons who are hearing impaired and developmentally disabled often require specialized employer/employee training programs, and it is the role of the placement specialist to organize, implement, and evaluate these programs to ensure success for the HIDD population.

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PERSONNEL PREPARATION

The personnel preparation chapter presents selected educational training models for inservice and preservice training of teachers. These programs may serve as guides for those professionals charged with preparing teachers to work effectively with hearing impaired developmentally disabled students and for teachers and administrative leaders already in service to these students. Within this chapter, attention is focused primarily on the preparation of teachers; however, specific training needs are often expressed by related professionals such as psychologists; audiologists, speech/language pathologists, medical personnel, rehabilitation counselors, and community living leaders. The enclosed materials may offer related professional groups "food for thought" in planning preservice and inservice training of a multidisciplinary nature.

Gallaudet College in Washington, D.C. is one of the few teacher training programs to offer a specific program preparing educators to work with children with combined hearing and developmental disabilities. Gallaudet has offered this graduate (M.A.) teacher preparation program with specilization in the education of the multiplihandicapped hearing impaired for the past six years.

Gallaudet's MHHI specialization has attracted and trained professionals to fill the critical need for well trained teachers and supervisors to serve in educational programs with multihandicapped hearing impaired students. The MHHI specialization has expanded beyond the boundaries of traditional training programs for teachers of the hearing impaired by including courses on behavioral and instructional technology crucial for educating mentally retarded, physically handicapped, autistic, learning disabled and visually impaired children. It has included modifications of traditional communication/language evaluation and facilitation strategies to meet the needs of children at the pre-symbolic stages of development. Since the inclusion of the MHHI specialization in the teacher preparation curriculum, the program and course content have been, and continue to be, modified to keep up with changing needs of MHHI children; with ideas and changes in delivery systems and instructional strategies; and with developments in augmentative technologies.

One major thrust of this grant is to encourage professional entry into areas of direct service to children with both hearing impairment and developmental disabilities. To this end, external review of the Gallaudet curriculum was sought from professionals with expertise with the target population of children and adults. An evaluation instrument along with a description of Gallaudet's program were mailed to reviewers. Selected results from this survey are reported in the article "Teacher Preparation for Multihandicapped Hearing Impaired Students" by Jones and Holzhauer. Feedback from this review, along with Gallaudet's internal review procedures, are being used to guide continuing program and course development.

The first doctoral level graduate program to develop leaders and researchers with specific expertise with the HIDD individuals was implemented recently at Johns Hopkins University. A brief program description and rationale are presented along with a listing of the areas of study and competencies required of students completing this program.

Professionals in the field speak of the paucity of available programs which merge specialized training in both hearing impairment and developmental disabilities. Alternative and innovative approaches to training seem warranted in order to prepare sufficient numbers of well trained, effective professionals to serve this special population. The article "Models for Graduate Education in the HIDD Area" suggest some alternatives for personnel preparation in the absence of a single specialized preservice program.

The final section of this chapter contains a description of selected inservice approaches to personnel training. The National Demonstration and Training Consortium for Severely Handicapped/Hearing Impaired Children and Youth has coordinated both inservice and preservice training efforts on behalf of severely involved MHHI individuals in educational, medical, and residential settings. The composition of this consortium has varied with the availability of adequate funding; at present, there are four sites fully participating. An overview of their respective training missions is presented, followed by more detailed descriptions of two of the inservice training projects.

In contrast to organized, other-arranged approaches to inservice training, the last selection describes a unique interactive computer-based communication system called The SpecialNet Multihandicapped Electronic Bulletin Board. This system enables professionals, parents, and paraprofessionals to confer and problem-solve on a regular basis regarding particular needs and interests. Users can rapidly request and share information, ideas, and questions, thus avoiding the typical feedback delays inherent in more traditional forms of inservice training.

GALLAUDET COLLEGE'S M.A. TEACHER PREPARATION SPECIALIZATION IN THE MULTIHANDICAPPED HEARING IMPAIRED

Background Information

Interest in and concern for multihandicapped children has grown during the past few years. Programs for the hearing impaired have become concerned because they have seen their populations changing to include more children identified as having educationally significant disabilities in addition to hearing handicaps. These disabilities range in severity from mild behavior problems to multiple intellectual, physical, sensory and emotional handicaps. These additional handicaps include vision impairment, mental retardation and physical handicaps such as cerebral palsy. The MHHI area includes students classified as multihandicapped, severely handicapped, and deaf-blind.

Griffing (1981) recognized that at least 40% of the children enrolled in programs for deaf children could be designated as multihandicapped. He proposed three subgroups:

1. Mildly MHHI. No need for a fundamentally different curriculum than other hearing impaired child. Their teachers do not need special training.
2. Moderately MHHI. Require some accomodations in environment, methodology, rate and staff of instruction, but the typical curriculum for hearing impaired students is appropriate for them. Their teachers require some special training.

3. Severely MHHI. Require a curriculum different from the typical curriculum for hearing impaired students and also require accommodations in environment, methodology, rate and staff of instruction. Their teachers require extensive special training.

The specialization in MHHI prepares teachers to work within both the moderately and severely MHHI with a special emphasis on the severely MHHI. The emphasis is on the severely MHHI for 3 reasons:

1. The need for teachers is greatest at that level
2. The educational programs for severely MHHI students, where available, are often inadequate or inappropriate, due partially to the lack of trained and skilled teachers
3. Severely MHHI students are complicated and difficult to teach, so they require teachers with intensive training and special skills and enthusiasm.

Program Overview

The 2-year (4-semester) program includes 59 credit hours of coursework and practicum experiences. The trainees majoring in MHHI complete 29 hours of coursework related to general education of the hearing impaired, including simultaneous communication training, and 29 credit hours focusing on the moderately and severely MHHI. Therefore, the trainees receive extensive training concerning both hearing impaired and MHHI students.

Because of the heterogeneous composition and needs of MHHI students a wide variety of topics are covered in the specialized courses in this area. A sample of some of the specific topics covered in the MHHI courses are listed below:

- Normal vision functioning, common vision impairments and educational implications
- Integrated service delivery models (combining educational and ancillary services into a single coordinated program)
- Assessment of MHHI students
- Travel training for MHHI students
- Cardiopulmonary resuscitation (CPR) training and management of seizures and other health-related disorders
- Adaptive communication devices (e.g., communication) boards for students unable to use their hands
- Adapting a "typical" curriculum for hearing impaired students to incorporate mildly MHHI students
- Prevocational and life skills training for MHHI students
- Assessment and programming related to prelanguage communication skills
- Application of simultaneous communication to the MHHI

An integral part of the MHHI program is the field-based experiences which are undertaken during each of the 4 semesters of the program. Continual supervision and coordination with campus-based coursework facilitate the development of instructional and management skills. The first semester involves short-term experience in a variety of programs. The second and third involve comprehensive assessment, planning, program intervention and evaluation with individual MHHI students, one time with higher functioning students and the other time with lower functioning MHHI students. In the field experience during the final semester, the trainee assumes responsibility for management of a class of MHHI students.

Employment Options

Graduates of the MHHI program typically seek positions as teachers in self-contained classes or resource rooms for MHHI students in residential or day programs for hearing impaired, mentally retarded, multihandicapped, or deaf-blind students. They may also work as educational specialists, diagnosticians, consultants, or supervisors in programs concerned with MHHI students.

We are grateful to the editors of <u>Directions</u> for granting permission to circulate this article prior to its publication in that journal.

The editors have requested that this article <u>not be copied</u> until it has been published in <u>Directions</u>.

A RATIONALE FOR
TEACHER PREPARATION FOR
MULTIHANDICAPPED HEARING IMPAIRED STUDENTS

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Running Head: MHHI Teacher Preparation

Abstract

Reflecting the growth of programs for multihandicapped hearing impaired (MHHI) students, preparation programs for their teachers have also developed in recent years. Curricula for teacher preparation programs should be based on rationales which include the variables of needs of the population to be served by program graduates, the personnel roles graduates will fill, and the competencies necessary to fill those roles. Gallaudet College has had a MHHI teacher preparation program since 1975. In the present study, national leaders in the MHHI area were surveyed to verify the assumptions in the rationale for the Gallaudet Curriculum. Their responses indicated subcategories of MHHI students for whom adequate services are most needed, for whom intense training is most important, and for whom well-trained teachers are most needed. These data were interpreted to indicate MHHI population needs for trained personnel. Respondents also indicated personnel roles for which need is the greatest and listed the most important competencies for filling those roles. Survey results indicated that assumptions undergirding Gallaudet's MHHI teacher preparation program are consistent with the perception of leaders in the MHHI field.

Teacher Preparation for Multihandicapped Hearing Impaired Students

Interest in the education of multihandicapped hearing impaired (MHHI) students has grown during the past few years. Programs for the hearing impaired have become concerned because they have seen their populations changing to include more children identified as having educationally significant disabilities in addition to hearing handicaps. These disabilities range in severity from mild behavior problems to multiple intellectual, physical, sensory and emotional handicaps. Such additional handicaps might include vision impairment, mental retardation and physical handicaps such as cerebral palsy. The MHHI students include those classified as multihandicapped, developmentally disabled, severely handicapped, and deaf-blind.

Accompanying the growth of programs for MHHI students is the need for preparation programs for their teachers. This need has been well documented (e.g., Flathouse, 1979; Stewart, 1971, 1981; Tweedie & Shroyer, 1982). In addition to need, however, a variety of variables must be considered when developing personnel preparation programs. Perhaps the most important of these variables is conceptualization of the educational needs of the student population to be served by program graduates. Unfortunately in the MHHI area, even though the general need for personnel preparation programs is clear, numbers, specific characteristics and needs of MHHI students themselves are very ambiguous (Flathouse, 1979; Griffing, 1981). This confusion is partially attributable to multiple terminology and classification systems and inconsistent criteria for determing the education needs of the students (Jones, in press). Based on the characteristic needs of MHHI students, functions to be performed by preparation program graduates and the competencies necessary to fill those roles should be developed. These roles and competencies are essential objectives of the program. In addition, the program content must be designed to enable mastery of the competencies by trainees in the program.

Gallaudet College established a preparation program for teachers of the MHHI in 1975. As the program has evolved, an implicit curriculum rationale has also evolved based on assumptions about MHHI population characteristics, personnel roles for which teachers are needed, and the competencies needed to fill those roles. These assumptions are very difficult to validate, however. For example, Jones (in press) discussed the difficulties in defining an MHHI population, and Shores, Cegelka and Nelson (1973) showed the lack of empirical validity for special education teacher competencies. In 1981, the American Speech-Language-Hearing Association (ASHA) undertook a dissemination project through a grant from the Administration on Developmental Disabilities (DD) to assist states in improving the provision of services to MHHI students. To meet the DD mandate of encouraging professionals to work in this area, one component of the project was designed to review and to disseminate the Gallaudet College MHHI teacher preparation curriculum. The initial step in the curriculum review was to verify the program rationale by comparing the opinions of leaders in the MHHI field with elements of the Gallaudet curriculum. Information was sought concerning three questions:

1. For which subcategories of MHHI student is the need for personnel preparation the greatest?
2. For which personnel roles is the need for trained personnel the greatest?

3. What competencies are needed by teachers of MHHI students?

Respondents

Questionnaires were mailed to 31 individuals who have demonstrated leadership and long-term involvement in the education of MHHI students. Individuals were selected who had written articles concerning education of the MHHI in professional journals, who had presented papers at ASHA-sponsored conferences concerning the MHHI, or who were leaders in well-known programs for MHHI students. An effort was made to include individuals familiar with service delivery networks in the hearing impaired, developmental disabilities, severely handicapped, and deaf-blind areas. Thirty-one individuals were selected; 19 questionnaires have been returned (61%). Respondents are profiled in Table 1.

[Insert Table 1 about here]

MHHI Population Characteristics

The first area investigated was an attempt to identify those MHHI population characteristics and needs which have implications for personnel preparation programs. Seventeen MHHI subcategories were identified to enable clear communication about the characteristics of the students involved. For example, to reduce confusion about whether the usual term deaf-blind includes those who are not functioning at a retarded level or those who are not totally blind, three more specific categories were used (hearing impaired blind, hearing impaired visually impaired, and hearing impaired visually impaired mentally retarded). Giving discrete, commonly understood or operationally defined categories (e.g., the levels of mental retardation defined in 1977 by Grossman) from which learning characteristics may be inferred was intended to elicit consistent, valid responses. Because need itself is a global and ambiguous concept, survey respondents rated each of the MHHI subcategories in terms of three separate variables: (1) adequacy of present services (e.g., identifying subgroups where services are least adequate); (2) intensity of training necessary for competent service delivery (e.g., readings vs observation vs practicum, etc.); (3) and the present availability of well-trained teachers (e.g., whether available in most or only a few programs). Responses to these questions are summarized in Tables 2-4.

[Insert Tables 2-4 about here.]

The data in Tables 2-4 can be combined by summing the ranks for each MHHI subcategory and then ranking those sums. This process is reflected in Table 5 which shows the relative overall need of the MHHI subcategories for trained personnel. The data in Table 5 imply that MHHI personnel preparation programs should stress preparation of teachers for more complex students, generally those who may be severely or profoundly handicapped and those with more than double handicaps. The need for personnel for more mildly involved students is not as great. This is consistent with the prediction reported by Tweedie and Baud (1981) that traditional residential schools for the blind and deaf will admit more low-functioning students.

[Insert Table 5 about here]

Personnel Roles and Service Delivery Arrangements

Personnel roles, the functions personnel preparation program graduates will fill, may serve as objectives for those programs. For example, a program electing to stress the assessment role of teachers of MHHI students could prepare graduates to become diagnosticians. Alternatively, programs may elect to stress the prevocational training or parent education functions of program graduates. Survey respondents in the present survey were asked to identify the availability of nine service roles for teachers of MHHI students. Their responses were collapsed across MHHI subcategories and are shown in Table 6.

[Insert Table 6 about here]

The data in Table 6 imply that the greatest MHHI service needs are parent and family information and support services, well-trained teachers, and vocational training program for high school age students. They show that programs for infants and specialized support services (e.g., speech and language therapy) are most available. The data should not be interpreted to imply, however, that the availability of any of those services is adequate at the present time.

MHHI Teacher Competencies

A third category of questions which survey respondents answered was concerned with competencies needed by teachers of MHHI students. Competencies determine the structure of teacher preparation programs since they may be the basis for course and practicum objectives, content, and evaluation (Shores, Cegelka & Nelson, 1973). Survey respondents were asked to generate five competencies they felt are most important for teachers of MHHI students. When similar responses were grouped, 16 competency areas were identified. These competency areas are listed in Table 7.

[Insert Table 7 about here.]

Comparison with Gallaudet Program

The Gallaudet College MHHI teacher preparation program is a two-year four-semester graduate-level specialization within the Department of Education. It includes 57 credit hours of course work and practicum experiences. The trainees majoring in MHHI complete 29 hours of required course work related to general education and education of the hearing impaired, including simultaneous communication training, language and speech development, audiology, education and psychology, and research. In addition, MHHI majors take 28 credit hours focusing on the MHHI. Therefore, the trainees receive extensive training concerning both hearing impaired and MHHI students. The program is based on 27 performance and knowledge competencies. (See Appendix.) These competencies provide a framework for the courses and field experiences which comprise the MHHI specialization. Table 8 shows all of the courses required for trainees majoring in education of the MHHI. The specialized MHHI courses are listed in Table 9.

[Insert Table 8 and 9 about here]

Survey respondents indicated that teacher preparation is most greatly needed for more complicated MHHI students and that personnel are most needed to fill the roles of parent/family training, direct teaching and specialized vocational training. The respondents also indicated 16 competency areas which teachers of MHHI students should master. Each of these elements is manifested in the MHHI teacher preparation program at Gallaudet College. While the Gallaudet program attempts to prepare teachers for all ages and levels of MHHI students, emphasis is placed on education of the severely handicapped. Two required courses deal exclusively with parent education and prevocational training. Finally, all of the competencies listed by survey respondents are included in the more extensive list undergirding the Gallaudet program.

Any curriculum, including those in teacher preparation, should be based on a rationale. In teacher preparation, curriculum rationales are often linked to assumptions about characteristics of the population with which program graduates will work, the roles they will fulfill and the competencies necessary for success in those roles. In the present survey, such assumptions implicit in Gallaudet College's preparation program for teachers of MHHI students are consistent with by the perceptions of leaders in the MHHI field.

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Table 1

Distribution of 19 Survey Respondents

Roles	
Teacher trainer/researcher	52%
Practitioner	21%
Support personnel	21%
Administrator	5%
Geographic Distribution	
Eastern states	39%
Central states	33%
Western states	28%

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Table 2

Adequacy of Services for Students with
Educationally Significant Hearing Loss and Accompanying Handicaps

Accompanying Handicaps	Score	Rank
Autism Severe Behavioral/Emotional Impairment Language Learning Disabilities	9	(2)
Profound Mental Retardation Vision Impairment/Mental Retardation and Cerebral Palsy	7	(4.5)
Mental Retardation and Cerebral Palsy	6	(6)
Visual Motor Learning Disabilities Physical Disabilities Visual Impairment and Mental Retardation	5	(8)
Severe Cerebral Palsy Moderate Mental Retardation Severe Mental Retardation	4	(11)
Mild Behavioral/Emotional Impairment Low Vision	3	(13.5)
Mild Mental Retardation Blindness	1	(15.5)
Mild Cerebral Palsy	0	(17)

Note: Ranking is from low adequacy (high need) to high adequacy (low need). Score reflects number of times subcategory was indicated as receiving "least adequate" services.

Table 3

Importance of Intense Training in Preparation for Working with Students with Educationally Significant Hearing Loss and Accompanying Handicaps

Accompanying Handicaps	Score	Rank
Severe Cerebral Palsy	88	(1)
Visual Impairment, Mental Retardation and Cerebral Palsy Severe Behavioral/Emotional Impairment	82	(2.5)
Severe Mental Retardation Profound Mental Retardation Mild Behavioral/Emotional Impairment	75	(5)
Blindness	77	(7)
Visual Motor Learning Disabilities	76	(8)
Mental Retardation & Cerebral Palsy	75	(9)
Moderate Mental Retardation	74	(10)
Mild Mental Retardation	73	(11)
Vision Impairment and Mental Retardation Language Learning Disabilities	72	(12.5)
Low Vision	70	(14)
Autism	69	(15)
Physical Disabilities	60	(16)
Mild Cerebral Palsy	52	(17)

Table 4

Availability of Well-Trained Teachers of Students with Educationally Significant Hearing Losses and Accompanying Handicaps

Accompanying Handicaps	Score	Rank
Severe Behavioral/Emotional Impairment Vision Impairment/Mental Retardation and Cerebral Palsy	48	(1)
Autism Vision Impairment and Mental Retardation	45	(3.5)
Profound Mental Retardation	44	(5)
Severe Cerebral Palsy	43	(6)
Severe Mental Retardation Mental Retardation and Cerebral Palsy	41	(7.5)
Physical Disabilities	40	(9)
Low Vision	38	(10)
Language Learning Disabilities	37	(11)
Mild Behavioral/Emotional Impairment Mild Cerebral Palsy Blindness	36	(13)
Visual Motor Learning Disabilities	35	(15)
Mild Mental Retardation Moderate Mental Retardation	33	(16.5)

Note: Ranking is from low availability (high need) to high availability (low need).

Table 5

Personnel Preparation Needs for Students with Educationally Significant Hearing Loss and Accompanying Handicaps

Accompanying Handicaps	Score	Rank
Severe Behavioral/Emotional Impairment	6	(1)
Vision Impairment, Mental Retardation and Cerebral Palsy	8.5	(2)
Profound Mental Retardation	14.5	(3)
Severe Cerebral Palsy	18	(4)
Autism	20.5	(5)
Mental Retardation and Cerebral Palsy	22.5	(6)
Severe Mental Retardation	23.5	(7)
Vision Impairment and Mental Retardation	24	(8)
Language Learning Disabilities	25.5	(9)
Visual Motor Learning Disabilities	31	(10)
Mild Behavioral/Emotional Impairment	31.5	(11)
Physical Disabilities	33	(12)
Blindness	35.5	(13)
Moderate Mental Retardation Low Vision	37.5	(14.5)
Mild Mental Retardation	43	(16)
Mild Cerebral Palsy	47	(17)

Table 6

Availability of Services for MHHI Students Ranked from Low to High Availability

Service Categories	Score	Rank
Parent/Family Information and Support Services	717	(1)
Well Trained Teachers	680	(2)
Specialized Vocational Programs for 16-21 Year Olds	672	(3)
Appropriate Planning and Placement Mechanisms	640	(4)
Specialized Educational Programs for 14-21 Year Olds	624	(5)
Assessment Services	623	(6)
Specialized Educational Programs for 3-13 Year Olds	617	(7)
Specialized Programs for Infants (Newborn-3 Year Olds)	574	(8)
Specialized Support Services (e.g., speech or language therapy, audiology, physical therapy)	557	(9)

Table 7

Most Important Competencies for Teachers of MHHI Students

Competency Area	Number of Times Mentioned
Assessment-related Competencies	
Select Appropriate Domains for Instruction	14
Assessment Skills in Appropriate Curricular Areas	9
Planning Related Competencies	
Task and Behavior Analysis Skills	6
Establish and Write Clear Objectives	5
Instruction-Related Competencies	
Behavior and Social Skill Management	11
Skills in Alternative Communication Systems	9
Adapt and Design Instructional Materials and Activities	4
Prevocational and Vocational Skill Development	2
Knowledge Competencies	
Understanding of Normal Development	6
Knowledge of Handicapping Conditions	5
Understanding of Learning Theory	3
Other Competencies	
Monitoring of Student Progress	11
Specific Attitudes and Personal Characteristics	7
Work with Support Services and Other Staff	7
Parent Training and Communication Skills	5
Program and Time Management Skills	3

Table 8

Gallaudet College
MHHI Teacher Preparation Program*

Credits	Semester	
10		GENERAL EDUCATION CORE COURSES
	II	Parent/Infant Education
	III	Social Foundations of Education
	III	Introduction to Research
	III	Diagnosis and Remediation of Reading Problems
19		EDUCATION OF THE HEARING IMPAIRED
	I	Education & Psychology of the Hearing Impaired
	I	Language and Psycholinguistics for Teachers
	I, II	Simultaneous Communication I & II
	II	Speech Development of the Hearing Impaired
	I	Introduction to Audiology
	II	Audiologic Habilitation
18		EDUCATION OF THE MULTIHANDICAPPED COURSES
10		FIELD-BASED EXPERIENCES IN EDUCATION OF THE MULTIHANDICAPPED
57		

* Proposed

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Table 9

Specialized Course Work in Education of the MHHI*
Gallaudet College

Semester	
I (Fall)	Educational Management of Physical, Intellectual and Vision Disabilities in the Multihandicapped (3)
	Behavior Modification (2)
	Introductory Field Experience in Multiple Disabilities (1)
II (Spring)	Development of Self-Help and Motor Skills in the Multihandicapped (2)
	Development of Language and Cognition in the Multihandicapped (3)
	Clinical Practicum I (1)
III (Fall)	Prevocational Training for the Multihandicapped (3)
	Teaching Academics to the Multihandicapped (2)
	Clinical Practicum II (2)
IV (Spring)	Seminar in Multiple Disabilities (3)
	Student Teaching (6)

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* Proposed

Appendix

PERFORMANCE AND KNOWLEDGE COMPETENCIES REQUIRED OF MHHI Graduates

Performance Competencies

1. Select Appropriate Instructional Areas. The trainee will identify areas of instruction that are appropriate for selected MHHI students and will support choices with logical rationale.

2. Assessment. The trainee utilizes systematic procedures to identify the student's current abilities with regard to the chosen instructional areas. This may include formal and informal observational assessment procedures, and should result in at least the following information:

   a. reliable baseline information regarding the student's ability to perform the instructional objective.
   b. reliable baseline information regarding the student's ability to perform at least the beginning steps leading to the achievement of the instructional objective.
   c. information regarding potential reinforcers/consequences to motivate the student.
   d. information regarding potentially feasible instructional procedures for the student.

3. Long-Range Objectives. The trainee utilizes assessment data to prepare a battery of long range objectives (with conditions for correct performance, measurable behaviors, and achievement criteria) for their students to achieve.

4. Task Analysis. The trainee generates a logical sequence of similarly constructed short-term objectives designed to enable mastery of each long-range objective.

5. Selection of Instructional Materials. In instructing the student, the trainee utilizes materials which are appropriate for the given student and task.

6. Instructional Procedures. The trainee utilizes instructional procedures which are designed to:

   a. communicate to the learner the objective of instruction.
   b. provide information to the learner regarding the accuracy or correctness of his/her responses.
   c. facilitate acquisition, proficiency and/or generalization of specific behaviors.

7. Instructional Effectiveness. The trainee's teaching results in documented and desired changes in the student's performance.

8. Modification of Inappropriate Behaviors. The trainee utilizes procedures to replace extraneous behaviors which interfere with the student's learning.

9. Work with Groups. The trainee demonstrates all instructional intervention competencies while working with two or more students.

10. Record Keeping. The trainee systematically records reliable and easily interpretable data regarding his/her students' responses to instruction.

11. Program Modification. The trainee utilizes objective data to improve instructional intervention.

12. Use of Resources. The trainee identifies and seeks information and/or assistance from:

    a. specialists
    b. parents
    c. local, state, and national agencies and organizations concerned with MHHI students.

13. Reporting. The trainee reports the effects of instructional intervention to:

    a. specialists
    b. parents
    c. para-professionals
    d. administrators
    e. others concerned with his/her students

Knowledge Competencies

14. History. THe trainee understands the history of the treatment of handicapped people, particularly as it relates to:

    a. education
    b. care
    c. institutionalization
    d. normalization
    e. least restrictive environment
    f. treatment
    g. custody and guardianship
    h. human dignity

15. Legal Obligations and Regulations. The trainee will understand the major aspects of federal and state legislation and litigation pertaining to services for the handicapped, including:

    a. P.L. 94-142
    b. P.L. 93-112
    c. federal funding programs

d. local, state, and private agencies
e. least restrictive environment
f. right to education
g. other civil rights h. child advocacy
i. human subjects protection
j. punishment
k. past and present litigation

16. Normal and Abnormal Child Development. The trainee will be able to describe normal and abnormal human development and to apply this knowledge in educational planning and programming in at least the following areas:

a. language
b. physical
c. emotional
d. cognitive
e. sensory

17. Commercial Materials. The trainee will be able to evaluate and utilize:

a. formal and informal assessment tools and approaches
b. curricula, "kits," and other instructional materials.

18. Intervention. The trainee will demonstrate a knowledge of intervention procedures for handicapped students (birth to 22) based on developmental and other models, and on their students' critical needs.

19. Medical/Physical Aspects. The trainee will understand various health problems and physical disabilities that affect handicapped students. This will include an understanding of preventive and emergency procedures.

20. Rationale/Sequence of Curriculum.

A. The trainee will understand the rationale behind the skill areas to be implemented in the curriculum teaching units.

B. The trainee will be able to develop instructional sequences in at least the following areas:

a. gross and fine motor
b. sensory/perceptual
c. communication/language
d. socialization
e. recreation and leisure
f. preacademic/academic
g. prevocational education
h. cognitive
i. affective
j. independent living skills
k. self-help skills

21. Instructional Programming and Management. Trainee will:

    a. be familiar with and have access to a variety of curricula and related materials for use in the systematic instruction of handicapped students.
    b. be knowledgeable in the process of task analysis for the purpose of beginning instructional programming.
    c. be able to adapt commercially available materials to the needs of individual students.

22. Adaptive Equipment. The trainee is able to select and/or design adaptive equipment for individual students, to facilitate normal movement patterns, and to prevent deformities from developing or worsening.

23. Alternative Approaches to Communication. The trainee recognizes and is able to assess needs for:

    a. alternative communication modes
    b. augmentative communication aids and systems
    c. is familiar with funding sources for augmentive bids
    d. is able to implement appropriate intervention strategies

24. Parent/Service Interactions. The trainee will understand and be able to implement appropriate parent-teacher interactions and parent-child interaction.

25. Information Specialist. The trainee will:

    a. be familiar with available state and local resources for handicapped students
    b. maintain an up-to-date knowledge of the relevant professional literature
    c. will be able to incorporate that knowledge in teaching
    d. develop skills in locating literature that is relevant to specific educational and behavioral problems in the classroom
    e. will develop skills in directing parents and others to materials and services in the community

26. Supportive Services. The trainee will be familiar with support services (including medical, audiologic, developmental, communication, recreational and vocational).

    a. national level
    b. state level
    c. local level
    d. school district level

27. Residential and Community Settings. The trainee will become aware of the continuum of living arrangements available to MHHI students in their locality.

Johns Hopkins University Doctoral Program Concentration on the Hearing Impaired-Multiply Handicapped

Larry Larsen, Ph.D.

The training program described in this section was originated in 1979 to prepare doctoral level personnel for work in the area of the hearing impaired-multiply handicapped, a population that includes individuals with moderate to profound hearing impairments co-existing with at least one other major disability such as blindness, mental retardation, emotional disturbance, or physical impairment.[1] Federal funds received from the Division of Personnel Preparation of Special Education Programs (formerly Bureau of Education for the Handicapped) of the United States Department of Education have been instrumental in supporting the program since it was started.

The history of educational services for the handicapped demonstrates that those with the most pronounced needs are the last to be served, and it is only recently that special education has recognized its obligation to educate the severely and profoundly impaired and students with multiple disabilities. In its concern with the hearing impaired-multiply handicapped, this program focuses on a population that has been largely ignored by the professional community and by most service agencies.

The doctoral program was created as an extension in an existing Ed.D. program offered by the Division of Education at Johns Hopkins University. Prior to its inception, the Division offered the doctoral degree in Human Communication and its Disorders with areas of concentration in the severely and profoundly handicapped, reading, language, and learning disabilities.

[1] The use of the term "hearing impaired-multiply handicapped" should not be construed as an effort as yet to inject yet another diagnostic label into the professional jargon. This designation is used only to describe those persons in our society who, by virtue of having multiple handicaps, one of which is hearing loss, are often excluded from the programs and services that they would have access to if they had only one disability. Indeed, the major reason why this population must be identified as a distinct group at present is because of our overuse of labels in the past.

Beginning with the summer of 1979, the hearing impaired-multiply handicapped was added as a new area of concentration, making it possible to initiate the program without creating an entirely new training curriculum or administrative structure.

Since its inception, the program has been a member of the National Demonstration and Training Consortium for Severely Handicapped/Hearing Impaired Children, an organization comprised of several sites involved in various aspects of training personnel for work with the hearing impaired-multiply handicapped. The member sites, which include Lexington School for the Deaf and Roosevelt Hospital in New York, Madison Metropolitan School District and The University of Wisconsin-Madison in Wisconsin, and Teaching Research in Monmouth, Oregon, assisted the program faculty in designing the original training curriculum presented later in this section, and have provided internship opportunities for the students in the program.

Purpose

The overall purpose of the program is to prepare doctoral level professionals who have a demonstrated competence in personnel preparation, service leadership, and applied research activities in the field of the hearing impaired-multiply handicapped. In the area of personnel preparation, the graduates of the program should be skilled in (a) designing comprehensive preservice and inservice training curricula for special educators and related services personnel; (b) developing college level courses and inservice training workshops and programs; and (c) presenting instructional content in the effective manner during preservice and inservice training activities.

As a service leader, the program's graduates should be capable of (a) organizing and administering comprehensive service programs for hearing impaired-multiply handicapped persons at the local or state level; (b) using an extensive knowledge of programming contents and methods in the design and development of services for the hearing impaired-multiply handicapped; (c) working effectively with parents and other primary care givers and with professionals from related services disciplines; (d) serving as an effective consultant to programs for hearing impaired-multiply handicapped students; (e) preparing technically sound grant and contract proposals; (f) demonstrating a knowledge of litigated and legislated requirements for educational and other services for exceptional children;

and (g) demonstrating a knowledge of, and applying, ethical standards in the provision of services to handicapped persons.

As an applied researcher, the program graduate is expected to (a) maintain an up-to-date knowledge of the research literature that is applicable to services and programs for the hearing impaired-multiply handicapped; (b) develop hypotheses that, when tested, will advance or improve our methods and techniques for educating hearing impaired-multiply handicapped students; (c) plan and design applied research studies to test those hypotheses, collecting and analyzing the data that are required for this purpose; (d) evaluate, interpret, and disseminate the results of the applied research studies to the professional community; and (e) plan and design evaluative research studies that objectively evaluate the effectiveness and quality of services rendered to hearing impaired-multiply handicapped persons.

As suggested by the preceding summary of expected training outcomes, the program has been designed to prepare generalists who can work effectively in a variety of positions and settings. While it is impossible to predict the exact nature of the positions that will be assumed by the students after their graduation, it is expected that some will be employed as local or state level program administrators and that others will accept faculty positions where they will be involved in personnel preparation and applied research activities. Depending upon their individual interests, other graduates may work in the areas of curriculum development, early intervention coordination, and in-service education.

Training Curriculum

The training curriculum is organized according to the competency statements shown in Table A. Each competency in the list can be acquired through one or more of five major tpes of learning activity, including (a) teaching university courses under the supervision of the training faculty; (b) taking university courses as prescribed in student's individual program of studies; (c) participating in practicum or internship activities; (d) completing "simulation" projects as a part of, or in addition to, formal coursework; and (e) completing a dissertation. Competency attainment can be determined in a number of ways, including (a) direct observation of student behavior in selected situations, for example, while teaching a university course; (b) tests and examinations taken as a part of course work and in the qualifying examinations that are required;

Table A

Competency Statements[2]

Competency	Learning Activities	Evaluation Procedure	Evaluative Criteria
1. Personnel Preparation			
1.1 Training curriculum design			
______ 1.1.1 Designs and implements preservice and inservice training needs assessments for general and special educators, related services personnel, administrative personnel, and paraprofessionals.	S, I	J, D	Given the task of developing preservice and inservice training needs assessments, the student identified competencies needed by personnel working with the hearing impaired-multiply handicapped and designs specific procedures and instruments to determine training needs with respect to those competencie
______ 1.1.2 Designs and conducts preservice training programs to prepare general and special educators, related services personnel, and paraprofessionals for work with the hearing impaired-multiply handicapped.	T, S, I	J, D	Given the task of developing a preservice training curriculum, the student designs and and describes the implementation of a comprehensive training program that addresses each of the skill areas required of personnel who are working with the hearing impaired-multiply handicapped.
______ 1.1.3 Designs and conducts inservice training programs to meet the needs of general and special educators; administrative personnel, related services personnel, and paraprofessionals who are working with the hearing impaired-multiply handicapped.	S, I	J, D	The student designs an inservice training program for the staff of a local education agency or private facility and conducts academic and practicum activities addressing each identified training need. The student also designs a progress measurement instrument for the program and a means to evaluate its effectiveness.

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[2] Some of the competency statements listed in Table A are based on an unpublished manuscript describing a doctoral program being conducted in the area of the severely and profoundly handicapped at the University of Massachusetts. We gratefully acknowledge the assistance that we received from this source in compiling this competency list.

Competency	Learning Activities	Evaluation Procedure	Evaluative Criteria
1.2 Course development and design			
______ 1.2.1 Plans courses for preservice training of general and special educators, related services personnel, and paraprofessionals who will serve the hearing impaired-multiply handicapped.	T	J	Given the task of designing a college or university course, the student prepares a syllabus that includes a course schedule, educational objectives, readings and other assignments, a comprehensive bibliography of the relevant literature, and procedures for evaluating student performance and assigning grades.
______ 1.2.2 Plans inservice workshops and training activities for general and special educators, related services personnel, administrators, and paraprofessionals.	T, I, S	D, J	Given the task of designing inservice activitie the student prepares a schedule of training activities, the content of those activities, and procedures for evaluating the acquisition of competencies addressed in the activities.
1.3 Teaching skills			
______ 1.3.1 Teaches effective college/university courses.	T	D, F, J	Given the task of teaching effective college/university courses, the student's teaching skill are judged acceptable by (a) the course particip attaining, on the average, at least 90 percent of the course competencies; (b) the student receive ratings on the Evening College Course Instructors Rating Scale (a rating scale used by students to rate each course and its instructor) that are at or above the median for Evening College instructor and (c) ratings made on at least three occasion by the project director and/or faculty of the student while involved in teaching duties.

Competency	Learning Activities	Evaluation Procedure	Evaluative Criteria
______ 1.3.2 Teaches effective inservice courses and workshops.	T	D, F, J	Given the task of teaching effective inservice courses and workshops the student's teaching skill are judged acceptable by (a) the inservice personnel attaining on the average, at least 90 percent of the course competencies; (b) the student receiving a satisfactory rating on a workshop evaluation scale; (c) ratings made by the project director and/or faculty while the student is involved in training activities.
2. Service Leadership			
2.1 Administration and supervision			
______ 2.1.1 Designs a child-find system to identify and locate exceptional and "at risk" children.	C, S	J	Given a region of specified demographic characteristics, the student describes a comprehensive child-find system that includes procedures for screening, identifying, and assessing exceptional and "at risk" children; the responsibilities of the disciplines, agencies, and organizations invoved; mechanisms for referring children to appropriate services; and the range of services that should be available.
______ 2.1.2 Designs a needs assessment study to identify the unmet needs of hearing impaired-multiply handicapped persons in a given geographic region.	C, S	J	Given a geographic region of specified demographic characteristics, the student designs a study to measure the unmet needs of the region's hearing impaired-multiply handicapped persons.

Competency	Learning Activities	Evaluation Procedure	Evaluative Criteria
____ 2.1.3 Designs, organizes and administers a comprehensive service system for hearing impaired-multiply handicapped individuals at the state and/or local level.	C, S	E, J	Given a region of specific demographic characteristics, the student designs a comprehensive service system for the hearing impaired-multiply handicapped, including site selection, transportation and budgeting, personnel recruitmen and preparation and program development.
____ 2.1.4 Designs, organizes and supervises a comprehensive program for the hearing impaired-multiply handicapped individuals in a given locality.	C, S, I	E, J, D	Given the specific characteristics of a hearing impaired-multiply handicapped population (e.g. age, degree of hearing loss, additional handicappi condition and nature of previous services), the student designs, organizes, and supervises a comprehensive program to include use of physical facilities, training of personnel, curriculum development and allocation of funds.
____ 2.1.5 Demonstrates familiarity with local, state, and national organizations and agencies that are concerned with services for the hearing impaired-multiply handicapped.	C	E	Lists relevant local, state, and federal organizations and agencies, and describes their responsibilities, and services. Lists each agency's funding source, its financial support to other agencies, and procedures for procuring funds from each agency if available.
____ 2.1.6 Serves as an active member of and participant in local, state, and national organizations that are concerned with services for the hearing impaired-multiply-handicapped.	N/A	D	Holds membership in at least two national organizations that are concerned with services for the hearing impaired-multiply handicapped. Actively participates in national, state, and local professional, advocacy and service groups, such as the American Speech and Hearing Association, the Council for Exceptional Children and The Association for the Severely Handicapped.

Competency	Learning Activities	Evaluation Procedure	Evaluative Criteria
2.2 Programming			
____ 2.2.1 Demonstrates an extensive knowledge of content areas that are relevant to comprehensive educational programs for the hearing impaired-multiply handicapped.	C	E	Maintains at least a 3.0 average in coursework in human anatomy and physiology, legal aspects and service systems, instructional and behavioral programming, fine and gross motor skills, parent-professional relations, personal and social skills, cognitive and intellectual development, language and communication skills and educational implications of hearing loss.
____ 2.2.2 Demonstrates knowledge of, and ability to evaluate and appraise, curricula that are applicable to the hearing impaired-multiply handicapped.	C	E, J	Given a curriculum that purports to be appropriate for hearing impaired-multiply handicapped student uses relevant criteria to evaluate it. Lists and describes curricula available for this population.
____ 2.2.3 Designs and writes sound curriculum sequences in selected content areas for the hearing impaired-multiply handicapped.	C	J	Uses a systematic approach to writing a curriculum sequence in a assigned content area.
____ 2.2.4 Collects assessment data for individual hearing impaired-multiply handicapped children and writes comprehensive individualized educational plans based on that data.	I, C	J	Selects and administers appropriate norm and criterion referenced tests for individualized assessments. Uses test data, observational findings and data collected from the interdiscipli ary team to compose comprehensive individualized educational plans.
____ 2.2.5 Designs and organizes a learning environment for hearing impaired-multiply handicapped individuals.	C, I, S	D, J	Given an average size classroom, the student equips and organizes it to implement the individualized educational plans of hearing impair multiply handicapped students.

Competency	Learning Activities	Evaluation Procedure	Evaluative Criteria
________ 2.2.6 Demonstrates ability to use the applied behavior analysis model.	C	E, D	For a particular child or group of children, the student observes and defines target behaviors and designs and implements appropriate behavioral programming procedures to increase desired behaviors and decrease maladaptive or interfering behaviors.
2.3 Parent-professional relationships			
________ 2.3.1 Develops and maintains effective relationships with the parents of hearing impaired-multiply handicapped children.	I, C	D, F, J	Receives favorable ratings and evaluations from the parents that are served by the student. Documents participation of parents in program planning and implementation activities.
________ 2.3.2 Develops a list of competencies that will assist parents in managing and teaching their children.	S	D, J, F	In conjuction with parents, develops a list of measurable competencies which parents judge to be practical and attainable.
________ 2.3.3 Plans a sequence of training activities to help parents acquire useful skills in dealing with their handicapped children.	S	D, J, F	The student designs a sequence of training activities that parents rate as useful and effective.
________ 2.3.4 Assesses the training needs of parents and designs a training program to meet those needs.	S	J	Outlines procedures for assessing the specific training needs of parents of hearing impaired-multiply handicapped students. Designs a training program, or selects an existing program, to meet those needs.
________ 2.3.5 Demonstrates effective techniques for interviewing parents.	S, P	J	Given a parent to interview, collects relevant information and shares program information with the parent.

Competency	Learning Activities	Evaluation Procedure	Evaluative Criteria
2.3.6 Teaches parents to administer prescriptive programs in the home.	P, I	D, J, F	Trains parents to administer prescriptive program and collect data. Training includes: (1) instruction to parents specifying behavior and reinforcement contingencies. (2) modeling of appropriate techniques for parents to use. (3) data collection procedures to be used. Given a child's current level of performance in an educational setting, the student prepares a program in conjunction with the parent that will coordinate in-home and in-school activities, and which will generalize and maintain acquired skills.
2.3.7 Demonstrates a knowledge of model parent involvement/training programs in the country.	C	E	Lists major parent involvement/training programs and describes each in terms of (a) population served, (b) costs, (c) content and methods, and (d) effectiveness.
2.3.8 Acts as a resource for parents, acquainting them with resources that are available to them.	C	E	Develops a bibliography of books and literature for parents. Develops a list of direct service programs that provide services for the hearing impaired-multiply handicapped. Develops a list of sources of financial aid for parents. Develops a list of professionals offering service to handicapped children and their families. Develops a list of parent support groups

Competency	Learning Activities	Evaluation Procedure	Evaluative Criteria
2.4 Interdisciplinary and transdisciplinary activity			
2.4.1 Demonstrates a knowledge and understanding of the primary purposes and methods of the various disciplines involved in services for the hearing impaired-multiply handicapped.	C, I	E	Describes the roles and primary methods of each discipline.
2.4.2 Demonstrates ability to serve as cooperative and effective member of interdisciplinary and or transdisciplinary teams.	I	D, F	Receives favorable evaluations from other members an interdisciplinary or transdisciplinary team on which the student participates.
2.4.3 Develops and leads interdisciplinary and transdisciplinary teams serving the hearing impaired-multiply handicapped.	I	D, F	Receives favorable evaluations from other members of an interdisciplinary or transdisciplinary team which the students develops and leads.
2.5 Consulting activities			
2.5.1 Provides useful and helpful consultative and technical assistance to programs serving the hearing impaired-multiply handicapped.	I, C	D, F	Serves as a consultant to at least 3 programs that serve hearing impaired-multiply handicapped stude Organizes and structures each consultation in ter of specific goals and activities. Prepares writt reports of programmatic strengths, deficiencies, and recommendations. Receives positive ratings o consultative services from consumers.
2.6 Grant proposal preparation			
2.6.1 Demonstrates knowledge of major federal and private granting programs that may provide funds for services to the hearing impaired-multiply handicapped.	C	E	Lists the major grant programs and the private organization or government agency administering each, and describes them in terms of their primary purposes.

Competency	Learning Activities	Evaluation Procedure	Evaluative Criteria
_____ 2.6.2 Prepares complete and viable grant proposals.	C, S	F, J	Given a "request for proposal", prepares a grant application that adheres to the requirements that it contains. The proposal must be approved by a panel composed of the student's peers and the project director/faculty.
2.7 Legal aspects			
_____ 2.7.1 Demonstrates a knowlege of state and federal legislation that pertains to services and programs for the hearing impaired-multiply handicapped.	C	E	Lists and describes the major elements of federal and Maryland laws concerning educational and other services for the hearing impaired-multiply handicapped.
_____ 2.7.2 Demonstrates an understanding of the major right to education, right to treatment, etc., judicial decisions that pertain to the hearing impaired-multiply handicapped.	C	E, F	Describes the major elements of judicial decisio that deal with the education, treatment, and placement rights of handicapped individuals. Lis ten major cases that have been decided in the las 30 years, describing each in terms of (a) major issues, (b) facts and history, (c) the reasoning underlying the judicial decision, and (d) impact. Each case must also be explained in terms of its relationship to other landmark cases and its pla in the historical development of the rights of handicapped individuals. Examples of such cases include: A. Right to Education Brown v. Board of Education (1954) P.A.R.C. v. Pennsylvania (1971) Case v. California (1972) David P. v. California (1973) Uyeda v. California (1972) C.A.R.C. v. Colorado (1972) Donnelly v. Minnesota (1973) Mills v. Board of Education, D.C. (1972) M.A.R.C. v. Maryland (1972)

Competency	Learning Activities	Evaluation Procedure	Evaluative Criteria
			B. Right to treatment: Wyatt v. Stickney (1972) N.Y.A.R.C. v. Rockefeller (1973) Burnham v. Dept. of Public Health, Georgia (1972) Ricci v. Greenblatt (1972) Welsch v. Likins (1973)
			C. Right to Placement: Diana v. California (1970) Larry P. v. Riles (1972) Guadalupe Organization Inc. v. Tempe Elem. Sch. District Ruiz v. California (1971) Stewart v. Philips (1970)
2.8 Ethical standards			
2.8.1 Demonstrates a knowledge of ethical standards and practices and applies that knowledge in programmatic and research activities.	C	J	Lists the ethical standards of psychology, education and other service fields. Demonstrates the application of ethical standards in designing treatment and research activities and lists and steps that will be taken to insure the human and civil rights of the participants in those activities. Recognizes violations of ethical standards. Identifies major ethical issues in th provision of services for the hearing impaired-multiply handicapped.

Competency	Learning Activities	Evaluation Procedure	Evaluative Criteria
Applied Research Skills			
3.1 Knowledge of Literature			
______ 3.1.1 Maintains an up-to-date knowledge of the research literature applicable to services and programs for the hearing impaired-multiply handicapped by reading current articles related to this field.	C, I, D	J	Designs research studies that are based on curren literature. Given an educational problem, completes a comprehensive search of the relevant literature.
______ 3.1.2 Critiques current literature in the field of hearing impaired-multiply handicapped.	C	E, F	Given a selection of current research in several relevant fields, identifies the strength and weaknesses of each article.
3.2 Applied Research Hypotheses			
______ 3.2.1 Develops testable hypotheses that advance or improve methods and techniques for the education and treatment of the hearing impaired-multiply handicapped.	G, D	J	Given an educational or treatment problem that concerns the hearing impaired-multiply handicappe and based on an exhaustive literature review, the student formulates research questions or hypothes that can be tested through experimentation.
3.3 Research Design			
______ 3.3.1 Distinguishes between basic and applied research.	C	E	Describes basic and applied research and can select research reports that are exemplary of each.
______ 3.3.2 Demonstrates knowledge of traditional group design and single subject research.	C	E	Lists the strengths and weaknesses of both areas of research, describing which research questions are most suitable to each.

Competency	Learning Activities	Evaluation Procedure	Evaluative Criteria
____ 3.3.3 Plans and designs applied research studies.	C, D	E, F	Given a research question or hypothesis, the student formulates a research design to address the question. Design must include: 1. statement of the problem 2. research question 3. definition of population 4. sampling method 5. measurement tools 6. research plan 7. threats to/controls for internal and external validity 8. statistical tests used 9. application of computer systems, when appropriate 10. interpretation of possible results 11. discussion of strengths and weaknesses of the design 12. alternative designs to address the same question 13. feasibility of the study in terms of: a. cost b. time c. relevance to the field d. acceptance by the professional community
3.4 Analysis and Dissemination			
____ 3.4.1 Analyzes, interprets, and evaluates the data collected in applied research studies.	C, D	J	Given the data collected in an applied research study, statistically analyzes that data and evaluates and interprets its meaning.

Competency	Learning Activities	Evaluation Procedure	Evaluative Criteria
____ 3.4.2 Disseminates applied research results to the professional community.	D	D, J	Writes research reports in journal style adhering to the requirements of the APA <u>Publication Manual</u>. Presents research results at professional meetings Publishes at least one article in a professional journal, and makes at least two presentations at professional conferences, prior to graduation.
3.5 Evaluative Research			
____ 3.5.1 Plans and designs evaluative research studies.	C, S	J	Given a program for the hearing impaired-multiply handicapped, designs a program of evaluative research to measure its effectivenss in relationship to its costs.
3.6 Independent Research			
____ 3.6.1 Plans, designs, and conducts research that is of applied use to practitioners in the field.	C, S	J	Given an area of professional need, plans and implements research that results in a useable tool for practitioners such as a book, filmstrip, teaching manual, or curriculum unit.
____ 3.6.2 Plans, designs, and implements dissertation research.	D	F	Given a research question that is of personal interest, designs and implements research that is an original theoretical and/or empirical contribution to the field.

(c) formal evaluations and rating scales completed by internship supervisors, by students enrolled in the courses taught by the doctoral trainee, or by program faculty members. The designators T, C, I, S, D in the competency list column labeled "Learning Activities" refer to each of the five major learning activities, while the designators D, E, F, J in the "Evaluation Procedures" column refer to the primary means whereby the acquisition of each competency can be evaluated.

Training Sequence

The program has been designed to make it possible for a student to enter doctoral training with a masters degree to complete his or her degree requirements in two calendar years of study. Although variations are needed in almost every case, the general training sequence is shown in Table B.

A Concluding Comment

The field of special education has been the subject of severe criticism in recent years. The allegations that have been made, which have surfaced in professional literature, in the news media, and in testimony and evidence presented in special education litigation, must be taken seriously. It should cause us to make major improvements in the quality of our programs. Special education teachers, it is frequently alleged, are poorly prepared for their teaching duties; educational administrators and supervisors lack the skills necessary for judging service quality or for providing the technical expertise that is sorely needed by teachers in the field. Preservice training programs, it is argued, are staffed by faculty members who are not themselves capable practitioners, and whose knowledge of effective special education practices is at best dated. The inservice training programs that are created to alleviate this situation, many feel, are little more than partial solutions for a training problem of major proportion and national significance. As a matter of law in some states, and as a matter of common opinion nationally, teaching is not considered to be a profession, and the low status accorded teachers is reflected in the low salaries paid them for their efforts.

There is no fast and easy remedy for our problems. However, it is doubtful that any significant and lasting improvements can be made in special education until the field has produced a fairly large number of highly skilled and competent doctoral level personnel who can direct quality service programs, prepare effective special education personnel,

Table B

DOCTORAL PROGRAM FOR STUDENTS CONCENTRATING IN THE SEVERELY/PROFOUNDLY HANDICAPPED AND THE HEARING IMPAIRED-MULTIPLY HANDICAPPED

Part I. Program Design and Requirements **Minimum**

1. Language . . . . 6 credits

(Select two from the following)

83.552	Language Development in Childhood
83.553	Language Disorders in Children
83.512	Education of the Severely/Profoundly Handicapped III: Language and Cognitive Development
83.513	Education of the Severely/Profoundly Handicapped IV: Non-Vocal Communications

2. Research and Measurement . . . . 15 credits

(Select five from the following)

20.401	Basic Statistics
81.707	Psychodiagnostics I
81.708	Psychodiagnostics II
86.404	Educational Measurement and Evaluation
86.405	Theory and Practice of Standardized Testing
86.708	Survey of Educational Research
86.710	Critique of Educational Research
86.714	Statistical Methods in Educational Research
86.715	Computer Applications in Measurement and Research
86.793	Graduate Project in Measurement and Research

3. Core Courses . . . . 15 credits

83.501	Legal Aspects, Service Systems, and Current Issues in Special Education
83.502	Instructional Planning and Management in Special Education
83.504	Parent-Professional Relationships in Special Education
83.507	Advanced Behavioral Programming
83.508	Medical and Physical Aspects of Handicapping Conditions

4. Major Area Courses . . . . 15 credits

(Select five from the following)

83.510	Education of the Severely/Profoundly Handicapped I: Fine Motor Skills
83.511	Education of the Severely/Profoundly Handicapped II: Gross Motor Skills
83.512	Education of the Severely/Profoundly Handicapped III: Language and Cognitive Development
83.513	Education of the Severely/Profoundly Handicapped IV: Non-Vocal Communications

83.514 Education of the Severely/Profoundly Handicapped V: Personal and Social Skills
83.516 Advanced Studies in Normal and Abnormal Development
83.517 Assessment and Evaluation of Neurological Disorders
83.518 Applied Neuroanatomy and Physiology
83.519 Advanced Treatment Techniques I
83.520 Neonatal Assessment (1 credit)
82.893 Graduate Project in Exceptional Children (1-6 credits)
83.441 Observation of Clinical Practices in Speech, Language, and Hearing
83.561 Educational Implications of Hearing Impairment I
83.562 Educational Implications of Hearing Impairment II

5. Supportive Areas . . . . 24 credits

Select 12 credits from each of two supportive areas. Supportive areas are available in:

Administration
Biological Foundations
Counseling and Human Development
Curriculum
General Special Education
Learning Disabilities
Mental Retardation
Psychodiagnostics
Severely/Profoundly Handicapped
Speech, Language, and Hearing
Clinical Education

6. Seminars . . . . 9 credits

Doctoral Seminar in the Severely/Profoundly/Multiply Handicapped I
Doctoral Seminar in the Severely/Profoundly/Multiply Handicapped II
Doctoral Seminar in the Severely/Profoundly/Multiply Handicapped III

7. Practica/Internship . . . . 12 credits

(Select one of the following alternatives)

Practicum with the Severely/Profoundly/Multiply Handicapped I (6 credits)
Practicum with the Severely/Profoundly/Multiply Handicapped II (6 credits)
or
Interdivisional Internship (12 credits)

8. Dissertation Research . . . . 12 credits

(Select one of the following alternatives)

Dissertation Research (12 credits)
or
Dissertation Research (9 credits)
Dissertation Research Seminar (3 credits)

Part II. Typical Schedule for the Full-Time Student

First Academic Term

Basic Statistics
Critique of Educational Research
Doctoral Seminar I
Core/Major/Supportive Area/Language Course
Core/Major/Supportive Area/Language Course

Second Academic Term

Statistical Methods in Educational Research
Doctoral Seminar II
Core/Major/Supportive Area/Language Course
Core/Major/Supportive Area/Language Course
Core/Major/Supportive Area/Language Course

May 1 - Qualifying examination in supportive area

Summer Term

Educational Measurement and Evaluation
Core/Major/Supportive Area/Language Course
Core/Major/Supportive Area/Language Course

Sept 1 - Qualifying examination in supportive area

Third Academic Term

Practicum I (6 credits)
Doctoral Seminar III
Core/Major/Supportive Area/Language Course
Core/Major/Supportive Area/Language Course

January 1 - Qualifying examination in major area/dissertatio proposal approved

Fourth Academic Term

Practicum II (6 Credits)
Computer Applications in Measurement and Research
Dissertation Research (6 credits)

May 1 - Dissertation data collected

Summer Term

Dissertation Research
Dissertation Research or Dissertation Research Seminar
Core/Major/Supportive Area/Language Course

Sept. 1 - Oral defense

PART III: Program Planning/Development Process

First Year

Prior to Registration	1. Each new student meets with Dr. Berk and selects research, measurement, and evaluation courses to be taken.
	2. Each new student meets with major adviser and completes a Tentative Program of Studies (Attachment #1). Two supportive areas are selected for each student and a tentative listing of language, major area, and supportive area courses is completed. Up to 33 graduate credits from prior academic work are transferred to the student's program.
By November 1	3. Faculty members who will be responsible for administering the student's qualifying examinations in his/her two supportive areas are selected. The student meets with his/her supportive area faculty members and obtains qualifying examination sample questions and reading list.
By the end of the first term	4. The student completes an Individual Planning Worksheet (Attachment #2), which is reviewed and approved by his/her major adviser. The Worksheet is used to make needed changes in the student's Program of Studies.
	5. A Timetable (Attachment #3) is completed for the student.
By the end of the second term	6. The student successfully passes his/her qualifying examination in one supportive area.
	7. The student's progress is reviewed at a meeting of the doctoral advisers.
By the end of the summer term	8. The student successfully passes his/her qualifying examination in the second supportive area.

Second Year

By the end of the first term	11. The student successfully passes his/her major area qualifying examination.
	12. The student submits an initial disseratation proposal to his/her major adviser.
	13. A dissertation committee is formed by the major adviser.
By February 1	14. The student's disseratation committee approves the disseratation proposal.
By May 15	15. The student's dissertation data is collected.
By July 31	16. The student completes the writing of the dissertation.
	17. The Director of the Division of Education forms the student's oral defense committee.
By August 31	18. The student successfully defends his/her dissertation.

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and conduct relevant research on the many issues that confront us today in special education services. A recent symposium on doctoral training in special education (Shofer and Chalfant, 1979), stated this point directly:

> "Special education is an applied field, and whether or not the field moves forward during the next decade depends upon the extent to which members in the field: (a) advance the present status of knowledge; (b) obtain a greater understanding of the nature of handicapping conditions; (c) develop more effective ways for identifying and diagnosing exceptional children; (d) create more effective instructional methods; (e) construct more effective delivery systems; (f) adequately evaluate the results of efforts; and (g) employ scientific methods of investigation to the problems in our field. To accomplish these tasks and improve professional practices will require the preparation of a core of scholars and researchers in the field." (p. 21)

To the best of the abilities of the faculty members involved, Johns Hopkins University doctoral program in the hearing impaired-multiply handicapped seeks to prepare some of these scholars and researchers who are so desparately needed in the field.

Reference

Shofer, R.T. and Chalfant, J.C., The Missouri Symposium on Doctoral Programs in Special Education: Considerations for the 1980s. Columbia, Missouri: Project on Cooperative Manpower Planning in Special Education, Department of Special Education, University of Missouri - Columbia, 1979.

Originally prepared by :
Model Demonstration Programs
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MODELS FOR GRADUATE EDUCATION IN THE HIDD AREA

In the United States, individual states have rather rigorous standards for the preparation and certification of personnel who serve handicapped individuals. This is as it should be since handicapped children have specific problems and needs that require special assistance. However, too often these state standards apply only in specific categories of disability such as deafness, blindness, mental retardation, and certain others. Increasingly, standards are being encouraged, and in some cases implemented via certification, in the preparation of personnel to serve the multiply handicapped. However, these latter attempts are minimal and inadequate. The "multiply handicapped" category is far too all-encompassing for truly meaningful outcomes. For example, the deaf-blind and the blind-mentally retarded are groups that are "multiply handicapped" yet may have vastly different needs. A teacher preparing to teach blind/cerebral palsied individuals would have few qualifications to teach deaf/mentally retarded students since the learning needs are quite different in each case and the required teaching skills are not identical.

The Model Demonstration Program encouraged the development of special degree training in the areas of service to HIDD persons, but these attempts met with only marginal success. Several graduate students did internships with the project developing expertise and leadership with HIDD individuals of different ages in a variety of service settings. One course on the HIDD population was offered for one semester through the College of Education at the University of Arizona.

A major stumbling block to development of teacher training programs in the HIDD area is the lack of certification requirements. State agencies and national groups such as the Council on Education of Deaf (CED) and the Commission on Accreditation of Rehabilitation

Facilities (CARF), as well as the American Association of Mental Deficiency (AAMD) lack specific certification standards for HIDD workers. Without such standards, teacher and counselor preparation programs refuse to attempt to define required knowledges and skills and, as a result, appropriate degree curriculum are not developed and implemented.

To be sure, defining the skills and knowledges required for serving a heterogeneous group such HIDD persons is by no means an uncomplicated task. Yet, these children and adults do exist. The invocation of the "Ostrich Syndrome" by certifying bodies and teacher traininig centers, among others, does not change this need. However, the Ostrich Syndrome was in evidence wherever the MDP turned! Replies received from teacher training and other professional degree programs boiled down to "Our present degree programs are adequate to meet HIDD needs" or "There are no certification standards for serving HIDD persons, hence we do not know how to develop an appropriate curriculum."

In a partial attempt to respond to this need, the MDP boldly - sans certification standards and san precedent - developed a statement and proposed curriculum for teachers training at the graduate level to serve HIDD persons. This proposal is presented below for consideration by teacher training programs having a pioneering spirit.

TEACHER PREPARATION TO SERVE THE HIDD

by

Vicki Palm

According to the 1976 <u>American Annals of the Deaf</u> "Directory of Services," there were then 71 institutions that offered teacher training in deaf education in the U.S. Thirty-eight programs were offered at the undergraduate level and 59 at the graduate level. There were also degrees offered in mental retardation at numerous universities across the country at both the undergraduate and the graduate levels. Teacher training programs in the area of multiple handicaps were, however, much harder to find. In 1976 only four states had programs for teacher training in the area of the deaf-blind. Such training was offered by five institutions. One program was available at the undergraduate level and five at the graduate level. In light of the fact that deaf-blindness had long been recognized as an unique handicapping condition and that, at a national level, deaf-blind regional programs had already been established to help coordinate services and provide money to programs for these individuals, the lack of teacher training programs in that area was appalling. The hearing impaired developmentally disabled had yet to be recognized as a distinct group that needed very specialized services that are uniquely different from those historically offered to either the deaf or the developmentally disabled. It was, therefore, not surprising that teacher training in this areas was also sadly lacking.

The state-of-the-art in teacher training in the area of hearing impairment in combination with one or more of the developmental disabilities is currently at a very minimal, if not non-existent, level. Most of the children being served through the educational system are being taught by teachers with degrees in either deaf education or mental retardation. Very much harder to find are teachers with undergraduate degrees in mental retardation and masters degrees in deaf education, or visa versa. Because there are few teacher training programs currently available that focus, even globally, on this dual disability group, however, there are few teachers educationally qualified to teach this group. The vast majority of "experts" in this field today have educational certificates in one area (i.e., deaf education) and a vast amount of experience with this multiply disabled group, but not a degree from a university qualifying them to teach this group.

Why is there a need for such specialized teacher training?

The education of hearing impaired developmentally disabled children is uniquely different from either the education of hearing impaired children or education of developmentally disabled children. When occurring in combination, these disabilities require specially trained teachers who can provide adequate and appropriate programming for both of these disabilities. This highly specialized training should provide the professional with a background in audiology, aural rehabilitation and language and communication development as well as coursework in the areas of EMR, TMR, severely and profoundly handicapped; physical, visual, and learning disabilites; and behavior management techniques.

Graduate work in the area of either deaf education or mental retardation rarely provides the professional with this wide variety of needed expertise to deal with the student who has multiple disabilities.

Too often the teacher with an educational background in mental retardation has little or no facility in manual communication. Training is also lacking in the areas of the implications of a hearing loss; speech skills development in the hearing impaired; the need for, and techniques in, auditory training; appropriate language development techniques for the hearing impaired; as well as less complex issues, such as the care and maintenance of hearing aids and amplification systems.

On the other hand, those teachers with an educational background in deafness who begin to teach HIDD students are generally lacking skills in the areas of appropriate behavior management techniques; pre-academic and vocational skills; curriculum development and adaptation for severely and profoundly retarded individuals; as well as knowledge in other disability areas, such as visual handicaps, physical impairments, and learning disabilities.

It is therefore, necessary for any teacher training curriculum to provide the trainee with background and experience in all these necessary areas." The following sample curricula are proposed:

1. Undergraduate Teacher Preparation. Students preparing at this level to teach HIDD students should take the regular coursework for a degree in special education, either in mental retardation or deaf education. Electives should be courses in the following areas:

a. Mental Retardation Major: Language and speech development for the hearing impaired, audiology, aural rehabilitation, and manual communication.

b. Deaf Education Major: Behavior principles, mental retardation, visual handicaps, physical handicaps, and behavior disorders.

Practicum experiences should vary widely and include experience with all levels of retardation in combination with all levels of hearing impairment.

2. Graduate Teacher Preparation. Providing someone with the wide array of courses necessary at the graduate level is a difficult, if not impossible, task without necessitating a two-year masters program. For that reason, the following masters level programs require the student to enter with a bachelor's degree in either mental retardation or deaf education. Class titles and content are based on courses offered at the University of Arizona in 1979.

c. Master's Degree Program of study for those with a deaf education background (B.S.):

Summer I			Units
Sp. Ed.	470	Mental retardation	(3)

Sp. Ed.	572a	Physically handicapped child	(3)

Summer II

Sp. Ed.	413	Education of the visually handicapped	(3)
Sp. Ed.	573a	Education of children with behavioral disorders	(3)

Semester I

Sp. Ed.	419	Behavior principles for the handicapped child	(3)
Sp. Ed.	474	Curriculum adaptations for exceptional children	(3)
Sp. Ed.	475	Observation and participation in special education programs	(3)
Sp. Ed.	**	Assessment of severely/multiply handicapped students	(3)

** A course number has not yet been assigned.

Semester II

Sp. Ed.	594	Field practice in teaching exceptional children	(6)
or			
Sp. Ed.	593	Internship	(6)
		Elective	(3)
			(36)

d. Master's Degree Program of study for those with a developmental disabilities background (B.S.):

				Units
Summer I				
	Sp. Ed.	589	Principles of audiology	(3)
	Sp. Ed.	405	Education of the deaf	(3)
Summer II				
	Sp. Ed.	484	Aural rehabilitation	(3)
	Sp. Ed.	581	Language development for the exceptional child	(3)
Semester I				
	Sp. Ed.	585	Communication development for handicapped children	(3)
	Sp. Ed.	582	Teaching language to handicapped children	(3)
	Sp. Ed.	474	Curriculum adaptations for exceptional children	(3)
	Sp. Ed.	475	Observation and participation in special education programs	(3)
			Elective (Manual Communication I)	(3)
Semester II				
	Sp. Ed.	594	Field practice in teaching exceptional children	(6)
	or			
	Sp. Ed.	593	Internship	(6)
			Elective (Manual Communication II)	(3)
				(36)

The intent of proposing these curricula is to make it easy for all colleges or universities to adapt their current programs of study to accommodate teacher training in the area of the HIDD. Because of the low priority which is unfortuntely given to the HIDD at this time, and the accompanying unfortunate economic position of the trainee who graduates with such a highly specialized degree, it is felt that this is currently the optimum approach to training teachers to successfully serve HIDD students.

The principles of these curricula can be utilized by programs preparing counselors, social workers, and others from various disciplines to work with HIDD persons. The goal of such preparation is to combine the critical training of the discipline (e.g., education, psychology, etc.) with the preparation necessary to serve HIDD persons.

SUMMARY

This chapter has attempted to describe the current problems in the area of personnel preparation at the degree level in the area of serving HIDD persons, and to propose means for resolving these problems. Specialized preparation programs are urgently needed and should be vigorously pursued by qualified colleges and universities. Models have been presented as a starting point.

Developed by:
Model Demonstration Program
The Rehabilitation Center
College of Education
The University of Arizona

Updated by:
HI-DD Grant Project
American Speech-Language-Hearing Association

A NATIONAL DEMONSTRATION AND TRAINING CONSORTIUM FOR SEVERELY HANDICAPPED/HEARING IMPAIRED CHILDREN AND YOUTH

For the past five years, the USOE - Special Education Programs, Division of Personnel Preparation, has funded a national demonstration and training consortium for severely handicapped/hearing impaired students. This consortium is currently composed of four sites who are now conducting inservice and preservice training for personnel working with the severely handicapped/hearing impaired. Sites exist at Lexington School for the Deaf in New York; Roosevelt Hospital in New York; Johns Hopkins University, Baltimore Maryland; and Teaching Research, Monmouth, Oregon.

The consortium is committed to the inservice and preservice training of personnel to work with the severely handicapped student who is also hearing impaired. To accomplish this the following goals have been established.

1. To develop programs for severely handicapped students which can serve as models for training teachers and related service personnel.

A program is defined as:

- A. Delivery of Services, e.g. assessment, instruction, and curriculum.
- B. Product development.
- C. Training - pre- and inservice, e.g. awareness and specific skill training.
- D. Dissemination.

2. To develop mechanisms for communication and information exchange between each site, i.e., inservicing each other and development of problem solving strategies for the network.

3. To develop mechanisms for interfacing the network programs with existing service delivery models in other settings.

4. To develop advocacy positions for severely handicapped/hearing impaired students through the collection of data and relating this information to funding agencies for continued program development.

Currently, the National Demonstation and Training Consortium sites are scattered geographically throughout the United States, each having a different educational approach to working with the severely handicapped/hearing impaired student. Each site provides inservice or preservice training to various kinds of personnel utilizing methodologies and strategies consistent with each site's philosophies. An explanation of the type of training provided by each site follows:

Site: The Roosevelt Hospital

Location: Manhattan, New York

Staff: One Pediatrician-Coordinator
Three Pediatrician Trainers
Consultants
One Secretary (Part-Time)

Facility: Roosevelt Hospital, Developmental Disabilities Center
College of Physicians and Surgeons of Columbia University
Lexington School for the Deaf
New York Institute for the Education of the Blind
Public School (N.Y.C.) 47 for the Deaf
Staten Island Developmental Center
Manhattan Developmental Center

Goal: To increase the early detection of and early intervention (medically and educationally) for the Severely Handicapped/Hearing Impaired Child.

Type of Training and Cost

I. Workshops

A. Pre-Service and In-Service Training for Undergraduate Medical Education (UGME), Graduate Medical Education (GME) and Continuing Medical Education (CME) groups-Four hour workshop-(WORKSHOP I) will cover such topics as:

1. Etiology, Epidemiology, Genetics, Signs and Symptoms, Diagnosis and Management, etc. of Hearing Impairement and Mental Retardation.

2. Developmental principles and assessment with special emphasis on language/communication-natural history and disorders.

3. The physician's role as a member of an interdisciplinary team.

4. Community resources and basic educational aspects.

B. In-Service Training for Educators of the Severely Handicapped/Hearing Impaired-2 1/2 hour workshop-(WORKSHOP II) will cover:

1. General Medical aspects outlined in Workshop I much more briefly and with more discussion of the varying multihandicapping conditions that may accompany hearing impairement.

2. An explanation of commonly used medical jargon.

3. Explanation of the health care system and the interaction of the system with educators.

4. Health curriculum for the students.

B. Practicum-a child who is hearing impaired and severely handicapped will be evaluated and managed by the medical student or pediatric resident under the supervision of an attending pediatrician or physiatrist.

C. A self-assessment examination will be taken at the end of this module.

For Information: Call or write Dr. Lou Cooper, Department of Pediatrics, Developmental Disabilities Center, The Roosevelt Hospital, Antennucci Bldg., 428 West 59th Street, New York, NY 10019, Phone: (212) 554-6565.

Teaching Research Infant and Child Center

Prepared by the Staff of Special Education Department

Teaching Research, Monmouth, Oregon 97361 **Vol. IX, No. 2, December 1980**

This is the fifteenth of a series of newsletter editions which will describe the activities of the Teaching Research Infant and Child Center. The Teaching Research Infant and Child Center consists of:

- — Infant and Toddler Program: Susan Maude and Kathy Newell
- — Integrated Preschool Program: Valerie Aschbacher, Judy Clark and Mary Riley
- — Parent Training Clinic: Bill Moore
- — Prescriptive Program: Gail Rogers
- — Group Home for Severely Handicapped: Dave Templeman and Mary Lee Fay
- — Elementary Classroom for Severely Handicapped, located in Monmouth-Independence School District: Nancy Trecker and Jerry Rea
- — Secondary Classroom for Severely Handicapped, located in Monmouth-Independence School District: Kathy Boyarski, Lynn Killian Gage and Randy Sullivan
- — Secondary Classroom for Mildly Mentally Retarded/Severely Emotionally Disturbed, located in Salem School District: Chris Hadden
- — Group Home for Mildly Mentally Retarded/Severely Emotionally Disturbed: Jay Buckley and Debbie Kraus

This issue of the newsletter describes the validation of the Teaching Research Inservice Training Model by the Joint Dissemination and Review Panel, U.S. Department of Education. The inservice training described herein was conducted within the National Model Center for Severely Handicapped which was for six years located in the Teaching Research Infant and Child Center. This training was conducted under the supervision of Ms. Torry Piazza Templeman, Director of Training at the Teaching Research Infant and Child Center.

VALIDATION OF INSERVICE TRAINING, SEVERELY HANDICAPPED CLASSROOMS

Teaching Research has made its second appearance before the Joint Dissemination and Review Panel. This panel was established by the Department of Education to select federally funded projects that are worthy of dissemination throughout the United States.

About 50% of the projects that appear before the panel are approved, but the process to prepare for that appearance is long and arduous. First, a project must have been federally funded and been in operation for a sufficiently long enough time to have demonstrated effectiveness with children. This usually takes two to three years of high quality operation. Then the project staff prepares a document according to a prescribed format not to exceed ten pages summarizing the major features of the project and its accomplishments. This document is reviewed critically by Office of Special Education (formerly Bureau of Education for the Handicapped) staff. Many projects never get beyond this stage. This review usually requires some revision of the ten page submission paper. After the revision is completed, it is forwarded to the Joint Dissemination and Review Panel who designates seven of its 21 members to conduct the review which takes place in Washington, D.C. In a very formal meeting with the project staff the panel members question and probe the data presented and then vote on the acceptability of the project.

Teaching Research's most recent submission was approved unanimously by the panel and was the first inservice training project ever approved by the panel. Specifically the project focused on the inservice training of teachers of the severely handicapped.

The following is a copy of the paper submitted to the Joint Dissemination and Review Panel:

Program Area: Education for the Moderately to Profoundly Handicapped

I. *Project Title:* Inservice Training in the Data Based Classroom Model for Severely Handicapped Children, Teaching Research Infant and Child Center

II. *Project Directors:* Victor L. Baldwin and H. D. Bud Fredericks

III. *Source and Level of Funding:*

	Federal
1974-75	33,527
1975-76	27,729
1976-77	29,821

IV. *Program Start Date:* July, 1974

V. *Brief Description of Project:*

One of the major functions of a national demonstration project is to be able to design educational intervention procedures that produce a significant impact on improvement in student performance and subsequently demonstrate that these techniques can be generalized to other educational settings with similar results. In order to accomplish the second half of this commitment it is necessary to develop a specific set of inservice training procedures that insure other professionals can learn how to implement the educational model. Data are submitted to demonstrate the effectiveness of the classroom model. However, this submission seeks to validate the inservice training procedures utilized to replicate the Teaching Research Classroom Model in other settings.

The Teaching Research Infant and Child Center classroom serves moderately, severely and profoundly handicapped students of various diagnoses, ages 8 to 18 years. Included are students classified as mentally retarded, cerebral palsied, autistic, emotionally disturbed, and deaf/blind. One of the purposes of the classroom is to demonstrate the feasibility of non-categorical education of handicapped students.

The classroom is formulated on the principle of individualization of programs within the context of a comprehensive curriculum emphasizing self-help, practical living, motor, language, and cognitive skill development. The classroom is certified by the Oregon Department of Education and is in part funded by local school districts. The model classroom is designed to serve 14 students with a teacher and two aides and utilizes volunteers and parents to assist in the instruction of the students.

THE DATA BASED CLASSROOM MODEL. The model, replicated in classrooms throughout the United States, has been described in *A Data Based Classroom for Moderately and Severely Handicapped Children* (Fredericks, *et al.*, 1977). The model utilizes two curricula, the *Teaching Research Curriculum for Moderately and Severely Handicapped* (Fredericks, *et al.*, 1976) and *The Teaching Research Curriculum for Adolescents and Adults* (Fredericks, *et al.*, to be published). Both are based upon the principles of developmentally sequenced materials and task analysis of the skills to be learned. Priorities for determining which skills will be taught to students are derived from a pretest that contains items selected from the curricula. The skills to be taught are prioritized by the parent and educational staff with emphasis on those skills which will assist the student to function more effectively in society. Since inadequate language and motor skills are the two most visible indicators of a handicapping condition, concentration is focused on these areas. After specific priorities are established, the student is placed in one or more curricular areas—self-help, motor, language, cognitive, and practical living skills.

Self-help skills include dressing, eating, toileting, and personal hygiene plus more advanced stages of self-care. The motor curriculum includes the entire range of basic motor movements from tone normalization and trunk righting, to walking, running, and jumping. Fine motor skills as well as recreational skills (e.g., swimming, throwing and catching a ball) are included. In addition, some standard physical education activities designed to improve strength and stamina comprise part of the motor program. The language curriculum includes both expressive and receptive language. For some students, total communication, integrating manual and oral approaches, is used for language instruction.

Practical living skills include budget and money management, time telling, food purchase and preparation, clothing selection and care, sedentary and physical recreational activities, socialization and sex education.

The teaching of students must include the management of their social behavior. Inappropriate behavior which interferes with the learning process must be eliminated before effective teaching can occur. Thus, if inappropriate behaviors are exhibited by a student, the initial teaching efforts must remediate these behaviors.

Because of the severe and profound handicapping conditions of many of these students, individualized instruction is emphasized. The model makes a distinction between individualized programming and individualized instruction. Basically, individualized programming refers to placing the student in a curriculum based on functional ability, while individualized instruction implies a one-to-one teaching relationship. When group instruction occurs, the interactions are designed for each student's individual instructional program. In this model, group instruction is provided by the teacher or aide.

Trained volunteers assume an important instructional role in this model. Nearly all of the one-to-one teaching is conducted by these volunteers. Before they are given any instructional responsibilities the volunteers are taught the proper way to deliver instruction for a particular educational task and taught to record the student's correct or incorrect responses. The maintenance of the quality of volunteers' instructional skills is monitored regularly by the teacher. A volunteer is either rotated among the students to teach a specific subject area or is assigned to one or two students and conducts programs across a variety of curricular areas for those students.

A necessary component in successfully using volunteers in the instructional process is the establishment of individual instructional programs for each student. A program prescribes the skill to be taught, the way in which the materials are to be presented and the feedback to be given to the student. Specific recording procedures to measure student performance on each program are prescribed and implemented. If the data show, or the volunteer indicates verbally that the student is having difficulty learning a particular program, the teacher attempts the prescribed instruction and determines if alterations are needed in sequencing, cue presentation, or feedback procedures. In all cases these educational decisions are made by the teacher based on student performance data that have been collected. These data provide the information needed by the teacher to determine the appropriate instructional level for each of the student's individual programs for the following day.

One of the assumptions of the model is that handicapped students learn in much the same way as non-handicapped students, only more slowly. Therefore, these students require more rather than less schooling when compared to normal students. The use of volunteers expands the amount of instructional time available in the classroom. Another attempt to expand the classroom day is to extend it into the home by teaching parents, foster parents and group home providers to serve as teachers. Utilizing the same training methods used to train volunteers, the teachers instruct the home providers in techniques to teach their children. Individual instructional programs, chosen by the parent and teacher to be taught in the home, are coordinated with programs in the school. Teaching periods in the home vary from 10 to 30 minutes daily. Performance data are collected in the home and sent back to the school the next day. These data allow the teacher to continue to make timely educational decisions.

The physical facilities for the classroom at Teaching Research include a large work area where children can have free time or where the teacher or aide can conduct group instruction. In addition to the large area, five individual instructional areas are provided. These are minimum requirements and local educational agencies that have adopted the model have had no trouble in locating similar facilities.

To date there have been more than 300 teachers trained in this model. The following is a brief description of the Inservice Training Model and data illustrating the degree of implementation and impact by those who have received training.

THE INSERVICE TRAINING MODEL. The Inservice Training Model includes *both* demonstration center and follow-up training. The first portion of the two part training involves participation in a five day training session at the demonstration center in Monmouth, Oregon. This training provides structured practicum experiences supplemented by small group seminars. During the five day session trainees complete nine objectives which are designed to develop competencies that will assist in their replication of the model. Criterion levels for evaluation of each objective have been specified (see Table 1).

Day one of the training week is devoted to orientation and observation of the demonstration classroom operated by the training staff. This observation period provides the trainee with an opportunity to see the model functioning in its entirety and provides a reference point as the model is dissected during the remainder of the week.

During days two through five the trainees participate in a four hour practicum in which they have the opportunity to perform each of three classroom roles: teacher, aide and volunteer. It should be emphasized that these practicum experiences are highly structured and follow a format of:

1. Demonstration of the task or role by a staff trainer.
2. Preparation for the task or role under the guidance of staff trainer.
3. Performance of the task or role by the trainee.
4. Formal observation and feedback to the trainee on a frequent basis.

For ten minutes out of each 30 minutes during the four hour daily practicum period, each trainee is formally observed in their interactions with children. The trainee's performance is recorded on an observation form and at the conclusion of the observation his/her teaching performance is reviewed with him/her. In addition, each trainee has a practicum in the administration of a placement test in the curriculum and a practicum in pinpointing and baselining an inappropriate behavior.

In the afternoon sessions trainees are taught how to examine and analyze the data collected on individual prescriptive programs and how to make educational decisions for each child's program for the following day. Small group seminars, each emphasizing a component of the model, are also presented each afternoon. Finally, the trainees prepare for the practicum experiences of the next day.

The second portion of the training program at the Teaching Research Infant and Child Center involves follow-up visits conducted at the trainee's own site. These visits are made by the same staff that conducted the training sessions at Teaching Research. Follow-up visits are scheduled eight to twelve weeks after the completion of the one week training session and again at 24 to 28 weeks after training. These follow-up visits are designed to measure maintenance of specific skills acquired during the training session, implementation of components of the Data Based Classroom Model that had been presented, and to provide assistance with any difficulties the trainees might have in the application of methods and materials learned during the five day training session.

For the purposes of measuring the degree of implementation of the Data Based Classroom Model, ten separate components have been defined. Each component has been carefully described on a rating sheet that includes how the observations are to be made, how the data are to be recorded and criterion levels. The ten components are:

1. Delivery of appropriate cues and consequences.
2. Assessment of student skill level.
3. Development of individualized program for each student.
4. Use of volunteers to conduct individualized instruction.
5. Use of aide to conduct group instruction.
6. Use of stimulation programs.
7. Use of toilet training program.
8. Development of behavior intervention program.
9. Use of system to monitor maintenance of acquired skills.
10. Conduct of home programs.

VI. *Evidence of Effectiveness:*

In order to demontrate the effectiveness of this model, it was necessary to establish the following: (A) that the model could be taught to others; (B) that teachers who were trained could implement the major features of the model; and (C) that this implementation would result in improved student performance. Evidence of effectiveness is presented in each of these three areas.

A. *Teaching the model to others.* To demonstrate that the model can be taught to educators, the 94 individuals trained between the period of June 1, 1978 to May 30, 1979 were selected for study. During the five day training period, the number and percent of those achieving criterion in each of the nine training objectives are shown in Table 1. One thousand six hundred and fifty-one or 98 percent of the attempted 1,686 objectives were completed by trainees at specified criterion levels. Therefore, at the completion of the training week nearly every trainee was able to demonstrate that he/she could successfully perform the activities thought to be necessary to replicate this model.

B. *Teachers ability to implement the model.* During the same period of June 1, 1978 to May 30, 1979, of the 94 trainees who attended training 57 were teachers working directly with handicapped students. The remaining 37 trainees were either administrators or supervisory staff and therefore were not personally conducting a classroom. No additional data after training were gathered on this group. Of the 57 teachers trained it was possible to obtain follow-up data on 40 of them. Seventeen could not be included because five had left their job, four were followed-up by another agency, and eight were trained too late in the year to receive scheduled visits at the time of this report.

The model is comprised of ten separate components. At the time of the first follow-up visit (which occurs 8-12 weeks following training) the first five components are examined for their presence and the quality of implementation. At the time of the second follow-up visit (approximately 24-28 weeks after training) the five components are reexamined and five additional model components are examined.

At the time of the first follow-up 83 percent of the first five components were present. Of those present, 72 percent were judged to have been implemented at established criterion levels. When the second follow-up visit occurred those five components were reexamined and 92 percent were now found to be present with 87 percent of those meeting criteria. Also on the second visit components 6-10 were examined and 51 percent were present and 74 percent of those were at criteria. Table 2 shows the data for the model components examined at the first and second follow-up visits.

Twenty-five individuals, from the original sample of 94, who attended training June through August 1978 were sent to training by the Oregon State Mental Health Division. (The 25 were chosen as the sample because they would all be from Oregon and therefore cost effective to do a pretraining visit on half of them.) They were selected for training on the basis of the Mental Health Division's priority criteria of: (1) teachers, (2) rural model aides, (3) classroom aides. A random sample of 12 of the 25 were chosen to receive a pretraining visit. At the time of this visit baseline data were gathered using the same staff, instruments and techniques, used to measure posttraining performance. Data are displayed for 11 of the 12 trainees in Table 3. One of the trainees did not attend training due to illness.

Table 2. Percent of model components present and meeting criteria at follow-up visits one (8-12 weeks) and two (24-28 weeks)

	COMPONENTS			
	1-5		6-10	
Visit	Present	Meeting Criteria	Present	Meeting Criteria
1	83%	72%	——	——
2	92%	87%	51%	74%

The data in Table 3 show the relationship between the trainee's ability to implement the 10 major components before they came to Teaching Research for training, at the time of the first follow-up visit after training and at the second follow-up. In every case there was an increase in the number of components the trainees were able to implement after training and in all cases but one there was even further increases by the second follow-up visit. These data would seem to indicate that teachers definitely behaved differently after training and continued to do so for at least 24 to 28 weeks.

C. *Improved student performance*. No model can be considered effective unless after it is taught to others, it produces

Table 1. Number and percent of trainees achieving criterion in each of nine training objectives

Number	Objectives	Criterion	Number Trainees Participating*		Achieved Criteria N	Achieved Criteria %
1	Pre/posttest on Behavioral Terminology	92% Correct	93		90	97
2	Study Questions Pertaining to Reading Material	85% Correct	90		90	100
3	Delivery of Appropriate Cues, Consequences and Data as Volunteer	90% Correct	94	Cues: Consequences: Data:	91 91 92	97 97 98
4	Completion of Updating Exercise	83% Correct	89		87	98
5	Completion of Placement	80% Correct	89		88	99
	Identify Appropriate Program	100% Correct	89		88	99
	Clipboard Exercise	80% Correct	89		87	98
6	Design of Behavior Program	80% Correct	90		89	99
7	Delivery of Cues and Consequences as Aide Conducts	85% Correct	90	Cues: Consequences:	87 87	97 97
	Stimulation Program	80% Correct	88		88	100
8	Agreement Between Raters Using TR Observation Form	85% Correct	83	Cues: Consequences: Data:	81 80 79	98 96 95
9	On task in teacher role and completion of required activities as teacher	80% App. Time 60% On Task 80% Checklist	86 85 85	Approp. Time: On Task: Checklist:	86 84 86	100 99 100

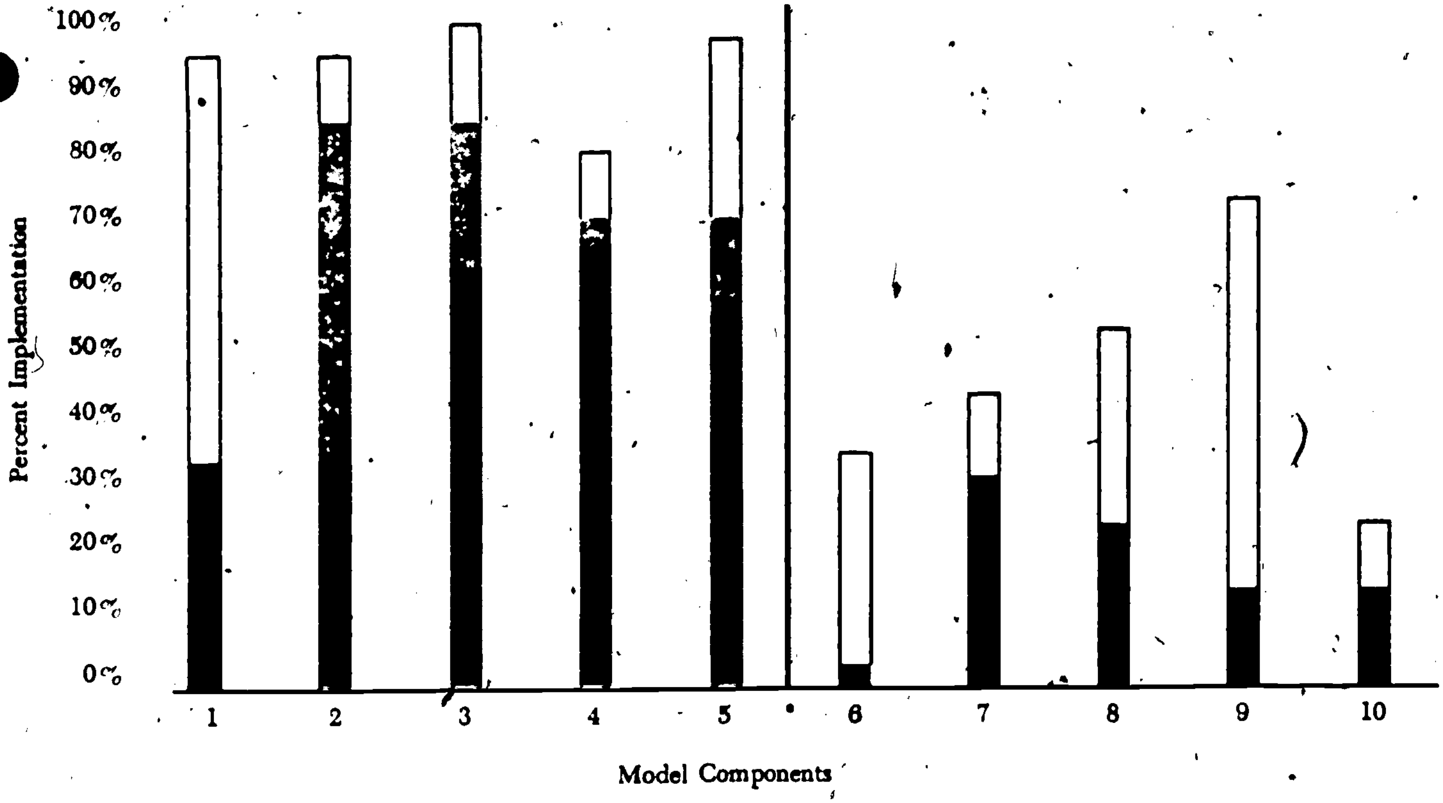
* Aides are not required to complete all objectives.

significant student progress. The progress of students described herein was measured not only in the Teaching Research classroom but in other Oregon classrooms for the moderately and severely handicapped. The instrument used for this measurement was the *Student Progress Record* (Mental Health Division, Salem, Oregon, 1972). This instrument measures student progress in 13 curricular areas: Social Skills, Receptive Language, Expressive Language, Reading, Writing, Numbers, Money, Time, Eating, Dressing, Personal Hygiene, Motor Skills, and Physical Fitness. Each student in classes for the moderately and severely handicapped in the entire state of Oregon is administered the *Student Progress Record* in the Fall, during a specified two week period, and again in the Spring during a specified two week period. Teachers administer the test to their students and the results are reported to the Oregon Mental Health Division.

To ensure reliability of reported scores, within two weeks after the teacher's testing, the Mental Health Division randomly selects a sample of students and curricular area for retesting. Representatives from the Division require the retesting of the students in the sample while both the original teacher/tester and Mental Health Division observer score the child's performance. Inter-test and inter-rater reliability scores consistently exceed .90. During 1975-76 and 1976-77, a total of 2,702 students were administered the *Student Progress Record* on both pre- and posttests. Several types of evidence for the content and construct validity of the SPR have been collected over a six year period. The SPR has shown high content validity as judged by curriculum experts' review of individual items—that is—the scope and sequence of each of the 13 domains of the test have been carefully based on task analyses and developed to match the curricula used in special education classrooms. The SPR exhibits a high degree of construct validity as evidenced by consistent student gains observed annually and differences between programs judged independently to vary in effectiveness. Empirical studies have also shown that the SPR possesses a high degree of factorial validity in that there are low interscale correlations combined with high internal consistency of each scale.

A random sample of 141 students, five percent of the total population tested through 1975-76 and 1976-77, was selected from classrooms where teachers had been trained in the Teaching Research model and who had demonstrated that they were implementing at least five of the model components at criterion level of performance. In addition, a random sample of teachers not trained was selected until an equal sized sample of 141 students was achieved. A comparison of the mean gain scores (Table 4) achieved by those students across the 13 curricular areas on the SPR indicated

Table 3. Comparison of percent of 11 trainees implementing components at pretraining, first follow-up (8-12 weeks) and second follow-up (24-28 weeks)



Components 1-5 are assessed at pretraining and visit 1 and 2.
Components 6-10 are assessed only at pretraining and visit 2.

• no change between
1st and 2nd visits

■ Pretraining
▨ First Follow-up Visit
☐ Second Follow-up Visit

that those in classrooms whose teachers had been trained demonstrated gains significantly higher than the comparison group, t (280) = 3.43, $p < .001$.

Table 4. Number, mean and standard deviation of gain scores of students in TR teacher trained classrooms with a random sample of students in other classrooms

	N	$\overline{X}$	SD
TR Trained	141	7.20	5.33
Non-TR Trained	141	4.92	5.84

An examination of the ages of the two groups indicated no significant difference. An analysis of the pretest scores of the two groups indicated no significant differences between the two groups, t (280) = .36, $p > .50$ (see Table 5).

Table 5. Number, mean and standard deviation of pretest scores of students in TR trained classrooms with students in other classrooms

	N	$\overline{X}$	SD
TR Trained (before training)	141	41.41	20.73
Non-TR Trained	141	40.44	24.59

An attempt was made to examine the pupil progress performance (mean gain) of the students of both groups of teachers during the academic year 1974-75, one year prior to when the experimental group of teachers were trained at TR. Only four teachers of the TR trained group could be located for the previous year. These four teachers had an enrollment of 36 students for the same time period. Another 36 students were then randomly selected from the non-TR trained teachers. The pretest scores (Table 6) of these two groups were compared for 1974-75 and found to be not significantly different, t (70) = .47, $p > .50$ (Table 6). Gain scores (Table 7) of the two groups were compared and also found to be non-significant for that year, t (70) = .50, $p > .50$. An examination of the age differences between the two groups showed no differences.

Table 6. Number, mean and standard deviation of pretest scores with teachers prior to any training, 1974-75

	N	$\overline{X}$	SD
TR Trained (before training)	36	46.72	20.16
Non-TR Trained	36	48.88	18.95

Table 7. Number, mean and standard deviation of gain scores of teachers prior to any training, 1974-75

	N	$\overline{X}$	SD
TR Trained (before training)	36	6.25	6.84
Non-TR Trained	36	7.10	7.36

Summary

The evidence for the effectiveness of the Teaching Research Classroom Model and inservice training procedures can be summarized, therefore, as follows: Data are provided which demonstrate that 94 educators trained in one academic year achieved criterion levels for 98 percent of the training objectives. When observed in their own teaching sites the trainees demonstrated the ability to implement the model as evidenced by 83 percent of the first five model components being present at the first follow-up visit. By the time of the second visit they were able to implement 92 percent of the components. Further there was a continual increase in the quality of the implementations as seen by the increase in the percent of the components meeting criteria by the second visit.

Additional evidence concerning the impact of training is shown by comparing teacher performance before training with the results after training and maintenance up to 28 weeks. There is a definite indication that teacher behavior in relation to the ten model components improve as a result of training and followup visits.

Finally, an examination of the gain scores achieved by students in classrooms where the teacher was trained in the Teaching Research Model indicated significantly greater skill gains (.001) than did a similar sample of children in classrooms not utilizing the model. Similar differences were not evident in the year prior to training with a sample of the same teachers. These gains would seem not only to be statistically significant but also educationally significant. The gains in student performance are reflective of a particular educational approach (Teaching Research) compared to a variety of other approaches as represented in the random sample. The growth across groups represents the acquisition of observable, measurable new behaviors that are each, one step closer to allowing the student to function independently.

Costs

The average annual operating costs per academic year per pupil, including administrative and overhead costs, range from $3,200 to $4,400 in classrooms using the model. Cost figures appearing in Tables 8 and 9 are actual costs for one year of operation of the classroom and training both of which occur at Teaching Research. In Table 8, it can be seen that the differences between initiation and continuation costs for the classroom are a result of increased need for administrative (technical) assistance and purchase of materials.

Training costs have been calculated to include cost for trainee travel and per diem to the Teaching Research site and for Teaching Research staff to conduct follow-up (see Table 9). The teacher and aides are shown at a 6-month rate because they are only directly involved in the training every other month.

Table 8. Classroom costs per year (12 months) per student (14)

		Initiation	Continuation
Administration	.50 FTE @ 24,080	860	.25 FTE 430
Teacher	1.0 FTE @ 18,956	1,354	1,354
Aide	1.0 FTE @ 12,188	942	942
Aide	1.0 FTE @ 9,002	643	643
Fringe @ 21.3%		809	717
Supplies		214	71
TOTAL		4,822	4,157

Table 9. Training cost per year (12 months) per trainee (28)

Administration	.20 FTE @ 24,080	172
Trainer	.25 FTE @ 14,784	132
Trainer	.25 FTE @ 13,552	121
Teacher	.25 FTE @ 18,956 (6 mo.)	85
Aide	.25 FTE @ 13,188 (6 mo.)	59
Aide	.25 FTE @ 9,002 (6 mo.)	40
Secretary	.10 FTE @ 7,000	25
Fringe Benefits @ 21.3%		135
Supplies and Materials		170
Travel		300
Per Diem $35/day x 5 days (trainees)		175
Per Diem $35/day x 2 days (T.R. staff)		70
TOTAL		1,484

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The Assistance in Programming and In-Service Training for Severely Handicapped/Hearing Impaired Individuals Project (APT)

Lexington School for the Deaf, Jackson Hghts., NY

In 1977, the Bureau of Education for the Handicapped, Division of Personnel Preparation funded a national demonstration and training consortium for severely handicapped/hearing impaired students. This consortium was composed of six sites throughout the country who designed inservice (and in some cases pre-service) training activities for personnel working with the severely handicapped student who is also hearing impaired (SH/HI). The Lexington School for the Deaf, New York was designated as one of those original training centers.

As with most severely handicapped populations, the SH/HI group includes a continuum of handicapping conditions within a variety of hearing losses and IQ levels. It includes individuals "labelled" deaf-retarded, emotionally disturbed deaf or hearing impaired, and institutionalized (e.g. developmental centers, psychiatric hospitals) persons. These individuals often feel into the "cracks" of deaf education or within programs for the retarded or emotionally disturbed, with few if any resources provided to meet their complex needs. The impact of the 1975 federal legislation and a growing number of these students within the school system as a result of the 1963-65 rubella epidemic, prompted the major training efforts nationally which this consortium represented.

The Assistance in Programming and In-Service Training (APT) project for personnel working with SH/HI individuals based at the Lexington School, is designed to provide a comprehensive inservice process which addressed both direct service and teacher training needs for this unserved population. It is based on a model demonstration approach toward training which utilizes "teachers as trainers" in the field, along with a strong thrust toward program implementation at the "home" front. To accomplish this latter goal, topical training and resource services involving staff who have worked with materials and programming for this group, are made available to trainees following the initial training phase. It is also multidisciplinary in nature, utilizing experts from mental retardation, deafness, vocational rehabilitation, speech and language and behavioral sciences. The goal is the development of a new professional, capable of dealing with the multidimensional problems associated with severe handicaps.

In 1977, training began utilizing the model program developed at Lexington in 1975 serving this new population. It was the Secondary Individualized Learning

Center (SILC), which utilized a life skills curriculum in a community ("out of the classroom") approach to learning. As the program developed (from 5 to 60 students in 4 years), a growing number of students began to emerge who needed more than just individual and experiential types of learning. These students were exhibiting more severe emotional problems which needed a more structured learning environment.

In 1979, an additional alternative program was developed for students assessed as "emotionally disturbed deaf" which utilized a behavioral approach. Inservice training began in this program in 1981. At the same time, the New York State School for the Deaf in Rome, NY initiated a cooperative educational program with the Rome Developmental Center, a state operated facility for the severely/profoundly retarded individual. It is anticipated that by 1982-83, inservice training will also be available for staff at this site for personnel who are interested in learning more about educational strategies for the institutionalized population. Over the past 5 years then, the APT project has expanded to provide a variety of inservice training options which exemplify the wide range of programs and issues that this atypical population represents.

In order to output to a consumer group who represents diverse constituencies, the APT project provides services in three categories as stated previously. The Model Program Based Training is the main focus of activities for the project. It provides direct "hands on"/experiential activities at Lexington with SH/HI students and peer trainers. Trainees spend 3-5 days in structured seminars, classroom work and community observations in the various model programs. Following training, staff members from the APT project site visit the "home" schools in order to provide follow-up consultation in program development. For schools/districts who find it impossible to send staff for the Model Based training, "on-site" or Topical Training workshops are available. These are shorter in length (1-2 days), and provide information only on an awareness level related to the needs of the SH/HI group. This at least begins the inservice training commitment necessary for establishing permanent alternative programs for this group.

Finally, Resource Services are provided on a number of levels to professionals in the field. These include maintenance of a multihandicapped bulletin board, in cooperation with Teaching Research, Inc., Monmouth, Oregon. This is an electronic telecommunications system known as SpecialNet, which provides updated information on a variety of topics, along with consultative assistance via computers to programs across the country. In addition, newsletters, development of curriculum materials and facilitation of "hooking up" staff across the country are a part of the daily services of APT. These three types of training activities then, are in many ways interactive, and are necessary in order to provide comprehensive and long term inservice. Studies of inservice activities have documented the need for such an approach, which in the long run proves both cost effective and leads to changes in performance and attitude.

The APT project has worked with over 75 programs during the last 5 years and has tried to incorporate all levels of training in each. We are convinced that inservice with this population of students provides relatively little unless all three components of the process are included in the long range design. To do any less, would be similar to giving someone an explanation of swimming, bringing them to a swimming pool, and saying "Good Luck". While the result might always be "sink or swim", with a little extra effort upfront, the more satisfatory conclusion can usually be attained.

The overall intent of the project is to initiate and be a catalyst on a number of levels in the development of alternative programs for SH/HI individuals. The efforts of APT are seen as self-perpetuating, in that by the end of the grant funding cycle, both model program development and training for this low incidence population will be established in the field, and be a part of the total direct service process.

SPECIAL ISSUE OF DIRECTIONS

FALL, 1982

MULTIPLY HANDICAPPED HEARING IMPAIRED

The delivery of services to hearing impaired persons with multiple disabilities is a unique venture commanding indepth knowledge of several handicaps, sensitivity to the interdependence of these handicaps, and a personal awareness of the impact of these services upon specific individuals. A menu of individually tailored services must be gleaned from the broader array offered to the general hearing impaired population and, at times, other disability groups. This process has attracted some of the most creative minds in the field to its ranks. These people are masters of figure-ground discrimination who can identify "special needs" hearing impaired people in the greater picture and pull them together to create a new pattern of services.

The fall issue of <u>Directions</u> magazine will focus upon delivery of services to and special teaching techniques for multiply disabled hearing impaired persons. We have attempted to obtain the best thinking of researchers and practitioners across the country. Topics cover philosophical reviews as well as innovative instructional approaches. If you work marginally or directly with multiply disabled hearing impaired persons, or are one yourself, you will find this issue thought provoking and invigorating.

For information on <u>Directions</u>, write: Judy Harkins,
Gallaudet College
House #3
800 Florida Avenue, N.E.
Washington, D.C. 20002

We are grateful to the editors of Directions for granting us permission to circulate this article prior to its publication in the special Fall 1982 issue devoted to the Multihandicapped Hearing Impaired.

The editors have requested that this article not be recopied until it has been published in Directions, Fall, 1982.

The SPECIALNET Communication and Information Network: An Application of Computer-assisted Telecommunications in Special Education

Bob Campbell, Ed.D.

The application of computer technology has expanded considerably in the past ten years. In the past five years advances in mico-processor technology have brought the microcomputer within reach of a vast new consumer market, not the least of which is the professional educator.

The microcomputer can serve several functions. Along with its' capacity for being programmed, storing information and retrieving it the microcomputer may be used as a communication device. The purpose of this article is to discuss the application of the microcomputer (and other similar devices) for communication. The discussion will include a further definition of computer-assisted telecommunications, description of a special education based computer-assisted telecommunications network -- SPECIALNET, and the development of several informal information bases.

Computer-Assisted Telecommunications

Telecommunications is a broad term representing a number of technologies which utilize some form of electronic medium as a carrier to permit individuals and groups to interact (i.e., two-way) with each other and with a variety of materials and information resources. Computer-assisted telecommunications is a text-based medium. It represents only one of the number of communications technologies under the umbrella of telecommunications. A more complete overview of telecommunications options may be found in Campbell, Snodgrass and Gibbs (in press).

To describe computer-assisted telecommunication one must make use of some of the terminology commonly associated with computers. These terms include hardware, modem and software.

Hardware. Hardware is a broad term used to describe computer equipment. A wide array of hardware may be utilized for the purpose of computer-assisted telecommunication. The base item of the computer's hardware for text input is the terminal, the typewriterlike keyboard of a micro-computer, a word processor or a minicomputer. In addition, a variety of terminals are commercially available which are speciafically designed for the sole purpose of communication. With minor exceptions most keyboards are similar in configuration and will function in a similar manner. For the purpose of receiving information two options are available. The Cathoid Ray Tube (C.R.T.) has a television like screen for displaying text in a video format. A CRT may be an integral part of a terminal. When a CRT is not part of a terminal a normal television set may be utilized for video display of text. A second option for text display is the printer. When wired to the terminal, a printer will provide a hard copy of text. Both a CRT and printer may be connected to the terminal to provide the user with either a video or a print option for viewing text. With this computer hardware and one other item the "modem" computer-assisted telecommunications is just a telephone call away.

Modem. The modem is a device that permits one to connect a computer terminal into the telephone line. Modem is an abbreviation for modulated-demodulate. The modem, converts the digital code of the computer into tones (modulation) which may be transmitted through telephone wires to another modem which then reconverts (demodulation) the tones to the computer digital code. In this way computer terminals with a modem wired into their circuitry can be utilized for communication purposes. Without software, however, only the hardware is in place for telecommunication.

Software. This instructional package which tells the computer and the user what to do is known as software. Generally, unless computers are of the same manufacture and utilize exactly the same software program, communication between their users is impossible. That is, computers of one manufacturer are not generally compatible with other manufacturers. Therefore,

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their software programs cannot be operated interchangeably and software is a necessary component for computer-assisted telecommunications. For this reason a number of commercial vendors offer a service which provides a software program which not only provides the necessary communication software but can match the vendors computer to nearly any other computer presently manufactured. In this way someone using XYZ manufacturers terminal can send text to the commercial vendors computer and in turn the commercial vendors computer sends that text on to someone using an ABC terminal. When a group of individuals using the same or different terminals for similar communication purposes utilizes a commercial vendor's computer system they are said to belong to the same network.

The number of computer-assisted telecommunications networks is growing rapidly. Networks presently exist which allow a user to access the latest stockmarket quotes, newspapers and news wire services, airline guide and restaurant information and hundreds of other information resources. During the past year a major new network has emerged which is primarily designed as a communication and information network for educators in general and special educators in particular. SPECIALNET is a special education computer-assisted telecommunication network being developed in conjunction with the National Association of State Directors of Special Education (NASDSE).

SPECIALNET

SPECIALNET uses the General Telephone and Electric system TELENET. The mainframe computer which operates the TELENET program is located in Vienna, Virginia. This system provides SPECIALNET users with access to each other by providing the communcation software and access to telephone ports (i.e. special phone numbers) in most cities throughout the country

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of 50,000 population and more and WATS line service in rural areas.

In order to access SPECIALNET the user dials a local or WATS number. When contact is made a computer carrier tone is heard and the telephone hand set is placed in the modem. The enter or return button on the terminal is depressed twice to activate access to the main-frame computer. The user is then asked to identify the type of terminal being used by typing in a simply code identifying the type of equipment being used. Next the user is asked to identify himself/herself as a member of the network by typing in a user name and a password. The password does not print and is only known to the user and provides security from unauthorized access. Once signed on, the user is welcomed to the newwork, told when the last access was made to the network (another security device) and provided a time and a date display. The user has now accessed SPECIALNET and a number of communication and information options become immediately available.

Communication Options. There are at present approximately 400 SPECIALNET subscribers in 40 states. Subscribers include state departments of education, local education agencies, regional resource centers, universities, schools for the deaf, and many other individuals in the field of special education. These agencies and individuals make up the network to which SPECIALNET users may communicated through what is called "telemail".

Telemail is a computer mail system that uses the SPECIALNET computer as a mailbox. The user types a message to another user on his terminal and sends it to the SPECIALNET computer. The message is stored there until the intended recipient makes contact with SPECIALNET. When contact is made the message is automatically posted for delivery and appears on the recipients screen or printer. For example when a message is to be sent:

You will see:	COMMAND
You type:	COMPOSE
You will see:	TO:
You type:	(Enter the name of the SPECIALNET user who is to receive your message, e.g., MSSD)
You will see:	CC:
You type:	(Enter any SPECIALNET users to whom courtesy copies are to be sent).
You will see:	SUBJECT:
You type:	(Enter a brief description of the message topic)
You will see:	TEXT
You type:	(Enter your message)
You type:	(Type a period on a line by itself to end the message.)
You will see:	SEND?
You type:	Yes
You will see:	MSG POSTED (date) (time) MSG:XXXX-1234-4678

A number of send options are available, these include:

- AFTER date time   Posts the message for delivery as soon as possible after the specified date and time.
- EVERY time period, xx TIMES   Posts the message on a repeating basis according to the specified time period.
- EVERY time period BEFORE date time   Posts the message on a repeating basis according to the specified time period and discontinues posting as of the specified date and time.
- ON date time   Posts the message for delivery on the specified date and time.
- RECEIPT   Posts the message for immediate delivery; with Return the sender receives a system notification of the date and time the recipient reads the message..
- REGISTERED   Posts the message for immediate delivery; the recipient must acknowledge the message before he/she can read it, and the sender receives a system notification of the acknowledgement.
- URGENT   Posts the message for immediate delivery, the message is placed at the top of the recipient's sign-on scan table, with an URGENT flag.

When the intended receipient of the message makes contact with SPECIALNET the message is automatically delivered. For example, if a message had been sent to the Model Secondary School for the Deaf at Galluadet College (MSSD), it would be posted as below when MSSD signed on to SPECIALNET.

```
Telenet
XXX XX

Terminal=D1
@ Mail

USER NAME? MSSD
PASSWORD? (Doesn't print)

Welcome to Telemail? Your last access was Wednesday, March 25, 1982, 11:06 AM

No.          Delivered         From          Subject                  Lines
 1.        Mar. 25  13:53      TRD         Article on SPECIALNET        3

Command Read 1
Posted:  Thur Mar. 25, 1982  1:51 PM EST  MSS: ABCD-1234-4678
From:    TRD
To:      MSSD
CC:      APT
Subj:    Article on SPECIALNET

    Thank you for the opportunity to describe SPECIALNET in Directions.
I am particularly excited about the MULTIHANDCAPPED Electronic Bulletin
Board. The manuscript should be in your hands on Mar 31, 1982. Bob
Campbell.

Action?
```

At this point MSSD would have several options for ACTION regarding this message:

ANSWER - Create a reply to the sender (TRD).
FORWARD - Send a copy of the message to another SPECIALNET users.
PURGE - Delete the message
FILE - Store the message under a file name.
EXIT - Return to the prompt, COMMAND? (Does not alter message, message remains in mailbox).

The above examples demonstrate the basic person to person communication functions of SPECIALNET's telemail options. In addition it is possible to edit entire text by using a variety of editing commands which are built into the system. Further, information can be organized into files -- files of computer memory. A file name is created and then assigned as a label to any number of messages. Finally, when a user sends messages frequently to several users (e.g., state departments) mailing lists may be created that permit messages to be sent to any number of users by assigning them to a given list.

Information. SPECIALNET represents a powerful communication medium for special educators. It also represents a major information base. By connecting individuals and agencies into regional state and local national networks, common resources may be shared to solve common problems facing special educators in diverse settings and geographic locations. This person to person information base is further extended by SPECIALNET through an electronic bulletin board system.

The electronic bulletin board is not unlike its' non-electronic counterpart. Information on a wide range of topics is displayed on a growing number of electronic bulletin boards. The SPECIALNET user has a choice of which bulletin boards to read and which items to read in each bulletin board. The administrator of each electronic bulletin board also acts as a professional and technical resource to users. Therefore, the bulletin board administrator becomes an additional information resource to users in specific special education areas. In addition to the growing list of bulletin boards described below, a number of statewide networks (e.g., Pennsylvania, West Virginia, Colorado, and Florida) maintain electronic bulletin boards which contain state specific information. The national electronic bulletin boards include:

FEDERAL - Describes current events at the national level partiularly in relation to congressional and administration action related to special education. Information is provided by NASDSE

CSPD - Provides information on the Comprehensive System of Personnel Development. It features information on current preservice/inservice practices and available resources, relevant information for their bulletin board may be sent to composing a message TO: CSPD

CONFERENCE - A list of special education related conferences is contained in this bulletin board. Upcoming conferences may be listed by composing a message TO: CONFERENCE

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CONGRESS	Members of the United States Congressional Committee are listed with addresses, phone numbers, and party affiliations.
CONSULTANT	Lists consultants in various areas of special education. Any consultant can be listed, no judgements are made regarding consultant qualifications. Consultants may be listed by composing a message TO: CONSULTANT
EMPLOYMENT	Lists employment opportunities in special education. Employment announcements may be sent to this bulletin board by composing a message TO: EMPLOYMENT
LITIGATION	Describes court cases and hearing decisions with references to assist the reader in obtaining indepth information on partiuclar cases. Updates are supplied by the editors of Education of the Handicapped Law Review.
OPINIONS	This bulletin board functions as SPECIALNET's "Letters to the editor". It provides users to an opportunity to express "opinion" about issues in special education. Messages may be sent TO: OPINIONS
PRACTICES	Promising Practices from around the nation regarding the provision of services for handicapped students are described. Information should be sent TO: COUNTERPOINT
RFP	Information regarding available grants and requests for proposals that relate to special education are provided by NASDSE
EARLY CHILDHOOD	Contains information pertinent to early childhood education. Send information TO: EARLYCHILDHOOD
MULTI HANDICAPPED	Information on curriculum materials, resources, technical assistance, services and programs for school age severely and multiply handicapped persons is provided. Information may be placed on this bulletin board by sending a message TO: MULTIHANDICAPPED

Each of these bulletin boards provide new updated information at regular intervals. SPECIALNET as well as non-SPECIALNET subscribers are encouraged to share their information and recources on the appropriate bulletin boards. It is hoped that special educators will learn to view these bulletin boards extensions of their dissemination resources and share their activities as they would through traditional information outlets. Such bulletin boards as PRACTICES, EARYCHILDHOOD and MULTIHANDICAPPED are particular suited to sharing resources related to the instructional needs of children and youth. To further clarify their concept the MULTIHANDICAPPED electronic bulletin board is further described.

The MULTIHANDICAPPED Electronic Bulletin Board

The development of this bulletin board was initially a response to declining resources of the National Training and Demonstrations Consortium for Severely Handicapped/Hearing Impaired Individuals. The MULTIHANDICAPPED bulletin board has become a cost-effective way of meeting project objectives for dissemination and technical assistance. The bulletin board is intended to be an information resource for practioners working with the mentally retarded, hearing impaired, deaf, deaf/blind visually impaired, health impaired and other multiply handicapped individuals. Information related to curricular, service delivery, program development, assessment and instructional methodology is emphasized. In addition, new commercial project and teacher made materials are highlighted regularly.

Although any individual or agency subscribing to SPECIALNET may send information to the bulletin board, non-members are also encouraged to share their information and resources through the Consortium. Member sites of the Consortium for Severely Handicapped/Hearing Impaired monitor the bulletin board daily for questions from the field and willingly input information for any individual or agency requesting assistance. A listing of Consortium members participating in the bulletin boards' administration is included at the end of this article.

Retrieval of information from any of the bulletin boards including the MULTIHANDICAPPED bulletin board is an easy process. Once access has been obtained to SPECIALNET (as previously described) the user may select access to the bulletin boards desired by responding to the computers COMMAND? prompt as follows:

```
You will see:  COMMAND?
You type:      CHECK MULTIHANDICAPPED
You will see:  NOW USING BULLETIN BOARD
               COMMAND?
You type:      SCAN ON 3-17
You will see:  BULLETIN BOARD CONTAINS:
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A listing of all the messages contained on the MULTIHANDICAPPED bulletin board (on that date) will be provided. You will see:

```
No.     Delivered        From        Subject                            Lines

1       MAR.17  13:53    MSSD        RESOURCE; TUTION FREE HIGH SCH       17
2       MAR.17  17:09    APT         NEWS: UPDATE N.Y. MHC DEAF TASK F     8
3       MAR.17  18:28    APT         RESOURCE: DEAF STORYTELLERS          11
4       MAR.17  12:43    TRD         RESOURCE: INDEPENDENT LIVING CU       6
```

From the subject heading users would be able to determine whether that information is appropriate for their needs. For example if item No. 1 and 2 would be useful to the user the following response would be made:

```
You will see:  COMMAND?
You type:      READ 1, 2
You will see:

POSTED:  WED MAR 17, 1982  1:52 PM EST MSG:UGDF-1378-2766
FROM:    MSSD
TO:      MULTIHANDICAPPED

SUBJ: RESOURCE: TUITION FREE HIGH SCH

THE MODEL SCONDARY SCHOOL FOR THE DEAF (MSSD) WAS ESTABLISHED
BY AN ACT OF CONGRESS (PL 89-694) IN 1966. MSSD IS LOCATED ON THE
CAMPUS OF GALLAUDET COLLEGE AND PROVIDES A FULL RANGE OF ACADEMIC
AND ELECTIVE COURSES. EXPOSURE TO VOCATIONAL CAREER AREAS, WORK-
STUDY PROGRAMS, AND EXTREACURRICULAR ACTIVITIES.  REQUIREMENTS FOR
ENTRANCE INCLUDE:  1) SEVERE OR PROFOUND HEARING LOSS (AVERAGE OF
70 DB OR GREATER IN BETTER EAR);  2) 14-19 YEARS OLD;  3) THIRD
GRADE READING LEVEL OR HIGHER DEMONSTRATED ON READING SUBTEST OF
THE STANFORD ACHIEVEMENT TEST 1974 HEARING IMPAIRED EDITION.  FOR
MORE INFORMATION, WRITE OR CALL THE ADMISSIONS OFFICE, MODEL
SECONDARY SCHOOL FOR THE DEAF, GALLAUDET COLLEGE, KENDALL GREEN,
WASHINGTON, DC  20002;   (202) 651 5841
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POSTED:  WED MAR.17, 1982  5:09 PM EST MSG:DGDF-1380-3183
FROM:    APT
TO:      MULTIHANDICAPPED
SUBJ:    NEWS: UPDATE N.Y. MHC DEAF TASK FORCE

UPDATE NY MH DEAF TASK FORCE  A SECOND GROUP OF PROFESSIONALS FROM
UPSTATE N.Y. PRESENTED TESTIMONY TO HOWARD BABBUSH AND HIS SENATE
MINORITY TASK FORCE ON THE NEEDS OF MULTIHANDICAPPED DEAF YOUNG
ADULTS ON MARCH 4, 1982. REPRESENTATIVES FROM GROUP HOMES, SCHOOLS
FOR DEAF (NYSSD. ST. MARY'S) AND POST-SECONDARY PROGRAMS (NTID)
WERE PRESENT IN ROCHESTER TO PRESENT THEIR VIEWS.  IT IS DIFFICULT
TO KNOW HOW FAST OR IF ACTION WILL BE TAKEN TO SECURE SERVICES
FOR THIS GROUP IN THE NEAR FUTURE.  BUT, AT LEAST THE "PAPER WORK"
IS BEING GATHERED.  WILL KEEP YOU POSTED.
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If the user wanted to look for information in the bulletin board placed at another time besides the date of access, several options are available. Instead of "on date", you would type, scan all (provides every entry contained), scan since date, scan before date, and scan subject. The MULTIHANDICAPPED bulletin board provides users with several general (key word) subject headings for scanning by subject. In addition, any key word in a subject heading (from the scan table) may be used to access particular information. The general category or subject headings used for the MULTIHANDICAPPED bulletin board include.

RESOURCES:	Program, curricula, training available both preservice and inservice, services descriptions, and any other information which might assist persons working with multihandicapped children or youth.
NEWS:	Items regarding litigation, forums, workshops, symposia, conferences, legislation, and all other newsworthy items "of a did you know nature".
PROGRAMS:	Items related to services available, model development, private and public programs serving multihandicapped.
QUESTIONS:	Request to the board for information related to meeting the needs of multihandicapped, including consultant, assistance in developing programs, and any and all questions the field may provide assistance in answering.

PUBLICATIONS:	Commercial or project prepared texts products related to the multiplyhandicapped.
PROFILE:	Descriptions of innovative projects and programs with resources to share regarding the multiplyhandicapped individuals.
MEDIA:	Audio visual materials which relate to the needs of multiplyhandicapped individuals including films, video tapes, audio tapes, and etc.

In summary, the MULTIHANDICAPPED as well as the other bulletin boards on SPECIALNET represent a powerful informal data base for special educators. MULTIHANDICAPPED provides individuals and agencies with an expanding resource base for sharing new insights into the creative and innovative work of many people in the field of special education. This information base is only as good as what is placed in it and expanding the base can only be accomplished if special educators will participate.

A Final Note on Cost

As indicated, the Consortium for Severely Handicapped/Hearing Impaired has found SPECIALNET to be a cost-effective addition to meeting its' national responsibilities for dissemination and technical assistance. Access to SPECIALNET involves two costs (not including the cost of hardware). First, a yearly subscription fee of $200 is charged. Second, the user is charged for connect-time (the period actually connected to the network) at a specific cost/hour depending on the time of day. Table 1 outlines these basic costs.

For further information regarding costs interested individuals or agencies should contact NASDSE (address included in the Appendix of this article).

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TABLE 1

HOURS	BASIC CHARGE (Session)	INWATS CHARGE (WATS)
Business Hours M-F 7am-6pm	$14.00/hr .23/min	$23.00/hr .38/min
Off-Peak Hours M-F 6pm-9pm All Day Sat., Sun., & Holidays	7.00/hr .12/min	14.00/hr .23/min
Night Hours Everyday 9pm-7am	4.00/hr .07/min	6.00/hr .10/min

Storage Charge: $.005/day/storage unit of 2,000 characters after first five days.

Broadcast Delivery: $.05/addressee after the first addressee of a broadcast message.

FOOTNOTES

This work was supported in part by the Department of Education, Office of Special Education Programs, Grant Number G008001450.

REFERENCES

Campbell, B., Snodgrass, G. & Gibbs, L. Telecommunications: Information Systems for Special Education's Future. Journal of Special Education Technology, (in press).

For more information on SPECIALNET contact:

Gary Snodgrass, Admin/SPECIALNET
National Association of State Directors
of Special Education
1201 16th Street, NW, Suite 610E
Telephone (202) 833-4218 or
SPECIALNET USER NAME: NASDSE

ADVOCACY

The advocacy chapter provides detailed information for professionals working with hearing impaired developmentally disabled children and adolescents. These materials are selected to meet several objectives:

- to review history of changes in services and rights guarantees for deaf and severely handicapped children and youth, with an emphasis on precedent-setting legislation and court cases.

- to provide current information on proposed changes in legislation addressing the needs of severely handicapped children and youth, including entitlement programs.

- to present advocacy perspectives and strategies for direct service providers working with hearing impaired developmentally disabled children and youth.

- to discuss certain philosophical principles - least restrictive environment, accessibility, right to habilitation - as they relate to services for the severely handicapped.

The first selection, adapted from materials produced at the University of Arizona, covers two major federal initiatives--P.L. 94-142 and the Developmental Disabilities Act--and describes the major requirements of each of these landmark pieces of federal legislation. The Special Education analysis for advocates which follows provides additional interpretive information concerning historical precedents and current interpretation of legislative requirements. This analysis was adapted by Kristin Hoff for the American Speech-Language-Hearing Association from materials produced by the Center for Law and Health Sciences, Boston University.

In addition to these substantial discussions concerning the requirements of the federal law, several "special issues" of particular relevance to hearing impaired developmentally disabled children and adolescents are addressed in a series of excerpts and materials, as follows:

- Vocational Education
- Twelve-month School Programming
- Interagency Coordination
- The definition of "Appropriateness," including excerpts from briefs in the recent Supreme Court case Board of Education v. Rowley.

Finally, related to severe budget cuts and major changes proposed in pending legislation, commentary is included from <u>A Children's Defense Budget: An Analysis of the President's Budget and Children</u> (1982). These materials foreshadow those proposed changes which have the most major implications for the delivery of services to hearing impaired developmentally disabled children and youth.

Related materials can be found in **Instructional Management** and in **Program Options.**

LEGAL AND CONSTITUTIONAL RIGHTS OF HEARING IMPAIRED DEVELOPMENTALLY DISABLED CHILDREN AND ADULTS

by

Edward M. Ober

Arizona Model Demonstration Program

Hearing Impaired Developmentally Disabled Persons:

The Right Not To Be Left Out

> No otherwise qualified handicapped individual in the United States, as defined in section 7(6), shall, solely by reason of his handicap, be excluded form the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance.*

Section 504 of the Rehabilitation Act of 1973, quoted above, and the comprehensive regulations implementing it, exemplify the fact that the law no longer relegates handicapped persons to second class citizenship. The 1970s have ushered in a new era of acceptance for the disabled. Congress has responded by codifying these rights and making equal treatment among the disabled and non-handicapped a legal mandate. The challenge now is implementing these laws.

The hearing impaired developmentally disabled (HIDD) are only a small segment of the handicapped community, but a segment often overlooked and underserviced.* This publication will explore the law as it specifically applies to that population. Then the paper will explore three major areas of the law affecting hearing impaired developmentally disabled persons: education, habilitation and employment. In addition to constitutional doctrine, two federal statutes will form the foundation of the analysis: The Rehabilitation Act of 1973, the Education for All Handicapped Children Act of 1975. The breadth of these laws will be explored, and suggestions will be given to facilitate their effective implementation. The study will conclude with proposals for additional legislation designed to further serve the HIDD community.

Definitions: The current definition of developmental disabilities, as contained in Public Law 95-602, the "Developmental Disabilities Assistance and Bill of Rights Act", Section 102(7), is:

> "(7) The term 'developmental disability' means a severe, chronic disability of a person which--
> (A) is attributable to a mental or physical impairments;
> (B) is manifested before the person attains the age twenty-two;
> (C) is likely to continue indefinitely;
> (D) results in substantial functional limitations in three or more of the following areas of major life activity: (i) self-care, (ii) receptive and expressive language, (iii) learning, (iv) mobility, (v) self-direction, (vi) capacity for independent living, and (vii) economic sufficiency; and
> (E) reflects the person's need for a combination and sequence of special interdisciplinary, or generic care, treatment, or other services which are of life-long or extended duration and are individually planned and coordinated."

The definition of developmental disability contained in Public Law 95-602, sometimes referred to as the new definiton of developmental disability, is based solely on an individual's functional limitations and need for services, rather than the diagnosis or nature of his or her disabling condition.

Hearing Impaired Developmentally Disabled: Acknowledging the preceding definitions together offers the following definition of the hearing impaired developmentally disabled:

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> The hearing impaired developmentally disabled are those persons who have a hearing impairment in combination with a disability which had its onset prior to the age of 18 years and is attributable to mental retardation, cerebral palsy, epilepsy, autism, or any other condition of a person found to be closely related to mental retardation and which is a substantial handicap that can be expected to continue indefinitely.

The compounding of these disabililties results in a devastating multiplicative effect on the individual. For example, a hearing impaired mentally retarded person is not only hindered by his or her hearing loss coupled with the effects of retardation, but also by the complications which result from the combination of the two. The loss of communication will increase the impact of retardation, which in turn will further impair the person's communication skills, and so on in a destructive cycle. Numerous degrees of hearing impairment and development disability exist, creating a wide range of possible combinations of multiple handicapping conditions.

Education

The Supreme Court of the United States, in the landmark decision of Brown vs Board of Education, said about education:

> Today, education is perhaps the most important function of state and local governments. Compulsory school attendance laws and the great expenditures for education both demonstrate our recognition of the importance of education to our democratic society. It is required in the performance of our most basic public responsibilities, even service in the armed forces. It is the very foundation of good citizenship. Today it is a principal instrument in awakening the child to cultural values, in preparing him for later professional training, and in helping him to adjust normaly to his environment. In these days, it is doubtful that any child may reasonably be expected to succeed in life if he is denied the opportunity of an education. Such an opportunity, where the state has undertaken to provide it, is a right which must be made available to all on equal terms.*

This language, spoken by the Court in addressing the problems of racial segregation in the public schools, has become the foundation for guaranteeing equal educational opportunities for the handicapped. Building upon those words, the decisions in Pennsylvania Association for Retarded Children v. Commonwealth of Pennsylvania, and Mills v. Board of Education of the District of Columbia developed in the federal courts a tradition of recognition that the disabled have in the educational realm, the same civil rights as the nonhandicapped.

In Pennsylvania Association for Retarded Children (PARC), a three judge panel in the eastern district of Pennsylvania approved a consent decree between the parties that, among other things, ordered the state to provide every retarded person between six and twenty-one access to a free public education and training appropriate to his or her learning capabililties. PARC was a class action brought by the Pennsylvania Association for Retarded Children by the parents of thirteen individual retarded children, on behalf of all mentally retarded children in Pennsylvania between six and twenty-one who were being excluded from education in the public schools. The defendants were the Commonwealth of Pennsylvania, the Secretary of Welfare, State Board of Education, and all the school districts in the state. The plaintiffs in PARC challenged the exclusions of mentally retarded children under four state statutes.

A consent decree reached between the parties forbid the state from using the challenged statutes to deny access to a free public education to any mentally retarded child. The consent decree further provided that no mentally retarded child may be subjected to a change in educational status without first being notified of the proposed change and without being given an opportunity to be heard in a due process hearing. The parties agreed that expert testimony showed that all mentally retarded persons were capable of benefitting from education.

Mills v. Board of Education of the District of Columbia constitutionally requires, under the due process and equal protection clauses of the Fourteenth Amendment, what PARC established by consent decree. Mills was a class action, brought on behalf of seven handicapped children by their next of friends, seeking a declaration of their rights and an injunction restricting the Board of Education for the District of Columbia from excluding them from the public schools or alternative placements. The defendants were the Board of Education and its members, the Superintendent of Schools and subordinate school officials, the Commissioner of the District of Columbia and certain subordinate officials, and the District of Columbia. The district court held that the Board of Education was violating not only its own regulations and Congressional statutes concerning education in the District of Columbia, but also the due process and equal protection clauses of the Fourteenth Amendment. Due process, the Mills court said, required a hearing before any child was excluded from, expelled from or classified into a special program.

Although the plaintiffs included children classified as brain-damaged, hyperactive, epileptic, and mentally retarded, the court's order was not limited to those disabilities. It held that "the District of Columbia shall provide to each child of school age a free and suitable publically-supported education regardless of the degree of the child's mental, physical or emotional disability or impairment." Under Mills, no child can be excluded from a public school setting unless he or she is provided adequate alternative services suited to his or her needs. The child must also be provided a constitutionally adequate prior hearing and periodic review of his or her status, progress and the adequacy of the educational alternative. Reasoning that constitutional rights must be afforded citizens despite greater expense, the court concluded that the failure to provide education to the handicapped in a public school or adequate alternative cannot be excused by the claim of insufficient funds.

Brown, PARC, and Mills have served as valuable precedent in many subsequent lawsuits brought to secure educational opportunities for the disabled. The case of In Interest of G.H. is especially important because it finds the right of equal educational opportunity for the disabled embodied in a state constitution as well as in the federal constitution. While the United States constitution does not have an explicit clause making education an absolute right, many state constitutions do.

Following the PARC and Mills decisions in 1972, legal commentators writing on the subject spent much of their efforts developing Fourteenth Amendment arguments that could be used to secure disabled persons access to free and suitable public education. These theories will be briefly explored.

Equal Protection Clause: The Court applies two standards of review when evaluating whether state action violates the equal protection clause of the Fourteenth Amendment--strict scrutiny and the rational basis test. Strict scrutiny, the much more stringent examination of the two, is invoked when the issue involves a fundamental right or a suspect classification, such as racial segregation. Applying a strict scrutiny test, the Court is more likely to find action violative of the equal protection clause than if it is searching only for a rational basis for the contested behavior.

A strong argument can be formulated that hearing impaired developmentally disabled persons, as well as all handicapped persons, are a suspect classification deserving of strict judicial scrutiny. Hearing impaired developmentally disabled persons have several characteristics that traditionally trigger close scrutiny. They are a group with no or minimal access to the political process. The classification stigmatizes individuals of the group in the eyes of society. Fialkowski v. Shapp, in deciding that the retarded are a suspect category, observed that the label of being retarded might bear as great a stigma as any racial slur. Also, the members of the class have congenital traits, the existence of which they have no control over.

If the persons initiating the action do not belong to what the Court recognizes as a suspect category, strict scrutiny may still attach if their claim alleges the violation of a fundamental right. In the educational context, this option may be unavailable in light of San Antonio Independent School District v. Rodriguez, where the Supreme Court held that education was not a fundamental right guaranteed in the United States Constitution. The Court, however, left us with some interesting dictum:

> Whatever merit appellees' argument might have if a State's financing system occasioned an absolute denial of educational opportunities to any of its children, that argument provides no basis for finding an interference with fundamental rights where only relative differences in spending levels are involved and where--as is true in the present case--no charge fairly could be made that the system fails to provide each child with an opportunity to acquire the basic minimal skills necessary for the enjoyment of the rights of speech and of full participation in the political process.

Fialkowski v. Shapp persuasively argues that the above language may be invoked to support the existence of a fundamental right to the minimum level of education needed to acquire the basic skills necessary for the enjoyment of the rights of speech and full participation in the political process.

If the Court decides that close judicial scrutiny is inappropriate, then it will require only that a rational basis exist for the state's action. The state predominately prevails when this test is applied because courts rarely find that there is absolutely no rational basis for the state's behavior. Some courts and commentators believe that after Rodriguez, the courts have no choice but to apply a rational basis test when challenging a state's failure to provide equal educational opportunities to the handicapped.

Due Process Clause: In addition to the equal protection clause, PARC, and Mills make it clear that the due process clause of the Fourteenth Amendment is a powerful weapon to use in securing publicly supported education for handicapped children. Procedural due process guarantees that no child will be excluded from publicly supported education without notice and an opportunity to be heard at a formal hearing. PARC says that at this hearing, the parents of the child have the right to counsel, to examine their child's records before the hearing, to present evidence and cross examine other witnesses, and the right to an independent medical, psychological and educational evaluation.

Together, the equal protection and due process clauses of the Fourteenth Amendment embody a strong constitutional mandate that when a state embarks on educating its children, it must do so without discriminating against the handicapped.

Pub. 94-142, the Education For All Handicapped Children Act of 1975. Congress followed the lead created by <u>PARC</u> and <u>Mills</u> and overwhelmingly passed P.L. 94-142, an Act to assure that all handicapped children receive a free appropriate public education. The Act, signed into law in November 1975, has become a major influence in assuring educational services for handicapped children and youth. Congress stated that its purpose was:

> to assure that all handicapped children have available to them...a free, appropriate public education which emphasizes special education and related services designed to meet their unique needs, to assure that the rights of handicapped children and their parents or guardians are protected, to assist states and localities to provide for the education of all handicapped children, and to assess and assure the effectiveness of efforts to educate handicapped children.

<u>Funding Priorities:</u> The law is emphatic in requiring that the state must, as its first priority, expend its funds on educating those handicapped children who are currently not receiving any education (the unserved). Second priority is given to the most severely handicapped within each disability who are receiving an inadequate education (the underserved). The legislative history reveals that there were 14,000 deaf and 268,000 hard of hearing children unserved in 1975. There were 257,000 mentally retarded children unserved, as well as 93,000 orthopedically and other health impaired children, which include the cerebral palsied and epileptic. The study further reveals that 1,080,000 emotionally disturbed children, which includes the autistic, were also unserved in 1975. Though the autistic were a very small portion of

this group, the alarming state of the unserved in this category suggests that very few autistic persons were receiving an adequate education.

The due process procedures require that the parent or guardian participate whenever the local educational agency (LEA) proposes to initiate or change, or refuses to initiate or change, the identification, evaluation, or educational placement of their child.

Assurance must further be given that to the maximum extent appropriate, handicapped children will be educated with children who are not handicapped. It must also be guaranteed that testing and evaluation procedures for the purposes of evaluation and placement will be selected and administered so that as not to be racially or culturally discriminatory. This requires testing in the child's native tongue or mode of communication. The Act further requires that the state plans and local applications provide procedures for evaluating, at least annually, the effectiveness of their programs in meeting the educational needs of their handicapped children.

Free Appropriate Public Education: While the Act is emphatic in requiring that the state provide a "free appropriate public education" to every handicapped child, it offers only a nebulous definition of what the term entails. It is proposed that the appropriateness of a child's education should be measured by the related services given to supplement his or her special education, whether the placement is in the least restrictive alternative, and by the effectiveness of the individualized education program. Each of these major features of the Act will be addressed separately.

Related Services: A free appropriate public education includes both special education and related services. Because the definition of 'related services' offered in the regulations implementing the Act is somewhat broader than the definition in the Act itself, it should be embraced. The regulations define 'related services' as:

> § 121a.13 Related services.
>
> (a) As used in this part, the term "related services" means transportation and such developmental, corrective, and other supportive services as are required to assist a handicapped child to benefit from special education, and includes speech pathology and audiology, psychological services, physical and occupational therapy, recreation, early identification and assessment of disabilities in children, counseling services, and medical services for diagnostic or evaluation purposes. The term also includes school health services, social work services in schools, and parent counseling and training.

These services are essential to an effective special education. While special education, the specially designed instruction to meet a child's unique needs is important, it is these additional related services that assist the child in benefiting from his or her special education. It is the related services that help the handicapped child to implement his or her learning and use it to his or her advantage in the community.

Mainstreaming - Least Restrictive Environment: The Education for All Handicapped Children Act requires that a state must

> assure that, to the maximum extent appropriate, handicapped children, including children in public or private institutions or other care facilities, are educated with children who are not handicapped, and that special classes, separate schooling, or other removal of handicapped children from the regular educational environment occurs only when the nature or severity of the handicap is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily.

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This concept has come to be known as the 'least restrictive environment', the 'least restrictive alternative', or 'mainstreaming'.

Whether these fears prove to be warranted or not rests on how the least restrictive environment concept is implemented. For many hearing impaired developmentally disabled children who lack the communication and comprehensive skills necessary to keep up with the pace adapted to the nonhandicapped students, placement in a regular classroom will be more restrictive than in a special classroom. For these children, it is essential that their movement in the direction towards the regular classroom proceed only as far as their skills allow. More likely than not, most hearing impaired developmentally disabled children will be more appropriately placed in a special classroom, with a teacher trained in the special skills needed to communicate with the students. Many educators of the deaf believe that deaf children are best educated in small special classrooms composed of children who are approximately the same age and educational level. The critical consideration is that each child is unique and "that different children have different educational strengths and weaknesses which dictate the need for different education programs."

Several questions should be asked when deciding upon the least restrictive environment for a hearing impaired, developmentally disabled child. Parents should inquire as to what provisions will be made for adequate communication between the child, teacher and classmates. They should ask whether the child will be receiving a quality education in addition to being placed in a setting with nonhandicapped children, and whether the educational placement will prepare or restrict the child's future options. A setting which may now seem a good one may actually do nothing to provide a child with skills for future employment. Inquiries into whether the child will be spending large amounts of unnecessary time travelling to the least restrictive environment, should also be made.

There is little question that a child's interests are well served by the ideal that, whenever appropriate, he or she should be educated in the same setting as are nonhandicapped children.

Individualized Education Programs. One method for a parent or guardian of a disabled child to assure that his or her child is being placed in the most appropriate setting is to take an active part in the development of the Individualized Education Program (IEP). Under the Act, the local educational agency or intermediate educational unit must guarantee that there is an IEP on each handicapped child for which it is receiving funds to educate. The Individualized Education Program is defined in the Act as:

> a written statement for each handicapped child.-..which includes (A) a statement of the present levels of educational performance of each child, (B) a statement of annual goals, including short-term instructional objectives, (C) a statement of the specific educational services to be provided to such child, and the extent to which such child will be able to participate in regular educational programs, (D) the projected date for initiation and anticipated duration of such services, and (E) appropriate objective criteria and evaluation procedures and schedules for determining, on at least an annual basis, whether instructional objectives are being achieved.

The Individualized Educational Programs are important because they place the emphasis upon the specifics necessary to provide an appropriate education for a specific child. The concept reinforces the current trend of making education more individualized, and of holding particular individuals accountable for obtaining those objectives. IEPs can become strong tools in guaranteeing that handicapped children are appropriately educated. Their success depends largely on whether the development and implementation of their objectives are taken seriously, rather than as bureaucratic busy work.

Procedural Safeguards: Although the Act, particularly through the IEPs, makes a careful attempt at bringing the system and the child's parents or guardian together in a joint effort to secure an appropriate education for the child, differences of opinion and occasional abuses of discretion are still likely to occur. For this reason, procedural safeguards have been built into the Act. These procedural due process safeguards give the parents or guardian of a disabled child several important rights.

The parents of a handicapped child must be given the opportunity to inspect and review all school records relevant to the provision of a free appropriate public education to their child. These include records concerning the child's identification, evaluation, and educational placement.

Parents have the right to obtain an independent educational evaluation of their child. This evaluation is at the public's expense if the parent disagrees with the evalution made by the local agency. However, if the public agency, through a due process hearing, shows the evaluation to be appropriate, it does not have to assume the cost. Whenever the parents pay for the independent evaluation, the local educational agency must consider it in any decision concerning the provision of a free appropriate public education to the child.

Reasonable notice must be given the parents whenever a program proposes to initiate or change the identification, evaluation, or educational placement of their child. The same is true when the public agency refuses to initiate or change these procedures. The notice must be given in the native language or the mode of communication of the parent.

A due process hearing is available upon request of the educational agency or the parent, whenever a difference between the two occurs concerning the identification, evaluation, or placement of the handicapped child. At the hearing, parents or guardians have the right to be accompanied and advised by counsel, and by individuals possessing special knowledge about the needs of disabled children. Parents have the right to present evidence and confront, cross-examine, and compel the attendance of any witness. They have the right to prohibit the introduction of any evidence that has not been disclosed to them at least five days before the hearing. Parents also have the right to a written or recorded record of the hearing, and to written findings of facts and decisions.

Due process requires that the hearing be held, and a final decision reached within forty-five days after the receipt of the request for the hearing. While the action is pending, unless the state or local educational agency and the parents or guardian otherwise agree, the child shall remain in his or her current educational placement. If the complaint involves the child's initial admission into a public school, the child shall, with the consent of his or her parent or guardian, be placed in the public school program during the course of the proceedings.

If the hearing was before the local educational agency, any party aggrieved by the findings or decision may appeal to the state educational agency. The same due process rights provided in the initial hearing must also be afforded on review. An independent decision shall be made by the state educational agency within thirty days after receiving the request for review.

The Act finally provides that any aggrieved party, upon completion of the administrative process, has the option of bringing a civil action in a state or federal district court, regardless of the amount in controversy. The policies embodied by the Act are vital ones, and the elaborate due process safeguards offer the means to ensure successful implementation of the law. The mechanisms exist to guarantee that each handicapped child in a state accepting funds under this legislation, receives a free appropriate public education. It is important that these safeguards are utilized to hold those persons responsible for providing a disabled child his or her education.

The regulations promulgated to implement Section 504 of the Rehabilitation Act of 1973 are explicit in requiring, just as the Education Act does, that any recipient of federal funds operating a public elementary or secondary education program shall provide a free, appropriate public education to every qualified handicapped child within the recipient's jurisdiction.

Before exploring Section 504 and its specific commands, a brief history is appropriate. The Rehabilitation Act of 1973 was passed on September 26, 1973 over President Nixon's veto. It was enacted primarily to aid in the creation and implementation of rehabilitative services for the handicapped, especially those with the severest disabilities. Its purpose was also to accelerate and coordinate technical and scientific research addressed at meeting the special needs of handicapped children.

In the 1974 Amendments to the Rehabilitation Act, Congress added a sentence to its definition of "handicapped individual" as it applies to Titles IV and V. Title V includes Section 504. The addition reads:

> For the purposes of titles IV and V of this Act, such term means any person who (A) has a physical or mental impairment which substantially limits one or more of such person's major life activities, (B) has a record of such an impairment, or (C) is regarded as having such an impairment.

This revision is significant because it broadens considerably the reach of Section 504. Not only does its prohibition against discrimination of the handicapped embrace those who have disabilities, it encompasses those who have been incorrectly labelled as handicapped.

As early as July 11, 1974, the Department of Health, Education, and Welfare promised that final regulations would be published and in effect by the end of fiscal year 1975. Yet it was not until April 28, 1977 that Secretary Califano, under the strong pressure of a court order, an executive order, and massive demonstrations protesting the undue delay, signed the final regulations.

The regulations address the area of education in considerable detail. Subpart D pertains to the education of disabled persons in preschool, elementary, and secondary educational programs. Subpart E addresses postsecondary education. (This section is extremely important because it does not apply to postsecondary education.)

Subpart D, pertaining to preschool, elementary, and secondary education, requires very much the same things as the Education for All Handicapped Children Act. The two should be read together when defining the scope of a state's obligation. As under the Education Act, the regulations require that the recipient annually identify and locate all qualified handicapped persons within its jurisdiction who are not receiving a public education, and notify them and their parents or guardian of the recipient's duty to provide them with one.

The regulations mandated that by September 1, 1978 a free, appropriate public education be provided to every qualified handicapped person in the recipient's jurisdiction. This compliance date is the same as that in Pub. 94-142. For the purposes of the regulation, a free, appropriate, public education is the provision of regular or special education and related aids and services that are designed to meet the individual's special needs as adequately as the needs of non-handicapped students are met. Implementation of an Individualized Educational Program developed in accordance with the Education Act, satisfies this standard.

As in the Education for All Handicapped Children Act, the regulations are clear in requiring that the handicapped student, to the maximum extent appropriate to the student's needs, be educated with nonhandicapped persons. A disabled child must be placed in a regular public school unless it is demonstrated by the school that the child, even with the use of supplemental aids and services, cannot receive a satisfactory education in that placement. Placements in alternative settings must take into account the proximity of the setting to the child's home. The regulations also require that nonacademic services and extracurricular activities, such as counseling, physical recreation, transportation, and special interest clubs, be provided in as integrated a setting as possible. Recipients must evaluate each disabled person believed to need special education and related services before an educational placement is made.

As in the Education Act, the recipient is required to establish and implement procedures for parents or guardians with respect to the identification, evaluation, and placement of their handicapped child. These safeguards include notice, a right to inspect records, an impartial hearing, representation by counsel, and a review procedure.

Under Section 504 regulations, any recipient that operates a preschool education program, day care program, or adult education program, cannot exclude persons on the basis of handicap. The needs of such persons must be taken into account when determining the aid, benefits, or services to be provided under these programs.

Finally, the regulations, as they apply to preschool, elementary and secondary programs, require that private programs receiving federal funds not exclude qualified persons from their programs on the basis of handicap, if an appropriate education can be provided with only minor adjustments.

Summary: The right to an equal educational opportunity is one of the most precious entitlements a hearing impaired developmentally disabled child has. The laws exist that guarantee that every hearing impaired developmentally disabled child is provided with this basic opportunity. The challenge now is implementing federal and state statutes so that every hearing impaired developmentally disabled person will benefit from these mandates.

> Mental retardation alone and deafness alone are significant handicapping conditions. When both intellectual and auditory deficits are present in the same individual, the summation of the two handicaps is frequently disasterous for the individual and his family. In fact, under current conditions, a mentally retarded deaf person (MRD) has only one chance in ten to avoid confinement in a public institution for the mentally retarded or to receive services in a school for the deaf. MRD persons are a discrete target population in the operating plans of few governmental agencies. In recent years the focus of legislation at national, state and local levels has been increasingly categorical. Program thrusts for the handicapped focused upon

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> "the" mentally retarded, "the" deaf, "the" learning disabled, and unitary handicap target populations. While categorization is a fundamental operation in science and in law, there is no evidence to support the notion that human beings -- the ultimate service recipients -- packaged with tightly knit scientific or or legislative labels. The prevalence of multihandicapped conditions, particularly among the severely disabled, is extensive and increasing in relative, and probably, absolute terms. Tunnel vision policies have impeded translation of this knowledge into program development for persons who do not fit squarely within the categorical confines of narrow legislation.

The history of developing federal policy for the hearing impaired and the developmentally disbled is overwhelmingly a history of program development through legislative mandate.

The concept of devising special initiatives to guarantee that a specified group of multiple handicapped individuals receive needed services, is not a new one. As early as 1967, Congress established regional centers to provide special programs and services to deaf-blind children. More recently, Congress in the Rehabilitation Act of 1973 established and appropriated funds for operating a National Center for deaf-blind youths and adults. The legislative history behind the establishment of the regional centers in 1967 is especially enlightening.

The same reasons for enacting special legislation for the deaf-blind hold true for the hearing impaired developmentally disabled. In Congress' words, legislation is needed to "provide a national program to meet a national need for a group of multiple-handicapped children who have been, for the most part, neglected in terms of educational and training opportunities which will help assure their full potential for communication, adjustment, participation, and self-fulfillment in society."

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The hearing impaired developmentally disabled, have, as do all handicapped individuals, the same basic civil rights that the nonhandicapped have. Admitting this, however, is by itself, not enough. Affirmative steps to provide for and accommodate the special needs of these persons is vital to erase a history of neglect and ignorance. We have an affirmative duty to provide a free public education, appropriately designed to meet the special needs of every hearing impaired developmentally disabled person, in the least retrictive environments possible. The void that silence has created must be filled with understanding and contentment, rather than the fear, neglect, and emptiness the hearing impaired developmentally disabled have so often lived with.

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Historical Context

The 1970's were a period of great change in the concept of public education for handicapped children. At the beginning of the decade, educational opportunities of students with special needs remained extremely limited. Without mandatory requirements from the state and federal levels, local school systems retained discretion in providing services for this neglected population. Low reimbursement rates from state educational agencies provided little incentive to promote special education. Great variations existed among localities in a patchwork series of programs. Eligibility for the few existing services heavily relied upon classifying or labelling each child according to a particular disability such as, for example, "emotionally disturbed," "mentally retarded," or "epileptic". Such rigid categories failed to account for the unique and individual needs of each child. Furthermore, this classification stigmatized the child whose parents sought local resources and inevitably created further obstacles for the child's later return to regular educational programs. As a result, many children remained at home without education during their formative years. Others were permanently segregated or "tracked" into inappropriate programs. Still others were left with the alternative of receiving little more than custodial supervision in institutional settings. Parents were excluded from meaningful participation in the planning and placement decisions for their children.

Adapted from: Developmental
Disabilities/Mental Retardation
Case Law Manual (Center for Law
and Health Sciences, 1981)

Influenced by the emergence of new values at the nation's universities and in community service centers, the general public's attitudes towards handicapped individuals and handicapping conditions shifted perceptibly. The concepts of "normalization" and "mainstreaming," which stress the delivery of services in the least restrictive settings and avoidance of segregating handicapped individuals, received increasing legitimacy. Such values evidently influenced the outcome of two seminal federal cases involving educational opportunities for handicapped children. Emphasizing due process arguments, Pennsylvania Association for Retarded Children v. Commonwealth of Pennsylvania, 314 F. Supp. 1257 (E.D. Pa. 1972), established in a consent decree a right to procedural safeguards -- notice and a hearing -- before a handicapped child could be transferred from a regular education class or placed into a special program. The court guaranteed access for mentally retarded children to a free public education "appropriate to their learning capacities" by requiring individualized evaluation and program planning. In addition, statutes favoring certain children with physical handicaps over those who were mentally retarded were invalidated, thereby eliminating the relevance of diagnostic labelling for purposes of determing eligibility for an educational program.

Equal protection arguments advanced in Mills v. Board of Education, 348 F. Supp. (D.D.C. 1972), on behalf of children with emotional problems led to the prohibition of outright exclusion of handicapped children from the educational benefits made available to others.

In response to the P.A.R.C. and Mills cases, several states enacted legislation to assure equal educational opportunity for handicapped children. Massachusetts, for example, passed a special education initiative, "Chapter 766" in 1972 which created an elaborate series of procedural safeguards to guarantee an "adequate, publicly supported education" for every child in the Commonwealth.

This growing recognition by courts and state legislatures of the rights of handicapped children to an adequate education undoubtedly influenced Congress in the passage of the Education of All Handicapped Children Act of 1975 (P.L. 94-142) which requires a free, publicly supported education appropriate to the individual needs of all children ages 3-21, regardless of handicap. Additional federal legislative enactments such as Section 504 of the Rehabilitation Act of 1973 and the Developmental Disabilities Assistance and Bill of Rights Act of 1975 further reinforced this national commitment to accessible education and education-related services within the community.

This discussion examines federal legislation regarding special education, particularly P.L. 94-142. In general, the federal statute and its accompanying regulations offer a wider array of procedural safeguards than are available in most state statutes. However, there remain significant exceptions to this rule, i.e., there are instances in which certain state laws provide greater benefits than federal legislation. Furthermore, almost all states have chosen to comply with the requirements of P.L. 94-142 by promulgating their own series of regulations.

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In reviewing special education developments, the advocate should examine any regulations promulgated by a state's department of education or other human service agency charged with the oversight and implementation of P.L. 94-142. The designated state educational agency has authority, among its other functions, to establish administrative rules and procedures for school districts under the federal mandate to provide special education. In that context, these agencies issue policy statements which may be legally determinative in certain situations and indicate a precedent or an interpretation of a law or regulation. It should also be noted that, in addition to state special education regulations, various states rely upon administrative procedures act to govern due process appeals hearings.

Federal Role

Policy statements and administrative directives are likewise issued by the federal agencies charged with monitoring and enforcing P.L. 94-142. These will be discussed first.

Under P.L. 94-142, the Bureau of Education for the Handicapped (BEH) was designated as the entity within the U.S. Office of Education to monitor and enforce state compliance. Also, the Office of Civil Rights (OCR) was empowered to investigate complaints under P.L. 94-142. However, OCR involvement is usually triggered by individual complaints relating to individual school districts or programs. OCR lacks the responsibility for assuring statewide implementation of P.L. 94-142. BEH's statutory mandate was far more detailed and explicit in the area of special education for elementary and secondary schools. BEH must conduct annual reviews of each state plan. In addition, OCR's enforcement mechanisms are more circumscribed. OCR can only negotiate voluntary compliance or initiate a cut-off of federal funding received by a local program. BEH, however, could demand compliance as a pre-condition for P.L. 94-142 funding; it is empowered to order cease and desist orders; and it can withhold any portion of a state's grant.

Federal Reorganization of H.E.W.

Effective July 1, 1980, the U.S. Department of Health, Education and Welfare was reorganized into two separate cabinet-level agencies: The Department of Education and the Department of Health and Human Services. As part of this bureaucratic reordering, the Bureau of Education for the Handicapped (BEH) has been given wider responsibilities in the new Department of Education under the new name of the Bureau of Special Education and Rehabilitative Services. The former Office of Civil Rights (OCR) of H.E.W. has re-emerged as two distinct OCR entities under each of the new departments.

P.L. 94-142: An Overview

Public Law 94-142 creates general standards of compliance for states to qualify for receipt of federal funds in special education. Currently, 49 states and several territories have elected to participate through acceptance of federal funds. P.L. 94-142 covers all handicapped children ages 3-21 who, because of their handicapping condition, require special education and related services. Included in the definition of handicapped children are mentally retarded, learning disabled, physically handicapped, hearing impaired, visually impaired, and emotionally disturbed children. The Act entitles eligible children to a free, appropriate public education through the provision of an individualized education program, otherwise referred to as an IEP. Special education and related services designated in the child's IEP must be provided at no cost to the child's parents. The educational placement of the handicapped child must be in the least restrictive environment. That is, to the maximum extent appropriate, the child must be educated with non-handicapped children.

Opportunity for parental participation in educational decisions for a child is required. Therefore, due process assurances are detailed in P.L. 94-142 to ensure fairness to parents and children where basic educational rights are at stake. These include rights to notice and a due process hearing on issues related to the identification, evaluation and educational placement of a child. The parents' right of access to a child's records and right to confidentiality of those records are also protected.

Under P.L. 94-142, states are eligible to participate in a continuing program of federal aid to defray a portion of the additional cost of educating handicapped children. To quality forthis assistance, the submission of a detailed annual program plan is required to demonstrate how each state will carry out its commitment to the goal of a free appropriate public education for all handicapped children. That state plan must also outline how the due process and other requirements of the statute will be fulfilled.

A share of the federal funds is available to the local school systems (referred to as local education agencies or LEA's). Local school districts must prepare detailed plans for approval by the state education agency (SEA) showing how they will fulfill the purposes of the law. This monitoring system means that the SEA bears the ultimate responsibility of assuring that the requirements of P.L. 94-142 are satisfied.

Definitions

Since P.L. 94-142 is the keystone to advocacy in special education, a clear understanding of the definitions and terminology appearing frequently throughout the statute and regulations is necessary.

Free Appropriate Public Education

Although P.L. 94-142 creates general standards of compliance for states, the statute is unequivocal in guaranteeing a free appropriate public education to handicapped students. This requires that:

- Special education and related services, be provided at public expense at no additional cost to the parents.

- Services are to be provided in conformity with an individualized educational program (IEP).

Handicapped Children

Eligibility under P.L. 94-142 is determined under the following definition:

> Handicapped children means those children evaluated...as being mentally retarded, hard of hearing, deaf, speech impaired, visually handicapped, seriously emotionally disturbed, orthopedically impaired, other health impaired, deaf-blind, multihandicapped, or as having specificlearning disabilities, who because of those impairments need special education and related services.

This definition is extended to the school age population of handicapped individuals ages 3-21. The term "handicapped children" includes the handicapped individuals ages 18-21.

Two criteria determine if a child is "handicapped" for purposes of P.L. 94-142:

1. An impairment listed under P.L. 94-142 definition of handicapped children.
2. A need for special education and related services because of the impairment.

These criteria would, for example, include a student who is deaf and needs special education because he or she connot benefit solely from placement in a regular class. A child with a controlled seizure disorder might not require special education because of that condition and therefore, might not be clasified as handicapped under P.L. 94-142. However, it should be noted that under Section 504 of the Rehabilitation Act of 1973, the category of qualified handicapped children eligible for special education can include those individuals who have a past record of impairment (such as emotional/behavioral disorder) or who are merely perceived as having a handicap (such as mental retardation).

As defined by P.L. 94-142, special education means:

> specially designed instruction, at no cost to the parent, to meet the unique needs of the handicapped child, including classroom instruction, instruction in physical education, home instruction and instruction in hospitals and institutions.

Under P.L. 94-142, related services includes:

> transportation and such developmental, corrective, and other supportive services as are required to assist a handicapped child to benefit from special education, and includes speech pathology and audiology, psychological services, physical and occupational therapy, recreation, early identification and assessment of disabilities in children, counseling services, and medical services for diagnostic or evaluation purposes. The term also includes school health services, social work services in schools, and parent counseling and training.

The determining factor of this definition is that related services are those "required to assist a handicapped child to benefit from special education." For example, a mentally retarded or deaf child, who is receiving special education and who has emotional problems which interfere with his or her ability to concentrate in school, would be entitled to psychological services under P.L. 94-142. However, when a child exhibits emotional problems primarily at home, some public schools have taken the position that psychological services will not be made available. The argument has been put forth that such related services are not technically required to assist the child to benefit from special education. This distinction has given rise to debates over the demarcation line between "educational" and "non-educational" needs. In general, advocates have found such distinctions to be artificial, sometimes used as a discriminatory technique for disqualifying otherwise qualified handicapped children with emotional problems from the benefits of P.L. 94-142.

It is important to note that under P.L. 94-142, a child is not eligible to receive related services unless he or she <u>needs</u> special education. For example, a student excelling in a program of regular education would not be eligible for psychological services under P.L. 94-142.

Under P.L. 94-142, evaluation means procedures used selectively with an individual child to assess the child's educational needs. It <u>does not</u> include basic tests adminstered to all children in a grade, school or class. Evaluation plays a crucial role in the area of special education. Because school districts are given the responsibility for identifying and locating all children within their jurisdictions who require special education and related services regardless of the severity of their handicaps, evaluation as a screening device can assist in this search. In addition, the availability of an accurate current evaluation is a prerequisite to the development of the child's individualized education plan. For a child who is not presently receiving a special education, a full evaluation must be conducted before the child is placed in a special education program. This must be done at no cost to the parents.

Because evaluation plays such a central role in special education, P.L. 94-142 outlines acceptable evaluation procedures in considerable detail.

- Tests must be in the native language or other mode of communication of the child (e.g., sign language for deaf children).
- Evaluation materials and procedures must not be racially or culturally discriminatory.
- Evaluations must assess specific areas of educational need. An IQ test is not sufficient.
- Test results should reflect the aptitude or achievement level the test is intended to measure (for example, a written math test given to a child with a reading impairment would not accurately measure mathematical aptitude).

- Trained personnel should administer the evaluation.
- No single evaluation procedure can be used as the sole criterion for determining the appropriate education program for a child. (That means a simple IQ test is not enough).
- A multidisciplinary team must evaluate the child, including one teacher and a specialist with knowledge of the suspected disability.
- A child should be assessed in all areas related to the suspected disability (including, where appropriate, health, vision, hearing, social and emotional status, general intelligence, academic performance, communicative status, motor disabilities).

Independent Evaluations

If the child's parents are not satisfied with the evaluation provided by the school district, they may obtain an independent educational evaluation of their child. This evaluation must be at public expense unless the school district initiates a hearing to show that the evaluation already performed is appropriate. In any event, the results of the parent-initiated evaluation must be considered in any decision regarding the child.

Re-evaluation

P.L. 94-142 requires that each handicapped child be re-evaluated at least every three years. The child's parent or teacher can request more frequent evaluations if they feel it is necessary. Re-evaluation should be distinguished from a review of a child's program, which must occur at least annually.

Individual Education Program (IEP)

The heart of the right to a free appropriate public education (FAPE) is a written individualized education program tailored to meet the unique needs of each handicapped child. This document is used to monitor the effectiveness of a child's special education placement and the services provided.

The IEP for each child must include: the child's present level of performance; short-term and annual goals; the special education and related services to be provided; the extent to which the child will be able to participate in regular education programs; dates for the initiation of services and their anticipated duration; and criteria to determine, at least annually, whether objectives are being met.

The IEP is to be developed at a meeting of the child's parent, the child's teacher, a special educator from the district, and where appropriate, the child. Where the child has been evaluated for the first time, a member of the evaluation team or someone familiar with the evaluation procedures used must also be present.

The school district has an affirmative obligation to encourage parent participation in the development of the IEP. This obligation includes notifying the parents of the meeting well in advance and scheduling it at a mutually agreed upon time and place. Every attempt must be made to ensure that the parents understand the proceedings at the meeting. This means that interpreters must be provided when necessary.

If the school district does not fulfill its obligation to encourage parent participation, the IEP is not valid. The parent should immediately make a complaint to the school officials, requesting a due process hearing and requesting that another meeting be held to develop the IEP.

Parents are entitled to a copy of their child's IEP on request. If the IEP does not reflect their understanding of what was agreed upon at the meeting, the due process procedures of P.L. 94-142 can be initiated by the parent.

When a child who is not currently receiving a special education is identified as having special needs, a meeting of the evaluation team to develop an IEP must be held within thirty days.

A meeting must be held at least annually to review each IEP, at which time the IEP must be revised, if necessary. However, some state regulations allow for the reconvening of the evaluation team at any time. In addition, parents have the right to revoke their permission for implementation of the IEP if the child does not appear to be achieving the original objectives of the IEP or if the school district fails to comply with the provisions of the IEP.

Placement for Handicapped Children

One of the most important requirements of P.L. 94-142 is that handicapped children must be educated in the least restrictive environment. As defined by the regulations this means:

> That to the maximum extent appropriate, handicapped children, including children in public or private institutions or other care facilities, are educated with children who are not handicapped and that special classes, separate schooling or other removal of handicapped children from the regular educational environment occurs only when the nature or severity of the handicap is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily.

The emphasis is on placing the child in the environment which is most appropriate. However, the burden of proof is placed on the person favoring removal from the regular educational environment, (or less resrictive setting), be it the parent or a representative of the school district--to show that this is required by the nature or severity of the handicap.

Placement decisions must be made on an individual basis for each child and must be based on the child's IEP. For example, a school district may no longer automatically assign children within a certain range of IQ scores to a pre-designated classroom. The child should be placed as close to home as possible, and unless the IEP requires otherwise, in the same school he or she would attend if not handicapped. In some school districts, these requirements may conflict with the requirements of programs promoting racial integration. There is so far no universally appropriate answer as to how such conflicts can or should be resolved.

To insure both that the child's placement is made on an individual basis and in the least restrictive environment, a continuum of alternative placements must be made available by the educational agency. This continuum should include instruction in regular classes, special schools, special classes, home instruction and instruction in institutions and hospitals. To encourage regular class placements, and to make them more feasible, the Act requires that supplementary services such as tutors and resources rooms be available for use in conjunction with regular class placements.

Program Options.

Education Program: Under P.L. 94-142, the handicapped child should have access to the same variety of educational programs and services available to non-handicapped children. This includes art, music and vocational education.

Non-Academic Services and Extra-Curricular Activities: These must be provided in a manner to ensure an opportunity for participation by handicapped children.

Physical Education: All handicapped children should receive physical education. Unless the child is enrolled full time in a special school or requires special physical education, P.L. 94-142 requires participation in regular physical education classes.

Handicapped Children Entitled to Free Appropriate Public Education

Handicapped Children Who are Given Priority: As of September 1, 1980, children between the ages of three and twenty-one are eligible for services under P.L. 94-142. The law establishes priorities for the use of federal funds by the state and local education agencies.

Federal funds are first to be used to provide a FAPE to first priority children. These are children for whom the state must provide a FAPE, but who are not receiving any education, i.e., handicapped children who have not been identified as such. Though priority for use of federal funds is given to "first priority children," the local education agency has an absolute obligation to ensure the every child who has been identified as handicapped receives a FAPE. The regulations for Section 504 seem to mandate this interpretation as well.

Location Of Eligible Children

- Local Public School: The rights and protections of P.L. 94-142 extend to all handicapped children who are attending facilities maintained by the local public school system.

- Placements in Private School or Facility by Public School System: Often the local school system will choose to use existing private special education facilities instead of developing the same facilities itself. When a handicapped child is placed in a private facility by the public school system, all the rights and protections of P.L. 94-142 apply. Enforcement of P.L. 94-142, including the development of an IEP, is still the responsibility of the school system which placed the handicapped child in the private facility.

- Residential Placements by Public School System: A child who is placed in a public or private residential facility by the local public school system is entitled to all the rights and protections of P.L. 94-142. It is still the responsibility of the local public school system to ensure that the child receives a FAPE, including the development of an IEP. Room, board, non-medical care, as well as special education and related services, must be provided at no cost to the family.

- Institutionalized Children: P.L. 94-142 applies to institutionalized handicapped children, such as residents of a state training school for retarded persons. State law must be consulted to determine whether responsiblity for the education of the child lies with the school district in which the institution is located or with the institution itself. Even if a handicapped child is institutionalized or in private school placement, he or she is entitled to a FAPE under P.L. 94-142, which means, most importantly an individualized education program. As with other types of school placements, ultimately it is the SEA which is responsible for monitoring the education program of an institutionalized handicapped child.

- Placement in Private School by Parents: If the parents of a handicapped child choose private school placement, despite the availability of a free appropriate public education, the public school system is not required to bear the costs of the private school. The parents may, however, wish to challenge whether the free public education offered is "appropriate" by using the due process procedures. If the parents prevail, the public school can under certain circumstances be ordered to pay the tuition cost for the private school. (See Amherst-Pelham School Committee v. Department of Education, 381 N.E. 2d 922 (1978).)

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Due Process Procedures Under P.L. 94-142

When evaluation and placement decisions or changes in existing placements are under consideration, due process safeguards must be provided to the child, the parents, and in some instance, the school district. These parties benefit from adherence to well-delineated educational practices and the essential elements of due process. If the parties are in harmony, due process challenges need not be invoked. On the other hand, if conflict arises, the due process appeal procedures of P.L. 94-142 provide a timely and effective mechanism for achieving finality and avoiding protracted disputes which may interfere with a child's education.

Procedural Protections Under P.L. 94-142

- Notice

When Notice is Required: The act requires written prior notice to the parents, guardian or surrogate parent of the child whenever the state or local district proposes or refuses to initiate or change the identification; evaluation; educational placement; or provision of a free appropriate public education (i.e., individualized instruction and related services as per IEP).

The notices must describe (in the native language of the recipient): the proposed action and the reasons for such action; the evaluation or other basis for the proposed action; the right of parents (guardian or surrogate parents) to file a complaint with respect to the proposed action and their right to obtain an impartial hearing (and judical appeal) to review their complaint.

Following the receipt of a notice as described above, or at any other time, a parent, a guardian, or surrogate parent may present a complaint to school officials with respect to any matter relating to the identification; evaluation; educational placement; or provision of a free appropriate public education of a handicapped child.

- Due Process Hearing Rights

Upon receipt of a complaint, the parent, guardian or surrogate parent must be offered the opportunity for a due process hearing. If a hearing is not offered, one should be requested immediately. (NOTE: Neither the Act nor the regulations prevent the use of mediation efforts prior to a hearing so long as a hearing is promptly provided if mediation fails.)

- Rights Associated with Hearing

A. The hearing officer must not be an employee of any agency involved in the education or care of the child.

B. The parents, guardian or surrogate parent may examine all relevant school records. (This can be done even in the absence of a hearing.)

C. The parents or other representative may obtain an independent education evaluation of the child. (This can be obtained even in the absence of a hearing.)

D. Any party to a hearing has the right to: a) counsel; b) the assistance of experts: c) present evidence, compel the attendance of witnesses and cross-examine witnesses; d) a record of the hearing; e) written findings of fact and a written decision.

E. Any hearing conducted by a local school district is appealable to the State Education Agency and all administrative decisions are appealable to state or federal court.

Placement of a Child Pending Decision. Unless the school officals and parents agree otherwise, the child is to remain in his or her current placement pending the outcome of the hearing. If applying for initial admission to school, the child (with the parent's consent) shall be placed in the public school program until all proceedings are completed.

Nothing in P.L. 94-142 prevents the invoking of emergency procedures when a child appears to be endangering himself/herself or others. Once jurisdiction over a disputed IEP has been retained, it would seem likely that a hearing officer is empowered to order an alternative interim placement pending a final decision.

Access to Records/Confidentiality

P.L. 94-142 generally incorporates the requirements of the Family Education Rights and Privacy Act regarding access to educational records and confidentiality of educational records.

Access to Records. Parents have the right to inspect and review any educational records relating to their handicapped child. A request to inspect records should be made in writing. School officials must comply with the request without unreasonable delay. If the information is needed for an IEP meeting or for a due process hearing, the request must be complied with before the meeting or hearing.

Confidentiality of Records. A child's educational records (containing the child's name or any other information by which the child might be identified) may not be released to anyone outside the LEA without parental consent. Before information from the child's record is released, school officials must notify the child's parent and obtain written consent to release the information.

The Family Education Rights and Privacy Act requires that when a student (handicapped child) attains the age of eighteen, the rights and protections regarding confidentiality of records and access to records be accorded only to the student and not to the parents.

Section 504: An Overview

Section 504 of the Rehabilitation Act of 1973, a major civil rights initiative, prohibits all programs and facilities receiving federal assistance from discrimination based upon a handicap. Since virtually all public and many private facilities rely directly and indirectly upon federal funds, this law has widespread application.

The regulations, promulgated under Section 504 by the former Department of Health, Education and Welfare, essentially require that recipients of federal funds provide equal opportunities, including equal education opportunities, to handicapped persons. Subpart D of the regulations contains requirements very similar to those found in P.L. 94-142.

Basically, both laws require that handicapped children be provided a free appropriate public education. Handicapped students must be educated with nonhandicapped students to the maximum extent appropriate. Educational agencies must identify and locate all unserved children. Evaluation procedures must be adopted to insure appropriate classification and educational services. And, procedural safeguards must be established.

In several respects, however, the Section 504 regulations have broader coverage than P.L. 94-142. For example, the definition of "handicapped person" and "qualified handicapped person" under Section 504 covers a wider population than the definition of "handicapped children" under P.L. 94-142. Under the latter definition, a handicapped child is a child who has one of the impairments listed in the statute, who because of that impairment requires special education and related services. Under Section 504, a handicapped child is an individual who has a physical or mental impairment that substantially limits one or more major life activities, has a record of that type of impairment, or is regarded as having that impairment. Particular attention should be given to the second and third categories, because this definition tends to be more inclusive.

Under the definition of "record," students who have a history of a handicapping condition but no longer actually have the condition, as well as students who have been incorrectly classified as having such a condition, are protected from discrimination under Section 504. Frequently occurring examples of the first group are children with histories of mental or emotional illness. Students who have, perhsps, been misclassified as mentally retarded exemplify the second group.

The third part of the statutory and regulatory definition of handicapped person can include students who are sometimes considered to be handicapped, but who do not technically fall within the first two parts of the definition, such as a child with a limp. This part of the definition also includes some individuals who might not ordinarily be perceived as handicapped, such as students with disfiguring scar or a lisp, as well as students who have no physical or mental impairment but are treated by a recipient as if they were, in fact, handicapped.

A careful reading of the Section 504 regulations suggests that recipients of federal funds modify their programs to accommodate the disabilities of applicants. The regulations also address the issue of overall program accessibility. Structural or physical changes in a program are one means for complying with this mandate; however, the more subtle attitudinal and non-physical barriers appear to be subject to scrutiny as well. To date, the Supreme Court has only reviewed one Section 504 case, a higher education decision involving a hearing impaired nurse seeking admission to a training program for registered nurses. *Southeastern Community College* v. *Davis*, 99 S. Ct. 2361 (1979).

It is important to stress that Section 504 has significant implications for advocates seeking to redress discriminatory educational practices in private facilities and programs receiving federal funds, for example, a blanket refusal of a residential program to admit children with a record of epilepsy, regardless of lack of seizure activity or the availability of effective medications.

The Future of Special Education Reform

More than six years have elapsed since the comprehensive Education for all Handicapped Children Act was enacted by Congress to assure a free appropriate public education to all handicapped children. Nearly $1 billion in federal aid is annually disbursed among the states to underwrite special education programs serving 3.85 million children. Despite genuine advances in providing educational opportunities for students with special needs, there still remain serious systematic shortcomings in the implementation of P.L. 94-142. A recent report issued by a nationwide coalition of advocacy groups working with handicapped children and their parents has pinpointed major areas of noncompliance:

- Tens of thousands of children who have been identified as handicapped and referred for evaluation and services are either on waiting lists or ignored altogether by school officials for months or even years.
- Institutionalized children and children in other placements outside their natural homes are routinely denied adequate and appropriate services or excluded from educational services altogether.
- Handicapped children are frequently denied related services, such as physical therapy, occupational therapy, school health services, and transportation, essential to enable them to benefit from special education.
- Many handicapped children remain unnecessarily segregated in special schools and classes for the handicapped.
- Many handicapped children still have not received an individual evalution or an individualized education program (IEP).

- Severely handicapped children are denied education in excess of the 180-day school year, even when such service is essential to the child's education.

The new federal directives which emphasize individualized programs and least restrictive alternatives have placed financial, administrative and political burdens upon local education agencies. Coinciding with the developments in public education, a nationwide movement is also underway toward deinstitutionalization of, and community-oriented care for, handicapped individuals traditionally isolated from the mainstram of society. However, school officials under P.L. 94-142 are becoming accustomed to the idea - some more reluctantly and with varying degrees of resistance than others - that public school systems are emerging as the front-line provider of a host of services far different from the types of services which the public once characterized as "educational" in nature. But the demands of an increasingly articulate class of special education consumers and their advocates are colliding with stiffening taxpayer resistance to generating more local revenues to finance this reform.

Imaginative and creative techniques for achieving the intent of P.L. 94-142 are needed. Such techniques must decidedly include a series of strategies to identify and define the shared responsibility of agencies which have formerly hidden behind rigid policies and exclusionary formulas in denying special education and related services to handicapped children. These strategies must be carfully orchestrated within the forums of federal and state courts, juvenile sessions, and education and mental health administrative proceedings in order to challenge traditionally ineffective responses to the unique and complex needs of handicapped children.

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SPECIAL ISSUES
VOCATIONAL EDUCATION AND VOCATIONAL REHABILITATION

Vocational Education

In the past, access to vocational education has generally been limited for handicapped students. However, a series of federal statutes - most recently the Educational Amendments of 1976 (P.L. 94-482) - have attempted to increase opportunities for their participation in such programs. State vocational education plans must now provide assurances that P.L. 94-142 requirements will be fulfilled. Meaningful vocational training for handicapped students therefore must be individualized while at the same time attempting to achieve integration of disabled and non-disabled students. If necessary, adaptive equipment supplemental aids, specialized teaching techniques and barrier-free classrooms must be utilized to comply with the requirements of Section 504 of the Rehabilitation Act of 1973.

To a large extent, severely handicapped children and students with significant special needs have been excluded from vocational education programs because of the underlying assumption that they are not able to participate in training for genuine employment. "Haphazard enforcement of legal rights, slow consumer organizing and limited vocational opportunities may be real; but the technology of vocational education for severely disabled students is available."* Advocates should be alerted to programs labeled as "pre"-vocational.

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* "Vocational Education: An Outline of Points and Authorities for Persons Interested in the Protection and Advocacy of Rights to Vocational Education for Developmentally Disabled Persons," Public Interest Law Center (PILCOP), Philadelphia, PA.

Credit: Adapted from Developmental Disabilities/Mental Retardation Case Law Manual. (Center for Law and Health Sciences, 1981).

Conceivably, they could lead to the premature removal of academic curricula for mildly disabled students. For more substantially handicapped students, such programs might, on the other hand, result in participation in non-functional, age-inappropriate, often meaningless, repetitive tasks, e.g., placing pegs in pegboards and stacking plastic rings. Students with threshold skills to assemble, sort, manipulate and design should be presented with meaningful tasks and should be allowed to use real vocational equipment, including tools and machinery. In order to eliminate discriminatory practices, the student's IEP should include objectives reflecting real vocational aptitudes and not merely the acquisition of "self-help" or "pre-vocational" skills.

Because the growing overall demand for vocational education exceeds the actual availability of programs and resources, some school districts engage in the practice of "creaming" - enrolling a limited number of mildly disabled students in vocational programs in order to demonstrate nominal integration. Other public school systems have established quotas for students who require special education services as part of the vocational education curriculum. One such admission policy was ruled to be illegal <u>per se</u> in the due process appeal of a sixteen year old learning disabled student with behavioral problems before a hearing officer of the Massachusets Department of Education. Relying upon P.L. 94-142 and Section 504 of the Rehabilitation Act of 1973, a hearing officer ordered the student's admission into a regional vocational high school and further required program modifications, including the provision of a qualified shop aid to implement a revised IEP. Interdisciplinary teams should be prepared to seek and recommend a wide range of integrated vocational placements, from full involvement in regular vocational education classrooms with supplemental aids and services to the provision of spearate special vocational classes within the context of regular public school environments. Such an array of options will encourage the meaninful participation of handicapped students in true vocational education programs using a non-stigmatizing, integrative service model.

Vocational Rehabilitation for Handicapped Persons

In an attempt to provide handicapped persons with the skills needed to obtain meaningful work, Congress enacted the Rehabilitation Act of 1973. (P.L. 93-112). Congress has placed special emphasis on providing vocational rehabilitation services to handicapped persons for the purpose of preparing these individuals for engaging in gainful employment to the extent of their capabilities. To assist the state in meeting costs of vocational rehabilitation, Congress has established a system whereby a state may receive matching federal funds. The responsibilities of the state are specified in a three-year state plan. Vocational rehabilitation services are administered at the federal level by the Rehabilitation Services Administration. At the state level, services are administered by a sole state agency; however, each state may provide for town, city, or county agencies to administer services within their local areas. This discussion focuses on the opportunities and rights of a handicapped person under the state vocational rehabilitation plan.

Scope of Services Provided

Vocational rehabilitation includes a broad scope of rehabilitation services available to disabled persons which can include virtually any or services that can be used to assist disabled persons in terms of their employability. Specifically, the federal regulations mandate that each state plan provide:

- Evaluation and rehabilitation potential including diagnostic and related services necessary to determine program eligibility.

- Counseling and guidance, including personal adjustment and referral to other rehabilitation services not provided under the Act.

- Physical and mental restoration services including medical or corrective surgical treatment; treatment for mental or emotional disorders;

dentistry; nursing services; hospitalization; nursing home care; prosthetic or orthotic devices; physical, occupational speech, and hearing therapy; therapeutic recreation services; and other medical or medically relevant work services.

- Vocational and other training services including personal and vocational adjustment, books, tools, and training services.
- Maintenance. Payments provided to cover a handicapped individual's basic living expenses, such as shelter, clothing and other subsistence expenses necessary to derive the full benefit of other vocational rehabilitation services being provided.
- Transportation including normal travel expenses, subsistence expenses while traveling, and transportation costs while relocating or moving to achieve a vocational rehabilitation objective.
- Services to family members of the handicapped individual, e.g., instruction or day-care services to a handicapped individual's child.
- Interpreter services for deaf persons.
- Reader services, orientation and mobility services for blind individuals.
- Telecommunications including sensory and other technical devices.
- Recruitment and training services.
- Job placement services.
- Post employment services necessary to maintain suitable employment.

- Occupational licenses, tools, equipment, supplies.

- Any other goods and services which can reasonably be expected to benefit a disabled person in terms of "employability."

It is almost inconceivable that any one handicapped individual would receive all 15 services. Nevertheless, it is the rehabilitation counselor's function to be a "counselor-broker." The counselor verifies eligibility based upon a finding of physicial or mental disability, assists in planning the individualized program for the client, and acts as a broker to purchase and arrange services necessary to carry out the program.

Eligibility for Services

The regulations mandate that client eligibility requirements be applied without regard to sex, race, age, creed, color, or national origin. Further, a state agency may not discriminate against a handicapped person on the basis of his or her type of disability, e.g., a counselor cannot turn away the "tough" cases of multiply disabled persons, and may not set an upper or lower age limit for the disbursement of services. Eligibility must be determined expeditiously and may be based only upon:

- The presence of a physical or mental disability which for the individual constitutes or results in a substantial handicap to employment

- A reasonable expectation that vocational services benefit the individual in terms of employability.

Diagnostic Studies.

The first step in determining eligibility is a Preliminary Diagnostic Study (PDS) to be followed by a thorough diagnostic study. This study is used to determine the nature and scope of services needed by the individual to attain his or her vocational goal. The state plan must provide for extensive hearing, visual, and psychological examinations. Mentally retarded applicants shall be given a valid intelligence test as well as an assessment of social functioning and educational progress and achievement. Eligibility determinations based on traditional assessment tools, e.g., IQ tests, aptitude tests, adaptive behavior checklists, work samples, should be subjected to close scrutiny, and often challenged, inasmuch as rehabilitation agencies may tend to use those and other assessment procedures originally developed for less handicapped individuals and apply them invalidly to severely handicapped persons. On the basis of these studies, an applicant may be found to be either eligible for services, ineligible, or put under extended evaluation in order to determine rehabilitation potential.

Order of Selection for Services

When, due to high demand, services cannot be provided to all eligible applicants, a state agency must establish priorities for the use of its resources. In establishing these priorities, the state plan must assure that the most severely handicapped individuals are selected for services before any other group of individuals. The regulations define "severely handicapped individual" as one who has severe physical or mental disability which seriously limits his or her her functional capabilities; one whose vocational rehabilitation can be expected to require multiple services over an extended period or one who has a disability resulting from one of the 23 conditions listed under the regulations.

The state agency is free to consider the financial need of handicapped applicants for the purpose of determining the extent of their participation in the costs of rehabilitation services. If the state chooses to establish an economic test for the child or the family, there are still certain services that may not be withheld because of an individual's financial limitations: evaluation of rehabilitation potential; counseling, guidance, and referral services; and placement services.

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Judicial Developments

There is little case law concerning clients' rights in the area of vocational rehabilitation. Because of the particularity of the regulations, administrative ease often takes precedence over strict adherence to the letter of the law. As a result clients receive fewer services than are their right. One commentator encourages lawyers to follow the appeals process and when necessary, to seek judicial review. "Hearings are not popular with agency staff, and in some cases the prospect of a review of their decisions by any higher authority may cause a reconsideration which will result in services being continued."

Special Issue: Preschool and Summer Progamming

For the multihandicapped hearing-impaired child, the issues of preschool programming and extended programming through the full school year can be critical to insuring early and effective interventions to meet developmental needs. Especially for parents seeking summer programs for their multihandicapped child, the school's obligation to extend services remains at issue.

Pre-School Programs The requirement to make free appropriate public eduction available applies to all handicapped children within a state who are betweeen the ages of three and twenty-one. In point of fact, the annual plans required under P.L. 94-142 "must include in detail the policies and procedures which (each state) will undertake or has undertaken, in order to insure that the state has a goal of providing full educational opportunity to all handicapped children aged birth and through twenty-one." The mandate to identify, locate and evaluate handicapped children (also referred to as the "child search" or "child find" process) under P.L. 93-380, enacted on August 21, 1974, covers the same 0-21 age range. The policy for this broader age requirement is to facilitate planning for younger children who will require special education. While a state is not required to provide such services below the statutory age ranges designated by P.L. 94-142, the state at its discretion may choose to provide services to those children.

Because early childhood intervention and infant screening programs have been selectively operated by public health agencies in various states, some local school districts have chosen to limit programming for the 3-5 age range. Early screening, diagnosis and treatment, including the provision of special education and related services, for this group of handicapped children at an important developmental state may reduce or avoid future placements in institutional or unnecessarily restrictive settings. Therefore, advocates are advised to examine state law and education practices regarding this age group's entitlement to services from school districts and from other public and private agencies.

Twelve Month Programs Traditionally, students have been enrolled in a regular education curriculum for approximately a 180 day school year. This practice has influenced the manner in which state and local educational agencies have interpreted the mandate of P.L. 94-142 for a free appropriate public education. Controversy has arisen over state and local policies which prohibit the funding of special education programs for handicapped children beyond the usual academic year. However, recent third circuit decision on the Pennsylvania Department of Education's rule limiting instruction to 180 days has found that such a blanket prohibition violates federal requirements for individualized programs based upon the unique needs of handicapped children. Armstrong v. Kline, 476 F. Supp. 583 (E.d. Pa. 1979). In this case, the plaintiffs presented evidence that certain children do regress when their educational programs are prematurely interrupted. This group of students faced the possible loss of essential skills and behaviors and would subsequently require a substantial amount of assistance to recoup their previously-noted gains. Therefore, a twelve-month program was required to provide continuity to and to avoid the regressive syndrome caused by the discontinuity of programming over the summer.

The reasoning behind the Battle v. Commonweath decision can be applied to situations where children require extended residential placements, specialized summer programs and educational-related services such as speech, physical and occupational therapy and counseling. Despite this promising ruling, it should be noted that the parents must be prepared to demonstrate the likelihood of loss on an individual basis, since the length and duration of special education services provided under P.L. 94-142 is one attribute of truly individualized progamming for the special needs child.

SPECIAL ISSUES:

INTERAGENCY COORDINATION

Despite the overall expansion of educational programs for handicapped children which have been noted since the passage of P.L. 94-142, persistent gaps still exist in services for what has been described as an underclass of children - a small but significant percentage of serverely handicapped and multiply-handicapped children. These children require a sophisticated array of education-related services and special care and treatment. Among human services agencies, they are sometimes referred to as "stuck cases" or "children who fall through the gaps." They are the focus of interagency disputes among the various state entities statutorily responsible for their welfare. They are the victims of service paradox whereby those children who are most in need of assistance and who potentially have a variety of entry points into the service network through several agencies are least likely to receive appropriate, individualized care.

Most public as well as private agencies serving children have usually targeted their resources for one primary issue or need: developmental or physical disabilities; mental health; public benefits; deliquency or education. Each agency has traditionally set standards, dispersed funds, and provided services only to limited categories of children. Severely handicapped children are consequently excluded from individual programs after a series of circular referrals from agency to agency.

The variety of special education and related services available under P.L. 94-142 was originally intended to reach the most severely handicapped groups of children. In reality, gaps in services may actually be exacerbated by attempts to implement P.L. 94-142. The underfunded and fiscally vulnerable local educational agency is becoming the unwilling lead agency for the provision of new services such as residential programs. System-wide conflicts have developed among state and local agencies, third-party insurers and parents over the responsibility for the cost of these formerly non-educational services.

The establishment of cost-sharing approaches has floundered in an attempt to expand and generalize successful solutions from individual cases.

The fragmentation and diffusion of case management responsibilities among state agencies has led advocates ultimately to select the due process hearings under P.L. 94-142 as a mechanism for securing accountability in delivering therapeutic services. As a result, definitional confusion has arisen over the perceived boundaries between educational and non-educational services. A District of Columbia case, which addressed the "stuck case" phenomenon points up the apparent artificiality of making such arbitrary distinctions. In North v. District of Columbia Board of Education, 471 F. Supp. 136 (D.D.C. 1979) a federal judge concluded that "it may be possible in some situations to ascertain and determine whether the social, emotional, medical, or educational problems are dominant and to assign responsibility for placement and treatment to the agency operating in the area. In this case, all of these needs are so intimately intertwined that realistically it is not possible for the court to perform the Solomon-like task of separating them." In this case, P.L. 94-142 was deemed to be the only legally available mechanism for securing a residential placement of a multiply handicapped 16 year old boy.

For multiply handicapped children, advocacy is an essential service - one which is publicly mandated through the creation of due process mechanisms and state protection and advocacy agencies under P.L. 95-602. Regardless of the existence of due process requirements and statutes, advocacy for the multihandicapped child translates into access to appropriate services - a right that is safeguarded foremost by the knowledge and awareness of the service delivery system.

SPECIAL ISSUES.

THE DEFINITION OF "APPROPRIATENESS"

Standards of "Appropriateness". The federal statute requires that each child receive a free appropriate publicly-supported education. The ultimate issue raised at an appeal hearing is whether or not the school district has proposed an appropriate IEP for the child. Some states which have enacted special legislation in response to P.L. 94-142, or whose own special education initiatives antedated the passage of the federal law, may invoke an additional standard beyond the requirement of appropriateness. In Massachusetts, for example, the enunciated standard is adequacy and appropriateness. Regardless of such language, the statutes, based on the concept of normalization through mainstreaming, require that services be delivered in the least restrictive appropriate placement.

> Beyond this almost self-evident conclusion, it is difficult to formulate an abstract standard of appropriateness that provides a convenient measuring rod against which to compare the needs of widely divergent individuals. A helpful standard must be one which recognizes individual learning capacity and determines the extent to which that capacity will be developed. An ideal system would be designed to achieve the maximum development of the intellectual capacity of every child. A more practicable standard might be one which defined appropriateness in relation to the actual level of educational services provided for most children within a given school system. Under such a standard, an appropriate education for a particular child would require services aimed at developing the child's intellectual capacity to the same degree that the school sought to develop the "normal" abilities of its nonhandicapped students. (Battle v. Commonwealth F. 2d (3rd Cir. 1980), 49. U.S.L.W. 2105)

To gauge the appropriateness of an IEP, the following elements must be considered:

- Whether the IEP was devised in accordance with the procedures set forth in the federal statute and regulations.
- Whether the child's special needs were correctly identified and based upon sufficient evaluation by the clinical team.
- Whether the conclusions of the clinical evaluation team are based on the information contained in the assessments and reports.
- Whether the IEP specifically reflects the needs identified by the clinical evaluation team.
- Whether the school district is capable of implementing the IEP.

If the parents choose to propose a placement as an alternative to the IEP, the hearing officer must examine the appropriateness of that placement. In addition, the hearing officer will rely upon other indications of appropriateness according to the facts of the case. The examiner must determine the weight and credibility of all evidence presented.

Most recently, the definition of "appropriateness" has been further clarified through court interpretation. Commentary concerning the ongoing case Board of Education v. Rowley is presented here to provide additional interpretation concerning the responsibilities of the school district to provide an "appropriate" and individualized education suited to the child's individual and special needs.

Report on Issues Affecting the Communicatively Impaired

GOVERNMENTAL AFFAIRS REVIEW

AMERICAN SPEECH-LANGUAGE-HEARING ASSOCIATION
VOL.3 NO.2
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SUPREME COURT DENIES AMY A SIGN LANGUAGE INTERPRETER

The Supreme Court handed down its first decision defining the scope of PL 94-142 when, in a 6-3 ruling, the Court said that the Hendrick Hudson School District in Peekskill, New York did not have to provide a sign language interpreter as part of the education of 10-year old Amy Rowley, a gifted child who is profoundly hearing impaired.

A lower court had ruled that Amy was entitled to an interpreter under PL 94-142, even though she had maintained an outstanding academic record without assistance, because under the law" each child (should) be given an opportunity to achieve his/her full potential commensurate with the opportunity provided to other children." This ruling was affirmed on appeal.

The Court's Analysis

Justice William Rehnquist's majority opinion, however, said Congress intended for the 1975 law "more to open the door of public education to handicapped children than to guarantee any particular level of education once inside." "Once inside the schoolhouse door," said Rehnquist, "the law generates no additional requirement that the services provided be sufficient to maximize each child's potential commensurate with the opportunity provided other children." All the school needs to show, said the Court, was that the Individualized Education Program (IEP) was developed under procedures that are "reasonably calculated to enable the child to receive educational benefits."

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"Thus," said the court, "if personalized instruction is being provided with sufficient supportive services to permit the child to benefit from the instruction, and the other items on the definitional checklist are satisfied, the child is receiving a free and appropriate public education as defined by the Act."

Pointing to the legislative history of PL 94-142, Rehnquist noted that the statute was devoid of any language which would set any substantive standard describing the level of education to be accorded handicapped children. "Certainly," said Rehnquist," the language of the statute contains no requirement like the one imposed by the lower courts - that states maximize the potential of handicapped children commensurate with the opportunity provided to other children."

Justice Rehnquist was joined in his majority opinion by Chief Justice Burger, and Justices Powell, Stevens, and O'Connor.

Justice Blackmun concurred with the majority opinion but stated that the relevant question was not whether the IEP was "reasonably calculated" to enable Amy to receive educational benefits, but whether Amy's program viewed as a whole offered her an opportunity to understand and participate in the classroom that was substantially equal to that given her nonhandicapped classmates.

Justices White, Brennan, and Marshall dissented. They criticized the majority's interpretation of the Act, stating, "because Amy was provided with some specialized instruction from which she obtained some benefit, and because she passed from grade to grade, she was receiving a meaningful and therefore appropriate education. This falls far short of what the Act intended...it would apparently satisfy the Court's standard...for a deaf child such as Amy to be given a teacher with a loud voice, for she would benefit from that service." They added, "Amy Rowley, without a sign language interpreter, comprehends less than half of what is said in the classroom - less than half of what normal children comprehend. This is hardly an equal opportunity to learn even if Amy makes passing grades."

ASHA's Reaction

Morgan Downey, an attorney and Director of Governmental Affairs for the American Speech-Language-Hearing Association, said that by adopting the lower court definition of the scope of PL 94-142, "the Supreme Court is saying that Amy is entitled to the same opportunity as nonhandicapped children to reach her potential. This is within the Congressional intent of PL 94-142." Downey maintained that the lower court ruling would not require hiring sign language interpreters for all hearing impaired children, but that this case involved Amy and only Amy. (See GAR, Vol. 3, No. 1, p. 57 for further background on the Rowley case.)

SPECIAL ISSUES:

FEDERAL BUDGET CUTS

Education of the Handicapped -- P.L. 94-142

The Problem

Although major progress has been made in the last 8 years to provide an education to handicapped children and get them on the road to self-sufficiency, no other Federal education program has received such harsh criticism from the Reagan Administration as the Education for All Handicapped Children Act, Public Law 94-142. That is because P.L. 94-142 requires the Federal government to actively protect the ecucation rights of handicapped children. The law requires that as a condition for receipt of federal funds, participating states must ensure every handicapped child a free, appropriate public education in the most normal setting possible, with an educational program individually developed with parental consent and participation. States are not required to participate in this program, but all but New Mexico do. As a result, approximately 4 million children currently receive special education and related services under the program.

P.L. 94-142 is "pro-family" because it promotes educating handicapped children in their own school districts and provides important opportunities for parent involvement. It was enacted by the Congress only after years of testimony that detailed the neglect and exclusion of handicapped children as a result of local and state school policies. Before enactment of P.L. 94-142 in 1975, states and the District of Columbia had statutory exemptions in their compulsory school attendance laws for children who were physically, mentally, or emotionally handicapped or who "could not profit from an education." One state, Mississippi, had no compulsory attendance law at all. Congress found that more than one million handicapped children were excluded from school

(Excerpts, including charts, from A Children's Defense Budget: An Analysis of the President's Budget and Children, Children's Defense Fund, 1982) entirely, and that less than half of all children identified as handicapped were receiving adequate and appropriate educational services.

In 1981, the General Accounting Office found that many local educational agencies still have not made a free appropriate public education available to all their handicapped children and probably will not do so until the mid-1980s. Insufficient local and state funds for special education were the most frequent reasons given for being out of compliance with P.L. 94-142. Over half of all local educational agencies also indicated they were unhappy with the technical assistance received from state education agencies.

The vast majority of state and local practices cited by the Administration as problems with the law are really inappropriate, uncreative local bureaucratic responses not mandated by the federal law. Lack of coordination among state agencies also contributes to local implementation problems. These are state problems demanding state and local solutions. What is more, participation in P.L. 94-142, as with all federal grant-in-aid programs, is voluntary for the states.

The Administration's Proposals

The Administration tried to repeal P.L. 94-142 in the 1981 session of Congress and fold its funding into a block grant. Widespread pressure from parents of handicapped children and congressional resistance prevented this effort.

Now, the Administration proposes a FY 1982 rescission that would cut 31 percent of P.L. 94-142's state grant funds for the 1982-83 school year, from $969 million originally appropriated in FY 1982 to $672 million. In addition, for FY 1983 the Administration proposes to block grant the program with Preschool Incentive Grants and the Title I Program for Institutionalized Handicapped Children (P.L. 89-313). The combined funding for these three programs would also be significantly reduced, from $1.1 billion in FY 1982 to $772 million in FY 1983.

The details of the block grant's substantive provisions have not yet been made public. However, last year they included repeal of P.L. 94-142. Even if the law is not technically repealed in this year's block grant, the Administration has already indicated its desire to amend it substantially.

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This is clear from the Department of Education's draft changes in the P.L. 94-142 regulations. These proposals curtail parental involvement, limit services, retreat from integration, eliminate procedural safeguards, and make it harder to hold state and local government accountable for the use of funds. The regulation proposals emphasize that the Department would like to cut back even further, but is hampered by the existing statute.

The Administration has also proposed to consolidate ten special-purpose progams into a single fund. Among the programs to be included are deaf-blind centers, projects for the severely handicpped, early childhood projects, and training for special education teachers. Funding would be cut by 16 percent from FY 1982.

Last year, in response to the Reagan Administration's proposed block grant, at least thirteen states began to repeal or substantially dilute their laws ensuring handicapped children an adequate educational opportunity. In addition, state education departments are changing policies in violation of P.L. 94-142 in reliance on the new federal laissez-faire approach to enforcement. For example, the Illinois Department of Education has proposed to its Board that it cease integration of handicapped children.

Thus, the net result of the budget cuts and change in federal law and enforcement will be a return to the practices of the past: exclusion, segregation and warehouse programs for handicapped children.

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Categorical Children's Programs, FY 1982 and FY 1983

Children's Programs	FY 1982 Current Policy[a]	FY 1982 Funding Level Now[b]	FY 1982 Proposed Level[c]	FY 1983 Proposed Level[d]	Percent Cut From Level Now[e]	Percent Cut Since FY 1981[f]
Child Care and Child Welfare						
Head Start	$ 904.0	$ 911.7	$ 911.7	$ 912.0	0.0%	+ 0.9%
Social Services Block Grant	3,099.0	2,400.0	2,400.0	1,974.1	- 17.7	- 36.3
Indian Social Services	33.7	26.3	26.3	22.0	- 16.4	- 34.8
Work Incentives (WIN)	394.9	245.8	245.8	0.0	-100.0	-100.0
Appalachian Area Development	159.4	59.2	59.2	0.0	-100.0	-100.0
Community Services Block Grant	586.1	336.5	336.5	100.0	- 70.3	- 82.9
Rehabilitation Services[g]	1,045.1	953.5	953.5	650.0	- 31.8	- 37.8
Runaway Youth	11.0	10.5	10.5	6.6	- 37.2	- 39.9
Juvenile Delinquency Prevention	116.4	70.0	70.0	0.0	-100.0	-100.0
Child Abuse State Grants	7.4	6.7	6.7	4.6	- 31.3	- 37.8
Social Service Demonstrations[h]	48.4	29.5	29.5	30.8	+ 4.4	- 36.3
Foster Care[i]	346.0	321.6	321.6	-		
Adoption Assistance[i]	10.0	10.0	10.0	-		
Child Welfare Services	177.0	156.3	156.3	-		
Child Welfare Training	5.6	3.8	3.8	-		
New Block Grant	538.6	491.7	491.7	380.1	- 22.7	- 29.4
Subtotal	$ 7,482.6	$ 6,033.0	$ 6,033.0	$ 4,080.2	- 32.4	- 45.5

Children's Programs	FY 1982 Current Policy[a]	FY 1982 Funding Level Now[b]	FY 1982 Proposed Level[c]	FY 1983 Proposed Level[d]	Percent Cut From Level Now[e]	Percent Cut Since FY 1981[f]
Education Programs						
Compensatory Education[m]	$ 3,961.0	$ 2,886.0	$ 2,474.4	$ 1,942.0	- 32.7%	- 51.0%
Handicapped Education[m]	1,201.5	1,042.1	783.5	845.7	- 18.8	- 29.6
Bilingual Education	194.0	138.1	126.6	94.5	- 31.5	- 51.3
Vocational and Adult Education	1,021.5	739.7	633.9	500.0	- 32.4	- 51.1
Indian Education	89.5	77.9	71.6	51.2	- 34.3	- 42.9
Follow Through	44.3	19.4	0.0	0.0	-100.0	-100.0
Women's Educational Equity	10.0	5.8	0.0	0.0	-100.0	-100.0
Civil Rights IV-A Centers	45.7	24.0	0.0	0.0	-100.0	-100.0
Higher/Continuing Education[n]	447.6	358.6	326.8	247.2	- 31.1	- 44.8
Student Financial Assistance[o] (Pell, Work/Study, Direct)	4,482.6	3,352.5	3,211.0	1,800.0	- 46.3	- 59.8
Subtotal	$11,497.6	$ 8,644.1	$ 7,627.8	$ 5,480.5	- 36.6	- 52.3

Categorical Children's Programs, FY 1982 and FY 1983
(continued)

Children's Programs	FY 1982 Current Policy[a]	FY 1982 Funding Level Now[b]	FY 1982 Proposed Level[c]	FY 1983 Proposed Level[d]	Percent Cut From Level Now[e]	Percent Cut Since FY 1981[f]
Child Health						
Preventive Health Block Grant	$ 107.4	$ 81.6	$ 81.6	$ 81.6	0.0%	- 24.0%
Mental Health Block Grant	585.8	432.0	432.0	432.0	0.0	- 26.3
Community Health Centers Block Grant	350.5	248.2	248.2	-		
Black Lung Clinics	4.9	3.2	3.2	-		
Migrant Health	46.8	38.1	38.1	-		
Family Planning	175.1	123.7	123.7	-		
New Block Grant	577.3	413.2	413.2	416.8	+ 0.9	- 27.8
Development Disabilities	64.2	58.7	58.7	41.7	- 29.0	- 35.0
Immunization	32.9	28.3	28.3	28.9	+ 2.0	- 12.4
Venereal Disease Prevention	51.6	38.4	38.4	45.6	+ 18.9	- 11.5
Maternal and Child Health Block Grant (excludes W.I.C. transfer)	494.6	347.5	347.5	347.5	0.0	- 29.7
Subtotal	$ 1,913.9	$ 1,399.7	$ 1,399.7	$ 1,394.1	- 0.4	- 27.2

TRENDS AND NEEDS
FOR HIDD IN THE 80's

UAF HIDD WORKSHOP
Futuring Session

May 12-14, 1982

INTRODUCTION

As a part of HIDD grant activities conducted by the American Speech-Language-Hearing Association, a National HIDD workshop was held on May 12-14, 1982 for invited representatives from University Affiliated Facilities programs funded by the Administration on Developmental Disabilities. The group of 34 representatives from a variety of disciplines was randomly divided into three topic sections - Mental Health, Communication, and Research - to apply their experience and project future trends and needs for the HIDD population in the 1980's. Three workshop faculty members, Kenneth Moses, Raymond Trybus, and David Yoder, were chosen for their content expertise to summarize the results of these" brainstorming" sessions to the full assembly of participants. The script of each summary, along with listings of the specific points from each individual group's efforts, are included in this section.

Mental Health

Kenneth Moses: Our group discovered something that I think is probably necessary to talk about in an open fashion which is that the very types of things we chose to deal with, we were living. The concept we decided to tackle had to do with setting up structures for enhancing mental health and for blocking "crazy makers" in a system that is dealing with trying to habilitate a child, and therefore the family as well. We tried to conceptualize and come up with ideas, each person having a pet project, a pet issue, all of which are listed here. As we tried to do what we did, I would like to share with you the process because it has a great deal to do with the conclusions we came to and the type of summary that can be offered.

We got angry. We started to split apart. We didn't like the assignment. We became irritated and annoyed and frustrated and realized that we had a circumstance that was a "crazy maker" in and of itself - it was the same "crazy maker" that probably goes on in a classroom, that goes on in a rehabilitation center, that goes on in a hospital; that goes on wherever a person is trying to deal with a topic with inadequate training, inadequate time, inadequate input, etc. The first thing we said was, "You know what? That's what its about." To set up a circumstance where we are going to be making reasonable recommendations for enchancing mental health, the first thing we have to say is, "It's got to be done sensibly." Sensibly we know about. What does that mean?

There are three basic things that everybody knows - research, education, and training. Big relevation, right?!. We keep living as though this is a big relevation because we don't actually apply those concepts of understanding that first, you do research; then you teach other people what you have learned; and then you train people how to do it. In what arena? Well, we looked and we came up with a nice little paradigm that has to be filled with research, education, and training. (See Matrix on P. 5.) This paradigm says there are three fundamental areas of enhancing mental health. **Number one is in the area of normal emotional development.** Conceptually, do people know what normal emotional development is? Do they know how it is enhanced? Do they know how to enhance it in a regular rehabilitation program? To give examples - do you know how to enhance autonomy? Do you know how to enhance security? Do you know how to enhance a positive self image? Is it part of your program? Do you know if it's part of your program? How do you know? Is it evaluated? Is it talked about? Is it examined?

The second area of primary concern is crisis management. We are all aware that having a handicapped child is a crisis to parents. Some of us are aware that having a handicap becomes a crisis to the child as the child becomes older and aware of it. It is a crisis to the community. It is oftentimes a crisis for the professionals who encounter the handicap and cannot cure it the way they hoped they might when they were in school. Is there knowledge of how to manage crisis, not by professionals in the mental health field but by people who are doing the habilitation in their natural milieu? Is it talked about? Is there a conceptual framework? Is there a philosophy? Is it behaviorally enacted in policies on a day-to-day basis.

The third area is understanding the effects of disability on the attainment of mental health - is that even considered or talked about? There are a number of levels of this concern. For instance, how does a deaf infant acquire the sense of security that a hearing infant gets when mother calls from downstairs and says, "I'm coming." How do you compensate for it. Is it thought about? Is it discussed? Is it part of a program? Again, the research, education, and training components have to go in these three basic areas - emotional development, crisis management, and the effects of disability all in the service of mental health.

Four different populations have to be addressed. Obviously the child - we don't have to dwell on that particularly; but secondly, is the **family**. Are systems incorporated that are looking at the family as a singular unit with the child? Is that an accepted concept and if so, how is it manifest in your treatment programs? Are the families automatically brought in? Are they offered service automatically? Do they somehow need to qualify to be mentally ill in some fashion before you offer them service? Looking at the **community** - is the community involved in your treatment program? The community can be a "crazy maker" or a mental health enhancer. Attitudes towards the disabled - their ability to move into the community and to move out - the ways of dealing with community attitudes towards differences should be part, it seems, of an agency's or hospital's skills. Therefore, again, we go into the arena of research, education and training in those areas.

Lastly, there are professional areas. I am talking about the mental health of the professional - dealing with stresses; dealing with the "burnout" issue; dealing with the unique circumstances of having to work with people who are terribly dependent upon you, your services and your attitudes without having enough information to do things the way you would want to; without having the funding necessary; without having the support when stresses are put upon you and the propensity then to take that out on the people you are working with or working for.

We became aggravated because we were afraid we would make fools of ourselves in some fashion; because we couldn't stand in front of you and say, "We have some wonderful innovative ideas that we have cranked out that you can now take and apply or test or do research on." We have a very non-innovative idea. I wonder why it has not been used to this point in the area we have been assigned - mental health - which is very simple. We must focus on research, education, and training on this 3 x 4 structure. That's what we have come up with and basically say, if indeed we want to come up with innovative programs out of a group like this and out of meetings of this nature, we are going to have to structure it so that we can get from each other the education, the research that's there, and then training to come up with innovative ideas.

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TRENDS AND NEEDS IN MENTAL HEALTH

Objectives:

- To identify specific needs in the area of mental health for HIDD children and their parents.
- To discuss innovative mental health considerations in the design of assessment and/or comprehensive service programs for HIDD children and youth.

The session was organized to discuss trends (T) and needs (N) in the dimensions outlined in the following maitrix.

	Child	Family	Community	Professional
Emotional Development	N / T	N / T	N / T	N / T
Crisis Management	N / T	N / T	N / T	N / T
Effects of Disability	N / T	N / T	N / T	N / T

Child-Oriented Needs:

- A consistent use of mental health consultants for residential schools
- The use of mental health inteventions as part of standard treatment.
- A leisure outlet.
- A need to study the overall effects of the disability and the specific effects of the disability on the child's emotional development.
- Help the child in going through his/her own grieving process.
- Friends/options/dignity.
- Advocacy.

Child-Oriented Trends:

- o Use of mental health clinics as a partner in assessment.

Family-Oriented Needs:

- o Retraining and a commitment of mental health professionals to accommodate the multiply handicapped.
- o Training for extended family and siblings.
- o Help for parents to recognize when a child is going through periods of crisis and how to help.
- o The development of respite care facilities.
- o Advocacy for crisis intervention programming.
- o Parenting counseling for HIDD adults and adolescents.
- o Crisis management for the child and the family of a child with progressive illness/disability.

Family-Oriented Trends:

- o Support for in-home services, i.e. programs and services to prevent out-of-home placement.
- o Increased availability of genetic counseling to reduce the incidence of conditions resulting in HIDD.
- o Family-to-family support systems.

Community-Oriented Needs:

- o To have a qualified clinician within the agencies to work with individuals and families.
- o To help the community to recognize when a child is going through periods of crisis and how to help.
- o To develop community awareness of the variety of disciplines that work with the HIDD population in mental health facilities.
- o Community intervention in terms of attitudes toward the handicapped.

Community Trends:

- Rise of anxiety around group residences.

Professional Needs:

- To have emotional development enhancement within the normal habilitation environment.
- To have crisis management enhancement with child, family, community and professionals.
- To give adequate training for mental health professionals in the type of disability they are seeing and to recognize the specific effects which a particular disability might have on the emotional development of the child.
- Professionals who are knowledgeable about the real service network of their geographical area.
- More integrated training for hearing impaired and developmentally disabled groups.
- Professional training around issues of public pressure, adjustment and resolution.
- Incentives for professionals to become involved with the HIDD population.
- Training professionals to be consultants within the community.

Professional Trends:

- Rapid development of information.
- Better information sharing.
- More training and education in the area of normal emotional development and crises and the effects of disabilities on these processes.
- Decreased funding base decreases the chance for sharing in some respects.
- The use of support groups for all four categories but emphasis on the use of support groups for professionals.
- Look at stress management programs.

- Working in groups when working with families.
- Identifying the HIDD child much earlier has impact on mental health in all areas.
- Interdisciplinary training to meet the needs of the hearing impaired-developmentally disabled population.
- Decreased interest in clinical training for people who have to do with the developmentally disabled at the governmental level.

Communication

David Yoder The first issue that our group was assigned had to do with identifying and projecting trends in the development, marketing and accessibility of augmentative devices and their impact on the HIDD student. Before I discuss what it was we did, I would call your attention to the prophecy statement which was a concern Chuck Tait brought up and one which I made mention of yesterday: with the glitter of devices and augmentative prostheses, we as professionals can get ourselves into the box of suggesting that this is going to "fix" all of the communication problems of the HIDD population. If that's our attitude, then it shouldn't surprise us if parents are going to assume the same kind of attitude. One of the things we did not spend time on but I would certainly underscore is that we need to look further at the efficiency and the effectiveness of the non-device systems that can be used with the HIDD population. We need to continue to focus on research relative to sign systems, formal gesture systems, and combinations thereof. While our task was basically to focus on the devices themselves, only about 5% of this population to date can effectively use those kinds of devices.

Our trends and needs can be categorized into a couple of areas: first, **research and information needs**. We need to look at the HIDD population and differentiate disabilities within that population and their function levels before we can begin to really develop and effectively market devices, especially simple devices that are going to be useful for this population. We need to increase the research on the population regarding the effectiveness of the various symbol systems including the sign and gesture systems that are in use today. We also need to continue the research on the design of the devices and/or communication prostheses.

Incidentally, I use the term "prosthesis" as a substitute for device. I do that for this particular reason: third-party payers and supporters of the devices are more responsive to terminology that more resembles that which deals with medical as compared to educational techniques. We have been using that particular term and while it does not mean that 100% of the time we are going to be successful in getting support for the device, we nevertheless use it. We are getting away from the use of the term "communication aid" because there are many places in this country where an aide is a person who facilitates lessons within a classroom situation. The terminology does become important.

Research on the design of prostheses in terms of size and portability becomes important - as does software compatibility with the systems that do exist and continued research to increase the quality or intelligibility of speech synthesis output. With this kind of information we might be more effective in providing inputto the the manufacturers and distributors of communication devices and prostheses. I have found the developers of communication prostheses very interested in hearing from professionals on new and better ways to make systems more efficient. If you have complaints and/or concerns, please make them known; manufacturers are quite receptive. With the advancement of computers and technology, the available hardware on the market for other than communication purposes is going to allow those of us within the profession looking at the needs of the HIDD population to come up with better fits for those things that already exist. Because these pieces of equipment have been developed not for specific disability populations, but for the general population, the market is much greater; therefore they become a cheaper item. There were a couple of comments made with the hope that communication devices will become cheaper over time. That is not too likely from the standpoint that we are looking for systems and devices for a small population. While you and I may look upon it as a large population, the manufacturer does not. It is not a market in which lots of people are being competitive.

Other than developing devices and prostheses for communication purposes, there is also the need for looking at various kinds of equipment and programs to increase the desire on the part of the multiply handicapped person to interact and to become communicative. I am pleased to say that there is a lot of very interesting work going on today in the area of electronics on environmental manipulation which, either through vocal and voice operated relays or other sorts of switching devices, allow people to move on the environment and thus create desires for interaction. There is also the continued need for the professions collectively to seek more independence from the medical profession in making recommendations for communication devices outside of the prescription by the physician.

In terms of **training and models**, the task that was given to us was to identify and project needs for professional training and models for meeting those needs in the next 3 to 5 years. We discussed this in two senses: 1) What can we do in terms of **inservice training**. There is a tremendous need for those of us within the profession to, in some sense, get caught up with the state-of-the-art relative to communication needs as well as to special needs of the hearing impaired DD individual. If there was a concerned voiced and a very real and important one, it is that speech and language pathologists are persons who are going to be very much involved in heading up teams for evaluation, assessment and program implementation, and as such, speech-language pathologists need greater familiarity with the special needs of the hearing impaired. By the same token, those trained in teaching hearing impaired persons need increased knowledge of language/communication areas.

Secondly, we discussed **preservice training** from the standpoint of interdisciplinary or, as I would like to look at it, a cross-disciplinary approach. The type of problems that we are working with are not those that can be dealt with as efficiently by any single profession as they can by multiple professions. This means that courses and seminars should be taught cross-disciplinarily with **cross disciplinary attendance** and **interaction** encouraged. Regarding a curriculum, we discussed some basic notions here and I might add that the Ad Hoc Committee on Nonspeaking within the American Speech-Language-Hearing Association has established a working committee that has been developing a suggested curriculum for training programs. This is an interdisciplinary curriculum that has been put together as a suggested guideline. Copies of the draft are available from the Director of Speech-Language Pathology at the ASHA National Office.

Some of the highlights of our futuring dealt with the notions that: we need information in basic electronics and computer programming if we are going to be dealing with devices and computers; we need to have much more training and hands-on experience with the HIDD population and other special populations; we need to have hands-on experience with the different types of communication devices/prostheses which are available; we need direct experience with the special assessment needs of this particular population, with the available facilitative techniques, and with different kinds of symbol systems; and we need to look at communication effectiveness beyond just the fitting of the devices themselves to what these mean to the significant others - families and the community.

TRENDS AND NEEDS IN COMMUNICATION

Objectives:

- To identify and project trends in the development, marketing and accessibility of augmentative devices, and their impact on HIDD students.
- To identify and project needs for professional training and models for meeting those needs in the next 3-5 years.

Trends:

- May want to separate out different disabilities (categories) within the HIDD population before the development and marketing of devices can be done, e.g., visually impairment, motor impairment.
- Contiunued advances in quality and flexibility of speech synthesis devices are likely.
- These devices will probably become less expensive and used more extensively in clinics and schools.
- The devices will be use by the HIDD population for sending and receving messages and for learning expressive and receptive language.
- The devices will be used by the HIDD population for sending and receiving messages and for learning expressive and receptive language.
- There will be a trend for more service delivery professionals to impact more strongly on the planning of technology.
- Reimbursement issues including physician authorization will need to be worked out.
- Considering the small size of the population benefiting from specific symbol design, software delivery cost-effectiveness must be determined. Manufacturers are interested in simple devices because of limited demand.
- Equipment will take a word and develop a full thought to facilitate poor language on the part of the profoundly HIDD. This is being worked on now.
- To make input as simple as possible and output useful to a maximum number of people or receivers.
- An increase in research on this population will promote meaningful advances in programs.

- As technology improves it should be possible to develop a dual mode personal computer which can be used to both receive and transmit verbal information.

- Medical, educational and other specialists will come to see the need for establishment of at least a basic communication system as a primary need and right of the severe/multihandicapped individual especially HIDD and will institute the practice of immediate referral to an established program.

- The size and portability of the devices will improve. There is hope for the development of simple device(s) with cross-system software compatibility; there are currently many companies with many incompatible software systems.

- As cost is reduced and demand increased, schools may be obligated to purchase these devices.

- Designing programs and equipment that will help the profoundly handicapped to want to communicate.

- Options in delivery will need to be explored and workable delivery systems established.

Concern:

The population is so small that available devices would probably never meet the personal needs of each child.

Prophecy:

Many professionals will continue to falsely believe that the solution to communication problems of HIDD individuals will be found in some new instrument or device.

Training and Models:

- More basic training and technical expertise with computers; not with the notion that we will become computer programmers but with the goal of understanding computer programs and their capabilities. Need expertise in "fixing it" or trouble shooting these instruments.

- Methodology/brainstorming sessions and hands-on workshops with HIDD children and adults (preservice and inservice) rather than lecture.

- There will be a need for advanced training for matching the needs of the client with available technology.

- A core group such as the participants at this UAF conference must become disseminators of information regarding the need for looking to augmentative systems of communication; they must be "salesmen" or "advocates" of the importance of the use of and consequently training in these systems.

- Professionals must be increasingly skilled in long-range remedial planning in addition to the short-term lesson planning we are more used to.

- Professionals need to have a working knowledge of various aspects of HIDD populations beyond their own disciplinary bailiwick.

Concern

Teachers of the hearing impaired have a limited knowledge of language. Speech-language pathologist's knowledge of hearing impairment, cognition, etc. is limited.

- Tremendous expansion in the training and preparation of special educators and other treatment professionals in the use of devices is necessary.

- Advanced training with input from occupational therapy and physical therapy with regard to the physical capabilities of handicapped individuals.

- The training objective will be to teach these professionals to use the devices, choose appropriate devices for the HIDD individuals and to develop software.

- Regional consortiums will be central to the training of professionals and their resources will need to be effectively networked for optimum service.

- Training needs should include exposure of non-professionals to such devices so clients will have a chance to partake in more reciprocal interactions. Public education leads to greater acceptance.

- Training professionals in methods and strategies to get kids into good programs as early as possible without incurring excessively costly procedures.

- Training institutions, i.e. universities, must be informed that personnel trained in the use of devices are needed in the employment force.

- Need a cross-disciplinary course for occupational therapy, physical therapy, psychology, speech-language pathology, audiology, special education, etc.

Research

Ray Trybus Unlike our friends in the mental health group, we didn't have any problems with the task. We know that our stock-in-trade in research is internal chaos and so we have no illusions that the outside work could be any different. We have just five things to tell you:

1. We integrated the needs and the trends (and you will see that in the things that I have to say). The first point really is that, although for reporting we need to summarize, our basic message is that the summary is not important but the specifics included in the summary are the key. The specifics are listed at the end of this summary. Our first substantive point is that we need **research on the definition, identification, nature and the extent of the HIDD population,** and that includes a variety of specifics; for example, the development of data bases of various kinds, setting up local high risk registries, doing public information as a way of encouraging child find, and so forth. All of that is included within that broad category of the nature, definition and extent of the HIDD population,

2. Next, our group generated a cluster of concerns related to research on **improving the techniques for assessment:** screening, early identification, diagnostic and assessment techniques for determining that a child is appropriately called a HIDD.

3. We felt a need for research on some **new strategies for working with HIDD individuals;** with parents, with the siblings; all together, that equals the family. What happens after identification and screening in the form of some kind of programming or intervention, is our third point.

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4. The first three identified research areas are really more in the area of needs. The fourth point we have made is that in looking at the first three, we see a **dysynchrony between what we see as the needs and trends.** Of the trends, the first thing that we are all worried about is an apparent reduction of the availability of funds, the dispersion of such funds, and increasing difficulty in getting the support that we need for research. And so, although we see the need to increase some things, we see decreasing funding support for that.

5. Finally, one trend that we see that is probably a positive one in our view; that is, a **current trend to focus on older people**; post-school, first of all, and then aging HIDD people. One member of the group said something like "demography is destiny", meaning that as our population grows up and we all become older, the needs and the voting power of that population will determine a lot for the future, so we can assume - as a trend - that we will see more emphasis on the needs of older HIDD people.

TRENDS AND NEEDS IN RESEARCH

Objectives:

- To identify and prioritize trends and needs for research with the HIDD population for the 80's.

Trends:

- An increase in medical and perceptual screening for the newborn.
- Reduction in moneys available to evaluate the new technologies that could be used with the population.
- Transfer of research funding to the states and private sector vs. federal coordination.
- Reduction of funds will prevent research into developing new communicative technology as well as curriculum and materials for this population.
- Increased interest in the adult and aging HIDD population.
- Struggle between established research programs to keep what they have vs. federal administration emphasis on competition in the research area.
- Interagency and international networking and collaboration.
- Accessing information from UAFs by preservice training programs.
- Improved public awareness through media campaigns.
- Combining of current resources to economize efforts in research and service delivery.
- There is indifference to the needs of post-academic individuals; need increased attention to the maintenance and facilitation of language and skill usage in the community.
- Federal and state mandating (without sufficient input from professionals) of diagnostic and rehabilitation service for the population.

Needs

- Behavioral and educational technology approaches to subject matter areas.
- Further ability to differentiate central language processing abilities and disabilities above those related to hearing impairment alone.
- Objective investigation into different methods of teaching language and reading.

- Strategies for working effectively with parents in diagnostic, treatment, follow-up.
- To develop parent programs for coping and dealing with HIDD children and teens.
- Information regarding what happens to HIDD population after school: number of jobs, what kinds of jobs, number successful, what happens to the rest of the population?
- To study attitudes of the deaf community regarding the developmentally disabled.
- To explore the limits of computer techology for use with HIDD people and service providers.
- Further research regarding most effective methods for training parents and paraprofessionals to provide services to this population.
- Further research regarding screening techniques for moderate and severe hearing losses as early as possible.
- Better procedures for prevention, identification and early intervention.
- development of community-based high risk register and child find programs to identify the HIDD population.
- Need a lot of information on where the present HIDD population receives their education and the outcomes and results.
- Training of personnel to teach the HIDD population.
- To research and develop new techniques and strategies that include language communication systems, curriculum and curricular materials specifically for HIDD.
- To study interaction of HIDD individuals with their siblings.
- To get a working definition of what is an HIDD child for the general population.
- To determine best ways to use recent technological advances to improve the standard of communication abilities of HIDD.
- Need a data base on how interventions should differ according to the unique characteristics of the HIDD child.

- Develop a consensus on the proper balance of research addressed to prevention, restoration and accommodation.
- Genetic engineering and cell biology.
- To explore and investigate the feasibility of new screening and DX procedures to meet the needs of HIDD individuals.
- Investigation into community attitudes toward HIDD population regarding mainstreaming for education, vocation and residence.
- Securing sufficient funds.
- Exploitation of math success found in deaf students.
- A better communication link between UAF's for research purposes.
- To set up network among UAFs and other agencies to collect data and plan for future needs.
- Further investigation into definition, nature and extent of the HIDD population.

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University Affiliated Facilities Workshop on
Hearing Impaired Developmentally Disabled
Children and Adolescents

May 12, 13, 14, 1982
Washington, D.C.

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