DOCUMENT RESUME

ED 196 196 EC 131 323

TITLE	Educational Methods for Deaf-Blind and Severely Handicapped Students. Volume IV.
INSTITUTION	Texas Education Agency, Austin. Div. of Special Education.
SPONS AGENCY	Department of Education, Washington, D.C.
PUB DATE	Aug 80
NOTE	181p.: For Volume I, see EC 120 743: for Volume II, see EC 120 114: for Volume III, see EC 121 577.
EDRS PRICE	MF01/PC08 Plus Postage.
DESCRIPTORS	Career Development: *Communication Skills: *Consultants: Curriculum: *Deaf Blind: Early Childhood Education: Elementary Secondary Education: Job Skills: Language Acquisition: Motor Development: Parent Attitudes: Play: Resource Room Programs: Self Care Skills: Self Mutilation: *Severe Disabilities: *Teaching Methods: *Vocational Education: Work Experience Programs

ABSTRACT

Fourteen papers resulting from workshops on the inservice needs of educators working with deaf-blind and severely handicapped students cover educational programing, communication, work skills, and consulting. Entries include the following titles and authors: "Play: An Instrument for Growth in Multihandicapped Children" (D. Enright): "Problems in Managing Self-Injurious and Self-Stimulatory Behaviors" (R. Neel, J. Kayser): "Teaching Self-Help to Severely and Multiply Handicapped Children" (T. Jones): "Motor Functioning" (M. Forman, M. Smith): "Introduction to a Study on the Concerns of Parents with Deaf-Blind Children" (P. Fernandez): "The Emergence of Intentional Communication" (I. Bretherton, E. Bates): "Early Childhood Language and Its Social Substrate" (L. Kent): "A Strategy for Developing Chronological Age Appropriate and Functional Curricular Content for Severely Handicapped Adolescents and Young Adults" (L. Brown et al.): "The Lower Functioning Severely Handicapped Individual: Providing Work Skills Training During the Educational Years" (G. Stone): "Career Development Needs of Students Who Are Multi-handicapped" (F. Simpson): "A Prevocational Resource Room: A Program Model for Severely Handicapped Students" (B. McGinnity): "Public School Sponsored Community Based Work Training Programs for Deaf-Blind Adolescents" (D. Dildy): "How to Consult with Instructional Staff" (A. Ivey): and "Consultation for Related Service Personnel" (C. Jones). (SBH)

Educational Methods for Deaf-Blind and Severely Handicapped Students

Volume IV

TEXAS EDUCATION AGENCY
DEPARTMENT OF SPECIAL EDUCATION
SPECIAL EDUCATION DEVELOPMENTAL SERVICES
CENTER FOR DEAF-BLIND

201 East Eleventh Street
Austin, Texas 78701
August 1980

Funded by:
U.S. Department of Education
Department of Special Education
Public Law 91-230, Title VI, Part C

COMPLIANCE STATEMENT

TITLE VI, CIVIL RIGHTS ACT OF 1964; THE MODIFIED COURT ORDER, CIVIL ACTION 5281, FEDERAL DISTRICT COURT, EASTERN DISTRICT OF TEXAS, TYLER DIVISION

Reviews of local education agencies pertaining to compliance with Title VI Civil Rights Act of 1964 and with specific requirements of the Modified Court Order, Civil Action No. 5281, Federal District Court, Eastern District of Texas, Tyler Division are conducted periodically by staff representatives of the Texas Education Agency. These reviews cover at least the following policies and practices:

(1) acceptance policies on student transfers from other school districts;

(2) operation of school bus routes or runs on a non-segregated basis;

(3) nondiscrimination in extracurricular activities and the use of school facilities;

(4) nondiscriminatory practices in the hiring, assigning, promoting, paying, demoting, reassigning, or dismissing of faculty and staff members who work with children;

(5) enrollment and assignment of students without discrimination on the basis of race, color, or national origin;

(6) nondiscriminatory practices relating to the use of a student's first language; and

(7) evidence of published procedures for hearing complaints and grievances.

In addition to conducting reviews, the Texas Education Agency staff representatives check complaints of discrimination made by a citizen or citizens residing in a school district where it is alleged discriminatory practices have occurred or are occurring.

Where a violation of Title VI of the Civil Rights Act is found, the findings are reported to the Office for Civil Rights, Department of Health, Education and Welfare.

If there is a direct violation of the Court Order in Civil Action No. 5281 that cannot be cleared through negotiation, the sanctions required by the Court Order are applied.

TITLE VII, CIVIL RIGHTS ACT OF 1964; EXECUTIVE ORDERS 11248 AND 11375; TITLE IX, 1973 EDUCATION AMENDMENTS; REHABILITATION ACT OF 1973 AS AMENDED; 1974 AMENDMENTS TO THE WAGE-HOUR LAW EXPANDING THE AGE DISCRIMINATION IN EMPLOYMENT ACT OF 1967; AND VIETNAM ERA VETERANS READJUSTMENT ASSISTANCE ACT OF 1972 AS AMENDED IN 1974.

It is the policy of the Texas Education Agency to comply fully with the nondiscrimination provisions of all federal and state laws and regulations by assuring that no person shall be excluded from consideration for recruitment, selection, appointment, training, promotion, retention, or any other personnel action, or be denied any benefits or participation in any programs or activities which it operates on the grounds of race, religion, color, national origin, sex, handicap, age, or veteran status (except where age, sex, or handicap constitute a bona fide occupational qualification necessary to proper and efficient administration). The Texas Education Agency makes positive efforts to employ and advance in employment all protected groups.

Introduction

The papers contained herein were collected from presentors at at the Spring 1979 series of workshops conducted jointly by the Texas Center for Deaf-Blind and the twenty regional education service centers in the state of Texas. The workshops were organized and conducted to respond to the priority inservice needs of educators working with deaf-b ind and severely handicapped students.

Services for the deaf-blind and severely handicapped have grown tremendously in the past few years. Those who have been working as educators in this field possess a great deal of knowledge concerning the theory and techniques for working with this population. Conferences and papers such as these are important in disseminating the kind of practical, useful information so necessary to good programming for these students. These papers are published in the hope that personnel in the field will continue to share, argue, and discuss ideas that will make educational programming for the deaf-blind and severely handicapped the best it can be.

TEXAS EDUCATION AGENCY

STATE BOARD OF EDUCATION
(State Board for Vocational Education)

MRS. ELIZABETH R. ARMSTRONG, Lake Jackson

JAMES M. BINION, Abilene

JOE KELLY BUTLER, Houston

W.W. CARTER, Amarillo

DON H. COOK, D.D.S., Mesquite

BRYAN CROUCH, Poteet

DR. VIRGINIA CURREY, Arlington

JIMMY L. ELROD, San Antonio

W.H. FETTER, La Marque

WAYNE FREDERICK, Orange

JOSEPH C. GATHE, M.D., Houston

E.R. GREGG, JR., Jacksonville

RUBEN E. HINOJOSA, Mercedes

JIM HOLLINGSWORTH, De Soto

WILLIAM N. KEMP, O.D., Houston

MRS. MARY ANN LEVERIDGE, East Bernard

PAUL MATHEWS, Greenville

REX REDDELL, San Marcos

WILLIAM R. SARSGARD, Fort Worth

MRS. LAURA TYNES, Waco

MRS. MARJORY VICKERY, Lewisville

JAMES H. WHITESIDE, Lubbock

WAYNE WINDLE, El Paso

ALTON O. BOWEN, Commissioner of Education
(Executive Officer of the State Board of Education)

GRACE S. GRIMES, Deputy Commissioner
for Planning/Accreditation,
Professional and Program Development

RAYMON L. BYNUM, Deputy Commissioner
for Program Administration and Finance

Spring 1979 Workshops for Personnel
Serving Deaf-Blind and Severely Handicapped

February 1-2, 1979: Galveston, Texas (Cluster D)

- Behavior Management - Wanda Myers and Paul Adams
- Cognitive Assessment of the Severely Handicapped - Deborah Bouchard Enright
- Prevocational Programming - Gretchen Stone

February 7-8, 1979: El Paso, Texas (Cluster A)

- Motor Functioning - Marilyn Smith and Marianne Forman
- Behavior Management - Dr. Dee Duncan
- Administrative Issues - Ken Crow
- Issues and Programming for the Severely Handicapped - Kitty Dorsey

March 1-2, 1979: Austin, Texas (Cluster E)

- Body and Sense Thinking and the Multihandicapped Child - Dr. Harry Wachs
- Techniques for Self-Abusive and Self-Stimulatory Behavior - Dr. Richard Neel
- Early Childhood Language and Its Social Substrate - Dr. Louise Kent

March 7-8, 1979: Dallas, Texas (Cluster C)

- Communication - Dr. Inge Bretherton
- Social Development in Deaf-Blind Children - Dr. Paulina Fernandez
- Prevocational Training - Betsy McGinnity, Dennis Dildy
- Workshop for Related Services Personnel - Tom V... Cynthia Jo... s

April 3-4, 1979: Abilene, Texas (Cluster B)

- Self-Help - Dr. Tom Jones
- Prevocational Programming - Frank Simpson
- Related Services - Cynthia Stone, Karen Clegg, Susan Metzger, and Tom Valentine

Table of Contents

Contributors

The Texas Education Agency wishes to acknowledge the contribution of the following persons in the development of this publication.

Inge Bretherton, Ph.D.
University of Colorado
Department of Psychology
Boulder, Colorado 80309

Lou Brown, Ph.D.
Department of Special Education
University of Wisconsin
Madison, Wisconsin 53706

Dennis R. Dildy
Region XX Education Service Center
1550 N.E. Loop 410
San Antonio, Texas 78209

Deborah Bouchard Enright
29 Beach Street
Milford, New Hampshire 03055

Paulina Fernandez, Ph.D.
New York University Medical Center
Millhauser Labs, Room 316
550 First Avenue
New York, New York 10016

Marianne Forman, O.T.R.
Marilyn Smith, L.P.T.
Harris County Department of Education
6515 Irvington Boulevard
Houston, Texas 77022

Ann Ivey, L.P.T.
1503 Van Couver
Arlington, Texas 76012

Cynthia G. Jones, O.T.R.
3205 Funston Street
Austin, Texas 78703

Thomas W. Jones, Ph.D.
Texas Tech University
Department of Special Education
Lubbock, Texas 79409

Louise R. Kent, Ph.D.
University of Pittsburgh
Department of Speech and Theater Arts
1117 Cathedral of Learning
Pittsburgh, Pennsylvania 15260

Betsy McGinnity
Charles V. Hogan Regional Center
P. O. Box A
Hathorne, Massachusetts 01937

Frank Simpson
The New York Institute for the Education of the Blind
999 Pelham Parkway
Bronx, New York 10469

Gretchen Stone, O.T.R.
4310 Avenue H
Austin, Texas 78751

EDUCATIONAL PROGRAMMING

PLAY: AN INSTRUMENT FOR GROWTH IN MULTIHANDICAPPED CHILDREN

Deborah Bouchard Enright

The purpose of this paper is to consider the implications and uses of play as a tool for promoting intellectual development in children. It is evident that play activity enables normal children to learn about themselves and the surrounding environment. It follows that play must also contribute to the development of sensory and motorically impaired children. This realization provides a foundation upon which appropriate intervention strategies involving play can be built. Our observation of young children interacting with their environments tells us two very important things regarding the way children learn. Unlike older children and adults, who have developed reasoning abilities for solving even the most difficult problems that are encountered with a thought-out "plan of attack", the young child's method of learning is remarkably different.

Learning Channels-Input and Organization

Sensory

We observe children gaining the first bits of information about themselves and their environment through their proximal senses of touch, taste, and smell as well as their distal senses of sight and sound. What marvelous tools, ready-made for use right at birth. When we begin to take a close look at the world which surrounds children, we realize what an abundant amount of complex simulation bombards the children daily. How do they even begin to sort it out and make sense of it all?

According to Jean Piaget, and many others who share his view, children are natural-born organizers of information. Because their senses provide them with the necessary means for gathering information, their first thoughts of what the world is all about are registered in their minds as images of objects or people that vary in color, intensity and pattern, sounds that range in pitch, loudness and duration, and tastes which offer a variety of textures. With each new encounter with a sensory experience, children are taking in information and storing it away into memory compartments. Eventually these perceptions will increase in number and complexity to provide a valuable reference for later manual and verbal expression.

Motor

What about movement? When we see children lying in their cribs or propped up in their chairs, we understand how directly

sensory information impinges on them. They have to do so very little at first, or so it seems, to synthesize environmental cues around them. But let's look again.

Older sister is trying to help mother by keeping a watchful eye on her baby brother. All of a sudden the shiny red rattle that she is holding in front of baby is displaced to one side, no longer directly in baby's line of vision. Baby begins to cry, concluding that the rattle has disappeared. Quickly, sister brings the rattle in front of the baby's line of vision and once again attention to the rattle is refocused. Minutes later, the rattle is displaced to the side again but this time baby follows it, realizing that although it is displaced, it has not disappeared. Here we see one of the first signs of movement guiding perception. In this situation, the baby has learned that the object has not disappeared into thin air, but merely has moved. In order to maintain visual contact with the object, the baby learns to coordinate head movements to follow the path the object has taken. Visual tracking becomes a skill which the baby will call upon again and again as he/she seeks to maintain contact with the interesting people and objects in his/her environment.

Sensory-Motor Intelligence

During this pre-lingual period, experiences with interesting sights and sound increase in conjunction with maturation of the central nervous system. This will bring eye-hand and ear-hand movement under more refined control. Increased mobility also begins to expand children's horizons. As they move around, reaching out into the environment with intention and purpose and increasing coordination, they exhibit practical know-how by using various means and activities to obtain what they desire.

This knowing is not simply a registering of sensory stimuli but it also involves motorically interacting with objects. These self-initiated, exploratory activities allow naturally curious children to become less dependent on others for the stimulation that leads to learning and more reliance on themselves. Early sensory-motor experiences form the foundation upon which all later intelligence develops.

Implications for the Handicapped Child

We can immediately understand why the visually or auditorally impaired child is at a distinct disadvantage as an active learner. The auditory or visual information that is relayed to the brain is distorted or incomplete. The normal child's perception of a ball

is an object red in color, smooth in texture, and loud when bounced on the floor; all experiences that add to the child's memory of a ball. These unique experiences with objects often elude children with a sensory impairment. As a result, these children are less aware of their environment and all too often, only interested in their own bodies for stimulation. A newly acquired rolling movement soon turns into a repetitive form of self-stimulation, which, if left unchecked, increases in duration and frequency and prevents the child from developing other types of movement that lead to growth and learning. Instead of hand play evolving into a purposeful reach and grasp pattern, it develops into a perseverative waving action that has no meaning and leads only back into the child's own body. These ritualistic behaviors add nothing to the child's understanding of the environment and therefore must be modified. Sensory impaired children may lack drive toward or interest in mastering the outside world because they are not aware of what exists around them.

Motorically impaired children are at a different disadvantage. Although they have the capacity to perceive information and observe people and events in the immediate surroundings, their inability to act upon the environment directly affects the amount of information they can obtain. Because movement allows children an opportunity to develop body image and explore their environment, motorically impaired children develop the concept of self and non-self at a slower rate. Children must establish this concept of 'me' apart from 'not me' before a method of communication can be learned. Otherwise the motor act of imitation, which leads directly to communication, is also affected.

A Guide Towards Intervention

It becomes quite obvious when determining intervention strategies for these children, that the role of the teacher or primary caretaker is not to sit back and allow self-discovery to take its course. Learning cannot be left to chance occurrences and random critical encounters with the social and physical environment. Otherwise there is no guarantee that the children will have the necessary experiences that lead to a fuller understanding of the world around them.

As various intervention strategies are implemented, there are two types of reactions that may occur. Each can be used as a guide to determining the proper level of exposure to new materials and learning situations.

The first type is an over reaction. Out of concern for the children's developmental delays and in an effort to help them "catch-up" with their peers, the teacher or primary caretaker may push the children into skill acquisition too soon. Often they respond by becoming visibly upset, with periods of crying and

considerable clinging. The children are obviously confused and are over reacting to their confusion.

The second type of reaction is even more harmful. In this situation the children do not over react or under react but merely acquiesce, giving in to the demands placed upon them. As a result, they learn the skill in a rote manner. The teacher is happy, but the skill the children have learned has no meaning and contributes nothing to their understanding of the world. More importantly, it sets a pattern of learning that does not promote development of problem solving strategies. An example is children who have learned how to count to ten. If you ask them to give you two blocks from the pile they are playing with, often they will respond inappropriately and give you three, or sometimes none at all. They have learned a non-generalized skill, reciting the names of the numbers in order, that does little to contribute to their understanding of numbers. Many children use number names, few have a perception of number. Let the children feel the blocks and "see" their shape and note how they fit together or fail to do so. We make our mistake in not allowing mainpulative play to run its course. While the children still want to know "how it handles", we are asking them to let the materials be representational. We are symbol conscious with no evidence that we should be. The problem arises when we place greater value on the spoken word than on the development of elaboration of thought through problem solving situations.

The Significance of Play

Learning Style

If we observe for a moment and allow children to show us their level of exploration and experimentation with objects, we are likely to find an abundance of information about their learning style. Their spontaneous play patterns will reveal the best channel or channels for learning. When we hand them a toy, do they visually examine it, hold it next to their ear and shake it; or do both? Perhaps they depend more on tactile input to find out about the toy by poking their fingers into it or squeezing it?

Motivation

Since play is one of the highest forms of motivation, observing children's play behavior will give us the most accurate information about their capabilities. When engaged with a toy they find interesting, they are obviously involved with it out of their own choosing; otherwise, it would be discarded. It is a pretty safe assumption that if we incorporate that favorite toy into a learning activity, the chances of maintaining the children's attention are increased. Walking a few steps suddenly becomes an activity which the children engage in readily when they know that their favorite stuffed monkey is just a short distance away.

Assessment

Aside from the factors of motivation and sensory channels there is even more critical information that can be gained by observing children's play - their level of development. Play provides us with the purest assessment of children's level of functioning in all areas that contribute to total development. A comprehensive evaluation of children who have a sensory and/or motor impairment should include observation of the child in a free play situation. These children cannot always respond adequately or accurately to standard assessment methods. Observing children in their natural setting may reveal a more realistic picture of their abilities, lending insight into their level of maturation, communication and intelligence.

As we observe children play with their favorite rattle, do they only shake it back and forth using a simple waving motion or can they transfer it from one hand to another? Are the motor actions employed with an object simple or complex? We know that if they can transfer the rattle, they are probably going to be able to transfer other objects of similar weight and size.

Is their level of socialization such that they attempt to share their toys with a person or are they unable to engage in reciprocal interaction, content to play by themselves and unaware of other people around them? If the latter, they are then at a level where differentiation of self from other has not occured. Their view of the world is limited to what they can do with their body to create an interesting experience. Anything occurring beyond the periphery of their body boundary is hardly noticed. If they do engage in interaction with a person, the object initially is the primary focus of attention. Any new type of play form assigned to the rattle, such as rolling it on the floor, may produce an imitative response from the child. These initial attempts at copying motor actions lead to the very highest form of imitation - the social language of our culture.

If the rattle is placed out of reach, how do the children retrieve it? Do they take advantage of a nearby tool, pulling a blanket that the rattle is resting on, thereby demonstrating an efficient problem solving strategy; or is such assistance overlooked as they rely on people to assist them in getting what they want, they are beginning to develop an understanding of the interrelationships between objects and people. These initial concepts become refined as we develop into thinking adults, but they have their origins here in the very early years of life.

Educational Implications

Often, children with sensory and/or motor impairments are not accustomed to express and involve themselves in play. Inter-

action with objects is characteristically concrete and inflexible. Beginning play is simple: mouthing objects, turning them and eventually transferring them easily from one hand to another. These actions may not be spontaneous, therefore, assistance and encouragement from a source other than the child will be necessary if exploration of this sort is to continue. If there is some attempt towards play, there are several things the teacher can do to enhance this learning situation. The child obtains a favorite rubber rabbit that has been placed within his/her reach and begins mouthing it. Since this is also a squeak toy, the teacher or adult can guide the child's hands in squeezing the toy; thereby co-actively demonstrating to the child another, more novel way to play with the rabbit. Not only it the squeezing action a more complex form of exploration but is also gives the child additional information about the toy - it produces sound.

After the child spontaneously begins squeezing the toy rabbit on his/her own, other squeeze toys should be introduced. This affords the child with many opportunities to practice his/her newly learned squeezing action. It also reduces the chances of this newly acquired action from developing into a conditioned, non-generalized response. Hopefully, squeezing will become an exploratory technique which the child employs with many objects he/she encounters.

Eventually, the chid's repertoire of play actions will increase in quantity and complexity until they hold more socially significant meaning. Instead of squeezing the rabbit, play may take a higher form whereby the child demonstrates how the rabbit hops. From a developmental perspective, we would hope that the child's interaction with the object would eventually lead to his/her ability to name it. These initial experiences with objects form the foundation for later acquisition and expansion of language.

The adult's role in sharing and regulating the pool of multi-sensory experiences is most significant. Physical contact with the immediate environment is not always possible for visually or motorically impaired children. Stimulation and instruction must compensate for the children's restricted awareness. Simply placing objects within the children's immediate physical surroundings increases the chances of interaction, but quantity of exposure to objects is not sufficient. Interaction with objects must hold meaning for the child. The adult can act as facilitator in guiding the child's exploration so that each attempt has qualitative significance.

Of primary consideration is a proper balance of multi-sensory stimulation. Just as the normal child perceives an object in a variety of sensory contexts, so must the handicapped child be allowed to experience an object in more than one way. Any additional information obtained about the taste, touch and sound of the object strengthens the child's association and depth of

understanding about the experience. Care should be taken not to bombard the child with objects and people; otherwise, confusion and frustration could develop. Exposure must be gradually regulated according to the child's interest and desire to manipulate objects.

Structured play alone is not sufficient. According to Piaget (1962) unstructured play allows children to take in reality in their own egocentric and idiosyncratic way. During a period of free play, children make the transition from infantile to more mature levels. They begin to take note of similarities and differences, sorting objects on the basis of these characteristics. These early attempts at classifying information aid children in their understanding of people, objects and events. A cup can be something to bang, roll or fill before children learn to drink from it. Time must be allowed for the exploration of an object before it's actual function is demonstrated. If children are engaged with a form of play that they have chosen, the chances are that their interest and attention will be sustained when the adult introduces a new form of exploration.

The Role of Language

Structured and spontaneous play experiences will do much to foster children's growth. Teacher-initiated play activities and free play sessions will provide occasions for non-verbal communication. As children and adults interact with one another through objects, these actions are often silent because the child's level of verbal communication is not yet developed, but are they meaningless? All too often we place excessive emphasis on the spoken word. At this stage of development it makes more sense to allow children to show us their cleverness. We must try to remember that use of arbitrary symbols we call words is a complex skill requiring relevant and meaningful experiences before acquisition can occur.

According to Furth (1973) motor actions and sensory information yield images which are accumulated and stored. Only through developed mental images of objects, people and events can children begin to assign the abstract symbols of words to represent these images. Furth (1973) warns us to guard against the misconception that because language is a tool for elaborating the thoughts of a developed mind, it is also the primary tool for the developing mind of the child. What is most important for the child who is sensory and/or motorically handicapped, is use of a medium for communicating which is most readily perceived and understood.

Summary

Developing the concept of play will take considerable time and effort. Progress will depend on the receptiveness of the

children to interaction with objects as well as their degree of handicapping conditions. But once an attitude of play is established, it can open up a whole new world to the children by operating as a motivating force to increase their awareness of self and others, promote communication and eventually foster a more elaborate and organized form of thought.

Reference

Furth, H. Deafness & learning: a psychosocial approach. Belmont, California: Wadsworth Publishing Co., 1973.

Piaget, J. Play, dreams and imitation in childhood. New York: W. W. Norton and Company, Inc., 1962.

Suggested Readings

Adler, S. The non-verbal child. Springfield, Illinois: Charles C. Thomas, Publisher, 1964.

Booth, B. & Kerr, R. Piaget, play and motor development. Paper presented at Seventh Interdisciplinary Conference, Piagetian Theory and the Helping Profession. Los Angeles, California.

Collins, M. A multi-tactile approach to language. In W. Smith (Ed.) New techniques for working with deaf-blind children. Denver: Mountain Plains Regional Center for Services to Deaf-Blind Children, 1974.

Fieber, N. Sensorimotor cognitive assessment and curriculum for the multihandicapped child. Workshop proceedings, Educational methods for deaf-blind and severely handicapped students. Austin: Texas Education Agency, 1979.

Fieber, N. Movement in communication and language development of deaf-blind children. In proceedings, National workshop for physical therapists, occupational therapists, and recreation therapists in deaf-blind programs, Dallas, Texas. Sacramento, California: Southwest Regional Center for Deaf-Blind Children, 1975.

Fink, R. The role of imaginative play in cognitive development. Paper presented at Fifth Interdisciplinary Conference, Piagetian Theory and the Helping Profession. Los Angeles, California: University of Southern California, 1976.

Flavell, J. The developmental psychology of Jean Piaget. Princeton, New Jersey: D. Van Nostrand Company, Inc., 1963.

Furth, H. Thinking without language. New York: Free Press, 1966.

Griffiths, R. Imagination in early childhood. London: Routledge and Paul Degan, 1919.

Hanes, M. Piaget's concept of structure in explaining language acquisition. Paper presented at Fifth Interdisciplinary Conference, Piagetian Theory and the Helping Profession. Los Angeles, California: University of Southern California, 1976.

Hartley, R. Understanding children's play. New York: Columbia University Press, 1952.

McAndrew, H. Rigidity and isolation: a study of the deaf and blind. In P.E. Prapp and P. Himelstein (Eds.), Readings on the exceptional child. New York: Appleton-Century-Crofts, 1962.

Piaget, J. The origins of intelligence. New York: International Universities Press, Inc., 1969.

Piaget, J. & Inhelder, B. Mental imagery in the child. New York: Basic Books, 1971.

Rothschild, J. Play therapy with blind children. The New Outlook for the Blind, 1960, 54, 329-333.

Schwebel, M. The role of experience in cognitive development. Paper presented at Fifth Interdisciplinary Conference, Piagetian Theory and the Helping Profession. Los Angeles, California: University of Southern California, 1976.

Sharp, E. Thinking is child's play. New York: E. P. Dutton, 1969.

Tracy, S. & Thielman, V. John Tracy clinic correspondence course for parents of preschool deaf children. Los Angeles, California: John Tracy Clinic, 1968.

Uzgiris, I. & Hunt, J. Assessment in infancy: ordinal scales of psychological development. Urbana: University of Illinois Press, 1975.

Yawkey, T. & Blohm, P. Imaginative play: language and imaginative play experience approach. Paper presented at Seventh Interdisciplinary Conference, Piagetian Theory and the Helping Profession. Los Angeles, California: University of Southern California, 1978.

Deborah Bouchard Enright
29 Beach Street
Milford, New Hampshire 03055

PROBLEMS IN MANAGING SELF-INJURIOUS AND SELF-STIMULATORY BEHAVIORS

Richard Neel and Joan Kayser

Changing the behavior of severely involved children is a difficult task. Experience over the last few years has shown that the more severely involved the child, the more systematic the instruction must be. In fact, one could easily define severity of condition by the amount of systematic instruction required to show a consistent effect. Systematic instruction usually involves a careful identification of the specific behaviors to be taught, a task analysis of the skills necessary to acquire those behaviors, the careful presentation of cues that will prompt the behavior, and then the application of contingent reinforcement upon the presentation of the behaviors by the learner. In theory, this procedure seems quite easy to apply, and indeed it is easy with a wide variety of children who have mildly handicapping conditions. Unfortunately, it is not an easy procedure to apply with children who are so severely involved that they are usually engaging in self-injurious or self-stimulatory behavior.

Self-injurious or self-stimulatory behaviors are frequently considered to be maladaptive behaviors. This is not so. They are very effective in controlling the environment of the child and have a profound, yet predictable, effect on the people in that environment. These behaviors are highly generalized behaviors that occur in the presence of a large number of stimuli. It is because they are highly generalized that they are so hard to modify. Consider a child who greets every person or demand with a tantrum or with a fit of hand biting or head banging. How likely is it that teachers, parents, and attendants will continue to demand anything of the child under such circumstances? It is more likely that these people will be intimidated and will react in ways which lessen the outburst. They will then quickly learn to carefully approach the child. Who has changed? The child? Probably not. The major proportion of the learning was done by the adult. Additionally, the child has been reinforced for engaging in tantruming or head banging. This scenario repeats itself all too frequently in schools for the severely involved. What can be done about it?

The first tendency is to suppress the inappropriate behaviors. The assumption is that suppressing these behaviors will clear the way for teaching new behaviors to the child. This is probably true for mildly handicapped children. It is less true, however, for children who are severely involved. A look at how severely involved children learn will demonstrate why this is so. Figure 1 shows a chart of a child who has a high rate of head banging (inappropriate behavior) as shown by the dark black line. The same child's rate of matching colors is shown by the stippled line near the bottom of the graph. Let's assume that a decision

is made to suppress the inappropriate behavior in hopes of increasing the desired one. Such a condition is shown in Figure 2. This condition could only occur if two things were to happen. First, one would have to discover an effective punisher that would suppress the inappropriate behavior and continue to suppress it until a new behavior could be learned in its place. The other condition is the discovery of an effective reinforcer that would increase the child's rate of matching. Both of these conditions are theoretically possible but rarely occur in the real world. It is more likely that the chosen punisher will have a limited effect; i.e., it will suppress the inappropriate behavior but will not reduce it to zero. It is also quite possible that the effect of the punisher will diminish over time. The task of finding a consistent reinforcer is also a difficult one. Many children have few discernable reinforcers. The few reinforcers that can be identified often lose their effectiveness over time. The result is that the new behavior is acquired at a very slow rate, if at all, and the highly generalized behavior will begin to regain its strength and occur with increasing frequency. This condition is depicted in Figure 3.

Thus the problem of decreasing the rate of a highly generalized inappropriate behavior and concurrently increasing a variety of competing behaviors is a tough one. All too often, teachers are instructed to withhold reinforcement of the inappropriate behavior and to systematically reinforce competing ones. This strategy is theoretically sound but is very difficult in practice. Ignoring is often recommended as a viable way to withhold reinforcement for these behaviors. It is, however, very hard to ignore a child who is putting his/her hand down his/her throat. Most adults are unwilling or unable to consistently ignore this behavior while looking for a competing behavior to reinforce. This type of problem makes modification of self-injurious or self-stimulatory behaviors a very difficult task.

Self-Injurious Behaviors

It is helpful to distinguish between self-injurious behaviors (SIB) and self-stimulatory behaviors when designing effective teaching strategies. These two types of behaviors seem to be maintained in different ways. Self-injurious behaviors are often maintained by external reinforcement. In a classic study, Lovaas & Simmons (1969) demonstrated that the frequency of self-injurious behaviors could be increased by the application of contingent attention (See Figure 4). In this study, the child increased his rate of SIB whenever he was soothed and comforted following each incident. This graph dramatically shows how teachers could inadvertently reinforce the very behaviors they were trying to eliminate. It is even feasible that a child could be reinforced to destroy himself/herself with attention from an unwary helper.

How, then, can you reduce SIB? Another study by Bucher & Lovaas (1968) showed that SIB could be reduced by placing a child in an isolated room for an extended period of time (See Figure 5). Jones, Simmons & Frankel (1974) found similar results. The difficulty with this procedure is that a child will increase his/her rate of SIB in the initial stages, and may cause himself/herself real harm. Even if there is no permanent damage to the child, few adults are willing to run the risk of harm or witness the seemingly harmful effects. The high rates of SIB could be lessened if the extinction procedure were started at the earliest stages of the problem. This, however, rarely occurs. The people most likely to come in contact with the child at an early age would not be aware of the effectiveness of ignoring, and they would instead try to comfort a child who is obviously so troubled.

What should a program for modifying SIB include? In most instances, a program to modify SIB should contain techniques for decreasing the SIB and building competing behaviors. The suppression of SIB will usually begin with the presentation of an aversive but can be faded to include response cost or overcorrection programs. There are several studies that have demonstrated the effectiveness of these techniques (Azrin, Gottlieb, Hughart, Wesolowski, & Rahn, 1975; Kelly & Drabman, 1977; Morrison, 1972; Sajwaj, Libet, & Agras, 1974; Wooden, 1974). The specific one to use depends upon the severity of the behavior, the length of time the behavior has been reinforced, the training and energy levels of the staff, and the resources and facilities of the school or institution. It is beyond the scope of this paper to provide a set of rules for deciding which technique to use under various conditions. The successful application of a procedure depends so much upon the judgment and persistence of the teachers involved, that it is probably impossible to describe a set of rules that would work in a number of settings. Instead, the following are two observations that have proven useful to a large number of teachers when working with children who are severely involved. (1) Change reinforcement often. When an effective reinforcer is found, there is a tendency to continue to use that reinforcer until it is no longer effective. A more practical technique is to find more than one reinforcer and change them on a random schedule. This will increase the probability of maintaining the reinforcers longer than if they were used separately. (2) Reinforcers can be strengthened by deprivation. Food is more effective when the child is hungry. That seems obvious. The fact is that attention is more effective when it is not liberally given. This is also true for music, warmth, play activities, etc. The basic rule is that when there is no effective reinforcer, one can be created by setting up minor deprivation states. It is then also possible to condition less effective reinforcers with the newly created ones. It is a constant struggle to build and maintain reinforcers,

but teachers should be doing it every day. This is especially hard for teachers to remember when they presently have an effective reinforcer.

Success is not always what it seems. A very interesting problem that occurs when working with SIB is that apparent success often turns into failure. When a child's SIB has been reduced and another behavior has been learned in its place, most teachers feel they have been successful. Such a program has substituted a highly generalized behavior with a very specific one. This will only be successful as long as the high rate of reinforcement required to teach the behavior is maintained. If the schedule of reinforcement is leaned, or if a new program is started because the old one reached criteria, then a likely result is the return of the SIB. This happens because the new behavior is very specific, and it will not be reinforced often in the natural environment. Consequently, it will begin extinction and become a stimulus for the return of the previously successful behavior (SIB). Lovass, Freitag, Gold, and Kassorla (1965) stated this phenomenon as a rule: the withholding of reinforcement from a previously reinforced alternative can function as a discriminative stimulus for SIB. Thus, fading of reinforcement or changing programs may produce the opposite effect of the desired one.

The solution to this problem is to maintain the new behavior until a wide repertoire of behaviors has been developed. The natural state of affairs is that most people have several behaviors that are intermittently reinforced in the natural environment. It is unreasonable to expect a child to replace a highly successful behavior (albeit an undesireable one) with a very specific one. If the teacher does not want the SIB to recur, then he/she must either teach a large number of behaviors to the child, or develop another highly generalized behavior that will successfully compete with the inappropriate one. Both of these tasks are very difficult with children who are severely involved, making the task of teaching these children far from easy.

Self-stimulation

Self-stimulatory behavior does not seem to respond to external reinforcement nearly as much as SIB. Several investigators have shown that the rate of self-stimulation does not decrease when reinforcement is withheld (Lovaas, Koegel, Varni, & Lorsch, 1975; Zegiob, Jenkins, Becker, & Bristow, 1976). Self-stimulation, then, seems to serve another function for the child. There is no clear explanation of that function, but a possibility might run like this. First, all people engage in the same behaviors that most would call self-stimulation. We are constantly moving our hand, twisting our hair, hiking our pants, stroking our chins

(with or without beards), and a variety of other little behaviors that seem to serve no outward purpose. We stop these behaviors when we are engaged in purposeful activity that requires our hands, or when we become aware of social consequences for the behavior. Interestingly, we do not permanently stop these behaviors, but rather, we temporarily suppress them or modify them to meet the perceived social situation.

For children who have not acquired a large number of purposeful behaviors the high frequency of self-stimulatory behaviors may be very appropriate. Consider newborn infants. They engage in such behaviors for a majority of their waking hours. It is only when they learn other behaviors that the frequency or the topography of the response changes. Thus the reduction of self-stimulation may be viewed as a byproduct of learning. It can even be used as an independent measure of such learning.

When self-stimulation is viewed as a natural occurrence that is present only because of the lack of other learned behaviors, then the need to suppress it is less. In fact, self-stimulatory behavior can be viewed as a potential reinforcer for new learning. The task becomes one of teaching new skills rather than eliminating self-stimulatory behaviors. However simply this concept may be stated, the task of teaching is a difficult one. Nevertheless, the emphasis of our programs must be the building of new behavior. The task is not to decide whether a specific technique will work but to discover under what specific circumstances it will work. (All behavior operates in a predictable manner and can be changed.) The difficulty is in analyzing the conditions that maintain the inappropriate behaviors and designing environments that will foster the acquisition of new ones. This analysis is by no means easy and will require the best efforts of all of us.

Richard Neel, Ph.D.
University of Washington
Experimental Education Unit, WJ10
Seattle, Washington 98195

Joan Kayser
University of Washington
Experimental Education Unit, WJ10
Seattle, Washington 98195

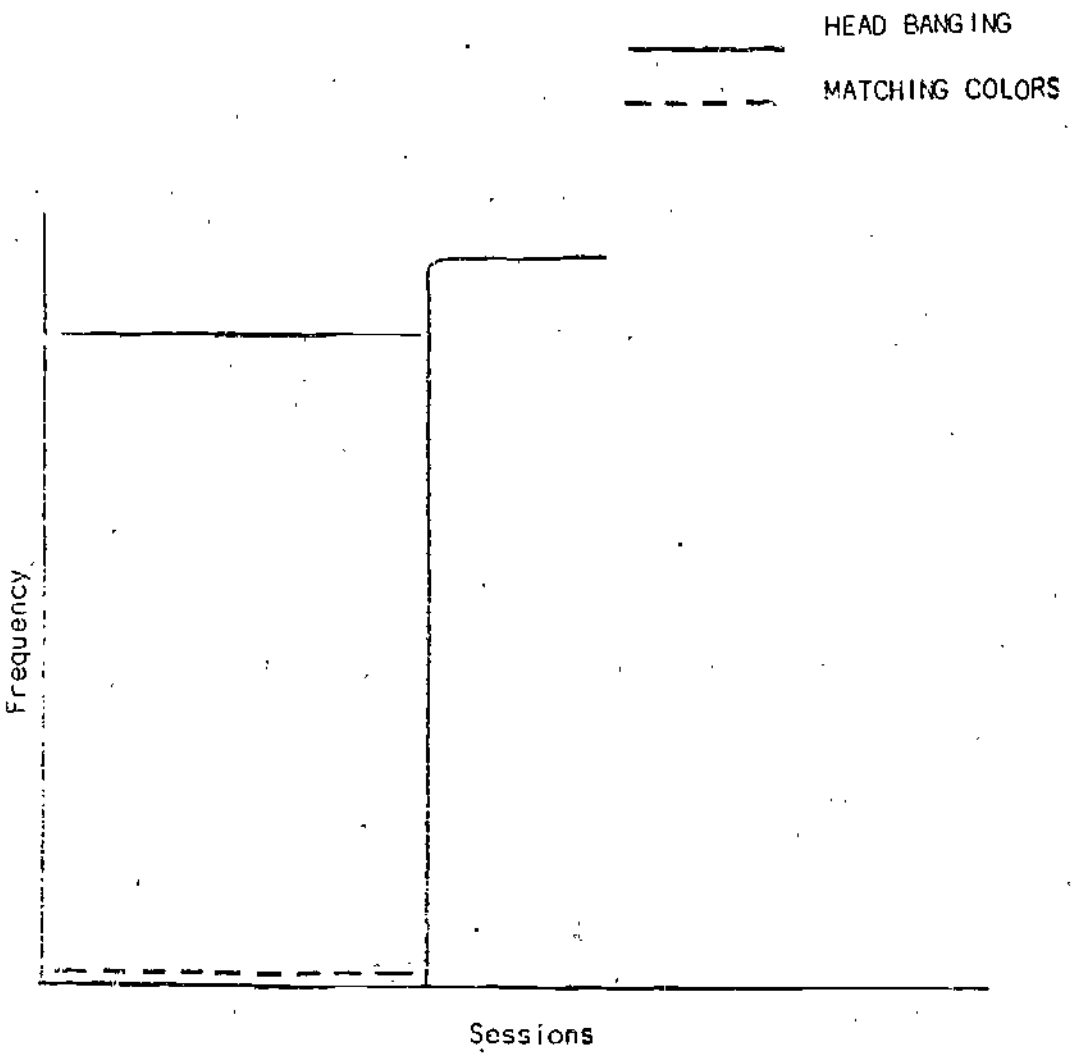


Figure 1.

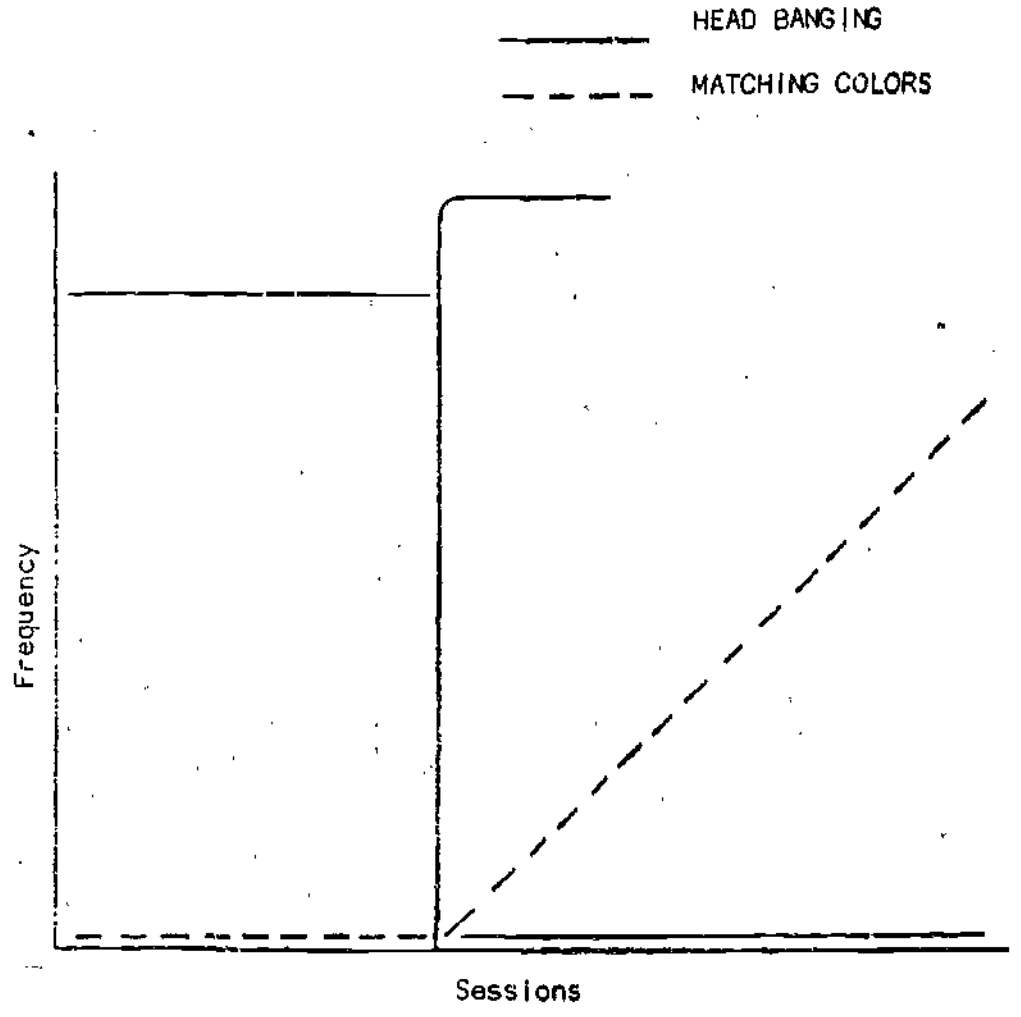


Figure 2.

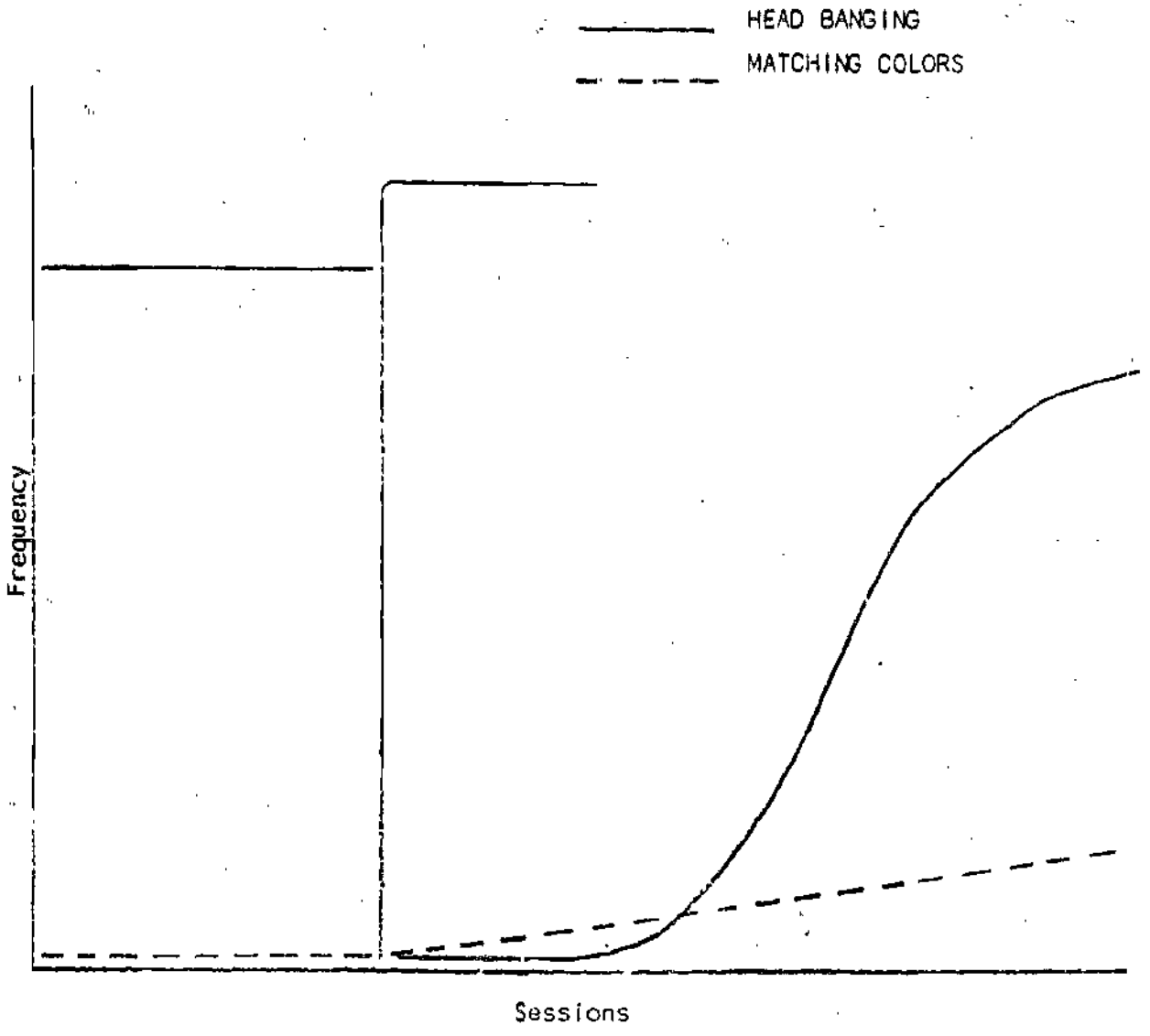


Figure 3.

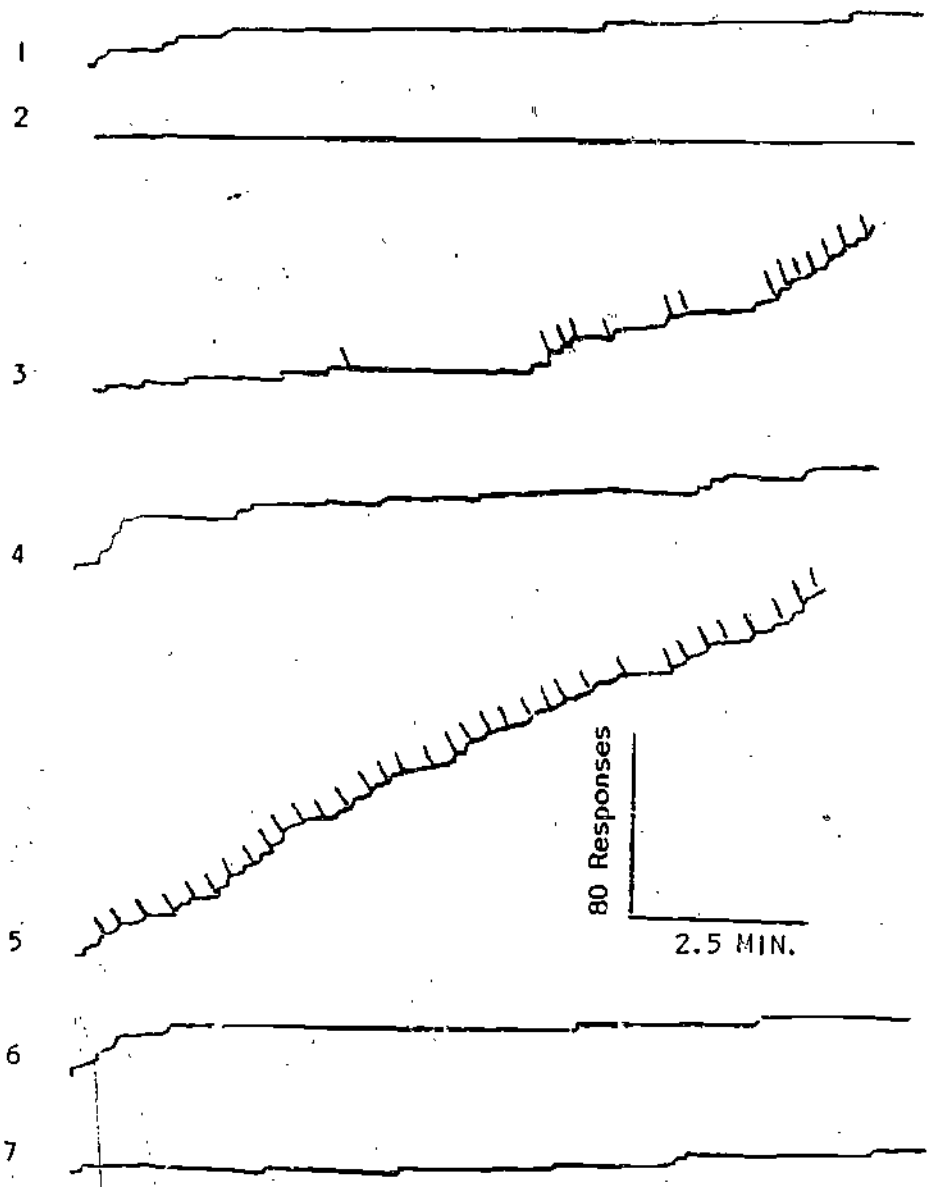


Figure 4. Cumulative self-destructive responses of Gregg during seven successive sessions. Diagonal hatchmarks in sessions 3 and 5 indicate occurrences of adults' attention contingent on self-destruction. Extinction was in force during the other sessions (Lovaas & Simmons, Journal of Applied Behavior Analysis, 1969).

Used with permission.

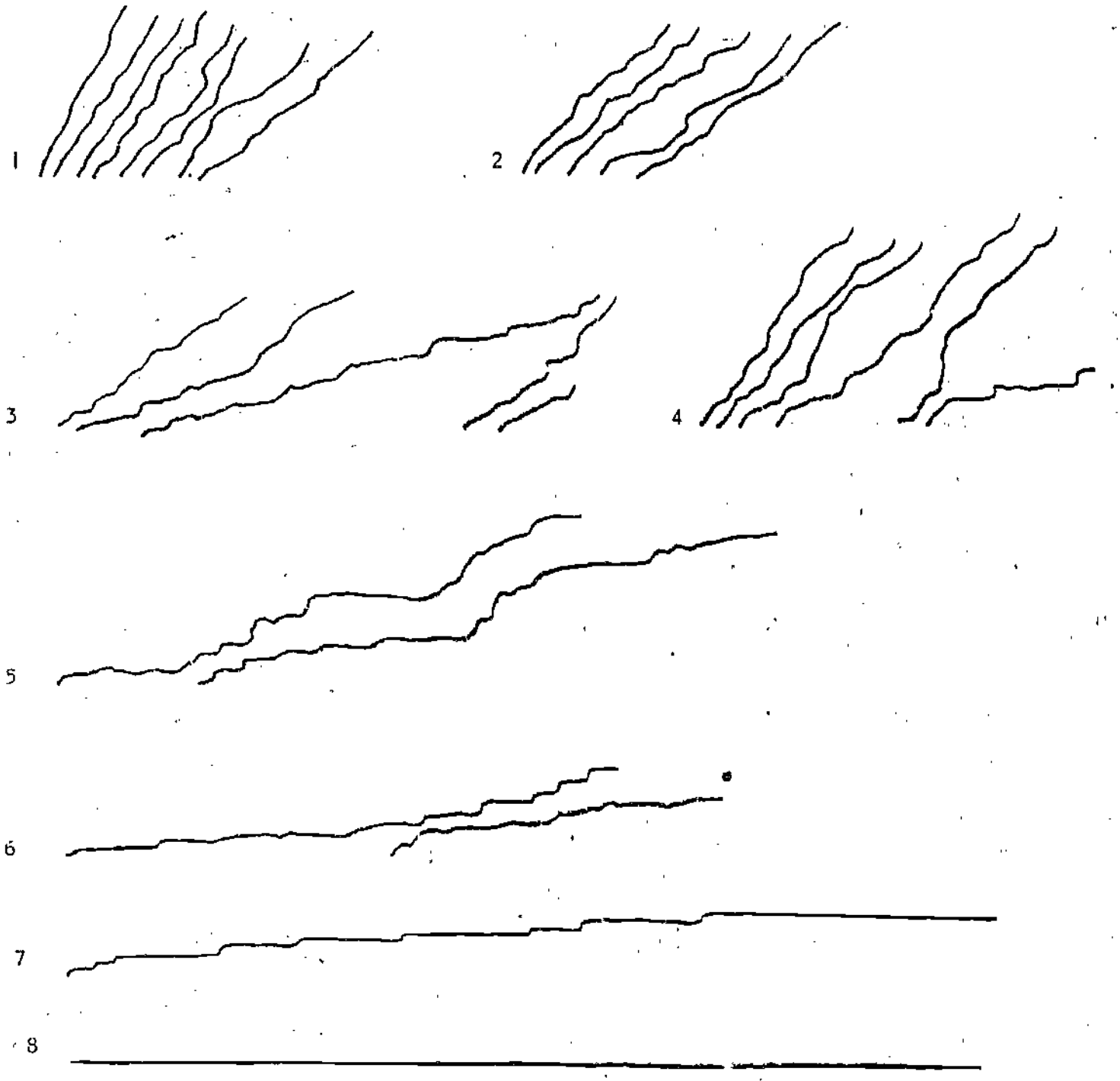


Figure 5. Cumulative self-destructive responses of an autistic boy during eight successive extinction sessions (Bucher & Lovaas, in M.R. Jones (Ed.), Miami symposium on the prediction of behavior, 1967: aversive stimulation, 1968).

References

Azrin, N.H., Gottlieb, L., Hughart, L., Wesolowski, M.D., & Rahn, T. Eliminating self-injurious behavior by educative procedures. Behavior Research and Therapy, 1975, 13, 101-111.

Bucher, B., & Lovaas, O.I. Use of aversive stimulation in behavior modification. In M.R. Jones (Ed.) Miami symposium on the predication of behavior, 1967: aversive stimulation. Coral Gables, F.: University of Miami Press, 1968.

Jones, F.H., Simmons, J.Q., & Frankel, Jr. An extinction procedure for eliminating self-destructive behavior in a 9-year-old autistic girl. Journal of Autism and Childhood Schizophrenia, 1974, 4, 241-250.

Kelly, J.A., & Drabman, R.S. Generalizing response suppression of self-injurious behavior through an overcorrection punishment procedure: A case study. Behavior Therapy, 1977, 8, 468-472.

Lovaas, O.I., Freitag, G., Gold, V.J., & Kassorla, I.C. Experimental studies in childhood schizophrenia: analysis of self-destructive behavior. Journal of Experimental Child Psychology, 1965, 2, 67-84.

Lovaas, O.I., Koegel, R., Varni, J., Lorsch, N. Some observations of the non-extinguishability of children's speech. In preparation, 1975.

Lovaas, O.I., & Simmons, J.R. Manipulation of self-destruction in three retarded children. Journal of Applied Behavior Analysis, 1969, 2, 143-157.

Morrison, D. Issues in the application of reinforcement theory in the treatment of a child's self-injurious behavior. Psycho-therapy: Theory, Research and Practice, 1972, 9, 40-45.

Sajwaj, T., Libet, J., & Agras, S. Lemon juice therapy: The control of life-threatening rumination in a six-month-old infant. Journal of Applied Behavior Analysis, 1974, 7, 557-563.

Wooden, H.E. The use of negative practive to eliminate nocturnal head banging. Journal of Behavior Therapy and Experimental Psychiatry, 1974, 5, 81-82.

Zegiob, L.E., Jenkins, J., Becker, J., & Bristow, A. Facial screening: Effects on appropriate and inappropriate behaviors. Journal of Behavior Therapy and Experimental Psychiatry, 1976, 7, 355-357.

TEACHING SELF-HELP TO SEVERELY AND MULTIPLY HANDICAPPED CHILDREN

Thomas W. Jones

Anyone--parent, teacher, other professional, or paraprofessional--who has had the opportunity to teach severely or multiply handicapped children can attest to the difficulty such complicated children have in learning skills seemingly acquired without effort by average children. Often it takes an inordinate amount of expertise on the part of the person who must teach those skills. With these complicated children, the validity and importance of self-help activities cannot be overemphasized. Self-help programming has implications for normalization, independent functioning, health, and even the survival of many low-functioning children.

Rather than provide a rationale for teaching self-help skills, however, it is the purpose of this paper to provide parents, professionals, and paraprofessionals with the practical skills necessary to teach self-help behaviors to complicated low-functioning children. Such skills are essentially the same regardless of whether the child is called deaf-blind; multiply, severely, or profoundly handicapped; or retarded. First, a general paradigm or methodology for teaching self-help skills will be presented. This will be followed by specific suggestions in the areas of feeding, eating, toilet training and grooming.

General Procedures

Planning is necessary for any teaching activity, perhaps especially for severely and multiply handicapped learners. Planning enables teaching to be as effective as possible, and of optimal benefit to the child. In one respect, anyone who teaches is a teacher, whether professional, paraprofessional, parent, or other caretaker.

Where to Begin

The first thing the person teaching should do is select a skill to teach the child. This may be based on needs of the child and/or the needs of others with whom the child comes into contact. The skill--actually the objective of instruction--should then be precisely defined. Unless the objective of instruction is very clear to them, teachers cannot communicate to handicapped learners what they are attempting to do.

For most self-care skills, once the objective of instruction is defined, a process called task analysis is necessary. In task

analysis the component behaviors of the defined skill are determined, unnecessary or redundant components are eliminated, and any prerequisite skills are determined. Each of these steps is essential for successful teaching. For example, failure to recognize that a pincer grasp is prerequisite to learning to zip a zipper may prevent one from being able to teach a handicapped learner that skill. It should be noted that, as instruction ensues, some of the components may still be too difficult for the learner to accomplish all at once. This situation implies that such components should be further analyzed into subcomponents. Such a process is called slicing.

In task analysis, consideration should be taken of the learner's individual skills and abilities and of the situation in which the behavior is to be exhibited. For example, the components of the task "puts on shirt" may differ for a hemiplegic child and one with good use of both arms. Likewise, the components of handwashing will vary with faucet arrangements in different situations. In this latter regard, it should be pointed out that generalization is typically a serious problem for severely handicapped learners. Often the solution is to teach the skill in each situation where it is needed. Thus, for children who are expected to wash their faces at both home and school, face washing should be taught in both contexts.

The final stage of planning is the determination of the sequence of instruction; the order in which the task analyzed components will be taught. Instructional sequences include forward chaining in which the first step, chronologically, is taught first, the second next, etc. An advantage of this sequence is that it is easy for the teacher to conceptualize; a disadvantage is the fact that, at each stage of instruction, the reinforcer must follow a different behavior. Reverse chaining, another instructional sequence, requires that the last step by taught first, then the penultimate step, etc. While this method is sometimes difficult to conceptualize, it overcomes the disadvantage of forward chaining. These chaining sequences are both useful for teaching a series of components of more or less equal difficulty, and they enable the seriously handicapped learner to combine several components into a meaningful sequence of behavior.

Still another method of sequencing instruction, especially useful where the components vary greatly in difficulty, is the whole task approach. Using this method, the teacher provides only the minimal amount of assistance necessary for successful execution of each component. The amount of assistance, of course, will vary with the level of difficulty of each component. With practice, the learner will gradually begin to perform the movements less dependently, so that the assistance will be withdrawn gradually until the learner performs independently. The whole task approach often enables more efficient teaching than either forward or reverse chaining. Useful task analyses may be obtained from

normal developmental sequences and published curriculum guides. The more severely involved the child, however, the less that is available and the more the teacher must rely upon knowledge of the child and of the task, and upon experience with similar children.

The Instructional Process

Almost all instructional activities encompass three factors based on an A-B-C paradigm. Teacher behaviors are necessary for each factor in order to ensure that learning will occur. The three factors are Antecedents, Behavior, and Consequences.

Antecedents refer to those stimuli which occur before the behavior is manifested. They may include verbal directions, signs, signals, gestures, physical assistance, presentations of a model, the presence of certain objects, and/or other contextual cues. As learning occurs, unnecessary antecedents should be faded so that the child learns to associate the natural antecedents (e.g., a pain in the bladder) with the desired behavior (e.g., elimination into the toilet).

Behavior refers to the movement which the teacher is trying to teach the child to perform. At the beginning of instruction the child should be manipulated--physically moved--to show him/her what behavior is being taught. Again, this should be faded as the child begins to "catch on".

Consequences are those stimuli that occur after the behaviors are mainfested and may be the most important factor in the A-B-C paradigm. Typically, consequences are reinforcers and may include a natural consequence of the behavior (e.g., the relief of emptying the bladder).

Finally, since most self-help skills are essentially motor skills (rather than cognitive or language skills) it is desirable to work from behind the child. In this way the teacher's prompting and assistive movements parallel what the child is learning. (If the teacher were in front, his/her movements would be opposite to the child's.) In addition, greater control and assistance, if needed, can be provided from behind.

Eating Skills

The entire feeding process can be broken down into a number of components: (1) acceptance of food based on texture, taste, and quantity; (2) scooping food onto a utensil; (3) bringing the food to the mouth; (4) oral manipulation of the food, i.e., eating; and (5) acceptable social behavior at mealtime. Feeding problems or difficulties can occur with any of these components. Selection

and eating problems will be discussed in this section and the other components in a later section.

Development of Normal Eating Patterns

In order to understand and remediate eating problems, it is necessary to understand the normal adult eating pattern. First, when a spoonful of food is presented, the adult lowers his/her upper lip to the spoon, or closes the lips around the spoon. At the same time, the spoon is withdrawn from the mouth. In this way, the food is removed from the spoon and falls onto the tongue just behind the front teeth. The jaw then opens slightly (although the lips usually remain closed) and the tongue moves sideways, positioning the bolus of food between the back teeth. Immediately the tongue is withdrawn back to midline and the jaw rotates and closes. This results in the crushing of the bolus and its falling into the pockets between the gum and tongue, and between the gum and cheek. The tongue again moves to the side, in coordination with the cheek muscles, in order to scoop the food back onto the chewing surfaces of the teeth. The chewing process is repeated until the food is sufficiently ground and softened to be swallowed. Salivation, while the food is in the mouth, assists in softening and lubricating the bolus. Finally, the tongue manipulates the bolus to the rear tongue midline. Swallowing is accomplished by the humping of the back of the tongue while the tip remains low behind the front teeth. The bolus slides down the back of the hump which results in its having been swallowed. Taking food, chewing, and swallowing, then, is an extremely complicated process, although most of us do it effortlessly hundreds of times each day. It is an obvious implication that, due to the complexity of this behavior, severely handicapped children will often need a great deal of assistance and instruction to enable them to eat successfully.

This picture is further complicated by the fact that infants usually suck and swallow in a very different way, and gradually acquire the eating skills of normal adults. At birth, infants are usually toothless and exhibit several reflexes which enable them to ingest food. The rooting reflex enables infants to find a nipple; and the suck reflex, in combination with the force of gravity, enables them to obtain liquid from a nipple. Infants are fed in a semireclining position. Also, as opposed to older children and adults, they swallow by flattening the tongue and extending the tip upwards and forward; often the tongue will protrude through the lips. As normal infants mature and myelinization increases, these infantile reflexes are inhibited; the children develop finer, more coordinated motor movements; and they learn the adult chewing and swallowing pattern as described above. This process usually takes place in the second half of the first year of life and is stimulated not only by increased neurological organization, but also by the eruption of teeth, the presentation of solid food, and the caretaker's need for independence. It should be emphasized that solid food should also be presented at this

age to handicapped children, regardless of their mental age or developmental level.

Unfortunately, many handicapped children continue utilizing infantile feeding patterns for many years. This may be due either to impairments in neurological development or to lack of experience, and could be an interaction of both. The problem is further complicated in instances where older children are fed as though they were infants for the convenience of the caretaker. Typically, such patterns and habits result in children who are unwilling and/or unable to accept and eat regular table food.

Rationale for Presentation of Solid Food

Unwillingness or inability to eat solids is of great concern because the ingestion of solid food (as opposed to liquified, pureed, ground, or chopped food) is necessary to maintain adequate health and nutrition. Specially, there are two rationales for teaching children to eat solids. First is their health. The entire digestive tract, from the teeth on down, needs the stimulation provided by solid food. Children who do not eat solids may have poor dentition, irregular and/or unnatural bowel movements, and other health problems. In addition, due to the ease with which carbohydrates may be reduced in texture and the difficulty in reducing the textures of protein foods (typically meats), children who do not eat solids may get diets too high in carbohydrates and too low in protein. An even more cogent rationale for teaching handicapped children to eat solids is normalization. Eating solids enables handicapped children to be more independent and to require less special accomodation. Learning to chew is also known to reduce drooling, a socially unacceptable cosmetic problem. Surely the need to eat solid food is an area of instruction for handicapped children which cannot be overlooked.

Causes of Feeding Problems

For handicapped children who exhibit feeding or eating problems, it is important to distinguish the cause of the problem. This has implicacions for both the nature of the treatment program and the professional discipline primarily responsible for directing the program. Generally speaking, feeding and eating problems can be classified as either medical, neurological, or behavioral in orgin. Examples of medical problems affecting feeding are cleft palate, multiple food allergies, pharyngeal paralysis, and esophageal atresia. These, obviously, are best treated by physicians, or others trained in the discipline of medicine. Neurologically based feeding problems are manifested by abnormal muscle tone, abnormal reflexes, or abnormal sensitivity in the oral area. Pediatric physical therapists or occupational therapists, a few speech therapists, and rare special educators have the training to deal with neurologically based feeding problems. Children with behaviorally based eating problems typically have resulted from perseverating in infantile eating patterns and/or having been fed in

ways which are convenient to the caretaker but not beneficial (actually, often harmful) to the children. Behavioral problems of handicapped children typically fall with the domains of special education and clinical psychology. Since they possibly come in contact with feeding problems more than any other professional discipline, special educators need to know how to distinguish between the causes of feeding problems as well as how to deal with behaviorally based feeding problems. Teaching handicapped children to eat solids involves oral assessment, positioning, and oral manipulation, in addition to the general procedures discussed earlier. Each of these areas will be discussed in detail.

Oral Assessment

In performing an oral assessment, the special educator must determine not only the cause of the child's eating problems, but also the child's specific abilities and disabilities with regard to eating. This may be done through observations and manipulation. Indications of neurological causes of feeding problems include abnormally high or low muscle tone, the presence of primitive oral reflexes (root, suck, bite) after a chronological age of about nine months, and/or a hyperactive gag reflex. In the absence of such problems and related medical problems, the special educator could probably safely conclude that the eating problem is behavioral in origin. Other factors to consider are oral assessments including nasal breathing, lip closure, drooling, ability to cough, tongue lateralization, shape of the palate, amount of salivation, response to texture, rotary jaw movement, oral hygiene, swelling or bleeding of gums, condition of teeth (caries, stains, whether deciduous or adult), occlusion, bruxination (teeth grinding), and the identification of any reinforcers which may motivate the child to learn.

Positioning

As with all activities with a severely handicapped child, position during feeding is of critical importance. Ideally the child should be seated in a chair (not a wheelchair) adapted to his/her individual needs. The child should be upright or leaning slightly forward. The neck should be slightly flexed with hips, knees, and ankle at right angles and feet securely supported. The person doing the feeding should be seated behind the child, at one side, and slightly higher.

In many cases, the jaw control position should be utilized. The feeder's hand should be placed on the child's face so that the index finger, and middle finger if needed, can control the child's lips with the remaining fingers under the jaw to support the tongue. In this way, the chewing and swallowing movements

can be facilitated, and the feeder's arm and chest can be used to maintain the child in the desired position.

Feeding

At the beginning stages of teaching children to eat solids, the feeder should present the food to the child. Not only will the feeder than be able to provide the stimulation needed, but he/she will also be teaching the slower plate-to-mouth pace needed to allow for chewing time. Care should be taken not to scrape the food off the spoon with the teeth. Rather the child should lower the upper lip or close the lips around the spoon to remove the food. Open the child's jaw, if necessary, place the spoonful of food into the child's mouth, and wait several seconds. If the desired lip movement does not occur, it may be necessary to manually manipulate the upper lip. Presenting the spoon in midline and pressing slightly on the tongue tip may also stimulate this lip movement. If the child is capable of properly removing the food from the spoon unassisted, then the food should be presented to the side. Once the bolus of food is in the child's mouth and the spoon removed, the jaw should be closed. If the child's tongue does not move the food to between the back teeth, then the feeder should do so with his/her finger. The jaw should be manipulated in a chewing movement and the food replaced between the back teeth until it is sufficiently ground to be swallowed. In order to be swallowed, the food must be positioned on the tongue's rear midline by either the child's natural tongue movement or the feeder's finger. Flat pressure beneath the jaw and lip closure should be maintained until the child swallows. Presentation of salt, ice, or vinegar to the lips may also stimulate swallowing in resistive children.

In some cases the child may be very difficult, hyperextending, screaming, and/or expectorating the food. Probably the most desirable way of consequating such tantrum behavior is to ignore it by calmly continuing to feed and manipulate the child, and by maintaining the desired posture. Although the child may be communicating his/her displeasure at this stimulation, the feeder, by continuing, is communicating: "I perceive your discomfort, but this is very necessary for you and will last only as long as it takes you to learn to do these things yourself." Finally, as indicated earlier, the child should be meaningfully reinforced immediately as a consequence of swallowing the food.

Additional Mealtime Skills

Meals should not be just a time for getting food into children, but instead, they provide some of the best times during the day for many kinds of learning experiences. Once a child has learned to eat solids, self-feeding should be taught. Usually,

the most efficient way of teaching this behavior is to start by working from behind the child and provide total assistance in grasping the spoon (or fork), scooping (or stabbing), and directing the utensil and food to the mouth. As the child begins to learn the pattern, this assistance should be gradually withdrawn in conjunction with the appropriate use of meaningful reinforcers. Drinking liquids from a cup is another skill which often needs to be taught to severely handicapped children. A cup with a cut-out section may be necessary to enable the feeder to observe the child's oral movements, facilitate lip closure and appropriate tongue movements, and to monitor the flow of the liquid. In some cases, thickened liquids may be easier for the child to handle at first than very runny liquids.

Once children have mastered the basic mealtime skills of eating solids, drinking, and self-feeding, there are many other feeding-related behaviors which could be taught at mealtime. These include proper grasp of the utensil (palm sideways not down), drinking through a straw, use of a fork, use of one hand only to lift a glass or cup, napkin use, cutting and/or spreading with a knife, opening a milk carton, pouring, carrying a tray, going through a cafeteria line, passing dishes, serving oneself, and cleaning the table. Family style meals often provide especially meaningful settings for teaching mealtime behaviors to severely and multiply handicapped children.

Toilet Training

Toilet training, or rather the lack thereof, is one of the most distasteful problems faced by caretakers of severely and multiply handicapped children. Both for the convenience of the caretaker and the fostering of the child's independence, toilet training should be begun as soon as the child is ready.

Readiness for Toilet Training

Readiness to begin toilet training is not related to the child's ability to sit or stand, to travel, or to communicate. Rather a child is ready to be toilet trained when able to stay dry for at least one and a half hours and when showing a pattern of times for elimination. In order to determine a child's readiness, his/her diapers should be checked every 5-15 minutes for several consecutive days. Each time the diapers are found to be wet (w) or soiled (s), the information should be recorded on a chart prepared for that purpose. If dry periods of at least one and a half hours and patterns of elimination times are observed, then the child is ready to begin toilet training. Dislike of being wet or soiled and anticipation of elimination (e.g., facial expressions, posture) are additional assets which should be noted, if observed. Manipulation skills, sitting ability,

independent ambulation, and communication skills are also assets, but children with none of these skills can begin to be toilet trained.

How to Toilet Train

During toilet training, every precaution should be taken to ensure that elimination takes place in the toilet and nowhere else. Elimination elsewhere should not be rewarding. When toilet training is begun the child should not wear diapers, but should wear rubber pants and training pants, or regular underpants instead. The child should be placed on the toilet at the time indicated by the patterns on his/her toilet training chart, and/or whenever he/she may show a characteristic facial expression or other sign. Never leave the child alone on the toilet, and never place the child on the toilet for more than 10 minutes at a time. Most important, reinforce the child immediately upon elimination into the toilet. In addition to the timing of bathroom visits, other factors increasing the child's probability of eliminating in the toilet rather than elsewhere are frequent drinks, the sound of running water, pouring water over the child's crotch while on the toilet, or a chilly bathroom. As in feeding, position is important in toilet training. The child should be secure with feet well-supported. A variety of toilet and potty adaptions can be made or purchased to meet individual positioning needs.

In between sessions on the toilet, the child's pants should be inspected periodically. If dry, this should be brought to the child's attention in a reinforcing way. If wet, do not put the child on the toilet. Instead, allow the child to feel the discomfort of clammy wetness (if he/she can perceive such), then change the child being sure to avoid making this a reinforcing experience. Such things as warm showers, prolonged contact, and much attention are reinforcing in many cases, and so should be avoided.

Once the child has "caught on" to what is happening, and (at least duing the day), usually eliminates into the toilet, the teacher has accomplished an important feat. (Staying dry and/or clean through the night may come later.) For many severely handicapped children this is the most that can be expected in toilet training, and the teacher or caretaker should be proud of such an accomplishment. There are, however, even more skills related to toilet training which should be taught if possible. Using fading procedures in conjunction with reinforcement, children should be taught to remove the necessary clothing, wipe themselves, flush the toilet, re-dress themselves, and wash their hands--all in the context of toileting. Through the repeated pairing of an appropriate signal with the toileting process, some children will learn to use the signal to communicate the need to go to the toilet. Finally, some children will recognize their needs and will go to

the toilet without adult assistance. Children with this last skill are fully toilet trained.

Grooming

Almost without exception, the general procedures presented at the beginning of this paper will be most efficient for teaching grooming skills. Again, since motor behaviors (rather than primarily cognitive or language behaviors) are involved, it is usually best to work from behind the child. It is also very important to use consistent, systematic procedures in teaching any grooming skill. Materials should always be found in the same position, sequences should always occur in the same order and the same verbal, tactual, and contextual cues should be utilized by the teacher or caretaker.

Brushing Teeth

Without special care taken by the teacher, so many steps may be involved in teeth brushing as to make it an unduly difficult skill for the learner to acquire. Probably the least difficult sequence should begin with toothbrush and paste "head down" in a cup placed on the sink at the child's sequence of behaviors would then proceed according to the following steps:

1. Pick up paste with non-dominant hand.
2. Remove cap with dominant hand.
3. Place cap on sink next to cup.
4. Pick up brush with dominant hand.
5. Squeeze paste onto brush.
6. Place paste next to cup.
7. Brush teeth outside surfaces first left to right, on top, then on bottoms, and then inside surfaces in the same order.
8. Turn on cold water with non-dominant hand.
9. Rinse brush.
10. Place brush next to cup.
11. Lift cup with dominant hand.
12. Fill cup with water.
13. Rinse mouth.
14. Turn off water.
15. Place cup next to cap, paste, and brush.
16. Place brush head down into cup.
17. Pick up paste with non-dominant hand.
18. Pick up cap with dominant hand.
19. Replace cap on paste.
20. Place paste head down into cup.

Shaving

As with other grooming skills, a system is of utmost importance. The particular system is not crucial although a suggested

system would be to move from the same side of the face as the learner's dominant hand to the other side. For handicapped learners, electric razors are usually more manageable and safe. In many cases the learners must be taught how to stretch their upper lips and necks so as to make the razor accessible to all the hair to be shaved. One should not be overly concerned if a learner develops a rash upon beginning to shave.

Deodorant

Severely and multiply handicapped adolescents and adults, like the rest of us, need to use a deodorant. Sprays cover the underarm area more efficiently but require good fine motor coordination to operate. Roll-ons, on the other hand, require less coordination but greater care, and several strokes are necessary to cover the entire underarm area. The decision as to which type to teach an individual to use should be based on the needs and abilities of each learner.

Nose Blowing

An unsightly problem faced by everyone who deals with severely handicapped individuals is a runny nose. In order to eliminate this problem and to foster independence and health, it is a goal of many to teach such children to blow their noses. This is not an easy skill to teach. Probably the best time to teach blowing through the nose is not when the child has a cold but rather when the nasal passages are open. Hold the child's mouth closed and show her or him how to move lightweight objects (a feather, ping pong ball, or whatever) just by breathing. Then, show the child how to do this more forcefully in response to the command "blow". Hopefully the learner will be able to repeat this behavior when needed during a head cold. It is also valuable in teaching nose blowing to have an adult with a cold to demonstrate the desired procedure.

Hair

As with other self-care skills, a system should be followed with hair washing, too. Working from back to front or left to right may prove effective. Simple yet stylish haircuts enable severely handicapped children to keep their hair neatly combed. A part is often an unnecessary complication. Perhaps the easiest hair combing system to teach is to comb the hair down on all sides.

Summary

In terms of self-care skills, severely and multiply handicapped children are capable of more independence than we have many times expected. Careful skill analyses, precise teaching

methods, meaningful utilization of reinforcers, and perserverance are necessary to enable such learning to occur. The result will be not only a less dependent, more normal child, but also a highly satisfied teacher, parent, or caretaker.

Thomas W. Jones, Ph.D.
Texas Tech University
Department of Special Education
Lubbock, Texas 79409

MOTOR FUNCTIONING

Marianne Forman
Marilyn Smith

Introduction

The Texas State law governing the practice of physical therapy defines it as meaning "the care of any bodily condition of any person by the use of heat, light, water, electricity, and physical massage, manipulations and active, passive and resistive exercise." Physical therapy literally means the use of physical agents for therapeutic purposes, as opposed to other methods of altering body function such as medical, surgical, radiation, and so on. The law continues to describe physical therapy as including: (1) "Evaluating the patient by performing tests and/or measurements of neuromuscular, sensorimotor, musculoskeletal, cardiovascular and respiratory functions as an aid to treatment"; (2) "Planning and implementing initial and subsequent treatment programs on the basis of approved test findings"; (3) "Delegating selective forms of treatment to supportive personnel with assumption of the responsibilities for the care of the patient and the continuing direction and supervision of the supportive personnel"; and (4) "The providing of consultative services for health, educational and community services". Physical therapy as defined above, except for consultative services, must be done under physician's referral. It does not have to be specific prescription, but the medical doctor must refer a child for evaluation and/or treatment by a physical therapist.

A Bachelor of Science degree in physical therapy is usually a four and one-half year program including two summers or six months of affiliations, which are actual clinical work in a variety of settings. Affiliations are usually four to six weeks in a hospital, pediatric and rehabilitation or other setting. A Masters program offers the last one and one-half to two years of the physical therapy program to someone who has a Bachelor of Science degree in a related field such as physical education or biology. Background courses include chemistry, bio-chemistry, biology, human physiology, and child and adolescent psychology. Then, generally through a medical school, courses include gross anatomy, neuroanatomy, neurophysiology, kinesiology or bio-mechanics, child development, tests and measurements, methods courses and clinical medicine, including courses in most medical specialties. Physical therapists working in the schools are relying most heavily on the child development, child psychology and psychology of disability and methods courses in pediatrics. Example of goals of physical therapy with handicapped students usually include positioning, maintaining or improving posture and range of motion, and normalizing muscle tone and movement patterns especially as realted to mobility and gross motor skills.

The definition of occupational therapy, as used by the American Occupational Therapy Association, (which also registers occupational therapists to practice) states: "Occupational therapy is the art and science of directing man's response to selected activity to promote and maintain health, to prevent disability, to evaluate behavior and to treat or train patients with physical or psychosocial dysfunction." Training is similar to that of physical therapists, except more emphasis is placed on psychology, and affiliations include experience in a psychiatric setting. Occupational therapists receive cursory training in gait and posture analysis and function of the lower extremities, and concentrate on upper extremity function and activities of daily living, or self-help skills.

The three major areas of responsibility of the occupational therapist in the school setting are: 1) fine motor skills; 2) sensory integration; and 3) self-help skills.

When physical and occupational therapists are both working with a student in the school setting there is often overlap of treatment techniques, and sometimes of treatment goals. For example: In the case of a young spastic cerebral palsied student, a long range teaching goal for the student might be to sit in an upright posture and perform fine motor and self-help skills. Examples of therapy goals which would aid the teacher in reaching educational goals might include:

Physical Therapy Goals	Occupational Therapy Goals
Long Range Goal: The student will sit with proper body alignment and stability to perform writing and feeding skills.	Long Range Goal: The student will demonstrate a functional hand-to-mouth pattern for feeding.
Short Range Goals and Treatment:	Short Range Goals and Treatment:
1. Relaxation techniques to inhibit spasticity.	1. Relaxation techniques to inhibit spasticity.
2. Use of a "roller chair" to separate legs and raise knees above level of hips (to prevent extensor spasticity).	2. Positioning in "roller chair".
3. Trunk balance activities to free upper extremities for functional use when in sitting position.	3. Upper extremity functional training - exercises, movement patterns, etc.

In this case, the occupational therapist may actually need to repeat the techniques used by the physical therapist to have the student positioned properly for fine motor skill training. The physical therapist may incorporate some of the techniques for upper extremity function used by the occupational therapist during the activities for balance in the sitting position.

General Overview of Clinical Signs in Rubella Syndrome and Cerebral Palsy

The etiological basis for the handicapping conditions of the students we see is undoubtedly varied. Because the term cerebral palsy is applied to a wide range of neuromotor dysfunctions, many students in the schools may be diagnosed as cerebral palsied. Congenital rubella syndrome is a cause of deafness and blindness in children.

The following overview is designed to give basic information regarding these syndromes.

Congential Rubella	Cerebral Palsy
Chronic, progressive viral disease	Static, non-progressive lesion (Actual lesion does not progress, however, it may appear to with age because of widening gap in developmental skills and age level.)
Onset:	Onset:
1st trimester fetal development (if onset after 1st trimester, sequelae diminish)	Prenatal Perinatal Perinatal
Cause:	Cause:
Rubella virus in mother during pregnancy	Multiple causes: anoxia, trauma, infection
Clinical Characteristics:	Clinical Characteristics:
A. Heart lesions B. Cataracts C. Deafness	Motor Dysfunction A. Delayed developmental milestones B. Abnormal patterns of movement
Motor deficit or delay is not uncommon	Deficits in vision, hearing, speech and language are not uncommon.

Basic Types of Cerebral Palsy

A. Spastic

Motor Characteristics

1. Hypertonic musculature
2. Topographical classification is varied
3. Abnormal postures
4. Voluntary motion

General Characteristics

1. I.Q. varies
2. Sensory and perceptual deficits more common in spastics than athetoids
3. Epilepsy is more common in spastics than athetoids

B. Athetoid

Motor Characteristics

1. Hyper or hypo tonic musculature
2. Usually involved in all four extremities
3. Involuntary movements ("athetosis")

General Characteristics

1. I.Q. often good or may be high
   M.R. may occur
2. High frequency hearing loss caused by Kernicterus
3. Drive and outgoing personality
4. Emotional lability more common than in spastics or ataxics

C. Ataxic

Motor Characteristics

1. Hypotonic musculature most common
2. Usually involved in all four extremities
3. Poor balance mechanisms
4. Voluntary movements clumsy and incoordinated
5. A "pure" ataxic is rare

General Characteristics

1. I.Q. often low
2. Visual, hearing, and perceptual problems are not uncommon

Review of Normal and Abnormal Motor Development

Normal development of the child is very much inter-related; it is difficult to discuss motor development without regarding sensory, cognitive, adaptive and personal-social development. When assessing motor development, the therapist is generally looking at the student's postures and movements as related to developmental milestones.

Some basic terminology which will be used in the presentation of motor functioning follows:

Reflex: An involuntary response to a specific stimulus.

Primitive Reflex: Also referred to as "transient reflex", as it is normally present at a certain time during development, but "disappears" or diminishes in effect as the brain matures and can better control movement.

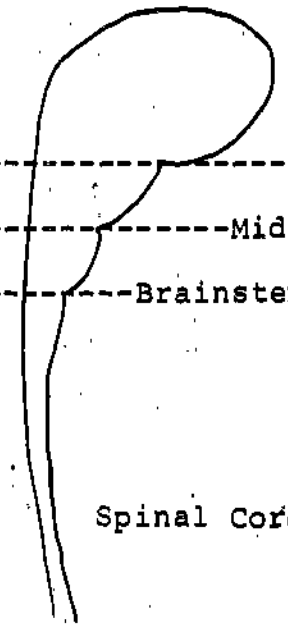
Righting Reactions: Develop as the brain matures to adjust to changes in position of body parts in relation to each other and to gravity.

Equilibrium Reactions: Automatic extension of extremities when balance is upset.

Muscle Tone: The normal degree of tension and vigor in a muscle.

Motor development begins in utero. As early as five weeks fertilization age, there is a lateral bending of the head away from a cutaneus (skin) stimulation of the face. (Jacobs, 1967) The development of these reflexes takes place by first involving the head, then the shoulders, trunk, pelvis and the extremities. The development of movement, then, is in a cephalo-caudal (head to tail) or proximal-distal (close to main body - away from body) direction. The nervous system, however, matures in the opposite or caudo-cephalo direction. The child is born with the lower part of the central nervous system, the spinal cord, in control of motor behavior. Maturation of the nervous system occurs with myelination (covering of the nerves by a sheath), and an increase in the diameter of the fibers to allow for increased conduction velocity of the nerve impulses.

Side View of Central Nervous System



Areas of Motor Control	Parts
Bipedal (two-point support)	Cortex - Equilibrium
Quadripedal (four-point)	Midbrain - Righting and Protective Reaction
Apedal (lying down)	Brainstem - Reflexes - (Asymmetrical Tonic Neck Reflex, Symmetrical Tonic Neck Reflex, Tonic Labyrinthine, Positive Supporting)
	Spinal Cord - Reflexes (Usually gross flexion or extension patterns, i.e., flexor withdrawal)

A newborn is basically a reflexive being, with the nervous system operating on a spinal cord level. People establish themselves as social organisms through movement, especially as they straighten (extend) their bodies and are able to move upright against gravity. Once born, a baby must deal with a constant stimulus which was minimized in utero: gravity. All movement that the child develops must now be done against the force of gravity.

Review of Developmental Milestones

I. Stage I - Approximately age 0-2 months.

Developmental Milestones: Beginning of midline orientation of head and arms.
Beginning of head contral

Movement (against gravity): The child is basically in flexed postures, especially with rounded back and flexed hips in supported sitting, and legs flexed in supine.

Head Control: Head is erect for a few seconds in sitting, beginning to lift in prone and to bear weight on forearms.

Nervous System: The baby's movement is basically dominated by flexion, and reflexes which are protective relating to cutaneus stimulation. Rooting and sucking reflexes exist for survival through nutrition.

II. Stage II - Approximately age 2-4 months.

Developmental Milestones: Beginning of extension throughout body.

Movement: Extension beginning when supine, baby lifts pelvis off floor, in prone, head is lifted higher, trunk more extended, and on forearms, able to reach and play, and feet flexed so toes can push (extend) against floor. The back is less rounded in sitting.

Head Control: Able to lift from supine and no head lag when pulled to sit.

Nervous System: The brainstem comes into play in the control of movement. For example, the Asymmetrical Tonic Neck Reflex is used to help the baby roll from side to side and increase movement against gravity. As the head turns to the left, the right shoulder, arm and leg are able to flex, and the baby can lift them up and initiate rolling. The rooting reflex is coming under control so that the baby can lift them up and initiate rolling. The rooting reflex is coming under control so that the baby can feed with head in midline.

III. Stage III - Approximately ages 4-6 months.

Developmental Milestones: Break up of total body patterns.

Movement: Lying supine, babies are able to play with feet, extending knees while flexing hips. Also, when sitting, they are able to lean forward (flexing at hips) and bear weight on extended arms.

Head Control: Good, especially in prone with weight bearing on extended arms, reaching with one arm.

Nervous System: Reflexly, the positive supporting reaction (brainstem level) is beginning to disappear, and a period of astasia (hypotonia of limbs) allows the child to go through a "bouncing stage". The change in muscle tone during bouncing helps to develop extensor tone in

the legs. The Asymmetrical Tonic Neck Reflex, (also brainstem level) is also coming under higher control and disappearing in effect. It allows children to keep their heads in midline and use their hands; facilitating development of a voluntary grasp, and inhibiting the previous palmar grasp reflex.

IV. Stage IV - Approximately ages 7-8 months.

Developmental Milestones: Trunk rotation (further break up of total body patterns).

Movement: Babies are beginning to push with arms and legs when prone. They are now able to attain sitting independently from supine position, using rotation of the trunk and pushing up to side sit. They are also able to use extended arms to the side.

Head Control: Good, including improved trunk control to sit unsupported briefly.

Nervous System: The maturation of the midbrain is evidenced by the development of the trunk righting reaction which allows for trunk rotation - separating the turning of the shoulders from the hips.

V. Stage V - Approximately ages 8-9 months.

Developmental Milestones: Acquisition of balance, use of quadruped position.

Movement: Further trunk rotation and break up of total body patterns allows for use of arms for support backwards and extension of arms with flexion of legs to assume, maintain, and rock in all fours position in preparation for creeping.

Nervous System: Further evidence of higher central nervous system function is evidenced by the development of protective reactions such as extension of the arms sideways and backwards.

VI. 10 months:

More dissociation of leg and arm movements takes place, allowing extension of arms with increased flexion of one leg to move in a creeping pattern.

10-12 months:

Arms and legs work together in a synergism (coordinated movement pattern). The arms help the legs in movement, such as flexing the arms while legs extend when pulling up to standing.

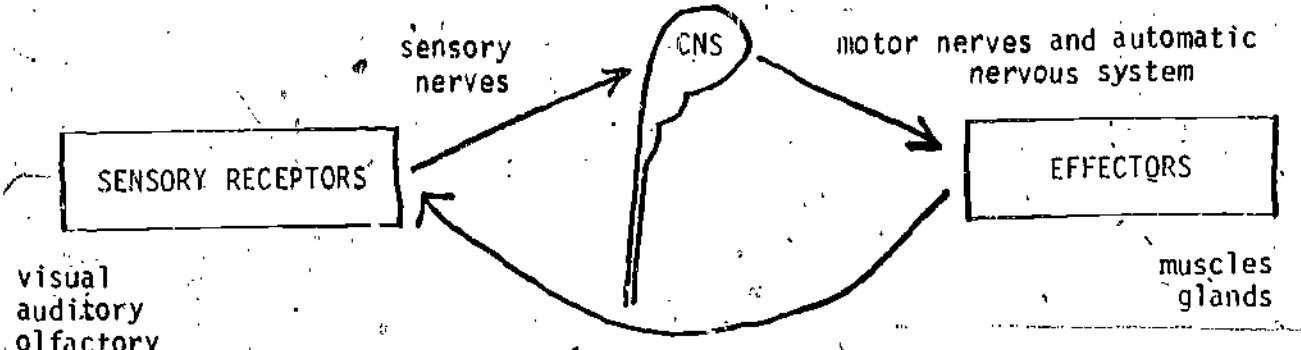
At this point in development, the cortex is now exerting control over movement against gravity as righting reactions, protective extension, and equilibrium are developed to maintain posture through the upright position.

Assessment of Abnormal Development

The above discussion is based on the maturation of the nervous system by stages of motor development. Each stage is generally preparatory for the next stage and the mobility and exploration of the child is very important in contributing to progression to the next stage.

In normal development, the nervous system matures as we have said, in a caudocephalo direction. The control of movement, however, generally develops proximal to distal in direction; and from primitive or simple mass movements to complex movement patterns. This development is dependent on normal muscle tone. An impairment of muscle tone will influence or be influenced by reflex activity, and will influence the ability of the child to explore the environment and progress through the stages of development.

A simplified view of the function of the sensory nervous system follows:



Impairment in the sensory receptors or nerves essentially impairs the whole system, as does impairment in motor output. Later we will discuss the processing of sensory input and the development of sensory integration.

Voluntary Movement:

The assessment of motor development includes observation and evaluation of the amount and type of voluntary movement present. Voluntary movement consists of three inter-related components:

1. Willed movement - may be cortically directed.
2. Reflexes - evoked in association with a willed act.
3. Sensory input from external and internal environment. (Waterland, 1967)

Further discussion of the actual process will take place in a later section.

Reflexes are not necessarily completely dominated by cortial control. They can be demonstrated in normal adults, especially as related to movements in which muscles work together in groups.

Successful, or skilled movement is a blend of cortical control and reflex patterns. Demonstration of this principle was performed on a volunteer from the participants of the conference:

1. The volunteer was asked to round the shoulders, depressing and protracting the scapulae. She was then asked to elevate and retract the scapulae (trying to touch the shoulder blades together).

   Reflex movement of the head was noted by flexion with rounding of the shoulders, and head extension with retraction of the scapulae.

2. The volunteer was then seated in a chair, and asked to internally rotate her arm as far as possible with it hanging by her side. She was then asked to externally rotate her arm.

   Reflexive head movement was also noted with turning away from the arm and flexing on internal rotation, and head turning towards the arm and extending on external rotation. (Waterland, 1967)

Equilibrium reactions develop with cortical influence, but are not voluntary movements. They are compensatory movements based on a state of readiness sufficient to bring limbs into a position of balance, and a necessary amount of support tonus.

The stimulus for eliciting an equilibrium reaction is a change in body spatial positions or supporting parts, change in position of limbs in relation to the trunk, or excitation of the labyrinths through tipping the support surface. The purpose of demonstrating an equilibrium reaction is to distinguish cortial control of an involuntary or reflexive response from willed movement utilizing a lower level reflex pattern.

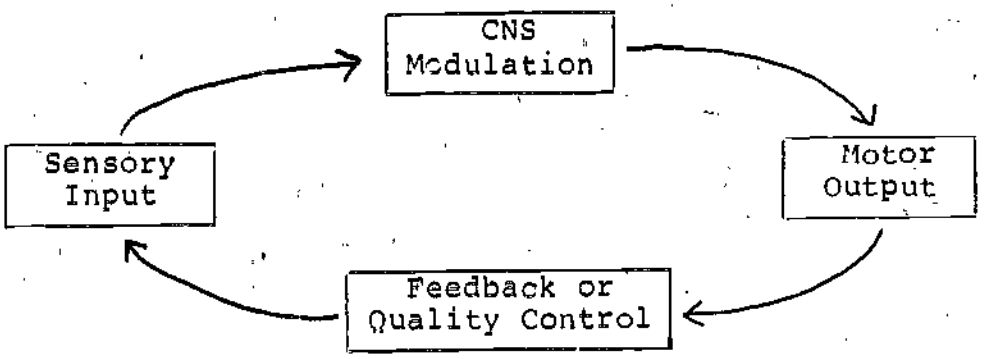
3. The presentor flexed and held the volunteer's left leg, and pushed her trunk to the left. The reaction of strong abduction and extension of the lifted leg was noted. (Walters, 1967)

Control of movement in the limbs develops in the following sequence: static positions; bilateral movement; mass reciprocal movement; mixed movements; and then torsion (rotation). Control of muscle groups develops sequentially from flexors to extensors, adductors, abductors, internal rotators, and external rotators. Some of the children we see with developmental delay and abnormal muscle tone, have essentially gotten "stuck" with certain muscle groups predominating. This causes increased muscle tone in certain muscle groups and prevents gaining control in other groups.

Sensory Motor Functioning

In attempting to understand complex movement activity, one must be able to discern the component parts.

The basic functional components of a motor activity include:



All motor activity has a sensory component. For example:

1. One yawns: the sensory input comes from sensory receptors sensitive to the oxygen supply in the blood.

2. The act of moving one body out of the way of an oncoming train: the sensory motor input comes from hearing, seeing or feeling the vibration of the train.

The sensory components of movement are basic. Three sensory systems furnish information from the body. They are called somatosensory systems and include the tactile, vestibular, and proprioceptive and kinesthetic systems. The following graph gives information regarding location of the system, the function, and how the system is stimulated.

SYSTEM	LOCATION	FUNCTION	STIMULATION AND MATERIALS
Tactile	Skin	Protection Discrimination	Ways to Stimulate the System 1. Rubbing 2. Rolling 3. Touch Materials Used to Stimulate the System 1. Barrel 2. Carpeting 3. Cotton Balls 4. Clay 5. Water 6. Paper Bags 7. Different Textured Materials 8. Sand 9. Mud 10. Paste of Flour and Water 11. Sandpaper 12. Water Paints 13. Shapes
Vestibular	Inner Ear Semicircular Canals	Balance Postural musculature Form and space perception	Ways to Stimulate the System 1. Spinning 2. Rocking 3. Rolling 4. Inverted Position

SYSTEM	LOCATION	FUNCTION	STIMULATION AND MATERIALS
			Materials Used to Stimulate the System 1. Swing, Hammock 2. Cage Ball 3. Barrel 4. Scooter Board 5. Mat 6. Innertubes 7. Sit and Spin 8. Vestibular Board
Proprio-ceptive	Muscles Tendons	Body awareness	Materials and Ways to Stimulate the System 1. Pushing self off a wall with leg while on a scooter board or hammock. 2. Walking a curved rope on all fours or a kneeling position. 3. Jumping into a circle, innertube, or over ropes. 4. Blowing cotton balls on floor in an all-fours position. 5. Wheelbarrow game.
Kinesthetic	Joints Vestibular Apparatus	Conscious awareness of joints in space or of body in space	Materials and Ways to Stimulate the System 1. Activities stated in proprioceptive section. 2. Pull-push heavy objects across table. 3. Hot potato game. 4. Pulling self along a rope while lying on stomach, back, or in sitting position. 5. Climbing a rope or pole. 6. Isometric activities.

1. Tactile System

At birth, the role of the tactile system is protection. The protective tactile system is stimulated by light touch and is developed in the fetus in utero. As infants develop, their need for a discriminating tactile system grows. In the mature tactile system, discriminatory functions dominate and protective functions are activated only as needed. Discrimination is stimulated by pressure touch; is developed after birth; and is influenced by gravity, body weight and tactile stmmulation.

At time, the tactile system retains its protective function and the individual may interpret touch as noxious or threatening. Tactile defensiveness is the term commonly used to describe these characteristics. A child demonstrating tactile defensiveness may exhibit avoidance of body contact; may not like to go barefoot; frequently wears long sleeves and long pants; and may be particularly aversive to shampoos, haircuts and face washing. The face, chest, abdominal areas and feet are especially sensitive to tactile stimulation. Tactile defensiveness may cause a child to be distractible and have a decreased attention span. The discriminating functions of the system may not develop to fullest potential.

2. The Vestibular System

The vestibular system has nerve pathways going to many parts of the brain. It is a very important system as evidenced by the fact that in the fetus, the vestibular apparatus is functioning by 21 weeks gestation. The vestibular system may be thought of as an internal guidance system. If the eyes are closed, it allows one to be aware of movement of the body in space.

A standardized test used to measure the integration of the vestibular system is the Southern California Post-Rotary Nystagmus Test. Nystagmus is the side to side movement of the eyes, which is normal adaptive response. One attempts to stablize the visual field following movement of the head by fixating on objects in space. It can be described by visualizing a person on a moving train whose tracks are lined by trees. The person focuses on one tree, follows it until it passes through the visual field, fixates on the next one and follows it, and so on.

The limbic system as influenced by the vestibular system is currently an area of much study. Many of the children we see exhibit a postural insecurity - an unnatural fear of losing contact with a support surface. Stimulation of the vestibular system in relation to change of position against gravity can be responsible for this fear.

The connection of the vestibular system with the automatic nervous system through the vagus nerve can effect blood pressure,

respiratory rate, heart rate, and can cause nausea and vomiting during vestibular stimulation. There may be a connection to seizure activity in seizure prone children. Vestibular stimulation must be done carefully and with constant observation. The effects of vestibular stimulation in some children can be very long lasting, and even delayed up to a day or more.

3. Proprioceptive-Kinesthetic Systems

Proprioception is defined as the unconscious messages we receive through muscles, joints and related structures. Kinesthesia is defined as conscious perception of joint position. The functions of these two systems help the individual to develop an awareness of the body and to develop motor planning skills. They help the individual reach increased movement proficiency and make modifications while moving. It might be compared to a quality control system.

The Team Approach in the Educational Setting

Physical and occupational therapists are relatively new in the public school setting. One mistake that we probably all have made is forgetting that we are used to working on a one-to-one basis, while teachers rarely have that opportunity. At our agency, we have found that we can fit in to the classroom setting by working with the teacher, finding out what questions and problems he or she has with specific students. We then need to find out the daily routine, such as free play periods, rest times, putting materials away, lining up and going to other areas of the school, etc. Most often, goals of positioning, handling and various activities for the therapy program can be fit into regular class routines by the teacher, requiring no extra time or individual attention, and often making what would normally be done for the student easier.

Occupational and physical therapists may have their own language, just as teachers do. We had to learn such things as LLD, EMR, TMR, ED, SH. Do not be afraid to ask a therapist to explain if you are not sure of the meaning. Also, be sure to tell the therapist if you know that you will be unable to carry out any recommendations, regardless of the reason: no time, not physically able, just don't agree with the recommendations, and so on. It will save a lot of guilt feelings and time, and allow you to work out another way of serving the student's needs.

Many of the methods by which we feel we can help a student utilize activities, games and play; and if carried over daily by the teacher, good results can be obtained. If a teacher is willing and able to do this, the therapist needs to make sure that any instructions are fully understood. Try to actually do what the

therapist recommends in his or her presence. Many times an occupational or physical therapist does things by "feel" or experience. The therapist may tend to take things for granted, or may even be unable to describe things verbally. If you try the activity in the therapist's presence, there is time for such questions to surface so that the program can be carried out correctly.

References

Jacobs, M.J. Development of normal motor behavior. American Journal of Physical Medicine, 1967, 46, 41.

Walters, C.E. Interaction of the body and its segments. American Journal of Physical Medicine, 1967, 46, 282-283.

Waterland, J.C. The supportive framework for willed movement. American Journal of Physical Medicine, 1967, 46, 273-274.

Suggested Readings

Ayres, A.J. Sensory Integration and Learning Disorders. Los Angeles, CA: Western Psychological Services, 1973.

Banus, B. Developmental Therapist. Thorofare, New Jersey: Charles B. Slack, 1971.

Finnie, N.R. Handling the Young Cerebral Palsied Child at Home. New York: E.P. Dulton and Co., 1975.

Sage, G.H. Introduction to Motor Behavior - A Neuropsychological Approach. Reading, MA: Addison-Wesley, 1977.

Marianne Forman, OTR
Marilyn Smith, LPT
Harris County Department of Education
6515 Irvington Boulevard
Houston, Texas 77022

INTRODUCTION TO A STUDY ON THE CONCERNS OF PARENTS WITH DEAF-BLIND CHILDREN

Paulina Fernandez

In 1941 Sir Norman McAlister Gregg, an Australian opthalmologist, first documented the etiologic relationship between rubella and congenital effects. Before that point, although rubella had been correctly identified as having a viral cause, it was not known that even a mild infection in a pregnant woman could cause severe defect in the fetus. Once the rubella virus penetrates the placental circulation from the pregnant mother's blood, the fetus acts as a culture medium. Therefore, not only those organs already being formed are in danger of being malformed; all organs which will develop after the time of infection are also vulnerable to the viral invasion. In autopsies of aborted fetuses and in the stillborn and neonatal dead, live rubella virus has been recovered from every organ system.

The consequences of congenital rubella become clearer as the children affected in the worldwide epidemic of 1964 continue to be evaluated systematically in a number of centers. The effects of congenital rubella reflect a truly awesome picture of damage. Rubella can cause abortion and neonatal deaths due to purpura (bleeding tendency). For the babies who survive, the consequences of this disease include deafness, visual anomalies such as cataract and glaucoma, cardiac malformations, and neuromotor abnormalities, such as spasticity of the legs, or of all voluntary muscles. Some centers have also reported children with poor functioning of immune mechanisms, diabetes, or growth disorders.

In terms of behavior, congenital rubella can also produce a high prevalence of mental retardation and childhood autism, as well as the other abnormalities which are due to brain damage. A further complication is caused by the fact that, for many of the rubella children, there can be a combination of defects which also creates its own behavioral problems. For example, such a child might be blind, deaf, and autistic; or deaf and retarded, with cardiac malformation. For each of these children with such a grouping of defects, the behavioral patterns present their unique problems for management and education. In fact, in order to fully comprehend the problems of these victims of congenital rubella as well as the concerns their parents have, it is necessary to keep in mind the fact that, where such defects occur in groups, the different pathologies interact and potentiate each other. Rubella children with more than one defect are truly "multi-handicapped" children, with extremely special needs.

During the course of a longitudinal study of children with congenital rubella, we documented the concerns of the parents. Many of these parents have no other childrearing experience. For a sizable percentage of parents (39% in our study), these are first children. Combined with the ordinary difficulty of learning to care for an infant, our parents were also faced with the need to provide adequate care for youngsters who presented many problems because they were retarded or autistic, as well as deaf, blind, spastic, or some combination of these. The problems of obtaining the correct medical treatment, psychiatric care, and educational programs for such children are extremely great. For many parents, the presence of such a child in the home creates a new range of difficulties. Their marriage itself may suffer; parents may feel guilty and unsure of how to treat well siblings; siblings may have trouble adjusting to a life in which they get a poor quality of attention because of the heightened care and attention required by a handicapped child.

As our rubella children grew older, parents were concerned about seeing that their children had the appropriate educational opportunities. With the right school or teacher, some of these children might flourish. Conversely, a program which did not fully recognize the child's complex needs might cause more problems than it solved.

Sixty-five percent of all the children in our study suffered from hearing loss, ranging from mild loss to profound deafness. For the parents of these children, concern about how to communicate with their children, about what methods of communication the children should learn, and about how well they were able to accomplish the task of communication when they did not hear, was paramount.

Because our study was longitudinal, we had a unique opportunity to determine what effect, if any, development would play in the nature of parent concerns. Some problems which occupied many of the parents when their children were preschool age might recede in importance when the children were eight or nine. Perhaps the demands of growth might change the focus of parent concern.

We were also interested in discovering whether parents had a realistic grasp of the priorities. Did they correctly perceive their children's disabilities? Was the amount of information they needed to assimilate with regard to their children's condition too overwhelming, or did they have a clear picture of how their children were doing? Was there a correlation between the actual performances of these children and the focus of parent concern? In the case of the children with hearing loss, we also had the opportunity of comparing data on parent concerns

with data about the children's actual performance in speaking, writing, and communicating in other ways. We also evaluated the children behaviorally, and could then correlate this information with the concerns parents expressed about the problems of living with their multi-faceted difficulties.

Paulina Fernandez, Ph.D.
New York University Medical Center
Millhauser Labs, Room 316
550 First Avenue
New York, New York 10016

COMMUNICATION

THE EMERGENCE OF INTENTIONAL COMMUNICATION

Inge Bretherton
Elizabeth Bates

Mother-infant interaction, long the province of researchers in social development and attachment, has more recently captured the interest of those hoping to explore and explain the roots of language. In fact, the early reciprocal interchanges between mothers and infants have been likened to protodialogue or preverbal conversation, and have been studied as such by developmental psychologists (Bruner, 1977; Kaye, 1977; Schaffer, 1977; Stern, 1975). Even the component skills of interaction sequences have attracted the attention of psycholinguists. For example, showing, pointing, and giving were studied by Escalona (1973) and Rheingold, Hay, and West (1976) as early forms of social sharing, but have since been interpreted as proto-speech-acts by Bates, Camaioni and Volterra (1975). Crying was studied by Wolff (1969) and by Bell and Ainsworth (1972) in terms of maternal responsiveness to distress, but has since become the subject of a study by Dore (1973) in which he proposes that early "attitudinal vocalizations" (such as crying) contribute significantly to later language acquisition.

Although this interweaving of two areas has been fruitful for both, the search for precursors of verbal communication and dialogue in early mother-infant interaction also has its dangers. Structural similarity of earlier and later forms of behavior may be, but does not have to be based on shared underlying programs.

Piaget has discussed the structural similarity of behaviors in terms of his notions of horizontal and vertical decalage. Horizontal decalage refers to similarity within cognitive levels (e.g. within the sensorimotor or preoperational stage) and involves the extension or generalization of a cognitive program which a child has acquired in one context to other contexts somewhat later. For example, Bell (1970) has reported that securely attached infants will manifest object permanence first in searching for the mother when she has disappeared behind a screen, extending the same search procedure to inanimate objects a few weeks later. By contrast, insecurely attached infants show the reverse order, searching for inanimate objects before they search for the attachment figure. Vertical decalage, on the other hand, involves structural similarity across cognitive levels. Instead of applying a sensorimotor program to a new sensorimotor context the child has to restructure the old sensorimotor program for use at a higher conceptual level. For example, a 16-month-old infant may finally master the ability to conserve the notion of permanent objects, despite complex disappearances and transformations. However, the same child will not yet be able to conserve attributes or dimensions (e.g. length, quantity and weight) under transformation

until several years later, at entry into concrete operations. For Piaget, both types of decalage involve direct transfer. In horizontal decalage the same program is applied to different contexts; in vertical decalage an existing program is rewritten for application at a higher level.

Psycholinguists looking for the roots of language and discourse in preverbal mother-infant interaction are clearly postulating something akin to Piaget's concept of vertical decalage (in this case from the sensorimotor to the symbolic level). However, there are two alternative explanations for these observed structural similarities. The first of these is simple that the two systems could independently have evolved similar solutions to similar organizational problems. For example, the turn-taking regularities witnessed in early mother-infant games may resemble later conversational rules merely because there are only so many stable ways to achieve dyadic interaction. In other words, solutions may be developed afresh (analogously) rather than by building on earlier solutions (homologously). Schaffer (1977), too, recognized this problem, pointing out that until we can show continuity (homology) all we are entitled to assume is analogy.

Schaffer also draws our attention to a second explanation of apparent continuity. Vocal turn-taking which has been observed in interactions with very young infants may be brought about entirely by the mother's skill at inserting her vocalizations at appropriate moments into the baby's babbling sequences. The continuity is provided by the mother, who withdraws her support as the child becomes able to respond contingently.

The only method whereby the case for or against continuity (i.e., the case for or against homology between earlier and later structures) could be made definitively is by way of deprivation studies, a method thankfully not open to us. Prolonged and severe social deprivation in infancy, as documented by Spitz (1965), does affect language development, but it does so along with impairment in every other area of development as well. It is impossible to say whether, in these cases, delayed language development was due to lack of opportunity to acquire the necessary cognitive skills or to loss of motivation for human interaction.

To examine the case for or against continuity we must therefore explore other methods, such as correlational studies or training studies. Correlational studies can be used to show whether skill at turn-taking in reciprocal games during an early stage of development is predictive of verbal dialogic skills later on. Through training studies, we can demonstrate horizontal decalage. If the same underlying program regulates two behavioral domains, then training in one behavior should lead to progress in the other, regardless of the sequence in which the two behaviors first emerge in a child.

We could decide to use either continuity or discontinuity as the working hypothesis for our research. However, since continuity in some sense is always a prerequisite for further development we suggest that the search for continuity is the more promising approach. Such a strategy will automatically uncover the degree of discontinuity between earlier and later competencies as well.

What do we mean by continuity? It is especially important that we define our terms because change is the most striking fact about infant behavior: the execution of behavior becomes more controlled and infant signals therefore become more readable to caregivers, dyadic sequences grow more complex and organized, the infant takes increasingly more social initiative and unintended (perlocutionary) signals are replaced with intended (illocutionary) messages. Despite this plethora of changes the case for continuity would be satisfied, in our view, if it could be shown that behavioral and organizational skills which an infant has acquired during one period of development are used in the construction of more complex behavioral and organizational skills later. We therefore believe that it would be most fruitful to investigate transitions between stages. (We use the word stage as an organizer, to mark the attainment of new skills. A new stage incorporates behaviors which have gradually been acquired during the previous state. Anyone reading Piaget's (1963) account of the five sub-stages of visually guided reaching within sensorimotor stage II will note that his stages do not refer to quantum jumps either.) In other words, we suggest studies of how the baby gets from A to B to C to D, rather than assuming that because A and D have something in common they must therefore be causally linked. Such an approach would predict higher correlations between A and B or B and C than between A and D.

Before we proceed with our presentation, we would like to insert yet another word of caution. Of course, the acquisition of interaction skills is affected by the maturation of the central nervous system as well as by the infant's interaction with the physical and social environment. No matter how synchronous early dyadic interaction, we have yet to hear of a conversing 3-month-old. Limits on the speed of development are imposed, for example, by the myelination of brain structures in the human infant (see Konner, in press, for a review). The visual system is already partially myelinated at birth, but the auditory system begins myelination only in the latter part of the first year. Furthermore, the corpus striatum and the globus pallidus myelinate in the first and second years. These structures, when stimulated in squirrel monkeys, give rise to highly ritualized, species-specific fixed action patterns (MacLean 1973). According to Konner, this raises the possibility that if there are fixed action patterns in human social behavior, they may be controlled from homologous

sites. We ought to keep these points in mind when reasoning about continuities in development in general and about the relationship between cognitive and communicative skills through underlying homology in particular.

The Emergence of Intentional Communication: How Well Has the Case for Continuity Been Made?

There are many different angles from which continuity in the emergence of intentional communication could be probed. In this paper we shall limit ourselves to discussing the case for continuity in terms of the development of intentionality and reciprocity. In order to engage in intentional communication one must be able to plan one's behavior, but one must also know that the partner can comprehend messages; that communication is reciprocal. Strange to say, there has been no systematic longitudinal study of intentionality vis-a-vis objects and persons since Piaget published the observations of his three children in Origins of Intelligence in Children (1963) and The Construction of Reality in the Child (1954). In order to provide a framework for our presentation we will first outline Piaget's observations and then relate them to subsequent research in this area, including our own. In the final section we will discuss the development of reciprocity from the earliest proto-dialogue to verbal discourse. Unfortunately, neither Piaget nor anyone else has provided a longitudinal study covering this whole period. We have therefore drawn on a number of different studies to present this topic.

The Development of Intentionality Vis-A-Vis Objects and Persons According to Piaget

Intentionality does not spring forth fully formed at the point when infants become capable of intentional communication: by then it already has a respectable history. Furthermore, to influence a partner intentionally is not the same as communicating intentionally. In this brief summary we present examples of intentionality stage-by-stage, and since people-directed intentionality cannot easily be discussed without considering the baby's complementary ability to predict the behavior of human partners we have also included examples of the latter. The term intentionality is used here in the same sense as defined by Bruner (1973):

> "Intention, viewed behaviorally, has several measurable features: anticipation of the outcome of an act, selection among appropriate means for achievement of an end state, sustained direction of behavior during deployment of means, a stop order defined by an end state, and finally some form of substitution rule whereby alternative means can be deployed for correction of

deviation or to fit idiosyncratic conditions. It can be argued from evidence that the capacity for all of these is present from birth." (p. 2)

Stage I: Laurent (all observations from Piaget, 1963) can use kinesthetic and tactile feedback to guide his search for the nipple, but only while he is already engaged in feeding.

Stage II: Laurent searchs for the sound of a rattle which is shaken out of his visual field. In analogous fashion he looks for his father who produces a bzzz sound out of the baby's sight. Laurent now initiates behavior intentionally, provided the goal remains perceptible during the search (OI, Obs. 48 and 49). In terms of predicting human behavior, Laurent has discovered that he will be fed in a person's arms and not on the dressing table (he only tries to nurse when held).

Stage III: Laurent (OI, Obs. 99) has learned how to shake a rattle dangling from the hood of his bassinet by tugging on a string. He is now able to foresee the effect he will create, looking at the rattle as he reaches for the string (OI, Obs. 169). Furthermore, he seems to have noted the connection between the intensity of his motoric efforts and the loudness of the rattle ("It is impossible not to deem this gradation intentional," (OI, Obs. 106)). In order to activate persons, the baby seems to use schemes which have been successful at activating the toys on his bassinet (arching, bouncing, or tugging on a string). Later during the same stage Laurent who has observed his father set a toy in motion tries to recreate the spectacle by grasping his father's hand and shaking it ("He treats it like a rattle whose properties depend on his own action," OI, Obs. 133). During this stage visual stimuli enable the baby to predict a person's behavior. Lucienne, at 3.5 months, stops crying when she sees her mother unfasten her dress for a meal (OI, Obs. 27).

Stage IV: Jacqueline plans activities with an object which is not visible (OI, Obs. 129). In the midst of tapping toys against her wicker bassinet she stops, looks for her shoe which is hidden by a shawl, uncovers it, and strikes it with a toy. Jacqueline (OI, Obs. 127) has also acquired some notion of persons as autonomous movers: it is now enough to push her mother's hand toward the piece of material which she wants her to swing back and forth. She does not continue to activate the mother's hand. Similarly, Laurent (OI, Obs. 123) pushes his father's hand away when that hand restricts his movement or is about to remove a desired toy. In terms of predictions, Jacqueline (OI, Obs. 109) smiles and says "aaa" as soon as the door to her room opens in the morning (before she can see the person) and cries (OI, Obs. 133) when see sees a person get up to leave.

Stage V: Jacqueline realizes (OI, Obs. 147) that objects can be made to move on their own provided they are placed in the

appropriate starting position, i.e. celluloid duck released under water will pop up spontaneously. Laurent (OI, Obs. 148) discovers that he can obtain one object (a watch) by pulling on a second (the support on which the watch is placed). Much later in the same stage, Jacqueline learns how to use a stick in order to move an object towards herself. The stick presents a more difficult problem since the baby has to create the connection, not utilize a connection already provided. Jacqueline also realizes that a person can be activated by messages. These messages may be behaviors such as assuming an expectant posture to get papa to continue his antics (Piaget, 1954, Obs. 152) or communicative gestures like pointing.

Stage VI: The baby now plans behavior several "moves" ahead and considers alternatives before carrying them out. Jacqueline arrives at a door with two blades of grass and puts the grass down out of the door's zone of movement before opening it (Piaget, 1963, Obs. 181). Jacqueline also knows that a false message is most likely to activate her parents: she pretends "a certain need" in order to be taken out of the playpen when her real intent was to continue the game she had been playing previously (Piaget, 1954, Obs. 160).

In Piaget's view, intentionality vis-a-vis people and objects develops very much in parallel. With each stage the infant is able to insert more behaviors between the formation of an intent and the attainment of the goal and to make predictions of human behavior further and further ahead of their actual occurence. This requires not only development of intentionality but parallel development of the concepts of time, space, object permanece, and causality; since a baby can only use feedback from an object or situation inasmuch as that feedback can be interpreted within an organized framework of "meaning".

Related Research on Intentionality vis-a-vis Objects and People

Other research findings, while in general agreement with Piaget's observations, indicate that he may have been too conservative in his account of intentionality.

Stages I - IV. Regarding intentionality vis-a-vis objects, Siqueland and DeLucia (1969) showed that the capacity to "make interesting sights last" exists well before the emergence of eye-hand coordination. Even three-week olds can operate slide projectors in order to view pictures, if the contingent event is hooked up with their much more mature sucking-system rather than their as yet immature grasping system. Watson (1972) showed that 8-week old infants can activate mobiles with headturns and finally, Papousek and Bernstein (1969) demonstrated that, without prior shaping, infants as young as 4 months of age are able to work out simple strategies for switching on a spectacle; strategies such as turning the head once to the right and once to the left.

Research on intentionality vis-a-vis people also suggests that infants may be somewhat more capable than Piaget envisaged, at least during stages I - IV. There is now abundant evidence that human infants are primed for social interaction from birth. There is also evidence that expectancies of caregiver behavior are formed during the earliest days. Sander (1977) found that babies respond with dismay if the mother's face is masked during feeding during the 6th day of life. In another "violation of expectation" experiment, Tronich, Als, Adamson, Wise and Brazelton (1978) showed that infants turned away from the mother if she stopped in the course of reciprocal play and presented a sober, immobile face for three minutes. Finally, as early as 4 months infants follow an adult's line of regard, looking where the adult is looking. This shared reference (Scaife & Bruner, 1975) goes a step beyond mere anticipation or noting that something is not right. Furthermore, there are some tantalizing suggestions in the literature which suggest that around 7 months of age infants begin to take more initiative at engaging the partner in interaction (not merely in keeping an interaction going with magical procedures, as suggested by Piaget's examples). Ainsworth (1973) has pointed out that at about this age babies enter a new phase in their relationship to the mother (the phase of active initiative in seeking proximity and contact). She reports that infants' greeting responses become more [illegible] and effective and that their active contact-seeking and maintaining behaviors are more significant: "His signals clearly [illegible] intent to evoke a response from the mother." Sander (1969) also postulates a stage of initiative beginning at 7 months, a period during which the infant makes social bids which are intended to secure the mother's attention and cooperation in reciprocal games. Since neither of these investigators was interested in intentionality per se, there is no precise indication on which aspects of infant behaviors their judgments were based. However, this period does coincide with Piaget's stage IV in the development of means: the ability to use old means to new ends. We suggest a more careful look at intentional behavior vis-a-vis persons from the beginning of stage IV to the onset of stage V.

Our own research indicates that the ability to "show off", to engage in a behavior that has previously attracted the attention of an adult, precedes intentional communication. We do not know, however, when these behaviors first appear. Furthermore, we have anecdotal evidence about infants who squirm in order to be put down and raise their arms in order to be picked up, using these behaviors to influence adults. Sugarman (1978) conducted one of the few studies of the transition from stage IV to V. She found that infants first either reach toward desired objects or look up at adults for help. Only later do they combine the two behaviors into one message (stage V) looking back and forth from object to adult while reaching toward the object. However, even the alternation of object and person directed behavior may occur earlier than Sugarman suggested. She made things difficult for

the baby by seating the person who offered the object slightly to the side and behind the baby. This spatial arrangement made it more difficult for the infant to look from object to person than had both been located in the same visual field. The period preceding the first occurrence of intentional messages is an interesting one: there seem to be definite attempts to influence adult behavior but without understanding that others are centers of intentionality like oneself.

Stages V and VI. With entry into stage V we are on much firmer ground: this is a period which we have studied extensively. It is the period when infants begin to attribute spontaneous mobility to objects and agency to people (Piaget, 1963). Instead of making an adult "go off", infants are now able to construct intentional messages. Intentional communication, as we define it, is signalling behavior in which the sender is aware a priori of the effect that a signal will have on his/her listener, persisting in that behavior until the effect is obtained or failure clearly indicated. The behaviors that are used to infer the presence of communicative intentions include (a) alternations in eye-contact between the goal and the intended listener, (b) augmentations, additions, and substitutions or signals until the goal has been attained, and (c) changes in the form of the signal toward abbreviated and/or exaggerated patterns that are appropriate only for achieving a communicative goal.

Around 9 months of age, some infants already use gestures whose sole purpose is communicative: giving, showing and pointing. In addition behaviors such as reaching which have already been in use for some time become ritualized into communicative conventions; that is, instead of desperately straining toward an unreachable object, the baby may look at the adult while opening and closing the palm as he/she reaches toward the object. In an earlier study with 3 subjects (Bates, Camaioni, & Volterra, 1975) we pointed out that nonsocial tool use (using one object to obtain a second, such as pulling in an object placed on a cloth) and social tool-use (using a person as a means to obtain an object or using an object in order to obtain a person's attention), were closely linked in time, although nonsocial tool-use tended to precede social tool-use. In a subsequent study with twenty-five children (Bates, Bretheran, Carlson, Carpen, & Rosser, 1979) we found significant correlations between individual measures of gestural communication and nonsocial tool-use at 9 months and significant correlations from 9-12 months for nonsocial tool-use with summary measures of gestural communication (Bretherton, Bates, Benigni, Camaioni, & Volterra, 1979). However, in this larger sample nonsocial tool-use did not always precede social tool-use. Sometimes the reverse was the case (horizontal decalage). We therefore postulated (Bates and others, 1977) that the same underlying program could first manifest itself in either the social or the nonsocial realm. Furthermore, social and nonsocial tool-use con-

tinued to be related across the age span investigated, so that progress in one predicted progress in the other. In addition, the emergence of first words and the quality of infant-mother attachment (as assessed in the Ainsworth Strange Situation, see Ainsworth, Blehar, Waters, & Wall, 1978) were significantly correlated with social and nonsocial tool-use (Bretherton, Bates, Benigni, Camaioni, & Volterra, 1979).

These findings would be less interesting had object permanence or spatial relations (two from the Uzgiris-Hunt [1975] scale) shown equally strong relationships with communication. But this was not the case. The only other variable which was related at all strongly to communication (and then only to verbal production, not to production of communicative gestures) was vocal and gestural imitation during the latter part of the study. Our results are supported by research from other quarters. For example, Snyder (1975) reported that language-delayed children at the one-word stage are significantly impaired both in tool-use (as measured by the Uzgiris-Hunt scale) and in several aspects of gestural communication or social tool-use (see also Curcio, 1977 and Snyder, Carlson, Bretherton, & Bates, 1978).

Across a longer time span only the summary variable of gestural communication remained strongly predictive of communicative development (Bates, Bretherton, Carlson, Karpen & Rosser, in press) both in the gestural and verbal realm. By contrast, nonsocial tool-use during the earlier study was only sporadically related to communication at 19 months, indicating stronger continuities over time within the social domain.

While there are certainly structural similarities, intentional communication is a qualitatively different kind of tool-use than pulling in a toy with a cloth or string. To achieve a real understanding of social tool-use the baby will, at some point, have to grasp the difference between what Aristotle has called "efficient and final causality". In the making of a statue the impact of the chisel on the marble is the efficient cause, and the plan which the artist has in mind is the final cause. In other words, plans, goals, and intentions are final causes of action. The child, in order to communicate intentionally, must understand first himself and then the partner as final causes. The baby must develop what Premack and Woodruff (in press) have called a theory of mind:

> "An individual has a theory of mind if he imputes mental states to himself and others. A system of inferences of this kind is properly viewed as a theory because such states are not directly observable and the system can be used to make predictions about the behavior of others."

However, a theory of mind alone is not sufficient. The child must also understand that he/she can operate on the partner as a

final cause or operate on the partner's intentions. In other words, the baby must realize that he/she can interface his/her mind with that of the partner or develop a theory of interfacing minds. A theory of interfacing minds can be used to even greater effect when the baby can (in stage VI) mentally manipulate the representation of the partner and thus select optimal communicative strategies, sometimes several moves ahead of the intended effect (see Jacqueline Piaget's first lie, quoted earlier).

We will now turn to the transition from stage V to stage VI. This transition is gradual, but by 13 months we feel sure that infants use both vocal and gestural symbols to recognize, categorize, identify, name, and communicate about events in the world. Volterra, Bates, Benigni, Bretherton, & Camaioni, (in press) report parallels between verbal and gestural naming which include parallels in content as well as in the qualitative changes across 9-12 months. For example, babies tend to have words for drinking implements (cup, bottle) as well as applying pretend schemes to these objects (drinking from an empty cup or bottle). Similarly, infants tend to have both greeting gestures and greeting words, eating gestures and eating words. Although the total number of words a baby can produce is significantly correlated with the number of gestural schemes, a baby often has the word for one item and the gesture for another, not the automatic and simultaneous acquisition of both.

The second parallel occurs in the gradual decontextualization of verbal and gestural naming. Both pretend behaviors and names tend to be applied to a narrow range of situations at first and to a much wider range of context later. For example the word "dada" first appears in situations where the child is engaged in play with the father, but is later used to label a picture of the father or when the father's car is heard in the driveway. This gradual freeing of communicative behaviors from contextual support enables the baby to use gestures more and more inventively.

We would like to further illustrate this point by describing the increasingly sophisticated manner in which babies use the pointing gesture. The transition from non-communicative to communicative pointing occurs when children make sure that the adult is attending to the message by brief visual checking (Bates, Benigni, Bretherton, Camaioni & Volterra, 1979). In a sample of 18 month olds (Bretherton, 1977), infants were seen to use this gesture in a more sophisticated way: they stood facing the mother while pointing to an interesting toy behind them, i.e., the children's gaze was away from the place at which they were pointing most of the time. Furthermore, infants come to use the pointing gesture to indicate events which are not visible; e.g., pointing in the direction of the drive and saying "Daddy" when the sound of father's car is heard (Bruner, 1977). At 15 months, Bruner observed an even more interesting instance of pointing: the child who was "reading" a book with his mother pointed to a wine bottle in the picturebook

and from there to the dining room table, as if conceptually linking the two. One of us (I.B.) has observed a similar use of the pointing gesture in a 15 month old boy in play with a doll family. Upon being presented with the mother doll, the child inspected it and then turned around pointing to his mother and saying "Mommy". When the father doll was brought out, the little boy looked at it carefully and then pointed toward the door saying "Daddy" (his father had not come to the lab). Similarly creative uses of the "Bye-bye" gesture have been noted in the author's present study with 13 month olds: waving bye-bye was used when the infant was tired and wanted to go home after a lab visit. It was also used during a home visit to indicate (we think) that the child wanted the testers to leave: by waving bye-bye to the tester instead of carrying out the suggested task.

As children enlarge and learn how to manage their communicative repertoire, many communicative intents other than the declaratives and imperatives mentioned by Bates, Camaioni, & Volterra (1975) become possible. Here are just a few which can be conveyed with simple gestures only:

demanding or requesting (reach + look to adult)
answering (shaking head to "do you want water?")
refusing (shaking head, making a ritual push-away gesture)
praising (clapping hands, usually in self-applause)
declaring or sharing reference (pointing, or point + look)

Dore (1973) has claimed that the illocutionary force of communicative intents is conveyed by the intonation of the preverbal utterances whereas the accompanying gesture indicates what is being communicated about. While we agree that this can be so, we do not believe that the distinction is always so clear-cut. Although the baby's intent may be encoded in the prosodic features of the preverbal utterance, it may also be encoded in the execution of the gesture (e.g., impatient waving of the arm while holding a point gesture is more likely to be intended as and to be interpreted as an imperative than a declarative). In addition to specialized communicative gestures (e.g., pointing), the performance of ordinary everyday behavior can have communicative intent. An example is Jacqueline Piaget's method for persuading her father to whisper into her ear again by merely assuming the appropriate posture (putting her ear near his moth). We have observed some similar examples of communicative behavior during our own studies, e.g., holding a telephone receiver to the mother's ear to induce her to phone (this conveys a message more precisely than merely dumping the whole telephone apparatus in the mother's lap). A related example that occurred several times involved turning the doorknob but intermittently looking back to the mother with plaintive sounds, conveying "help me to open this door". This type of behavioral communication has not been studied systematically--and no wonder since it is particularly difficult here to differentiate intended from non-intended messages (illocutionary from perlocutionary forces).

However, we have in our observations come across one type of behavioral communication which has all the hallmarks of intentionality: teasing. Teasing was reported by more than half of the mothers of the American sample during our recent longitudinal study. Teasing or "fooling" usually involves the following features: (a) the baby makes sure the adult is watching, (b) the baby only pretends to carry out the activity, (c) the baby seems to expect a very specific adult reaction. Examples of teasing are:

1. Looking if the adult is watching and then reaching toward a forbidden plant, but not actually touching it, waiting for the adult to say "no".
2. Climbing the stairs part way (this is not permitted), looking back to see if adult is watching and as adult approaches, quickly trying to climb a few more steps.
3. Pretending to fall downstairs when adult is nearby.
4. Pretending to be asleep or hiding when mother enters the room in the morning. When mother holds out her hands, coming forward a little and then bouncing back into a pretend-sleep position.
5. Offering food to adult; putting it even closer when adult opens his/her mouth, but pulling it back at the last moment.

When a baby teases he/she is, as in an act of pointing or showing, operating on the adult's intentions. Teasing is thus a much more advanced way of "making the adult go off" than the mere "showing off" of an earlier stage.

Having discussed some examples of the baby's increasing sophistication in how he/she employs gestures and behaviors to convey intents, we can now examine creative gesture-word combinations. In our previous study we analyzed gestures and words separately. In our present study we are seeing slightly older infants (mean age 13.5 months). At this age, we have noticed two types of word-gesture message constructions: a parallel and an additive type. In parallel constructions the word expresses very much the same communicative intent as the gesture, so that in many cases the word alone or the gesture alone would suffice to convey the intent (e.g., saying "bye" and waving). To make the point clear we are listing some examples below:

"Dis" or "See" + point or show
"Dadoo" (thank you) or "Da" (Italian for give) + give
"Hi" or "Bye" + wave
"Up" + arms-up
"No" + headshake
"Uhuh" + nodding
"Yeh" + self-applause

Because of their redundancy these dual messages are clearer

to the addressee than their single counterparts. This is especially true of the case of showing, in which adults often have trouble distinguishing between an infant's intent to give and infant's intent to show. Additive combinations, on the other hand, are not only clearer but more precise than single gestures, although there are big differences in how much the combination adds to the message. Some examples we have observed and found in the literature are:

"Duckie" + point to poster (at 13 months)
"Milk" + reach toward kitchen counter (at 13 months)
"Doos" (juice) + banging on refrigerator (at 12 months)
"No" + pushing food away (at 13 months)
"Mummy" + headshake, seemingly for "it's not Mommy" when a stranger enters instead of the mother (at 16 months).
"More" + headshake, seemingly for "no more" (Carter, 1975, at 15 months)
"Fix" + give (at 18 months)

These combinations could be studied in much more detail. For example, it would be useful to look at the temporal relations that hold within gesture/sound pairs, i.e., whether the word always follows or precedes the gesture, whether the two are generally simultaneous, or whether the sequence is optional. Another approach would be to examine the relative weight of gesture vs. sound in these combinations. For example, Carter (1975) has presented the only detailed longitudinal case study currently available on the precise nature of gesture/sound combinations in this age range. A particularly interesting pattern reported in her study regards the relative stability of gesture vs. sound in the longitudinal course of these packages. In the earlier phases, the gesture tends to be relatively fixed in form, while the sound may vary considerably within the same communicative goal situation. Later on, within the same kind of context, the sound becomes more fixed in form while the gesture "frees up" or becomes more variable.

As soon as the word "sequence" is mentioned, most linguists will probably think, "Ah, primitive syntax". However, word-gesture combinations do not have to be arranged sequentially to carry their meanings, and as Carter has shown, they may also be rearranged considerably in form without significant variations in communicative effect. Some recent research on language at the one-word stage, in particular a study by Greenfield and Smith (1976), suggests that single words combine with gesture and with the non-verbal context to convey such "grammatical" concepts as agent-action, action-object, and object-location--notions that the authors describe with a version of Fillmore's case grammar (Fillmore, 1968). A number of criticisms have been offered of this "rich interpretation" approach in reading the intentions of one-word speech (e.g., Howe, 1976). Still, there is good reason to believe that children con-

trol more complex combinatorial meanings than is evident in their one-word utterances alone.

The Greenfield and Smith data regards combinations of word and gesture by children learning a language that will, at least eventually, depend most heavily on the oral component. However, children acquiring a purely gestural code show remarkable precocity in conveying complex meanings. First, it appears that the earliest fully symbolic signs in children acquiring American Sign Language (ASL) as a native language appear at about 9 months (Prinz, 1978), and there is one documented case of a completely conventional and arbitrary sign as early as 6 months of age (Hoffmeister, 1978). Furthermore, the ASL combinations (analogous to 2-word utterances) have been reported around 14 months by deaf parents of deaf children, at least four months earlier than in infants acquiring an oral language (Stokoe, 1976). Whether we are studying the acquisition of oral or manual languages, it seems fair to conclude that an examination of the earliest regular gestures will tell us a great deal about transitions into linguistic behavior that obeys grammatical conventions.

Once multiple-word utterances become common in the oral modality, the accompanying gesture may drop back in importance. Carter's results certainly suggest that the gestural component of messages may at least become more variable and hence less dependable (conventional?) in form. Nevertheless, as we shall see in the next section it will be a long time before language is no longer an accompaniment of action tied to the ongoing sensorimotor context. In short, it will be a while before a child can perform the analogue of cooking dinner while discussing language development.

The Emergence of Dialogue

True dialogue divorced from action only appears well into the second year of life (Ervin-Tripp, & Miller, 1977). Do the forms of ritualized mother-infant interaction which precede this ability facilitate its development or are they strict prerequisites (e.g., dialogue will not develop without them)? As we have already pointed out, the term protodialogue has at time been used loosely to note similarities between ritual games and discourse (or even communicative ability), assuming but not actually showing underlying homology. As we will show, the lack of longitudinal studies in this area makes it difficult to make statements about continuity with confidence.

The earliest mother-infant games have more to do with developing joint rhythms than with turn-taking per se. Before one month of age, interaction sequences are hard to establish (Brazelton, Kozlowski & Main, 1974). Thereafter mother and infant interact (if they are

successful) in joint synchrony. The mother tries to get the baby to respond to her antics, and as he/she becomes increasingly excited the mother adds more behaviors until the baby shows signs of flagging. At this point the mother tends to tone down her own behavior to match the baby's; the next round of interaction starts when the baby looks back at the mother. Stern and his colleagues have studied mothers and infants at play from 3 to 4 months describing the observed interactions as a dance (Stern, 1977). Such games may be necessary precursors to later repetitive turn-taking games such as looming reciprocal vocalizing, reciprocal hand-clapping, and so on. The repetitive form of turn-taking becomes exceedingly common later on. Many such games are invented on the spur of the moment even with unfamiliar partners. They are useful, especially with unfamiliar partners, because of their simple script; "First you do this, then I do that".

Mothers first introduce games with a "storyline" (e.g., peekaboo and pattycake) around 5 months of age (Ratner & Bruner, 1978). Ratner and Bruner in their longitudinal study of a disappearance game were not out to show continuity in the baby, but continuity in the dyad. Figure 1 (redrawn from their paper) depicts the structure of a disappearance game in which the mother pulled a clown from a cloth cone and made it disappear again. Note how the mother, when she first introduced this game, marked each juncture with appropriate utterances.

Insert Figure 1 about here

At first (5 months) the baby was mainly a spectator, at 7 months the baby began to respond to the rhythm of the game, at 8 months he/she imitated the mother's vocal marking of the clown's disappearance. Finally at 15 months, the baby had mastered the whole sequence and was able to perform either the agent role with minor variations, or as a recipient, to insert appropriate comments to the partner's actions. It is probably more difficult to show continuity in this type of complex game which is at first much too difficult for the infant than through a series of games with graded difficulty.

To what extent is the acquisition of turn-taking skills dependent on the kind of ritual interchange we just discussed? After all, babies cooperate with their mothers in many other, less structured, activities such as eating, bathing and going to bed. In fact, it is rather hard for mother and infant not to develop a series of dyadic scripts. The opportunity to acquire turn-taking competence in these less ritualized cooperative sequences should also be studied.

Bates has conducted an investigation which highlights the importance of just such situational variables in conversations of

older children with their mothers. Two-, three-, and four-year olds interacted with their mothers in two types of situations: (a) a task-oriented situation in which the couple was asked to draw a picture together and (b) a free play situation in which the mother was asked to sit in a chair while the child explored the laboratory playroom. Each person's utterances were analyzed in terms of communicative intentions or speech acts and in terms of whether the utterance was a topic initiation or a response to the other speaker. From this information two ratios were calculated. The first of these, dominance, looked at the proportion, the more that person dominated the flow of conversation. The second ratio, conversational sensitivity, consisted of the speaker's responsive utterances divided by the partner's total utterances. This value was larger when a person responded to a larger number of the partner's topic initiations and responses. The child's conversational sensitivity increased from 2 to 4 years, whereas the mother's started at a high level and then decreased as the older child took more responsibility for keeping the conversation going. This was true in both situations. The dominance ratio, on the other hand, operated very differently in the two situations: in the drawing task the mother dominated with a far higher proportion of topic initiations; in the free play situation the roles were reversed. In other words, the sensitivity measure taps age differences in interaction that are relatively constant across situations, while the dominance measure reflects "division of labor" in different kinds of contexts.

These findings suggest a similar line of inquiry in earlier stages of turn-taking. What are the developments that hold constant across ritualized mother-infant games and looser dyadic scripts? Which behaviors vary, and how do they vary as a function of the kind of interaction taking place?

The final question we must ask is whether ritualized, playful interaction (as opposed to more informal interaction) is in fact a necessary prerequisite to dialogue. In our research in Italy and in the United States (Bates, Benigni, Bretherton, Camioni, & Volterra, 1979), we noted that the Italian babies who play far more ritual games than American babies were also more advanced in speech. Bates (1976) reports some evidence that this relative precocity (in comparison with American children) continues into the development of grammar. Still, this evidence only suggests facilitation, not necessity. On the other hand, Brazelton (1977) reports that a group of Zinacanteco Indians whom he studied in Mexico minimize playful social interaction during the first year of life. During the first 3 months, the infant's face is often covered to protect it from the evil eye; even in the context of feeding interactions the mother does not speak or smile to the infant. These infants do learn to converse, however. This one example (and there are others; see Levine, 1977) is sufficient to demonstrate that ritual play interaction is not a prerequisite to

discourse. To what extent, then, is verbal dialogic skill enhanced or facilitated by ritual game interactions? How important is the quality of joint actions in general? We have recently (Bretherton, Bates, Benigni, Camaioni, & Volterra, in press) presented evidence showing that the quality of mother-infant attachment during the first year of life (as measured by Ainsworth's Strange Situation) is not related to the speed of language acquisition. However, our study and other similar studies which we reviewed have related vocabulary size and other strictly linguistic measures to mother-child interaction, but not to discourse skill in the broad sense. We simply do not yet know if early harmonious quality of interaction in play as well as other cooperative sequences is related (or not related) to later discourse skill.

Conclusion

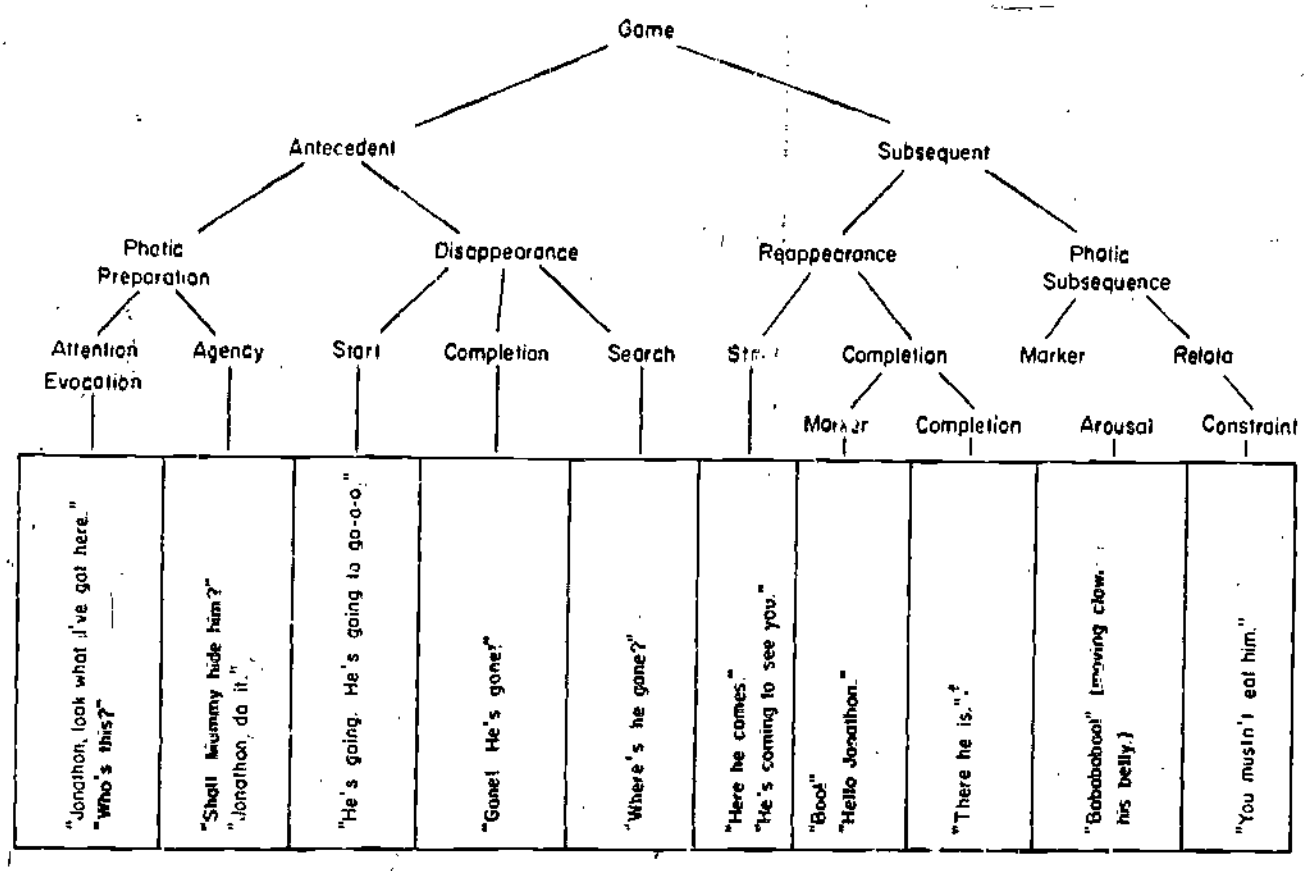
We cannot claim to have proven the case for continuity. But where we, ourselves and others have looked carefully, we have found good evidence for continuity in "local", stage-to-stage transitions. By moving one step at a time, from A to B to C, to D, we can make a much more convincing case than in gross analogies from A to D. This in no way detracts from the fact that enormous qualitative changes take place during those transitions. The issue of continuity vs. discontinuity is independent of the question of how much has been changed, added, substituted, or rearranged -- a point which is sometimes overlooked.

The major transitions that we have examined here are the following.

(1) Awareness that one can affect someone's behavior during an already ongoing interaction; to
(2) awareness that one can intentionally "activate" the partner to make him/her "go off"; to
(3) making the partner carry out one's own intentions (i.e., intentional signals); to
(4) elaboration and differentiation of a set of specific communicative signals, in increasingly "conventionalized" or mutually agreed upon and, in some cases, arbitrary form, which coincides with the development of a "theory of interfacing minds"; to
(5) the ability to generate plans about how to select signals for particular communicative effects, how to rearrange the signals on the basis of feedback from the partner, and in some cases the ability to plan communications several "moves" ahead in an interactive sequence. This occurs in step with the construction of an internal model of the perceptions, intentions, and feelings of other human beings, and a symbolic theory of interfacing minds.

Our own studies have concentrated on the transitions from point 3 to 4, and point 4 to 5. At the earliest end of the scale, these transitional moments connect back into the work by Schaffer, Collis, & Parsons (1977), Sander (1977), Kaye (1977), and others concerning the nature of very early mother-infant interaction. At the late end of the scale, we can foresee connections with an extensive existing literature on "role taking" or "perspective taking" in early childhood -- starting with recent work on perceptual role taking in infants (e.g., Lempers, Flavell & Flavell, 1977) through to studies of older children on "people thinking about people thinking about people" (Miller, Kessel & Flavel, 1970). The child begins in the first few days with built in propensities to engage in interaction with conspecifics. These primitive tendencies insure that he/she will find himself/herself firmly based within regular and predictable interactive sequences where he/she becomes aware of his/her own ability to influence the behavior and the internal states of others. These developments have implications far beyond the acquisition of language, per se, to all the various uses that we can make of language in our exchange with fellow human beings.

Figure 1. The Structure of a Disappearance Game (from Ratner and Bruner, 1978)



References

Ainsworth, M.D.S. The development of infant-mother attachment. In B.M. Caldwell and H.W. Ricciuti (eds.), Review of child development research 3. New York: Russell Sage Foundation, 1973.

Ainsworth, M.D.S., Blehar, M.C., Waters, E., & Wall, S.M. Patterns of attachment: a psychological study of the strange situation. Hillsdale, N.J.: Earlbaum Associates, 1978.

Bates, E. Pragmatics and sociolinguistics in child language. In D. Morehead and A. Morehead (eds.). Language deficiency in children: selected readings. Baltimore, MD: University Park Press, 1976.

Bates, E., and others. From gesture to the first word: on cognitive and social prerequisites. In M. Lewis and L. Rosenblum (eds.). Interaction, conversation and the development of language. New York: Wiley, 1977.

Bates, E., Benigni, L., Bretherton, I., Camaioni, L., & Volterra, V. Cognition and communication from 9-13 months: Correlational findings. In E. Bates, The emergence of symbols: Cognition and communication in infancy. Academic Press, 1979.

Bates, E., Bretherton, I., Carlson, V., Carpen, K., & Rosser, M. Next steps: A follow-up study and some pilot research. In E. Bates et al. The emergence of symbols: Cognition and communication in infancy. New York: Academic Press, 1979.

Bates, E., Camaion.. .., & Volterra, V. The acquisition of performatives pri.. to speech. Merrill-Palmer Quarterly, 1975, 21, 205-226.

Bell, S.M. The development of the concept of the object as related to infant-mother attach ent. Child Development, 1970, 41, 291-313.

Bell, S.M., & Ainsworth, M.D.S. Infant crying and maternal responsiveness. Child Development, 1972, 43, 1171-1190.

Brazelton, T.B. Implication of infant development among the Mayan Indians of Mexico. In P.H. Leiderman, S.R. Tulkin, and A. Rosenfeld (eds.), Culture and infancy: variations in the human experience. New York: Academic Press, 1977.

Brazelton, T.B., Kolowski, B. & Main, M. The origins of reciprocity: the early mother-infant interaction. In M. Lewis and L.A. Rosenblum (eds.), The effect of the infant on it's caregiver. New York: Wiley, 1974.

Bretherton, I. Beyond wariness: Infants spontaneous approach to and pr imal interaction with unfamiliar adults. Paper presented at the Biennial meeting of the Society for Research in Child Development, New Orleans, March 1977.

Bretherton, I., Bates, E., Benigni, L., Camaioni, L, & Volterra, V. Relationships between cognition, communication and quality of attachment. In Bates, et al., The emergence of symbols: cognition and communication in infancy. New York: Academic Press, 1979.

Bruner, J. The organization of early skilled action. Child Development, 1973, 44, 1-11.

Bruner, T.S. Early social interaction and language acquisition. In H.R. Schaffer (ed.), Studies in mother-infant interaction. New York: Academic Press, 1977.

Carter, A. The transformation of sensorimotor morphemes into words: a case study of development of "more" and "mine". Journal of Child Language, 1975, 2, 233-250.

Curcio, F. A study of sensorimotor functioning and communication in mute autistic children. Unpublished manuscript, Boston University, 1977.

Dore, J. On the development of speech acts. Unpublished doctoral dissertation, City University of New York, 1973.

Ervin-Tripp, S. & Miller, W. Early discourse: Some questions about questions. In M. Lewis and L.A. Rosenblum (eds.), Interaction, conversation, and the development of language. New York: Wiley, 1977.

Escalona, S. Basic modes of social interaction: their emergence and patterning during the first two years of life. Merrill-Palmer Quarterly, 1973, 19, 205-232.

Fillmore, C. The case for case. In E. Bach and R.T. Horns (eds.), Universals in linguistic theory. New York: Holt, 1968.

Greenfield, P. & Smith, J. The structure of communication in early language development. New York: Academic Press, 1976.

Hoffmeister. Personal communication, September 1978.

Howe, C.U. The meanings of two-word utterances in the speech of young children. Journal of Child Language, 1976, 3, 29-48.

Kaye, K. Toward the origin of dialogue. In H.R. Schaffer (eds.), Studies in mother-infant interaction. New York: Academic Press, 1977.

Konner, M. Biological bases of social development. In M. Kent and J. Rolfe (eds.), Primary prevention of psychopathology, Vol. 3. Hanover, N.H.: University Press of New England, in press.

Lempers, T., Flavell, E., & Flavell, T.H. The development in very young children of tacit knowledge concerning visual perception. Genetic Psychology Monographs, 1977, 95, 3-53.

Levine, R.A. Child rearing as cultural adaptation. In H.P. Leiderman, S.R. Tulkin and A. Rosenfeld (eds), Culture and infancy. New York: Academic Press, 1977.

Miller, T.H., Kessel, F.S., & Flavell, J.H. Thinking about people thinking about people thinking about...: A study of social cognitive development. Child Development, 1970, 41, 613-623.

Papousek, H. & Bernstein, P. The functions of conditioning stimulation in human neonates and infants. In A. Ambrose (ed.), Stimulation in early infancy. New York: Academic Press, 1969.

Piaget, J. The construction of reality in the child. New York: Basic Books, 1954.

Piaget, J. The origins of intelligence in children. New York: Norton, 1963.

Premack, D., & Woodruff, G. Does the chimpanzee have a theory of mind? The Behavioral and Brain Sciences (Special issue on cognition and consciousness in nonhuman species), in press.

Prinz, P. Personal communication, September 1978.

Ratner, N., & Bruner, J. Games, social exchange, and the acquisition of language. Journal of Child Language, 1978, 5, 391-401.

Sander, L.W. The longitudinal course of early mother-infant interaction: cross case comparison in a sample of mother-child pairs. In B.M. Foss (ed.), Determinants of infant behavior IV. London: Methuen, 1969.

Sander, L.W. The regulation of exchange in the infant caregiver system and some aspects of the context-content relationship. In M. Lewis & L.A. Rosenblum (eds.), Interaction, conversation and the development of language. New York: Wiley, 1977.

Scaife, M. & Bruner, J.S. The capacity for joint visual attention in the infant. Nature, 1975, 253, 265-266.

Schaffer, R.H. Early "interactive development" In R.H. Schaffer (ed.), Studies in mother-infant interaction. New York: Academic Press, 1977.

Schaffer, H.R., Collis, G.M., and Parsons, G. Vocal interchange and visual regard in verbal and pre-verbal children. In H.R. Schaffer (ed.), Studies in mother-infant interaction. New York: Academic Press, 1977.

Siqueland, E.R. & DeLucia, C.L. Visual reinforcement of non-nutritive sucking in human infants. Science, 1969, 165, 1144-1146.

Snyder, L. Pragmatics in language-deficient children: Prelinguistic and early verbal performatives and presuppositions. Unpublished doctoral dissertation, University of Colorado, 1975.

Snyder, L., Carlson, V., Bretherton, I., & Bates, E. Communicative and cognitive abilities in nonverbal autistic children. Paper presented at the 10th Annual Stanford Child Language Research Forum, April 1978.

Spitz, R. The first year of life. New York: International Universities Press, 1965.

Stern, D. Mother and infant at play. In M. Lewis and L.A. Rosenblum (eds.), The effect of the infant on it's caregiver. New York: Wiley, 1975.

Stern, D. The first relationship: Mother and infant. Cambridge, Massachusetts: Harvard University Press, 1977.

Stokoe, W.C. Sign language autonomy. In S.R. Harned, H.D. Steklis, & J. Lancaster (eds.), Origins and evolution of language and speech. New York Academy of Sciences, 1976.

Sugarman, S.A. Description of communicative development in the prelanguage child. In I. Markova (ed.), The social context of language. London: Wiley, 1978.

Tronick, E. Als, H., Adamson, L., Wise, S., and Brazelton, B. The infant's response to entrapment between contradictory messages in face- -face interaction. Journal of the American Academy of Child Psychiatry, 1978, 17, 1-18.

Watson, J., Smiling, cooing and "The Game". Merrill-Palmer Quarterly, 1972, 18, 323-339.

Wolff, P.H. The natural history of crying and other vocalizations in early infancy. In B.M. Foss (ed.), Determinants of infant behavior IV. London: Methuca, 1969.

This paper has been previously published in:
W. Damon (ed.) New directions for child development. San Francisco: Jossey-Bass, 1979.

Acknowledgement: During the writing of this article and the longitudinal study reported in it the authors were supported by Grant #BNS-76-17624 from the National Science Foundation.

Inge Bretherton, Ph.D.
University of Colorado
Department of Psychology
Boulder, CO 80309

Elizabeth Bates, Ph.D.
University of Colorado
Department of Psychology
Boulder, CO 80309

EARLY CHILD LANGUAGE AND ITS SOCIAL SUBSTRATE

Louise R. Kent-Udolf

Introduction

In normally developing children, the rapidity with which language is learned all but obscures the process; he result, nonetheless, is amazingly uniform. In view of the essentially uniform result, it can be theorized that parents set the stage for language to be learned and that they adequately reinforce its progressive acquisition and the growth of linguistic complexity. At the same time, it can be theorized that children reinforce their parents for these behaviors. Neither parent nor child is presumed to be expert in training the other. Yet, the normal child learns quickly enough so that the parent is rarely troubled by the child's rate of language learning; and the child is rarely handicapped by the parent's inexpert instruction. No single principle or strategy can account for language learning in the normal child. In the most general sense, there appears to be a strong mutual orientation on the parts of both child and parent toward adult-adult linguistic interaction. On a sort of minimal response-cost basis, the parent provides the necessary and sufficient conditions for language learning and the child provides reinforcers to the parent sufficient to maintain the tutorial set and positive affect. The normal process, then, is the mutual meeting of minimal needs over an extended period of time. In the process, parent and child are generally 'satisfied' with the frequency with which they are understood by the other and with the progress that is being made toward adult-adult linguistic interaction.

The history of the handicapped or developmentally delayed child may be theorized to be quite different from that of the normally equipped and normally developing child. The special child may fail to occasion sufficient stage-setting behaviors for language on the part of the parent and may fail to reinforce the parent adequately for the tutorial and stage-setting behaviors that are occasioned. There may be a mutual failure on the parts of both parent and child to meet each other's minimal requirements; both may need more than they receive. The normal system flounders. The result is unpredictable; there is no uniform result for parent or for child.

In our search to find ways to help handicapped and developmentally delayed children and their parents, we scrutinize more and more carefully parent-child interactions of normally developing dyads. Clinically, we seem to be asking that time move in reverse and then to move forward, allowing us to orchestrate a proper fresh start for our special children and their parents. Surely we know that in reality there is no such thing as a fresh

start. Each new start must dignify what has occurred before. This is one reason why the application of the 'developmental model' to handicapped or developmentally delayed children and their parents may not be entirely valid. The developmental model has already failed them! The developmental model may only be appropriate for the normally developing child from whom it is derived. To apply it to the handicapped or delayed child denies the unique histories of both parent and child. The question is whether the most efficient way to teach language is the way that normally developing children happen to learn it. The professional interventionist is expected to offer something more potent than a recapitulation of what appears to suffice for the normally equipped and normally developing child.

By drawing on the literature on attachment, adult-child interaction, child development, behavior analysis, developmental psycholinguistics, cognition, and discrimination learning, it should be possible to develop language programs that would maximize the chances of success for language learning. At a minimum, a language program should consist of a defensible sequence of behaviors to be learned, accompanied by instructions on how to teach them such that the child's performance will be as near errorless as possible in spite of inevitable flaws in the program itself.

The Major Assumptions

For the sake of clarity, the assumptions on which this monograph is based are presented below:

1. A non-verbal affective-interpersonal communication system is achieved between normally developing infants and their caregivers prior to the infants' comprehension of the formal language of their family, culture, or society. The basic semantic relations of early child language and their cognitive correlates are inherent in this early affective communication system.

2. Early child language is an extension of the previously established affective communication system.

3. Cognitive and linguistic growth are interdependent; and the achievement of milestones within each are interlaced throughout child and adult life. Certain sets of cognitive skills may be prerequisite for the attainment of certain sets of linguistic skills and vice versa.

4. Abnormal language development and delay may be due to multiple and interacting affective/interpersonal, sensory, cognitive, and instructional failures of both infant and caregiver.

4a. Abnormal language and delay may be significantly related to mutual failures of infant and caregiver (a) to achieve between them a non-verbal affective/interpersonal communication system, (b) to find a shared sensory mode(s) for language and discourse, and/or (c) to learn and to teach selective attending and discrimination skills within shared sensory modes.

4b. Abnormal language and delay may be significantly related to mutual failures of infants and caregivers to maintain instructional interactions with each other. That is, the child may fail to provide to the caregiver sufficient reinforcement which, if provided, might maintain the caregiver's instructional interaction; and the caregiver may fail to provide the child with sufficiently salient or reinforcing stimuli which, if provided, might maintain the child's attending to the caregiver's instructional efforts.

5. Abnormal language development and delay can be significantly affected through programming that (a) recognizes the affective bases of language and the interdependence of cognitive and linguistic growth, and (b) is guided by the construct of errorless learning.

The Major Programming Components

Assuming that abnormal language development and delay can be significantly affected through programming that recognizes the affective bases of language and the interdependence of cognitive and linguistic growth, these three components deserve careful consideration in planning our approaches to intervention for the children and parents that we serve. In the sections that follow, these three components are considered separately; we must remain aware, however, that these components are our own verbal inventions and that their psychological reality and independence are open to question. The developing child remains always all of one piece.

Affective Interpersonal Communication

In the story of mother-infant attachment, the mother is positively disposed to her baby from birth. She occasions the infant's first affective responses through the gazing, touching, stroking, cuddling, cooing, murmuring, whispering, and talking that are inherent in her close physical contact with the child. The mother interprets the child's affective responses as indicants that all is well with her baby; and she enjoys a sense of sureness. These affective responses quickly come under the stimulus control of her touch, her voice, and her odor, as well as the visual features of her presence. The mother interprets these differentiated positive responses to her as signs of love; and she is thereby reinforced for a wide range of nurturing behaviors toward the child. The mothers gaze at their children who gaze stead-

fastedly back. Beautiful. All is well. Mothers touch the babies and they root toward her. Mothers talk to the babies softly. They alert. They are comforted by the warmth of her physical presence and by the sound of her voice. All of this is the foundation of a communication system between these two: these babies orient positively to the mothers. The babies signal the mother to remove aversive stimuli--hunger, cold, pain, isolation, boredom, restraint. The babies let her know when she has succeeded in removing the source of their trouble. The babies request attention to themselves. They comment on their happy state by engaging in patterned exchanges of eye contact and rhythmic motor movement with their mother. The babies tell the mothers "No". "I don't like that." "Stop it." by objecting to and resisting actions or states imposed on them. The babies laugh appreciatively to their mothers' clowning and to games of hide and seek, of peek-a-boo. They vocalize in unison and reciprocally with their mothers. They change their facial expressions as mother changes hers. They are able to break and regain synchrony with mother. This is a kind of conversation between lovers that requires no words.

But the mother does talk; and the baby's behavior comes under the stimulus control of her speech, of its temporal patterns, special intonations, phrase contours and special words, too. And the mother's behavior comes under the stimulus control of her baby's differentiated cries, gestures, facial expressions, postures, vocalizations, intonations. It is from this early interpersonal communication system that language and discourse arise. It is hard to notice when the child actually begins to talk because the process has been so gradual and is such a part of a system that has been so long established. The child and mother retain their affective communication system; but the child comes to gloss more and more of the communicative exchanges with words or signs. The child becomes more specific, acquiring more and more of the conventional features of the language of the culture. In essence, a second language is learned.

Ill or handicapped newborn babies and their mothers too often do not readily achieve attachment and a mutually reinforcing system of communication. The continuity of the mother's contact with the ill or handicapped new born baby is disrupted; and the mother is dependent upon 'experts' to care for her child. The mother is anxious that all is not well with her baby. She has limited opportunity to establish a dialogue or synchrony with him or her, no opportunity to become confident of herself as a mother, no opportunity to feel exclusive love. The child, instead of being a discriminative stimulus for all kinds of good, warm feelings, becomes a conditioned stimulus for anxiety. The mother's unsettling feelings may be interpreted variously by her as incompetency, rejection, failure--feelings that breed depression. By the time the child is stable and capable of responding to the pleasure evoking stimuli which typically characterize maternal behavior, this mother may not be able to approach her child with sureness and delight. Her tentative efforts to nurture may not be synchronized with the child's weak tendancies to respond reinforcingly; and their mutual failure

to bond securely may heighten her anxiety and sense of desperate failure. She may tend more and more to approach the child only when he or she is crying or otherwise engaging in behaviors incompatible with the display of positive affect in response to her. There may be less and less opportunity for the child's positive affect to become discriminated to the mother, no more the case for hers to the child.

All of this can be thought of as an elaborate, mutual failure between mother and infant. The child's basic needs of food and hygiene are met but not the need to establish human attachment and synchrony--the bases for human communication and discourse. The mother has her baby but she has not found him or her; she feels alone, disappointed, rejected, anxious, and depressed. She may feel shame for herself and her baby. She may feel that they are both painful disappointments to her husband and to other relatives. The child has a mother but is not enthralled by her; the child can't find her without help, nor she the child.

What are we to do when these children are brought to us for help, communicating no messages to us other than sadness and distress or rage at our intrusion? How can we occasion their positive affect toward us? How can we occasion achievement of an affective interpersonal communication system with us? The attainment of these goals can be facilitated through programmatic intervention. And their attainment is critical to the children's subsequent acquisition of language and discourse.

A Programmatic Response

As an exemplar, I refer you to Bradtke, Kirkpatrick and Rosenblatt (1972) who have attempted to objectify the attainment of affective behaviors in profoundly mentally retarded and multiply handicapped children. These workers call their approach "intensive play". It is a one-on-one approach. It requires an average size room; a large mat or carpeted area; a large wall mirror adjacent to the mat; a large rocking chair; comfortable clothing; background music that varies in tempo, mood, and intensity depending upon the pace of activities ranging from gentle rocking to vigorous play; and no shoes.

In the beginning, teachers impose on the children close physical contact that may be resisted or only apathetically accepted. They impose affection that may not be reciprocated. They persist in adhering to the programmed routine in spite of the children's continuing resistance or apathy. They believe that ultimately the children will find them irresistable; and they continue to woo them. They do not expect, and rarely receive, social reinforcers from the children. They are reinforced by miniscule changes in the children's behavior and by their colleagues.

Each child receives a minimum of 30 minutes per day of inten-

play. Although the objectives vary from child to child, the first 10 minutes is spent in relatively gentle play; the next 10 minutes, in vigorous physical contact play; and the last 10 minutes, in rest and relaxation, maintaining close physical contact between child and teacher. Objectives and plans for intensive play are written for children depending upon their size, their physical strength, their combativeness, their level of cognitive development, their motor capabilities, the available sensory modes shared between teacher and child, and the current status of affective communication between them.

With the understanding that there can be no standard set of progressive objectives suitable for all children, the following examples of objectives for intensive play are offered to demonstrate how affective achievements can be operationalized:

.Child will give spontaneous notice to teacher when approached.
.Child will readily give eye contact to teacher when approached.
.Child will give greeting to teacher in response to teacher greeting him or her.
.Child will initiate greeting to teacher.
.Child will smile on eye contact with teacher.
.Child will smile when brushed gently on cheek by teacher.
.Child will engage in vocal exchange initiated by teacher
.Child will initiate vocal exchange with teacher.
.Child will spontaneously imitate vocalizations and noises.
.Child will initiate physical contact with teacher.
.Child will initiate familiar play routines with teacher.
.Child will spontaneously imitate facial expressions of teacher.
.Child will give notice of cessation of activity with teacher.
.Child will turn toward or approach teacher when distressed or frightened.
.Child will mold to teacher when held and rocked by him or her.
.Child will request shared attention from teacher to other stimuli.
.Child will give notice of absence of specific features of play routine (such as the rocking chair or the music).

In general, we might expect children to progress through several stages on their way to achieving a set of progressive objectives tailored to their special needs. At first we might expect strong physical resistance and avoidance. Later we might expect passive acceptance. Later, acceptance with a faint sign of comfort or pleasure. Then, perhaps, acceptance with some visual regard and positive anticipation. Later yet, smiling. And still later, the children might initiate gentle touching of the teacher's face, looking bravely into the teacher's eyes. By now, we might begin to see pleasure at being touched by the teacher. The children may engage in exchanges of vocalization, facial expressions, and movements. The children are enjoying play now. We expect to see them alert to changes in the play routine. We expect to see them initiate familiar routines. We expect to see them approach the teacher and to touch him or her and to pull him

or her toward the mat or the chair. We are hoping to see some impishness! And we are hoping eventually to become the children's sought-after comrade in vigorous exhilarating physical play, human objects to be explored with wonder and curiosity, good company for cuddling; a safe harbor. And with this base, it is possible that these children may have things to say to us, and that what we say may matter to them. Intensive play, or some adaptation of it, offers a bridge to positive affective interpersonal communication. Without this level of human communication, language intervention strategies cannot be expected to be optimally effective; and with this level of human communication, instructional attending behaviors can be expected to be readily obtained and easily maintained.

Intensive play can easily be adapted to the special needs of particular children. For blind or visually impaired children, it is extremely important that intensive play occasion and strengthen the use of hands for exploring persons and objects tactilely, for searching for objects, and for producing stimulus change by acting on the environment bare-handed or with tools. Fraiberg (1977, 1971) considers the training of hands to search for positive reinforcers to be of crucial significance with respect to children's learning to crawl. She believes that children who search with their hands will crawl and that children who crawl freely will learn to walk and to run with gusto! She also believes that children who learn to crawl will not become children who sit and rock. Further, Fraiberg considers the training of the hands to produce stimulus change by acting on the environment to be of crucial significance with respect to the child's not learning to self stimulate or to self-abuse. The implication is that learning to manipulate the environment in play will facilitate the acquisition of other forms of adaptive hand usage such as eating and dressing.

Blind or visually impaired children often need to be taught to smile and to communicate affect through their facial expressions, and they can be taught to do this through tactile stimulation within the context of intensive play. Congruence between facial expressions and situational contexts makes the children more appealing to others, more likely to be socially reinforced. These insights from the blind have significance for sighted children as well as for blind; and their implications deserve careful consideration.

Depending on the particular child, there are other strategies that can and should be combined with intensive play to facilitate positive interpersonal affect, attending, and communication. Total communication, autism reversal procedures (Azrin, Kaplan and Foxx, 1973); and instructional procedures which make the attention and cooperation of the teacher reinforcing to the child (Miller and Miller, 1973) are all compatible with intensive play and may contribute to the attainment of affective interpersonal objectives for a given child.

Semantic Relations of Affective Communication

Early child language is an extension of affective interpersonal communication; and the basic semantic relations of early child language are inherent in this early communication system. If these assertions are accurate, how can we describe the content of what might be communicated and how might we expect to recognize it in the non-verbal behavior of the handicapped or developmentally delayed child?

The controlling stimuli for affective communication may be assumed to be the presence or absence of people, pets, objects, movement, and actions imposed; the presence or absence of internal and/or external states; and changes of state such as degrees of comfort, hunger, pain, wetness, warmth, darkness, deprivation from novel sensory stimulation, etc. Given this range of private and shared stimuli to communicate about, what might be communicated? And how?

Communication is first of all bi-directional. Normally developing infants respond to the efforts of others to communicate with them and they also initiate communication with others. For purposes of simplification, only, infant communicative repertoire can be categorized into Notice, Request, Acknowledgment, Rejection/Objection, and Compliance/Refusal. These parameters and their possible communicative modes are characterized below.

Notice The infant or young child shows Notice to at least the following:

- .the presence or introduction of positive reinforcers (which might be expected to include certain persons, pets, objects, actions, and states of being)
- .the absence or withdrawal or termination of positive reinforcers
- .stimulus change
- .the presence or introduction of negative reinforcers
- .the absence or withdrawal or termination of negative reinforcers

The infant or young child may communicate Notice through the following, sometimes overlapping, modes:

- .alerts, 'perks up', stills, fixates on controlling stimulus
- .changes in facial expression, especially eyes, mouth, and brow
- .cessation of on-going activity
- .sensory and/or postural orientation toward controlling stimulus
- .changes in vocal behavior, for example, begins to cry or stops, begins to laugh or stops, begins to vocalize or stops

Requests The child Requests at least the following:

- .notice to self or some aspect of self
- .shared notice between self and caregiver to other stimuli

.presentation or recurrence of positive reinforcers
.stimulus change

The child may communicate Requests through the following modes:

.any or all features of Notice, above, plus a demand feature such as vocalization as to call, reaching, pulling, searching, i.e., a more physical and active orientation toward the controlling stimuli than in Notice
.shifting of orientation between caregiver and object of request
.non-specific irritability

Acknowledgments The infant or young child Acknowledges at least the following:

.fulfillment of Requests made to the caregiver
.non-fulfillment of Requests made to the caregiver

The child may communicate Acknowledgment through the following modes:

.smiles at person who has fulfilled request, appears placated, consoled
.highly variable response when Request is unfulfilled, depending upon disposition, deprivation state, and reinforcement history; response may range from tantrum to whimpering to physical attack to passive acceptance.

Rejection/Objection The infant or young child Rejects or Objects to at least the following:

.presence or introduction of aversive stimuli (may also be viewed as Request for removal, termination, or dimunition of aversive stimuli or negative reinforcers)
.cessation or removal or dimunition of positive reinforcers

The child may communicate Rejection/Objection through the following communicative modes:

.physically pushes away aversive stimuli
.averts gaze from aversive stimuli
.struggles to disengage self from aversive action imposed by caregiver
.displays patterns of distress including robust crying!

Compliance/Refusal The child may Comply or Refuse to Comply with the following requests or demands:

.request by caregiver for notice to caregiver
.request by caregiver for shared notice between child and caregiver to object
.request for performance or recurrence of familiar routine

.request for presentation or recurrence of stimulus object
.request for cessation or dimunition of action being performed by child

The infant or young child may demonstrate Compliance as follows:

.behaves as expected by person making request or demand; i.e., reinforces the person making request or demand

The infant or young child may demonstrate Refusal to Comply as follows:

.fails to show Notice to Request
.hides face or otherwise averts gaze from caregiver in response to caregiver's request for notice to self and to request for shared notice
.physically resists prompts for recurrence or cessation of actions
.generally fails to behave as expected by caregiver thereby failing to reinforce the caregiver.

Given this range of things that handicapped or developmentally delayed children might be expected to give notice to and to communicate with their teachers about, can communication between these two be facilitated through some programmatic adaptation of intensive play? Probably so. Furthermore, given the experiential base of intensive play, children and teachers can extend this affective communication into other spheres of their shared experience such as eating, toileting, bathing, dressing, grooming, mobility training; that is, everything that they do together.

In order to facilitate communication, it is important for teachers to look for the communicative content in the behavior of delayed or handicapped children, to acknowledge it, to honor requests whenever possible, and to verbally interpret it or reflect it back to the children as much as possible. This assures the children that they have been understood and also models features of typical linguistic glossings of their messages. If we misinterpret the message, the children may correct us, giving us a new message to reflect. If we are unable to grant the request, we will let them know that we understand them before we refuse them. And we will reflect the feelings and content of their response to our refusal of the request is the prevailing noise level permits! Admist all of this reflecting, interpreting, and modeling, we will be setting the stage for the children to begin to imitate specific linguistic features, in sign and/or in speech. This entire process actively involves the children in communication. Even though they may not be expressing themselves linguistically, they will be appropriately attentionally engaged, they will be differentially responding to a wide variety of stimuli, and they will be experiencing a considerable range of social reinforcers. It cannot be emphasized enough than until the teachers have become generalized social reinforcers for the children they will not be able to optimally facilitate affective communication between the chi and themselves.

In order to clarify the process of reflecting or interpreting the feeling and content of non-verbal signs of children, the following examples of linguistic glossings of some high probability messages are offered:

Glossings for various non-verbal signs of Notice.

.Hey!
.Hi + ___!
.Look at that!
.You did it!
.Wow! New shoes!
.Whee! This is fun!
.You like that!
.Where's + ___? It's gone!
.Mmmmmmmm good.
.Listen to that!
.Oh,no. It's broken.
.Oooooo, it's dark in here.
.Yuck! Hands dirty!
.[illegible]-oh. You got it on your dress.
.[illegible]u are wet.

Glossings for some non-verbal signs of Requests

.You want more!
.You want to go outside, don't you?
.You want this?
.Again? You want more + ___?
.You want to help me.
.You are tired of this, Huh?
.You want a little [illegible]elp there.
.We want some light in here!
.You want to play!
.You want up!
.You want to see?
.You want out of there!
.You want down, don't you!

Glossings for some non-verbal signs of Rejection/Objection

.You don't like this. Sorry.
.You are cross with me!
.You don't want me to leave.
.Enough is enough, huh?
.You don't want any part of this, do you?
.You aren't ready to come in, are you?
.This is too tight, isn't it?

Early Child Language

The basic semantic relations of early child language are inherent in the affe[illegible]e communication system established between infants and

the nurturing members of their households. Children's first linguistic expressions of these relations, spoken or signed, are extensions of earlier achievements. Children are usually understood in their own home in spite of the fact that they talk as though all major sentence constituents are optional. As Brown (1972) has stated, children's early language is well, but narrowly, adapted to their world.

Brown (1973), Bloom (1970), and Leonard (1976) have elegantly detailed the normal child's early linguistic accomplishments. This presentation will not attempt to propose a sequence among the semantic relations expressed, other than to say that those which are most clearly present in children's affective communication system (as described above) are likely to be linguistically represented before those that are less clearly present. Efforts to date to derive a reliable, more refined, sequence of emergence among the early semantic relations expressed have met with considerable frustration and may possibly only reflect the variance of normal development. We may assume, however, that children understand much more than they say and that they understand everything that they themselves express. There are probably many exceptions to this generalization for individual children; but they need not concern us here in this general consideration of early child language.

The semantic relations most clearly reflected in affective communication are Notice, Recurrence, Non-existence, and Rejection. Children are able to give notice, to request notice, to request the presentation or recurrence of reinforcers, to acknowledge the responses of others to their requests, to reject, to object, and to comply or to refuse to comply with requests made by others; they do so with a variety of intonational patterns suggesting exclamatory, declarative, imperative, interrogative, negative and affirmative sentence types. In early speech, children commonly gloss their affective indications of notice with words such as 'there' 'here' 'uh-oh' 'no' 'hi' 'bye-bye' 'allgone' 'more' and '(a)gain' and '(a)nother'. Similarly, they specifically mark non-existence with 'allgone' 'all done' 'no + ___' and 'no more + ___'. And the utterances specific to rejection and objection are 'no' and 'no more'. All of these types of relations are present in the early non-verbal communication of children; and these verbal glosses are very likely to be present among children's first utterances.

What is absent in the early non-verbal expressive communication system of children, are efficient means with which to indicate specificity. Children are unable to specify exactly what they want unless they are able to point to it, literally and figuratively. Hence, the most remarkable change that occurs when children begin to express themselves linguistically is that they begin to label or to specify the names of persons, objects, actions, places, attributes and states. Children typically name themselves and members of their household, including pets; making requests and giving notice with these proper names. The specification of object names greatly expends children's ability to communicate, enabling them to give specific notice of

existence "Hi cookie', and non-existence 'cookie all gone', to make requests for the recurrence of specific objects 'more cooke', and to make specific rejections 'no cracker'. Children learn to label a cluster of common objects seemingly all at once. These might be expected to include words like 'car' 'key' 'shoe' 'cookie' along with an assortment of other objects of special salience to them.

Children say a relatively small number of action and state names such as 'come' 'eat' 'go' 'see' 'make' 'want'; and they often use locative words such as 'outside' 'up' and 'down' to request specific actions. Their first two-word combinations with action and state names are apt to take the form of person names (including themselves) + action or state such as 'Joey make' 'Mama come' "Joey want' and state or action + object such as 'want cookie' 'open door'.

In addition to these new accomplishments, children begin to linguistically specify locations, possessors and especially salient attributes of objects and people. Although early on 'here' and 'there' might be used to mark only Notice, they soon come to be used to specify relative locations. Other words commonly used to specify location are 'home' 'outside' 'car' 'bye-bye' and 'bed', all often combined with 'go'. Children do not typically use prepositions when first specifying locative relations between objects or between persons and objects such as 'Key in box' or 'Mommie in bed'. Rather, they might be expected to say 'Key box' and 'Mommie bed'. They are not too particular about word order; but a devoted mother can usually divine the child's 'meaning' from the context.

Possessive relations are usually marked with proper names + object, for example 'Daddy car'. Again, word order is not well restricted to possessor + possessed, and 'meaning' sometimes is in doubt. Note that children do not use the possessive morpheme 's to mark possession at this time. They may understand this but they don't say it. Often children will use the pronoun 'mine' or 'my' quite early relative to other pronouns which are typically not present in early child language. This probably speaks to the special salience of possession, more than to that of pronominal usage.

The specification of attributes is usually quite limited in number at first, including only a few such as 'this' 'that' 'hot' 'big' and, again, some small cluster of special sali the child. These attribute words may be used alone or in with person and object names, in any order, such as 'big cookie' or 'cookie hot'.

Another remarkable change that occurs when children begin to express themselves linguistically is that they begin to make requests for information and for confirmation of their own utterances. At first they do this be means of the questioning intonation attached to words that they already have in their repertoire example 'car?' 'bye-bye?' 'outside?'. Only later do they formulate questions; but when 'Wha's 'is?' becomes productive, children achieve effective control over their own developing language la...

At about the same time, they learn to request nomination and location 'Who's 'is?' 'Where's + ___?'. These early question forms greatly expand children's opportunity to learn the lexicon of the language. In addition, children are now able to comply with requests for information. That is, instead of just being able to comply with requests for information or to refuse by following or not following motoric commands, they are now able to respond to requests for information such as 'What's your name?' 'Where is your hat?' 'Who is this?'. They are able to interact intraverbally and to engage in linguistic discourse. They are able to specify their own information deficits; and they respond differentially to the verbal responses of others to their question forms. They are able to respond verbally to a verbal discriminative stimulus; they are able to acknowledge the verbal responses of others to their responses and to respond verbally and differentially to them. They are conversational!

In addition to children's ability to say and combine all of the above relations rather quickly into two word utterances, they concomitantly learn some social refinements, if encouraged, such as 'please' and 'thank you'. 'Please' combines especially well with 'more', a potent combination in most households.

Having briefly catalogued the things that young children are apt to say, a brief description of some of the features of our language that are not typically present in early child language may be helpful. As indicated above, children do not early on include prepositions in their speech. They simply omit the preposition as though it were understood. When they do begin to include them, the first ones are usually 'in' and 'on'. The order of acquisition of prepositions after this is highly variable. We have also already mentioned the absence of the possessive inflection such as in 'Mommy purse'. Similarly, the young children do not use the plural inflection on nouns; they are apt to say 'two doggie' before they say 'doggies'. Indeed, before children consistently use the plural inflection, they are apt to have a variety of attribute words denoting numerocity such as 'one' 'two' 'many' 'no' 'all' 'some'. Children typically do not inflect verbs in any way, either to mark tenses or to mark agreement with subject; although they may learn the past tense form of certain common irregul verbs such as 'ate' as separate lexical units. The first 'real' verb inflections, when they do occur, are likely to be present progressive forms such as "Joey going'. Note that at first they do not include 'is'. 'Verbing' comes before 'is verbing'. And, finally, in early child language there are essentially no articles or pronouns other than the very salient 'my' and 'mine' duo.

Brown (1973) and Leonard (1976) have both discussed and described the acquisition of the morphological features described above as well as others not characteristic of early child language. Their acquisition is facinating and of programmatic importance once children begin to talk in sentences of three or more words. Programmatically, however, they do not belong in 'Early Child Language'. Should you be interested in their order of mastery, Brown (1973)

reports an order that seems to have general predictive validity; however, individual variations are to be expected. Be aware that the order of mastery of morphemes reported in the literature will vary depending upon the criteria used for mastery. Brown's criterion is three successive samples in which the morpheme appears 90 percent of the time or more in obligatory contexts (p. 271). This criterion tends to extend morpheme 'mastery' well into middle childhood for normally developing children. However, for what it is worth, if you listen to late night talk shows on the radio, you will discover that many adults who are at least capable of using telephones and radios have never mastered the morphology of the English language!

In early child language there is a dearth of time-related lexical units; and, indeed, this is correlated with the relatively late acquisition of the comprehension of temporal constructs. One of the first temporally-related lexical units that is used and seemingly understood by the children is 'later' or 'after awhile'. These expressions should be used when working with young children as appropriate in the context. Otherwise, it seems best to refer to sequencing activities in terms of 'first we do this and then we do that' or 'when we finish this, we will do that'.

Another thing that very young children do not do is 'deny'. In the literature on child language, denial is often lumped together with two other forms of negation: rejection and non-existence. There exists considerable literature, however, which attests to the possibility that denial is much more difficult than rejection and non-existance; both of which are present in the early affective interpersonal communication between infant and caregiver. The controlling stimuli of early rejection and non-existence responses are typically quite concrete; the controlling stimulus of a denial response is by definition, at least in part a verbal one. A behavioral analysis of denial versus rejection/non existence suggests that the cognitive demands of denial are heavier than those of rejection and non-existence. This simply says that although rejection and non-existence clearly belong programmatically in early child language, denial does not.

In programming early child language, then, we would first be concerned with children's comprehension and expression of the basic semantic relations that are typical of early child language. Although anyone who will take the time to do it can program early child language for a particular child, it might be worthwhile to first look at some of the currently available attempts to do this such as Kent (1974). This program encourages the use of the program as a guide for the teacher to develop a more individualized program.

In conclusion, remember that early child language is an extension of affective communication and that communication is bi-directional. It is not enough to teach children to name objects; they must be able to tell you their secrets. It is not enough that

they be able to follow commands; they must be able to refuse! It is not enough that they be able to answer questions; they must be able to ask them.

The Cognitive Connection

For the normally developing child, cognitive and linguistic growth are interdependent. At the present time, it is not possible to state with any degree of certainty that specific cognitive attainments are prerequisite to the attainment of specific linguistic skills or vice versa. In as much as verbal behavior is under multiple stimulus control, however, it seems safe to assume that those cognitive skills which seem to be essential to the ability to learn simple and complex discriminations must be of importance to the learning of a first language (see Estes, 1970). Directed by this assumption, one can abstract from the literature on cognitive development those features which seem most clearly relevant to early child language; these features are listed below:

1. An outer-directed vigilence for sensory input; a state of sensory alert to the environment; the ability to scan in all available sensory modes.

2. Selective attending via all available sensory modes, to the limit of sensitivity, to highlighted stimuli; focusing on highlighted stimuli; the ability to fixate.

3. Shift of selective attending from one critical stimulus dimension to another within an available sensory mode.

4. Shift of selective attending from one critical stimulus dimension to another across all available sensory modes.

5. Memory in all available sensory modes: visual, auditory, tactile, olfactory, gustatory.

To the extent that teachers are able to operationalize these features to instructional tasks, they may expect to find this summary of early cognitive achievements useful. One must be cautious, however, to carefully monitor the error rates on individual students, for any training tasks which have been derived from the above cognitive features.

Sensory alert in any available sensory mode would seem most readily attained through play and the contrived introduction of unexpected stimuli; the response to which could initially be modeled. The other features of attending can for the most part be operationalized to task via simple and complex matching and sorting tasks. Form, color, size, texture, sound, odor, taste, mass, length, and numerocity suggest a plethera of dimensions that might be used. Memory training tasks would basically take the form of delayed match-to-sample tasks for stimulus dimensions and patterns of stim-

uli. Another memory task might involve matching to 'what's gone' within sensory modes.

The literature on cognitive development contains references to a variety of memory strategies. Training in these strategies can be operationalized across all sensory modalities. Two of these strategies which seem most ameniable to being taught to young children are rehearsal and categorizing or clumping. When developing rehearsal training strategies for severely handicapped and delayed students, it is important to start with single items and to consider the child's memory for two unrelated stimuli as a major achievement. The tasks can be made more or less difficult as children demonstrate their level of performance; the level of difficulty of the training task should always provide a high density of success.

The development of cognitive objectives based on early cognitive abilities and training tasks leading to their attainment offers a challenge to the teacher who wants to provide multi-modality training. Although detailed information with respect to the interlacing of cognitive and linguistic skills is not presently available, the cautious intermingling of training on cognitive tasks, of keeping a relatively low error rate (no greater than 40 per cent) could reasonably be expected to facilitate linguistic growth to the extent that language depends on discrimination and memory.

Strategies

Or, how to succeed without really having an errorless program

Ideally, language programs should consist of error free sequences of social, cognitive and linguistic behaviors to be learned which result ultimately in normal adult language behavior, both receptive and expressive. We know that today we have no ideal programs. To a large extent, the success of programs that we do have depends heavily on the social skills of the teachers who use them to counteract the potentially harmful consequences of the high error rates occasioned by high error risk programmed sequences. In this section, consideration is given to some strategies and sources of strategies which may assist teachers in managing error rates and in cushioning the students from the cummulative punishing effects of errors occasioned by less than ideal programming.

The Drill Strategies

If students will accept a structured approach to learning, some of what we do to teach them can efficiently be put in the form of drill. A potpourri of strategies that will enhance the success of this traditional approach are presented below.

Alternation Procedure: The alternation of high and low error risk items. Traditional drill concentrates on the performance of skills yet to be learned, affording students little or no opportunity to demonstrate skills already mastered or to be reinforced for a high proportion of correct responses. The density of positive reinforcement is simply allowed to vary as a function of the number of correct responses to training tasks; and this number may be relatively low as compared to the number wrong. Differential reinformcement for correct responses may not always be sufficient to facilitate new learning. This is especially likely to be true for handicapped and developmentally delayed students who may have a very limited history of academic success and very weak resistance to extinction. In my experience with children from these populations, a density of positive reinforcement greater than 55 per cent across a series of trials is minimal for new learning to result from drill. This density can be easily arranged independent of the child's level of mastery by surrounding trials on new or high error risk items with trials on previously mastered or low error risk items.

The experimental evidence that speaks to this issue is in the area of discrimination learning, manipulating independent variables of intertrial interval durations and/or filled versus unfilled intervals. A selected bibliography of readings in this area is presented at the end of this paper.

On a subjective basis, the alternation procedure seems to help maintain children's fragile attending behaviors and to support their positive affect throughout the training session. Something like an academic Premack principle seems to be operating: the opportunity to engage in a low error risk academic task can be made contingent upon performance of a high error risk academic task. The former seems to reinforce the latter. Furthermore, children seem to enjoy the alternation procedure. There seems to be something inherently reinforcing about having the opportunity to demonstrate competency.

Some teachers are reluctant to adopt the alternation strategy because, on the face of it, it appears to be a waste of instructional time. Actually, the facilitative effect on new learning, the enhancement of attending, and the arousal of positive affect more than compensate for any instructional time spent on 'non-essential' tasks.

The interpolated low error risk trials should ideally take as long to perform as the high error risk trials with which they are alternated. Ideally, the low error risk trials should consist of invitations to engage in behaviors quite unlike those involved in the training task, and performance on the low error risk task should always be socially reinforced. For example, a good interpolated task for receptive language drill would be to invite the child to copy a simple pattern such as X's, +'s, 0's with a colored

felt-tipped pen in two inch squares on a piece of paper ruled off in two inch squares. The child's response (possibly only a mark or scribble) would be closely attended to by the teacher and socially reinforced upon completion, regardless of its correspondence to the model.

The alternation procedure can be used effectively within a series of trials on the same class of items or it can be used between classes of activities. For example, high error risk activities such as a series of trials on nomination of objects can be surrounded by training activities that involve previously mastered content or the opportunity to make or do something that will invariably be evaluated as 'excellent'.

The alternation of high and low error risk activities and the alternation of high and low error risk items within activities can make an enormous difference in children's attending behaviors, their general affective state, their interest in or orientation toward school, and their learning achievements. These are simple procedures involving no special equipment or cost; and their facilitating effect on performance and learning has been well demonstrated with retarded children on a variety of training tasks (see Winter, 1973; Neef and Kent, 1975; and Neef, Iwata and Page, 1977).

The Encore Procedure: Practicing Success. At the time that a child responds correctly to what has been for that child a high risk item, the child can usually be easily prompted to follow this correct performance with several successive repetitions. This is called the encore procedure. This procedure inflates the proportion of correct to incorrect trials; it affords the child special notice or social reinforcement for the correct performance of a difficult or new item; and it occasions practice on the difficult item within a context of success. For example, let's say that in a set of items the child has never yet spontaneously correctly named the object 'book'. On this particular trial he or she names the item correctly with no prompt. The trainer might say, 'That's right! It's a book! Good talking! Let's hear it again, five times. Say ____.' As the child repeats 'book', the teacher counts off the productions on the fingers of one of his/her hands. At the end, the teacher might hug the child and say, "I'm proud of you. You can say 'book'." The same strategy can be used to reinforce correctly imitated responses. The opportunity to repeat success is very reinforcing. Again, there seems to be something special about being invited to demonstrate one's own competency. The encore procedure is a simple way to strengthen responses and it takes very little time, barely more than the time to occasion one correct response since the child and the teacher are already primed for the response.

The Rehearsal Strategy: How to remember. One of the earliest memory strategies used by children is the rehearsal strategy; and this memory device continues to be prepotent for short term memory

tasks throughout adult life. In addition to simply maintaining the presence of information for immediate use, rehearsal can facilitate the transfer of information from short to long term memory.

Most young normal children under about seven years do not spontaneously begin to use rehearsal unless specifically instructed; and when instruction is withdrawn, rehearsal tends to cease. Nevertheless, rehearsal can be supervised in the school setting; and since it facilitates memory when it is used, the teacher may want to use it to teach the performance of specific tasks.

The facilitating effects of the rehearsal strategy were first observed in a training situation in which the teacher was attempting to teach non-verbal children to retrieve two objects named from a group of four unrelated objects. The teacher sat facing the children saying and signing the two objects to be retrieved repeatedly until the children made their choice among the items available. The children are permitted to benefit from the rehearsal behaviors of the teacher; and they do benefit, making more correct pair responses than without teacher rehearsal.

Extending this original rehearsal strategy to the children has been successful in some instances. At first, the teachers, provide rehearsal as above. Next they begin to require the children to join in the rehearsal activity before they are allowed to physically contact the objects. The teachers say, 'Do it with me' and mold the children through the signs if necessary. The teachers continue to accompany the children in rehearsal, occasionally checking to see if the children employ rehearsal without accompanyment. When the children begin to display occasional rehearsal initiative, the teachers begin to provide rehearsal on only every other trial. Only when the behavior is essentially automatic on the part of the children do the teachers further reduce the frequency of their accompanyment. The teachers need not be concerned if automaticity of rehearsal fails to occur for many weeks or months; this would be consistent with the literature on normal children. The value of the strategy is measured by its facilitating effect on the children's mastery of the training task involved, that is, the ability to retrieve correctly two items named from a group of four unrelated objects.

It is unimportant whether children rehearse in speech or sign or both simultaneously. For many children, signing is the first rehearsal mode observed. At first, they tend to look at their hands as they sign; they watch themselves talk to themselves on their hands. Later, they look at the objects as they sign; and still later they look at the objects as they vocally rehearse, hands poised to reach for the objects. The rehearsal procedure takes no extra time at all. It reduces the likelihood of impulsive responding and focuses on adaptive hand use.

Effective Prompting: How to give hints that really help. When children fail to respond or respond incorrectly on some training item,

teachers usually attempt to prompt the correct response. In this section, the use of effective prompts to occasion expressive and receptive language responses as well as non-linguistic congnitive responses is considered.

If the response to be occasioned is an expressive language response, it can seemingly best be prompted through the use of manual gesture or sign backed up by pairing the manual gesture or sign with an imitative vocal prompt (see Weaver and Ruder, 1978). The procedure can be abstracted from the following example. Mike is able to respond correctly when his teacher simultaneously says and signs a request for him to give her an apple in the presence of an apple and a banana. He has also occasionally said 'apple' as he gives it to the teacher. Now his teacher wants to strengthen Mike's labeling response for apple. She holds the apple to one side of her face at about eye level and says, 'This is an _____,' pausing to let Mike supply the word 'apple' by himself. If he fails to say 'apple', the teacher repeats the procedure adding the sign for 'apple' when she comes to the pause. If this fails to prompt the response, she repeats the procedure, adding both the manual and vocal imitative prompts. If Mike signs the correct response but does not say it, the teacher might socially reinforce the response but advertise extrinsic reward for the correct vocal response, using only the vocal imitative prompt. "Good signing! When you say 'apple', you get juice. This is an _____." The pause is followed by "Apple. Say 'apple'," if Mike again fails to say the word. If this fails, his teacher should alternate quickly to some low error risk item!

If the response to be occasioned is receptive or a non-verbal cognitive response such as matching or sorting, it can best be prompted through the use of highlighting followed by a progressive fading procedure (see Suggested Readings). Highlighting refers to any training procedure in which differential response to the training stimulus is prompted by exaggerating the perceptual salience of some feature(s) of the stimulus itself; that is, the prompt is incorporated within the training stimulus. For retarded and autistic children it has been shown that highlighting followed by a progressive fading procedure is markedly superior to prompting strategies which add qualitatively different cues such as the teacher's pointing to the training stimulus (Schreibman, 1975; Wolfe and Cuvo, 1978).

Some of the experimental tasks used to assess highlighting are similar to typical receptive language and cognitive training tasks. Several stimuli might be placed in front of the child and the teacher would ask the child to point to the one the teacher names. Or, the teacher may set the child to a non-verbal match-to-sample task. Traditionally, differential response to the training stimulus would be prompted by the teacher's pointing to the training stimulus. This type of prompt is called an extra-stimulus prompt because the prompt is not within the stimulus itself, but external to it. A within-stimulus prompt attracts attention to the training stimulus

by exaggerating or intensifying some relevant feature or stimulus dimension of the training stimulus. Once the child responds differentially to the training stimulus, in the presence of another stimulus of the same general class, the prompt is gradually faded, maintaining an error rate no greater than some prescribed amount. The highlighting is gradually faded but may be temporarily augmented if errors increase beyond some arbitrary limit. Fading is accomplished with a see-saw approach: fade, slight increase in error rate, error rate reduced to 5-10 per cent, another fading step, slight increase in error rate, error rate again reduced to 5-10 per cent, another fading step, slight increase in error rate, error rate is not reduced to 5-10 per cent within training sessions on two successive days, highlighting increased, error rate is reduced to 5-10 per cent, another fading step and so on.

It is not always clear how this strategy can be applied to the many types of receptive language and non-verbal cognitive training tasks which comprise a significant portion of the training of developmentally delayed and handicapped children. Each task seems to require its own analysis; the defining characteristics of each stimulus object vary depending on the object with which it is being contrasted. What is clear is that highlighting is superior to pointing; and pointing heretofore has been the most common way of prompting these sorts of tasks.

Application to language and cognitive training seems difficult because of the variety of stimulus dimensions to choose among for highlighting common objects. It would seem, however, that any distinctive feature of the training stimulus that can be highlighted and subsequently faded offers the teacher a possible prompting strategy superior to the more traditional extra-stimulus point. For example, consider a spoon versus a plate. In this instance, the shank of the spoon, a feature not shared with the plate, could be highlighted. Once the feature is selected, the mode of highlighting must be chosen: hue, saturation, sound, size, mass, texture, smell, shape. The question of how to most interestingly and potently highlight the chosen feature is answerable, but must be answered time and time again.

This has been a brief and sketchy consideration of the possibilities of highlighting as a prompting strategy for receptive language and cognitive training tasks which, hopefully, will pique your creativity. There is something here for us; but we have not yet begun to make creative application of it.

Child Register: A possible source of strategies

Since 1964, when Brown and Bellugi's "Three processes in the child's acquisition of syntax," first appeared, there has been evolving a growing interest in describing the special ways in which mothers speak to their children, special in that they do not talk to other adults in the same way that they talk to their young

children. Concomitant with this descriptive interest has been an interest in whether these special features (as a package, referred to as 'Child Register') are importantly and causally related to the child's acquisition of language. This possibility and its implications for intervention invite our consideration of Child Register. A selected list of references on this topic is presented in the Suggested Readings at the end of this paper.

Taken as a whole, the various features of Child Register seem designed to simplify the language and to make it easier to segment into words; to make the message more redundant; to make the interaction more interesting and entertaining; and to make it more intimate. Just exactly how does Child Register differ from adult talk?

Descriptive Features of Child Register. Mothers talk to babies and young children in relatively high pitched voices; and they speak much more slowly than when talking to adults. Facial expressions and the intonational patterns of voice are exaggerated with a high proportion of the content words being stressed. The mother pauses before important words and at the ends of sentences, and she tends to repeat and/or to paraphrase what she has already said. She is apt to position herself close to her baby, smooching, nuzzling, and gazing at him or her as she talks and pauses. She is apt to whisper to her baby much as she might to a lover. During play, the mother is apt to address the baby with many tongue-clicking, lip-popping, kissing, humming, and other non-speech noises interspersed in her talk.

When she talks in words, the mother often reduces consonant clusters in important words to single consonants, for example, 'stomach' may become 'tummy'. She is apt to make an important word into a reduplicative ('car-car', 'tum-tum,'.'night-night', 'bye-bye') or to put it into a diminutive form such as 'horsie' or 'potty' which also has the effect of increasing the perceptual salience of the final consonant of the root word. And she is apt to add a second rhyming word such as 'tootsie-wootsie' or 'doggie-woggie'. Combinations of these phonological gyrations produce many words that are common to small children: 'wa-wa', 'bubu', 'boo-boo', 'sisi', 'ta-ta', 'nana', as well as 'doo-doo' and 'pee-pee'. Not unrelated are the special words used only in childhood to refer to certain objects or animals, for example 'choo-choo' for train, 'bow-bow' for dog, and 'moo-moo' for cow.

The content of what is talked about in Child Register deals with shared affect, activities, and sensory experiences of the moment and the immediate future. The mother may comment on what the child is already attending to or she may direct the child's attention to something in the immediate context.

Mothers use fewer pronouns in speech to their young children than in speech to other adults. They rarely use the pronoun, 'I', using instead their own name, 'Mommie'. They rarely use a third

person pronoun when referring to someone else; rather, again, they use the name of the person, such as 'Daddy', 'Grandma', or Auntie B'. The children themselves are often referred to by their own proper names, for example, 'Joey is hungry' when Joey is actually being addressed. Possessive pronouns are often similarly displaced by proper names. Mothers often pronominally include themselves in references actually intended only for the child, for example, 'It's time for us to take our bath' or 'It's time for our nap.' Regardless of how or why mothers come to do these things, the net effect is that the number of different pronouns in use in Child Register is considerably smaller than the number in use in adult talk.

Mothers also simplify the language by reducing the number of function words used, the number of verbs, the number of modifers, and the number of verb forms. The words that are used tend to be especially concrete or affective. And the type-token ratio (number of different words used divided by the total number of words used) is small in Child Register when compared to that in adult talk. The sentences mothers address to their young children are generally much shorter than those addressed to adults. Both the mean length of utterance and the mean length of pre-verb utterance are shorter. The sentences are not all simple, active, declarative and affirmative; but they tend generally to be less complex than in adult talk (see Brown and Hanlon, 1970). There are relatively few compound or complex constructions, and the passive voice is essentially absent. Questions are common, but many of them are rhetorical ones which the mother answers herself.

Once children begin to communicate verbally, mothers begin to respond to children's utterances in some ways that have been identified as peculiarly characteristic to Child Register. For example, mothers commonly respond to the utterances of young children with expansions which consist of the mothers' imitating or paraphrasing what the child just said followed by the inclusion of some piece of additional rolevant content--something a little beyond the production level of the child. And, if the mother fails to understand something the child says, she is apt to prompt the child to repeat what she failed to understand by asking a question with the word order unchanged from the child's preceding statement, for example 'You want what?' or 'What?' or 'What did you say you want?' In addition, mothers repeat and paraphrase their own utterances to children at high rate, seemingly pressing persistently for verification from the children that they understand.

The various research efforts that have yielded this summary description of Child Register have also revealed, as one might expect, that mothers' speech to normally developing children gradually shifts from Child Register to adult talk as the child advances in years (see Phillips, 1973; Snow, 1972; and Broen, 1972). The question of what occasions the use of Child Register and what occasions its shift toward adult talk has been asked, and at present, there is no satisfactory simple explanation. We can only assume that the

mother's behavior is attributable to subtle features of her environment, her reinforcement history, and the parent-child interaction that are common across most dyads of normally developing and normally equipped infants and their mothers.

Features of Child Register that tend to be overlooked are those that it shares with adult talk. None of the differences between Child Register and adult talk are present in mothers' speech all of the time or example, only about 30 per cent of the sentences addressed to children are simple, active, affirmative, and declarative; the other 70 per cent are characteristic of the syntax of adult talk (Brown and Hablon, 1970). Mothers expand only about 30 per cent of children's utterances (Brown and Bellugi, 1964); and only about 45 per cent of mothers' responses to children are sequiturs to what the children have just said (Brown and Hanlon, 1970). Furthermore, there is some evidence that children are actually more attentive to utterances that are somewhat beyond their own production level (Shipley, Smith and Gleitman, 1969). Research has typically focused on the differences between Child Register and adult talk, rather than on the similarities. This point is raised here since it would seem to be an important consideration to a functional analysis of the shift from Child Register to adult talk that occurs as the normally developing child grows older.

Toward a Functional Analysis of Child Register. Research findings show that Child Register is powerfully affected by the actual presence of a child, suggesting that children themselves largely control the linguistic input directed at them (see Snow, 1972a). The evidence to this point is impressive. Not only do women with minimal experience with children display a strong immediate shift to Child Register when placed with a young child (Snow, 1972a), but so do four-year-old children who have no younger siblings (see Shatz and Gelman, 1973). The shift in register seems to be under tight stimulus control; the 'discrimination' is apparently easily acquired; the response 'generalizes' to all children, to other small and dependent forms of life, to miniature inanimate objects, and to dependent elderly persons as well; and the 'discrimination' seems unaffected by long periods of disuse or inactivity. It is very much as though we were dealing with a respondent, the eliciting stimulus being the babe. This brings to mind an anecdote from Harlow's Learning to Love (1971, p.6) in which he tells about having projected a photograph of a baby monkey on a screen at a women's college. "All 500 girls in the audience gave simultaneous gasps of ecstasy. The same test has since been conducted with many college audiences. Not only are the all-male audiences completely unresponsive, but the presence of males...inhibits the feminine ecstasy response. Evidently nature has not only constructed women to produce babies, but has also prepared them from the outset to be mothers." Harlow shows a copy of the appealing picture and the caption reads, "Elicitor of female ecstasy response."

In Snow's 1972a study, she showed that women failed to make a full shift to Child Register when asked to talk as though

they were speaking to two-year-olds. This coupled with the evidence of a shift toward adult talk as the normally-developing child grows older, suggests that the child provides potent differential reinforcement to the speaker. The simplest possible explanation would seem to be that the child's attending to the speaker operates as a guidance system for the speaker's behavior. And, indeed, Snow (1972b) and Spring (1974) present convincing evidence to this point. Dale (1976, pp. 145-146) puts it simply: "Thus children may control the linguistic input available to them by means of their selective attention to the speech of other people. And, as the child's language advances and he attends to more complex speech addressed to him advances as well." As inadequate as this analysis is at specifying exactly what features of Child Register exert stimulus control over the child's attending behavior and exactly what behaviors of the child exert stimulus control over the mother's shift in register, this analysis is actually the best we have at present. An operant interactional analysis in which the first response is a respondent has not been formulated.

Does Child Register Affect Language Growth? The question of whether all or certain features of Child Register are importantly and/or causally related to the child's acquisition of language remains unanswered. The fact that Child Register exists and that it wanes in strength as the child's language behaviors grow stronger has been established. This inverse relationship between the strength of Child Register and the strength of child language is at least circumstantial evidence that some of the features of Child Register are importantly related to language acquisition. Further, we know that Child Register contains some features or combination of features that are especially interesting to young children (see Snow, 1972b, and Spring, 1974) and that these features are to some extent independent of the actual presence of the speaker; that is, they are inherent in the acoustic signal alone. The children in both of the studies cited showed a preference to hear Child Register rather than adult talk. Again, the evidence is circumstantial; but it does support the assumption that young children do differentially attend to Child Register. And we know that attending to the critical stimulus dimensions of a display is critical to learning to make adaptive discriminations. Therefore, the finding that Child Register occasions differential attending on the part of the child establishes Child Register as a potentially useful tutorial device. Capturing and maintaining the attention of a young child is no small feat and Child Register seems to do this admirably well.

Let's take another look at the characteristics of Child Register to see if we can discriminate among (a) features that might serve primarily to establish and maintain positive affect, (b) features that might occasion and maintain attending behaviors, and (c) features that might contribute programmatically and procedurally to the learning of linguistic discriminations.

Human attachment and Child Register share some common features. These features have no linguistic value at all; rather they are as-

pects of the affective interpersonal communication system early established between normally functioning mother-infant dyads. Included in this group would be physical contact, eye contact, synchrony of movement and pause time, smiling, and the sound or prosody of speech itself. The mingling of these features with the linguistic features of Child Register may function to protect the dyad from the consequences of early linguistic failures. Their presence may serve to keep the dyad engaged and mutually oriented and may offer a limited guarantee of the opportunity to try again. It is particularly significant for teachers of the blind to realize that human infants differentially attend to the human voice by the end of the second week of life (Klaus and Kennell, 1976) and that this feature can be carried by the acoustic signal alone; that is, it does not require the physical presence or sighting of the speaker.

What are the features of Child Register that might be expected to occasion and maintain attention or sensory alert? Intrusive perceptual salience is critical to alert infant attending; and stimulus change, variability or novelty is critical to its maintenance. Features of Child Register that might satisfy these demands for interest and entertainment value might include the high-pitched voice and variability in pitch, whispering, non-speech noises, the addition of rhyming words and reduplicatives, exaggerated loudness or stress and variability of the loudness of voice or patterns of stress, and variability in sentence length and inflectional pattern. None of these features carry linguistic information per se. They can, however, be superimposed on language; and, if they are, they may serve to facilitate children's making discriminations among linguistic features due to [illegible] state and positive affect.

Foremost among those features that might more directly occasion semantic and linguistic discriminations would be the focus on shared referents in the immediate context, pairing what is said with its referent, and the shifting of reference across the child, the mother, and shared environmental stimuli. Also important would be the small type-token ratio, the repeated use of a small number of words in limited contexts. The slow rate of speaking would be critical in enabling children to segment the separable units of the language, and there is some evidence that it facilitates processing (Woodcock and Clark, 1968). The pausing before important content words and at the ends of sentences would seem to serve the same functions. The use of stress on important content words might further facilitate segmentation. The reduction in the number of pronouns used would contribute to the low type-token ratio and it would also provide redundant use of the proper names of persons in the child's environment. The use of short sentences, in combination with the reduction of functors, verbs, and modifiers, might highlight the primary references and relationships and might accomodate young children's auditory memory capacity as well. All of these syntactic and morphological gestures, then, are ones that might function to highlight critical semantic and linguistic discriminative

stimuli. Some of the curious phonological features might facilitate acoustic discriminations among words while others might simply offer perceptual novelty, reinforcing attending behavior.

Once children actually begin to say words, the mothers' expansions, prompts, asking and answering their own questions, and endlessly repeating and paraphrasing themselves would all seem to be possible ways of maintaining children's attention, highlighting critical linguistic discriminative stimuli, placing a greater demand on children for linguistic comprehension, and providing more varied and complex models of syntax and prosody. Interestingly, as noted above, children have been shown to be most attentive to utterances that are somewhat beyond their own production level (Shipley, Smith and Gleitman, 1969).

What we may have in Child Register is a medley of features intertwined and superimposed on each other which, in concert, increase the likelihood that a child will attend to the critical stimulus dimensions of the linguistic input and learn to make adaptive discriminations among them. The mother is like a living, loving Big Bird who entertains and engages the child in irresistable song and dance while the subtleties of syntax and morphology are repetitiously conveyed in varying forms via subliminal advertising.

Application of Child Register to Programming a First Language for the Developmentally Delayed Child. Assuming that at least some of the features of Child Register do in some way aid normally developing children in approximating their ultimate attainment of adult talk, we might logically ask how we can use what we know about Child Register to better program for developmentally delayed children and their families.

First of all, the review of Child Register has emphasized the importance of human attachment to language learning. The teacher of a first language must first of all be a lover. The affective interpersonal relationship again clearly emerges as an essential precursor for communication and language; and any general intervention strategy based on what we know about Child Register must attempt to teach the adult-child dyad to be mutually reinforcing. To be optimally effective in achieving our linguistic objectives we must place a high priority on the attainment of social/affective objectives. These objectives must include the child's attainment of behaviors which will reinforce the parent and/or teacher: mutual gaze, smiling, positive response to physical contact, and affective communication.

The effective behaviors of parents and teachers must be reinforced if they are to be maintained; and we know that we cannot depend on children's ability to reinforce. We must program opportunities for receipt of potent social differential reinforcement for effective teaching because they cannot be expected to occur otherwise. The particulars are best designed locally to fit the special demands of climate, geography, living and working arrange-

ments. It is important to stress that teachers and parents should be encouraged to design 'burn-out' prevention systems for themselves and each other; even the best teachers are vulnerable to the effects of prolonged effort, disappointingly slow progress, and the failure of children to adequately reinforce. Indeed, this is the common condition for parents and teachers of developmentally delayed children. If we want to shore up our and their effectiveness, we must place a high priority on shoring up the reinforcers!

Secondly, we must attempt to extract the essence of Child Register and make it an integral part of our adult-child interactive style. The major message seems to be to interactive intimately with the children surrounding them with the certain knowledge that we are attending solely to them. And we should attend to what they attend to and provide enactment and linguistic glossing that accurately reflect the feeling and content of what the children would say. In addition, we should use with variety and unselfconscious spontaneity every supra-segmental device available to us to make ourselves and our messages irresistably salient. Brazelton, Tonick, Adamson, Als, and Weise (1975) cite a touching example of a blind mother instructing her husband in how to get their infant daughter to vocalize: 'Slow down, wait for her, pitch your voice higher'.

And lastly, we must be open to new questions and to the application of new strategies. For example, that normal children acquire adult talk is undeniable; and it is clear that mothers' interactions are significant. What we may want to question is whether what is 'normal' is 'ideal'. Although attempts to demonstrate the facilitating effects of expansions on language growth in children have been equivocal, a broadened category of expansions, not typically used by mothers, has been shown to facilitate syntactic growth in at least one study (Nelson, Garskaddon and Bonvillian, 1973). When using this approach, incomplete sentences uttered by the child were expanded; that is, the teacher repeated or paraphrased what the child said, including it, however, in a complete sentence that was relevant to the context. Complete sentences uttered by the child were recast; that is, the teacher responded in a sequitur that was cast in a different syntactic form, such as a question in response to the child's affirmative statement. The content-words of the child are retained; but the syntactic form is varied. Could such an approach be adapted to serve the developmentally delayed child? I think so. A professional interventionists, we have the responsibility to try.

A Last Note on Child Register. We have explored the ways that mothers talk to normally developing children. We have considered the problems of explaining what occasions this behavior, and its shift toward adult talk. We have wondered whether these behaviors actually facilitate language growth in the child. And we have wondered about whether or not they can effectively be applied to intervention with the developmentally delayed child. It is possible. In particular, we can apply a great deal of what we know from Child Register to making ourselves and what we say more interesting and entertaining, and to effectively highlight the training stimuli.

Total Communication: The strategy of choice

The use of Total Communication (TC) in teaching the deaf and hearing impaired, the retarded and developmentally delayed, the autistic and emotionally disturbed, and the aphasic or brain damaged has become very visible in the last several years. Yet, there remains much controversy, confusion, doubt, and anxiety among professionals and parents with respect to this strategy which has purportedly helped many children and their families and teachers to begin to communicate with each other.

TC is simultaneous communication in all sensory modes that are shared between people. This means that TC is not just signing and it is not just simultaneous signing and speaking. It is, rather, the artful blending of speech and sign with all other information-bearing sensory modes such as smell, taste and touch. For the young child TC execution incorporates many of the features of Child Register. TC highlights the intended stimulus of shared focus and the distinctive feature(s) of the training stimulus in order to teach discriminations. TC offers the non-verbal child a way to participate linguistically with others, often a welcome opportunity for one who has experienced much failure, frustration and sadness due to speech. TC requires a teacher who is willing and able to provide maximally redundant messages, gradually fading out the redundancy as the child's achievements permit. TC involves simultaneous speaking and signing but it also includes communication boards, freely expressed body postures and movements, exaggerated facial gestures, the dramatic use of all of the vocal supra-segmentals such as melody, tempo, and stress, and traditional orthography, too. What has just been described is very close to what some teachers of little children have always done. Some teachers are 'enthusiastic'. This kind of enthusiasm does make a difference. These teachers are rarely misunderstood by the children. Attending is no problem for them. The teacher is the most fascinating thing in the classroom! The children are enthralled. This teacher really doesn't need tokens. The teacher is the reinforcer. The teacher's physical presence, attention, approval, physical contact, comfort, affection, and delight are the tokens. The best teachers have always know this. And the best teachers of little children have always been total communicators!

In a TC classroom, talking and signing would be combined with language boards. The concept of the lap board type of language board can be extended to room-encircling bulletin boards for children who are able to see and feel and move to the board to reach and touch their referents. This makes a third, and less fleeting, communicative mode available to the child. And these modes, the speech, the signing, and the written or pictured word or concept, when used together can support each other and can be made to exploit the child's ability to discriminate among complex auditory, visual, olfactory, tactile and gustatory stimuli. That is what TC is; and the skillful TC teacher puts it all together with ease and enthusiasm. (For a catalog of useful materials for TC programs, write to the

Sign Language Store, P. O. Box 4440, Northridge, California 91328. For other materials in TC for children and for yourself, write to the Galludet College Book Store, Washington, D.C., for their catalog. For parents and teachers, I specially recommend The Joy of Signing (Riekehof, 1978). For materials to stretch your imaginative blending of all sensory modalities into communication, write to Creative Resources in Waco, Texas, for their four sensory experience books as well as for descriptions of other titles of interest and of help to the teacher who craves attention.)

The sensory sensitivities of normal infants seem to be fully developed and operational at birth, and the research literature tells us that the ages at which infants display a variety of sensory discriminations closely approaches zero. These findings say two things: We have failed to maximize on the multi-modal sensory abilities of handicapped children and we have failed to maximize on the multi-modal sensory abilities of our normally, but perhaps far from optimally, developing children. The full and early use of TC by mothers and teachers who already employ Child Register, offers enticing possibilities. If you are already convinced of the merit of TC, you may wish to skip the following section; if you question the use of TC, however, please consider the following rationale.

Why Not TC? Now, instead of defending TC as a strategy of last resort for the most profoundly handicapped, let's consider the evidence that might support TC as the strategy of choice for the establishment of affective and linguistic communication for all children.

There are anecdotal and systematic accounts of manual linguistic expression occurring in deaf infants between five and six months of age (Dale, 1976; Schlesinger, 1972). Along a comparative dimension, a large literature testifies to the fact that non-human primates, who never achieve satisfactory spoken language, do achieve linguistic skills through manual sign and that they begin to do so as early as three months of age (Gardner and Gardner, 1975). In addition to reflecting the earlier motor maturation of the non-human primates as contrasted with the human, these findings may reflect the lesser motor demands of a manual expressive mode as contrasted with a vocal one. Further, these findings suggest the possibility that the social and cognitive prerequisites for the initiation of expressive language are attained prior to the attainment of the neuro-motor coordination that is necessary for human speech and that the normal human infant might be expected to initiate linguistic expression through a manual expressive mode sooner than through a vocal one. It is also possible that manual signs, in the absence of a common linguistic frame of reference, may convey to the infant more information than speech. The normal child, then, who is early exposed to both speech and the language of sign might be expected to understand linguistic input and to engage in linguistic expression sooner than the child who is exposed only to speech.

Deaf children who are exposed early on to sign achieve a greater success in reading and written linguistic skills than their class-

mates who are not exposed to sign until later (Vernon and Koh, 1970, 1971; see also Schlesinger and Meadow, 1972); further, no differences between the groups have been detected in speech performance or in measures of psychosocial attainments. In 1970 Vernon and Koh (pp. 535-536) summarized the argument as follows:

> Data have been presented comparing the effects of early exposure to manual communication with early exposure to oral communication in genetically deaf children. The use of early manual communication produced better overall educational achievement including superiority in reading skills and written language. Comparisons on the variables of speech intelligibility and speechreading indicated no differences despite the fact that the oral group, for the most part, had extensive pre-school oral training whereas the manual group had neither this training nor had they parents who could use hearing to aid them in speech. In psychological adjustment no statistically significant differences were found.
>
> The findings of this study lend further support to the results of previous investigations which also indicated that early manual communication markedly facilitates educational achievement and linguistic development; that speech and speechreading skills are not hurt by manual communication; and that psychological adjustment is as good or better for those who learned manual language early in life. These findings in support of the value of early manual communication prevailed despite the fact that the children exposed to strictly oral training had hearing parents whose speech, language, and educational skills and achievement were superior to those of the children raised in a manual communication environment and whose parents were deaf.

Vernon and Koh (1970, 1971) further present data which support the contention that deaf children who are exposed to early manual communication start to school with an advantage over other deaf children and that this advantage continues to increase over time.

Schlesinger (1972) reports on the acquisition of sign in a deaf child (Ann) reared by deaf parents. At the age of 19 months Ann had 117 recognizable word signs and five signs for letters of the alphabet. This compares very favorably with typical expressive lexical achievements for the hearing child of comparable age. Further, Schlesinger reports on the acquisition of signed and spoken language by two normally hearing siblings, Jason and Kathy, who were exposed from birth to both spoken and signed language. Although neither parent was deaf, the paternal grandmother who lived with the family was; and both parents as well as the grandmother were fluent in manual communication. The data on Kathy and Jason were obtained from diary accounts maintained by the parents. At the age of 18 months, Kathy was credited with 245 words and 113

signs while Jason at a comparable age was credited with 81 words and 51 signs. It is not reported whether all words uttered by the children were also signed or whether there were some discrepancies. Nor is there any indication of which child was the elder. Nevertheless, it is clear the Kathy and Jason both had speaking vocabularies that exceeded normal 18 months expectancy. No data are reported on these children with respect to cognitive development or subsequent linguistic or academic achievement.

In summary, then, we know that the normal human infants are capable of linguistic expression through sign sooner than through speech in spite of their ability to make sophisticated discriminations among linguistically significant acoustic stimuli (Eimas, Siqueland, Jusczyk, and Vigorito 1971). Further, we know that early exposure to sign facilitates reading and written linguistic expression in deaf children with no concomitant untoward consequences. Still further, it appears that deaf children who are exposed to early manual communication are able to maintain and to increase over time their superiority over deaf children exposed early on to only oral communication. Therefore, it seems reasonable to propose to provide normally developing human infants with a total communication (TC) environment from birth. From all of the above, we would expect this treatment to result in the normal child's achieving linguistic understanding and manual and oral linguistic expression at an earlier age than if provided with a predominantly oral environment. To the extent that linguistic achievement interact with cognitive growth, we might speculate that early exposure of normal children to TC might accelerate cognitive as well as linguistic growth. Further, we would not expect any toward consequences in terms of psychological adjustment or delay in vocal linguistic expression. The longitudinal study of the achievements of infants exposed to this treatment would permit us to see whether or not cognitive and/or linguistic growth would be accelerated, whether the possible early acceleration would dissipate over time, and whether the possible early achievement of cognitive and linguistic milestones would result ultimately in a generally higher than expected level of functioning. The value of introducing deaf children and their families to TC is evident; and the literature is replete with small sample studies and reports of individual successes testifying to the facilitating effects of the use of TC with a wide variety of other communicatively handicapped populations.

The value of TC for normal children remains almost completely unexplored. The potential for increasing the achievement levels of normal children during the school age years would seem to warrent the exploration of this possibility. Indeed, Vernon and Coley (1978) have presented a preliminary report suggesting that sign and/or finger spelling can be used to facilitate the normal child's learning to read. They point out the similarity between some of the ABC signs and their written counterparts, again emphasizing that deaf children reared by deaf parents often know considerable finger spelling when they enter school and that this reading of signed words is rather easily transferred to the reading of printed words.

It may be that the emergence of oral language production in normally developing children is constrained not so much by cognitive readiness as by the neuro-motor demands of speech. What waits to be done is a study of hearing parents raising their normal children in a TC environment from birth. The data on the experimental subjects could be compared directly to already existing norms on the cognitive and linguistic achievements of normally developing infants.

If TC accelerates the development of the normally developing child, the consequences of this "success" would be several:

(a) As educators, we would need to be prepared to offer accelerated educational programs consistent with the child's cognitive/linguistic/social (but not necessarily physical) growth, much as we might for the "gifted" child.

(b) As members of a society, we would need to be prepared to tolerate a younger generation that might be characteristically "gifted" by our "normal" standards; this might make unanticipated social demands on the first older/normal generation.

(c) As students of child development, we would be confronted with the monumental task of re-writing the textbooks in a wide range of related areas. (Perhaps we might choose to defer this task to the younger generation!)

(d) As students of theory in child development we would need to be prepared to divest ourselves of theories supported by "facts" derived from developmental data based on ourselves and our ancestors and to construct new theories that would be capable of accounting for our new observations in a parsimonious and internally consistent manner.

How Can This Be? There are several possible explanations for why sign appears to be more easily acquired than speech. An obvious one is that the hand movements of sign make lighter demands on neuro-motor coordination than do the synchrony of articulatory movements, breathing, and phonation necessary for speech. If this is true, speech would be expected to be later appearing than sign, would be expected to require more practice, and would be expected to take longer to become highly differentiated or skilled. Furthermore, although fluent sign is as evanescent and as difficult to segment as speech, learners of sign are able to see and manipulate the configuration and movement of their own hands and to compare them to their teacher's hands. The teacher can both repeat the movement of a sign and hold static the beginning or the ending of a sign. Furthermore, the teacher can manipulate and mold the learner's hands to match the example. Speech can be amplified acoustically and expanded in time but there is no comparable way to make the production process of breathing, phonation and articulation for speech as visible as the production process for sign.

On a more abstract level, sign is less arbitrary than speech; that is, there is generally a greater iconicity between signs and their referents than between spoken words and their referents. There is often a visible similarity between the sign and its referent, whereas spoken words are only rarely conceived of as having an acoustic similarity to their referents.

If there were a discrepancy between visual and auditory memory which favored visual memory (To my knowledge, we have no evidence to this point), the child would be expected to recall the sign more readily than the spoken word when asked to specify an object label. Having made the sign, the sight or feel of the sign might function as a discriminative stimulus for the spoken word. The author has often seen TC children look at their hands and form a sign before saying a word in response to a request for a label. And the author has seen an adult aphasic client look at her hands signing a preposition before saying the preposition signed.

Perhaps sign is a more primitive communicative mode from an evolutionary point of view. This point of view would be supported by the adaptation hypothesis. Given the choice, communication via speech is more adaptive than manual communication for the reasons cited below as disadvantages of sign. Nevertheless, from a maturational point of view, if this hypothesis were true, signing might be expected to occur before speech. The question remains as to why its early occurrence seems to facilitate the early occurrence of speech. This facilitating effect of sign on speech has been observed in language delayed and disordered children as well as in normally developing children. There are other less well formulated explanations dealing with interactions among handedness, sex of learner, and degree of right-left hemisphere specialization; and anyone using TC with children might wish to collect data relevant to these parameters.

Advantages and Disadvantages of Total Communication. No consideration of TC would be complete without an attempt to catalog the advantages and disadvantages as they are presently understood.

Advantages

TC provides an orderly redundancy to the message. This can increase the amount of information understood by the receiver. For example, if one already understands one mode really well and if the message in that mode is sufficiently redundant and noise free, perhaps nothing helpful is gained from the overlay of another mode. However, if one has not really mastered either mode, the two together may provide more information than either alone. The resultant redundancy is increased significantly above that offered by either mode alone.

TC is visual which is the primary mode of affective interpersonal communication in human infants. The child is already visually attending. It provides a way to direct the child to selectively attend

to the critical auditory distinctions by pairing them with the visual.

It is possible for the child to communicate through TC at an earlier age than through spoken language alone.

The child who communicates through TC is more reinforcing to the parent or teacher than the non-verbal child.

There is some evidence that the child who learns to communicate through TC is able to read earlier and more easily.

TC engages the hands in useful activity that is incompatible with self-stimulation or self-abuse.

Disadvantages

The disadvantages of sign are sufficient such that a person capable of speaking would not prefer sign. This is good because we want children to talk as well as to sign if they possibly can. The most frequently cited disadvantage of sign is that everyone does not know sign or choose to learn it; this disadvantage may be greatly minimized as more and more deaf and hearing impaired children are mainstreamed in our schools. Furthermore, it seems to me that there is currently a veritable explosion of interest and awareness of sign as a socially acceptable linguistic mode.

Another disadvantage is that one cannot sign over the telephone! Bell Telephone has minimized the impact of this disadvantage for the deaf through electronic technology; however, the use of this technology is at present limited to certain receivers, usually providing only for emergency messages. Nevertheless, the technological capability is there and could be extended both in terms of the "callers" and the "callees".

Still another disadvantage is that signs cannot be seen in the dark. The dark renders the receiver of sign to the communicative status of the deaf-blind. This disadvantage is not usually serious and can be eradicated via the use of a light switch! One usually chooses to be in the dark! Nevertheless, it is a constraint and may greatly affect pillow talk, conversation during the first moments of power failures, and nocturnal communication on campouts and in drive-in movies. This disadvantage is a serious one to the deaf or deaf-blind person and requires that sign become tactile rather than visual in order for it to function as a linguistic mode.

Still another disadvantage is that signing is incompatible with other manual activity. Although most sophisticated signers can sign one-handed, two hands are preferable to one. There are times when it is just not possible or feasible (or safe!) to sign when one might wish to communicate linguistically. A signing driver is a real menace on the road! And what if a person dependent upon sign burns both hands in an accident and finds himself/herself

reduced to covert signing within two football-sized bandages? There are other, everyday activities that demand that hands be occupied in non-signing activities. How about the lost art of washing or drying dishes? Setting the table? Opening a can? Tossing a salad? Folding laundry? Making a bed? Splicing a wire? Tightening a bolt? Typing? Just about anything one does is incompatible with signing. In addition, it is physically very tiring as compared to talking.

It is impossible to amplify a signed message with one's own physical equipment; that is, it is not possible to scream or yell in sign. This disadvantage can be minimized by creating an exaggerated visual display such as jumping up and down, waving the arms. However, the successful use of this strategy still depends upon the visual attention of the intended receiver. The receiver of a signed message must be looking at the sender; and sometimes it is impossible to attract the attention of the intended receiver. There are other times when it is dangerous for intended receivers to look away from what they are doing; and looking at the sender is often inconvenient or incompatible with other ongoing behaviors of the intended receiver.

There are real disadvantages to sign. Nevertheless, for the manually unimpaired person who is unable to speak intelligibly and for the person who is unable to hear, sign may be the communicative mode of choice for linguistic expression and reception, having far fewer disadvantages than other non-oral linguistic modes such as writing/reading, language boards, Bliss symbolics and the variety of electronic modes.

Alternative Expressive Modes for the Motorically Impaired. Although TC is a compelling strategy to be used in talking to children, it offers the motorically handicapped child pitifully little as an expressive linguistic mode. For children who cannot or choose not to talk or to sign, there are available now a growing variety of alternative expressive modes. And their availability in combination with a TC environment greatly enriches the life experiences of many special children and their families.

For a variety of sources in this area, I refer you to Vanderheiden and Grilley's Non-vocal Communication Techniques and Aids for the Severely Physically Handicapped (1977) and also to Trace Research and Development Center for the Severely Communicatively Handicapped, 1500 Highland Avenue, Madison, Wisconsin 53706. The Trace Center is an excellent source of current information on all types of communication systems and devices for the motorically handicapped.

References

Azrin, N.H., Kaplan, S.J., & Foxx, R.M. Autism reversal: Eliminating stereotyped self-stimulation of retarded individuals. American Journal of Mental Deficiency, 1973, 78, 241-248.

Bloom, L. Language development: form and function in emerging grammars. Cambridge, MA: MIT Press, 1970.

Bradtke, L.M., Kirkpatrick, W.J. & Rosenblatt, K.P. Intensive play: a technique for building affective behaviors in profoundly mentally retarded young children. Education and Training of the Mentally Retarded, 1972, 7, 8-13.

Brazelton, T.B., Tonick, E., Adamson, L., Als, H., & Weise, S. Early mother-infant reciprocity. In Parent-infant interaction, Ciba Foundation Symposium 33, New York: American Elsevier, 1975.

Broen, P.A. The verbal environment of the language learning child. Monographs of the American Speech and Hearing Association, 1972, 17.

Brown, R. A first language: The early stages. Cambridge, MA: Harvard University Press, 1973.

Brown, R. & Bellugi, U. Three processes in child's acquisition of syntax. Harvard Educational Review, 1964, 34, 133-150.

Brown, R. & Hanlon, C. Derivational complexity and order of acquisition in child speech. In J.R. Hayes (Ed.), Cognition and the development of language. New York: Wiley, 1970.

Dale, Philip S. Language development: Structure and function. New York: Holt, Rinehart and Winston, 1976.

Eimas, P.D., Siquelard, E.R. Jusczyk, P., & Vigorito, J. Speech perception in infants. Science, 1971, 171, 303-306.

Estes, W.K. Learning theory and mental development. New York: Academic Press, 1970.

Fraiberg, S. Insights from the blind. New York: Basic Books, 1977.

Fraiberg, S. Intervention in infancy: a program for blind infants. Journal of the American Academy of Child Psychiatrists, 1971, 10, 381-405.

Gardner, R.A., & Gardner, B.T. Early signs of language in child and chimpanzee, Science, 1975, 187, 752-753.

Harlow, H.F. Learning to Love. San Rafael, CA: Albion Corp., 1973.

Kent, L.R. Language acquisition program for the retarded or multiply impaired. Champaign, Illinois: Research Press, 1974.

Klaus, M.H. & Kennel, J.H. Maternal-infant bonding. St. Louis: C.V. Mosby Co., 1976.

Leonard, L.B. Meaning in child language. New York: Grune and Stratton, 1976.

Miller, A. & Miller, E.E. Cognitive-developmental training with elevated boards and sign language. Journal of Autism and Childhood Schizophrenia, 1973, 3, 65-85.

Neef, N.A., Iwata, B.A. & Page, T.J. The effects of known item interspersal on acquisition and retention of spelling and sightreading words. Journal of Applied Behavior Analysis. 1977.

Neef, N.A. & Kent, L.R. The effect of stimulus repetition on performance of a discrimnation task. Paper presented at Midwestern Association of Behavior Analysis Convention, Chicago, Illinois, May 1975.

Nelson, K.E. Carskaddon, G., & Bonvillina, J.D. Syntax acquistion: Impact of experimental variation in adult verbal interaction with the child. Child Development, 1973, 44, 497-504.

Phillips, J.R. Syntax and vocabulary of mothers' speech to young children: Age and sex comparisons. Child Development, 1973, 44, 182-185.

Riekehof, L. The joy of signing. Springfield, MO: Gospel Publishing House, 1445 Booneville Ave., 1978.

Schlesinger, H.S. Language acquisition in four deaf children. In H.S. Schlesinger and K.P. Meadow, Sound and sign. Berkeley; CA: University of California Press, 1972.

Schreibman, L. Effects of within-stimulus and extra-stimulus prompting on discrimnation learning in autistic children. Journal of Applied Behavior Analysis, 1975, 8, 91-112.

Shatz, M. & Gelman, R. The development of communication skills: Modifications in the speech of young children as a function of listener. Monographs of the Society for Research in Child Development, 1973, 38, (152).

Shipley, E.F., Smith, C.S., & Gleitman, L.R. A study in the acquisition of language: Free responses to commands. Language, 1969, 45, 322-342.

Snow, C.E. Mothers' speech to children learning language. Child Development, 1972(a), 43, 549-565.

Snow, C.E. Young children's responses to adult sentences of varying complexity. Paper presented to the 3rd International Congress of Applied Linguistics, Copenhagen, August, 1972(b).

Spring, D.R. Effects of style of maternal speech on infants' selection of vocal reinforcement. Unpublished paper, Seattle, WA: University of Washington, 1974.

Vanderheiden, G.C. & Grilley, K. Non-vocal communication techniques and aids for the severely physically handicapped. Baltimore, MD: Park Press, 1977.

Vernon, McCay & Coley, J.D. The sign language of the deaf and reading-language development. The Reading Teacher, 1978, 32, 297-301.

Vernon, McCay & Koh, S.D. Early manual communication and deaf children's achievement. American Annals of the Deaf, 1970, 115, 526-536.

Vernon, McCay & Koh, S.D. Effects of oral preschool compared to early manual communication on education and communication in deaf children. American Annals of the Deaf, 1971, 116, 569-574.

Weaver, K.S. & Ruder, K.F. The effect of the gestural prompt on syntax training. Journal of Speech and Hearing Disorders, 1978, 43, 513-523.

Wolfe, V.F. & Cuvo, A.J. Effects of within-stimulus and extra-stimulus prompting on letter discrimination by mentally retarded persons. American Journal of Mental Deficiency, 1978, 83, 297-303.

Woodcock, R.W. & Clark, C.R. Comprehension of a narrative passage by elementary school children as a function of listening rate, retention period and IQ. Journal of Communication, 1968, 18, 259-271.

Suggested Readings

Abrahamsen, A.A. Child language: An interdisciplinary guide to theory and research. Baltimore: University Park Press, 1977.

Bloom, L., Rocissano, L., & Hood, L. Adult-child discourse: Developmental interaction between information processing and linguistic knowledge. Cognitive Psychology. 1976, 8, 521-522.

Bourne, L.E., Jr., Guy, D.E., Dodd, D.H., & Justesen, D.R. Concept identification: The effects of varying length and informational components of the intertrial interval. Journal of Experimental Psychology, 1965, 69, 624-629.

Burger, A.L., Holmes, M., Blackman, L.S. & Zetlin, A. Use of active sorting and retrieval strategies as a facilitator of recall, clusterings and sorting by EMR and nonretarded children. American Journal of Mental Deficiency, 1978, 83, 253-261.

Cazden, C. Child language and education. New York: Holt, Rinehart, and Winston, 1972.

Cazden, C. The situation: A neglected source of social class differences in language use. Journal of Social Issues, 1970, 26, 35-69.

Clark-Stewart, K.A. Interactions between mothers and their young children: Characteristics and consequences. Monographs of the Society for Research in Child Development, 1973, 38, No. 153.

Cross, T.G. Mothers' speech and its association with rate of linguistic development in young children. In N. Waterson, and C.E. Snow (Eds.), The development of communication: social and pragmatic factors in language acquisition. New York: Wiley, 1976.

Cross, W.L. Children's discrimination learning as a function of intertrial interval duration. Psychon. Sci., 1970, 18, 321-322.

Dunn, J.F. Patterns of early interaction: Continuities and consequences. In H.R. Schaffer (Ed.), Studies in Mother-infant Interaction. London: Academic Press, 1977.

Dunn, J., Wooding, C., & Hermann, J. Mothers' speech to young children: Variation in context. Developmental Medicine and Child Neurology, 1977, 19, 629-638.

Dunn, J.F. & Wooding, C. Play in the home and its implications for learning. In B. Tizard, and Harvey, D (Eds.), The biology of play. Clinics in developmental medicine No. 62. London: SIMP, with Neinemann Medical, 1977.

Freedle, R. & Lewis, M. Prelinguistic conversations. In M. Lewis and L.A. Rosenblum (Eds.), Interaction, conversation, and the development of language. New York: Wiley, 1977.

Friedlander, B.Z. The effect of speaker identify, voice inflection, vocabulary, and message redundancy on infants' selection of vocal reinforcement. Journal of Experimental Child Psychology, 1968, 6, 443-459.

Guralnick, N.J. Effects of distinctive-feature training and instructional techniques on letter and form discrimination. American Journal of Mental Deficiency, 1975, 80, 202-207.

Horton, K.B. Infant intervention and language learning. In R.L. Schiefelbusch and L.L. Lloyd (Eds.), Language perspectives: Acquisition, retardation and intervention. Baltimore: University Park Press, 1974.

Hubbell, R. On facilitating spontaneous talking in young children. Journal of Speech and Hearing Disorders, 1971, 42, 216-231.

Kent, L.R. A consideration of selected strategies for teaching a first language. Allied Health and Behavioral Sciences, 1978 1, 252-271.

Knight, M.S. The effects of intertrial interval duration on short-term retention of a two-choice visual discrimination task by retarded children. Journal Experience Child Psychology, 1968, 6, 241-253.

Ling, D. & Ling, A.H. Communication development in the first three years of life. Journal of Speech and Hearing Research, 1974, 17, 146-159.

MacDonald, J.D., & Blott, J.P. Environmental language intervention: the rationale for a diagnostic and training strategy through rules, context and generalization. Journal of Speech Hearing Disorders, 1974, 39, 244-256.

MacDonald, J.D., & Horstmeier, D. ELI: Environmental language intervention program. Columbus, Ohio: Charles E. Merrill, 1979.

MacFarlane, J.A. Olfaction in the development of social preference in the human neonate. In Parent-infant Interaction, Ciba Foundation Symposium 33, New York: American Elsevier, 1975.

Mahoney, G. Etiological approach to delayed language acquisition. American Journal of Mental Deficiency, 1975, 88, 139-148.

Mahoney, G.J. & Seely, P.B. The role of the social agent in language acquisition: Implications for language intervention. In N.R. Ellis (Ed.), International review of research in mental retardation, Vol. 8. New York: Academic Press, 1976.

Moerk, L. Verbal interactions between children and their mothers during the preschool years. Developmental Psychology, 1975, 11, 788-794.

Nelson, K.E. Structure and strategy in learning to talk. Monographs of the Society for Research in Child Development, 1973, 38, (149).

Newport, E.L. Motherese: The speech of mothers to young children. In N.J. Castellan, D.B. Pisoni, and G.R. Potts (Eds.), Cognitive Theory, Vol. 2. Hillsdale, New Jersey: Lawrence Earlbaum Associates, 1976.

Snow, C.E. Mothers' speech research: An overview. In C.E. Show and C.A. Ferguson (Eds.), Talking to children: Language input and acquisition. Cambridge: Cambridge University Press, 1977.

Snow, C.E., Arlman-Rupp, A., Hassing, Y., Jobse, J., Joosten, J., & Vorsters, J. Mothers' speech in three social classes. Journal of Psycholinguistic Research, 1976, 5, 1-20.

Sperber, R.D. Developmental changes in effects of spacing of trials in retardate discrimination learning and memory. Journal of Experimental Psychology, 1973, 99, 186-198.

Sperber, R.D., Greenfield, D.B. & House, B.J. A nonmonotonic effect of distribution of trials in retardate learning and memory, Journal of Experimental Psychology, 1973, 99, 186-198.

Tawney, J.W. Training letter discrimination in four-year-old children. Journal of Applied Behavior Analysis, 1972, 5, 455-465.

Terrace, H.S. Stimulus control. In Operant behavior: Areas of research and application. W.K. Honing (Ed.), New York: Appleton-Century-Crofts, 1966.

Underwood, B.J. Ten years of massed practice on distributed practice. Psychological Review, 1961, 68, 229-247.

Winter, S.D. The effect of temporal separation on performance of a discrimination task. M.S. Thesis, Western Michigan University, Kalamazoo, Michigan, August, 1973.

Wootton, A.J. Talk in the homes of young children. Sociology, 1974, 8, 277-298.

Louise R. Kent Udolf, Ph.D.
University of Pittsburgh
Cathedral of Learning
Pittsburgh, PA 15260

WORK SKILLS

A STRATEGY FOR DEVELOPING CHRONOLOGICAL AGE APPROPRIATE AND FUNCTIONAL CURRICULAR CONTENT FOR SEVERELY HANDICAPPED ADOLESCENTS AND YOUNG ADULTS

Lou Brown, Mary Beth Branston, Susan Hamre-Nietupski, Ian Pumpian, Nick Certo, and Lee Gruenewald

The MA-CA Discrepancy Hypothesis

For years parents have been told by professionals, "Yes, Mr. Jones, your child is twenty years old and will complete school in ten months, but he has a MENTAL AGE OF FOUR. That is why we are teaching him to sing, "When you're happy and you know it clap your hands"; that is why we are teaching him to touch long as opposed to short, to touch big as opposed to little, and to touch a card with four pennies taped to it".

The Earlier State Hypothesis

For years parents have been told by professionals, "Yes, Mrs. Smith, your child is eighteen years old and will finish our training program shortly. However, you must realize that DEVELOPMENTALLY she is only functioning at the tertiary-phallic-near receptor-olfactory channel-early preoperational level. That is why we are teaching her to imitate foot stomping, to match plastic spoons to pictures of plastic spoons, to open and close the world's largest artificial and nonfunctional zipper, and to pass a bean bag to the person next to her in a circle".

The "Not Ready For" Hypothesis

For years parents have been told by professionals, "Yes, Mrs. Johnson, your child will be completing school in a year or so, and we agree with you in theory that your child should be taught to perform chronological age appropriate and functional skills in natural environments. However, the result of our multidisciplinary evaluation clearly indicates that your severely handicapped child IS NOT READY socially, emotionally, intellectually, physically, economically, cognitively, politically, religiously, ethically, linguistically, and conceptually to learn to perform the skills you are requesting. However, when she progresses through the successive, vertical, linear, developmentally-sound, ontogenetically-determined, yet possibly invalid, sequences that we have arranged, maybe then she will be ready to learn to perform chronological age appropriate functional skills in natural environments".

The Artificial Approximation Hypothesis

> For years parents have been told by professionals, "Certainly, Ms. White, we could attempt to teach your child to perform chronological age appropriate and functional skills in natural environments. However, such a totally functional orientation would result in only "spotty" development; would be treating the symptom and not the cause; would be very short-sighted, anti-intellectual, anti-academic; would be teaching splinter skills; and would be extremely cumbersome to many administrators, teachers and unions. You will just have to trust us in that we are teaching APPROXIMATIONS of those skills."

These vignettes are intended to illustrate a variety of concerns related to the curricular content typically presented to severely handicapped adolescents and young adults. There are few curricular materials designed specifically for this population. Most curricula utilized with severely handicapped students are referenced to theories or models of normal human development which track the progressive refinement and elaboration of basic motor, social, and cognitive skills into the complex and competent performances characteristic of normal adolescents. These theories or models of human development are typically stage theories which divide development into relatively discrete states through which all children proceed en route to becoming independently functioning adults. The curriculum sequences derived from such stage theories can be described as "bottom-up sequences": they begin by teaching those skills which presumably occur first in a "normal" developmental sequence and then proceed to skills which occur at progressively older ages. Since severely handicapped students manifest significant skill deficits, they frequently receive instruction only on curriculum objectives characteristically offered to and mastered by infants or very young children. As severely handicapped students become adolescents or young adults, the outcome of such curricular strategies often results in the delivery of instruction which is non-functional, artificial, and inappropriate for their chronological age. Though severely handicapped students may in fact evidence progress through "bottom-up" curriculum sequences, the obvious performance discrepancies between them and their nonhandicapped chronological age-mates actually increase over time. A very real question confronting educators of severely handicapped adolescents and young adults is related to how long to retain their students in bottom-up or norm-referenced curricula. That is, given a limited number of years remaining in school programs, can the student possibly progress fast enough or far enough to acquire the skills needed for the most independent functioning possible in complex, heterogeneous post-school environments? It is often argued that curricular content for chronologically young children based upon the hypothetical stage theories of early development can be adapted to generate curricular content for older severely handicapped students.

However, until such arguments are converted into empirical demonstrations of how adolescent and young adult severely handicapped students can be taught to perform chronological age appropriate functional skills in natural environments, it seems that more intermediate alternatives are at least worthy of consideration.

Since the notion of teaching severely handicapped students chronological age appropriate functional skills in natural environments is a departure from current educational practice, perhaps each major component should be presented in more detail.

Functional skills. Functional skills, as the phrase is used here, refers to the variety of skills which are frequently demanded in natural domestic, vocational and community environments. Functional skills are not limited to performances which affect the actual survival or physical well-being of an individual; they also include the variety of skills which influence a student's ability to perform as independently and as productively as possible in home, school and community settings. Nonfunctional skills, by contrast, are those which have an extremely low probability of being required by daily activities.

Any single skill may be considered to be functional or nonfunctional depending upon the materials, teaching context, etc. For example, teaching a severely handicapped adolescent to take a quarter from a change purse, insert it in a vending machine, make a selection by pushing a panel, and then remove the purchased item from the machine is very functional. It is a skill performed several times a day by many nonhandicapped adolescents and adults. On the other hand, fitting pegs into a pegboard is relatively nonfunctional since the probability is remote that such a skill enhances the ability to live independently and since such a skill is rarely performed by nonhandicapped adolescent and adult members of society. Despite the fact that inserting a coin in a vending machine and fitting pegs into a board may include identical components (e.g., pincer grasp, controlled release, and hand-eye coordination), one skill is considered here as much more functional than the other.

Functionality is not an all-nothing or an either-or phenomenon. For example, in cribbage and other table games, nonhandicapped adults in fact put pegs in boards. The critical factor is how often the skill is actually required in natural environments and the relative extent to which performance of the skill enhances independent functioning. Teaching a severely handicapped adolescent to walk a balance beam is relatively nonfunctional in comparison to teaching the same student to walk across bleachers at a sporting event. Teaching a severely handicapped student to zip a zipper on a zipper-board is relatively nonfunctional while teaching that student to zip his own jeans is quite functional. The skills necessary to act appropriately in response to exit signs, restroom signs and vending machine cues are more functional than the skills necessary to verbally label words representing the names of the primary colors.

Natural environments. Natural environments, as the phrase is used here, refers to the variety of least restrictive environments in which a severely handicapped student is being prepared to function. These environments are important to curriculum development both as a location for training and as a source of curricular content.

There are many severely handicapped students in this country who are being taught important skills, but only in artificial or simulated environments. Included are those severely handicapped adolescents who are being taught telephone skills using a telephone that functions only between the classroom and the hallway; those who are taught to "ride" the cardboard bus in the school cafeteria; those who are being taught to tell time only on clocks made from paper plates; and those who are being taught to "grocery shop" for empty boxes in the classroom store. One major assumption underlying such training, of course, is that if a severely handicapped student is being taught to perform a functional skill in a simulated environment (e.g., a public school) he/she then will be able to perform the same skill in a natural environment. When severely handicapped students are of concern, one can have little confidence in such an inference (Stokes and Baer, 1977). Unfortunately, we cannot infer that because severely handicapped students perform important skills in simulated environments, that they will perform the same skills in natural environments. If we are to teach severely handicapped students to perform functional skills in natural environments, it is necessary either to teach skills in those natural environments or to empirically verify that the skills are, in fact, being performed in those environments (Brown, Nietupski, and Hamre-Nietupski, 1976).

Educational programs for adolescent and young adult severely handicapped students should be focused on preparation to function ultimately as independently and as productively as possible in non-school and post-school environments. Thus, it is suggested that the teaching of skills that are only appropriate, or even only primarily appropriate, in school environments should be minimized, and the teaching environments should be maximized. For severely handicapped students who are five years old and enrolled in an early education program, some of the least restrictive environments for which they should be prepared include their natural homes, regular public school programs containing nonhandicapped students, day care centers containing nonhandicapped students, and public recreation facilities. That is, it is crucial that young students be taught both the skills required in subsequent school environments and the skills necessary to function as independently as possible in their homes and neighborhoods. However, for severely handicapped adolescents and young adults, educational services should focus minimally upon the requirements of future educational environments, and should focus maximally on preparation for functioning in a variety of least restrictive domestic, vocational, and community environments.

Certainly there are crucial skill clusters that can be taught most efficiently in school settings. For example, it would be difficult to teach many chronological age appropriate social skills to severely handicapped students during school hours in nonschool settings because most nonhandicapped peers are in school. However, teaching nonhandicapped students and severely handicapped students to interact socially has at least two major purposes: a) so that acceptable social interactions might occur in school environments; and b) so that acceptable social interactions might occur in extra-school and post-school environments. Therefore, for selected purposes, schools may be viewed as natural environments for adolescent and young adult severely handicapped students. However, the older severely handicapped students become, the more natural nonschool environments become. Thus, in a preparatory context, at some point natural environments for adolescent and young adult severely handicapped students should not include schools because schools are not the environments in which severely handicapped students are being prepared to function. Since the major purpose of educational programs for severely handicapped students is to prepare them to function in nonschool or extra-school environments, the task then becomes to identify those environments and to insure that educational time and resources be invested as efficiently as possible.

The identification of future least restrictive environments has direct implications for the prioritization of particular skills within curriculum domains. For example, if an adolescent girl's projected group home location and her vocational training site are connected by public bus route, then her school experience should develop the complement of skills required to use that transit system. On the other hand, if her group home and future vocational placement are not mutually accessible by bus, the community mobility objectives should emphasis walking, street crossing, using cabs, etc. Stated another way, the particular functional skills taught to any severely handicapped adolescent or young adult should be determined in large part by the demands of his/her current and future natural environments.

Chronological age appropriate skills. Initially the assertion that severely handicapped adolescents and young adults should be taught chronological age appropriate skills using chronological age appropriate instructional materials may seem absurd. It is apparent to even the most optimistic professionals that there are a substantial number of skills that severely handicapped students will never acquire. Translating from Spanish to English, selling life insurance, and driving a bus are but a few. At the same time, however, there are many chronological age appropriate skills that severely handicapped students can indeed acquire. Eating, communicating, and turning on a television set are but a few. If one goal of education is to minimize the stigmatizing discrepancies between severely handicapped students and their nonhandicapped peers, it is our obligation to teach severely handicapped students the major functions characteristic of their chronological age, using materials and tasks which do not highlight the deficiencies in

their repertoires. For example, since young children typically play with simple wooden puzzles as a recreational activity, it is quite appropriate to teach young severely handicapped children to play with such puzzles. However, since nonhandicapped nineteen year olds rarely spend recreational time assembling a four-piece puzzle of Big Bird, it is stigmatizing to teach a severely handicapped adolescent to engage in that particular activity. Either a different leisure activity (e.g., listening to records, doing a craft) or a puzzle with more age-appropriate content (e.g., Farrah Fawcett-Majors or John Travolta) would be preferable. Since nonhandicapped adolescent and young adult students frequently make independent purchases at grocery stores, department stores and drug stores, shopping skills should receive considerable attention in a curriculum for severely handicapped adolescent and young adults. Even though teaching may be relatively prolonged and prosthetics may be used, it is imperative that severely handicapped students receive instruction on these major life skills. The requirements that curricular content for severely handicapped adolescents and young adults be functional and be developed from natural environments are insufficient if the skills being taught are not as chronological age appropriate as possible.

The remainder of this paper presents an empirical strategy for generating curricular content for severely handicapped adolescents and young adults which emphasizes the teaching of functional and chronological age appropriate skills in natural environments. There is a fundamental difference between the curriculum development strategy presented here and what is generally referred to as a curriculum sequence. This "strategy" is a series of suggested actions in which a teacher might engage in order to determine curricular content for the particular individuals in his/her classroom. This curriculum development strategy will not produce a fixed curriculum sequence but rather will identify major skills individual students must acquire in order to function as independently and as productively as possible in post school years.

Assumptions of the Curriculum Development Strategy

The curriculum development strategy delineated below is based upon three major assumptions. First, adolescent and young adult severely handicapped students should be prepared to function as independently and as productively as possible in a wide variety of "least restrictive" community environments (Brown, Wilcox, Sontag, Vincent, Dodd, and Gruenewald, 1977). Second, it cannot be inferred that because adolescent and young adult severely handicapped students have been taught to perform skills in schools and other simulated settings they will functionally use those skills in other environments. Thus, it is necessary to teach as many skills as possible in as many natural extra-school environments as are appropriate (Brown, Nietupski, and Hamre-Nietupski, 1976). Third, the phrase "severely handicapped" represents students with a wide

variety of performance characteristics and ultimate capabilities. Thus, curriculum development strategies and resulting content should be sufficiently flexible so that the full range of severely handicapped students can receive appropriate localized and individualized educational services.

Figure 1 contains an overview of the phases of the proposed curriculum development strategy. Each phase will be discussed in more detail below.

Insert Figure 1 about here

Phase 1: Delineate Curriculum Domains

The first step in the curriculum development strategy is to delineate topics of major instructional concern. The phrase "curriculum domain" is used here to describe the first of several steps that can be made toward dividing the total life space of a student into non-mutually exclusive, admittedly arbitrary, but perhaps more manageable units. Obviously, there are as many possible curriculum domains as there are domain makers. However, our focus will be on four major life areas. The curriculum domains we propose for adolescent and young adult severely handicapped students represent a significant departure from traditional curriculum divisions. For nonhandicapped students, curricular content is typically partitioned into major academic subject areas such as reading, math, language arts, social studies and physical education. For some handicapped students these same divisions may hold, while for severely handicapped students curricula are usually organized around basic skill areas such as communicative, cognitive, social, gross and fine motor, and self-help skill development. This latter curricular orientation reflects a bottom-up approach to skill building. Consistent with the view that the education of severely handicapped adolescents and young adults should be referenced against the requirements of relatively independent adult functioning, it is proposed here that curricular content can be organized into domains or divisions such as domestic living, vocational, leisure/recreational, and community functioning. This organization is designed to emphasize a "top-down" rather than a "bottom-up" orientation.

All severely handicapped students in our society, regardless of individual functioning levels, will function in some type of post-school domestic environment, whether it be a natural home, foster home, group home, or supervised apartment. Similarly, all severely handicapped students have the right to a longitudinal, systematic and comprehensive vocational training program that is designed to maximize the probability that they will be able to engage in some form and degree of remunerative work. In order to make more productive use of their free time, all severely handicapped students should be taught to engage in a variety of individual and group

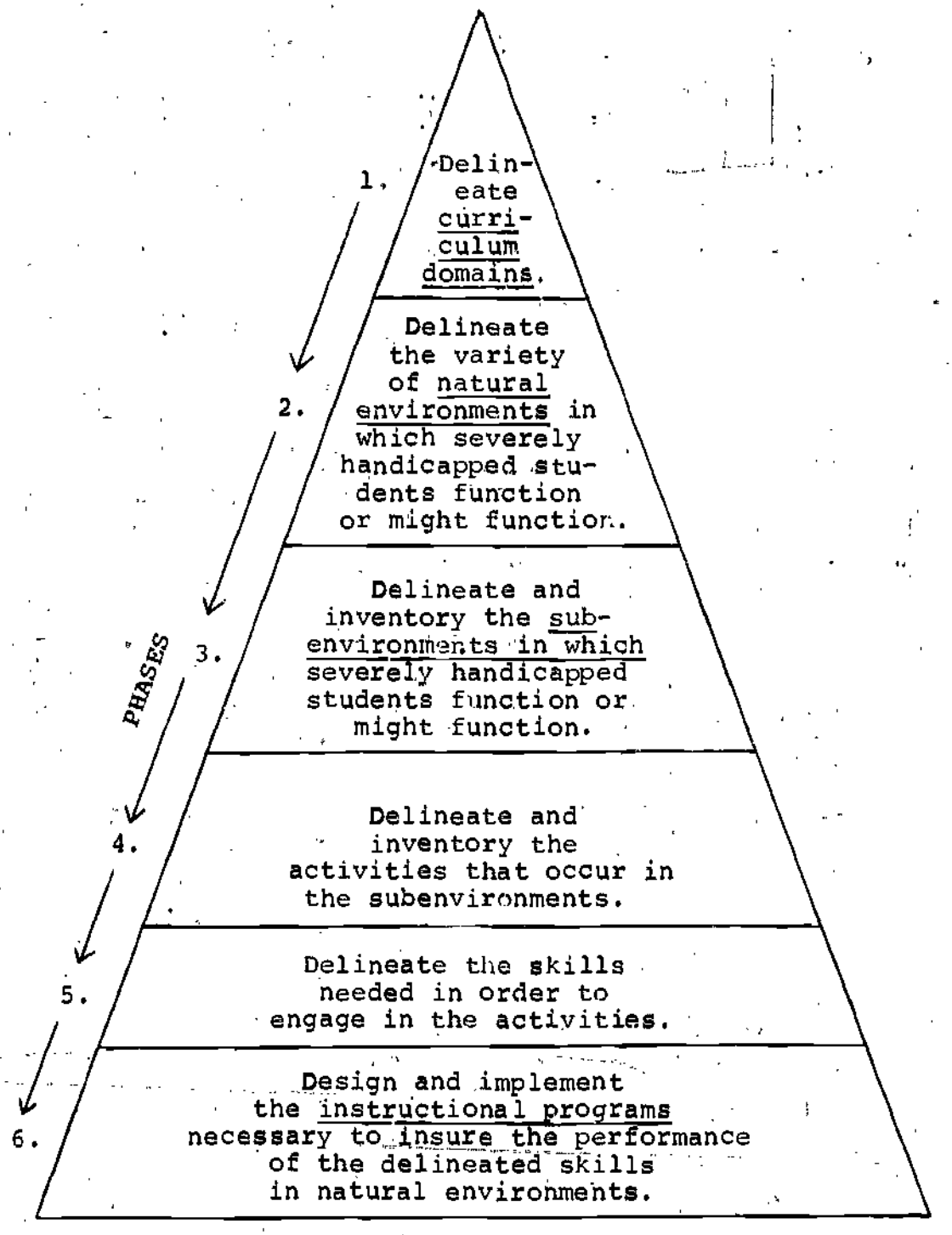


Figure 1. A strategy for developing chronological age appropriate and functional curricular content for severely handicapped adolescents and young adults.

leisure and recreational activities. All severely handicapped students will function in at least some community environment. To be maximally effective, they must be taught the skills and provided the experiences necessary to allow them to travel through that community and to access its resources. These and other equally relevant curriculum domains reflect the major life demands of nonhandicapped adults and therefore serve to organize instructional objectives for adolescent and young adult severely handicapped students.

Phase 2: Delineate the Variety of Natural Environments in Which Severely Handicapped Students Function or Might Function

The purpose of this phase of the curriculum development strategy is to delineate the environments in which severely handicapped students are currently functioning, and the least restrictive environments in which they might function in the future. The term "environment" refers to the places in which severely handicapped students live, work, and play. Using the domestic living domain as an example, adolescent severely handicapped students might currently be living at home with their natural parents. However, it is a reasonable educational objective to attempt to plan with and prepare the parents, the severely handicapped students, and other persons in the community for the day when the students will reside in a different kind of living arrangement. Therefore, the environments that might be delineated are the homes of the parents of the students, group homes, sheltered apartments, etc.

Since specific domestic, vocational or recreational skills could be performed in a variety of different environments, the task here becomes that of simply listing those environments. It is important that the listing not be limited to those environments in which a student already functions. Every effort should be made to identify all possible environments where domestic, vocational or recreational activities could occur. Unfortunately, there are many severely handicapped students who are unduly confined to very circumscribed environments. These students are deprived of access to many other potentially appropriate places and experiences in the community. To increase the number of natural community environments in which adolescent and young severely handicapped students function is certainly a reasonable educational objective.

Phase 3: Delineate and Inventory the Subenvironments in Which Severely Handicapped Students Function or Might Function

Each environment in which severely handicapped students function or in which they might function in the future can be divided into subenvironments. For example, a home can be divided into a bathroom, a bedroom, a dining room, a living room, etc. A vocational environment can probably be divided into work space, eating space, a social area, restrooms, etc. The purpose of this phase of the curriculum development strategy is to delineate and inventory all the component environments or subenvironments in which the student will

be expected to function. Again, every effort should be made to identify all the subenvironments in which nonhandicapped adults normally operate.

Phase 4: Delineate and Inventory the Activities That Occur in the Subenvironments

For every subenvironment in which a severely handicapped student currently functions or might be expected to function, there are a variety of activities that might occur. For example, some of the activities that are appropriate for a bathroom are toileting, cleaning the sink, folding towels, shaving, showering and tooth brushing. In a community drug store, appropriate activities might include picking up a prescription or purchasing grooming items. The purpose of this phase of the curriculum development strategy is to delineate and to inventory the many different activities that are appropriate for each subenvironment identified in Phase 3.

Phase 5: Delineate the Skills Needed in Order to Engage in the Activities

Once activities appropriate to various subenvironments have been delineated, a major issue then becomes: "Can a particular severely handicapped student perform the specific skills necessary to engage in part or all of a particular activity?" The objective of this phase of the curriculum development strategy is to delineate the skills needed by both severely handicapped students and by other persons who function in the subenvironments so that the severely handicapped students participate at least to some degree in at least some of the activities identified. It should be emphasized that even if a severely handicapped student is not capable of engaging in a particular activity independently, he/she should not be denied the opportunity for partial participation. For example, if a severely handicapped student cannot acquire the skills necessary to assemble a particular item in a sheltered workshop, that task might be divided into components so that the severely handicapped students can complete at least part of the task successfully. Additionally, even though a specific severely handicapped student may not be able to develop the skills necessary to toilet himself/herself independently in a public restroom, the activity should be adapted so that skills necessary to participate in at least some parts of the process can be acquired and performed. Efforts should be made here to precisely describe the language, reading, math, motor, social, etc., skills needed to engage in each delineated activity. (The reader interested in one way to arrive at such a skill delineation is referred to Belmore and Brown, 1976.) Plans can then be made to teach the skills of concern or to develop functional alternatives by arranging for performance adaptations and/or appropriate prosthetic devices.

Phase 6: Design and Implement the Instructional Programs Necessary to Insure the Performance of the Delineated Skills in Natural Environments

Once the skills that are necessary for involvement in a parti-

cular activity are determined, a severely handicapped student must then be taught to perform those skills. The purpose of this phase of the curriculum development strategy is to design and implement the instructional programs necessary to teach severely handicapped students and others to perform as many of the skills delineated as possible in as many natural community environments as possible. (The reader interested in one version of what is referred to as an instructional program for severely handicapped students is referred to Williams, Brown and Certo, 1975.)

Discussion

If this curriculum development strategy is implemented, it will become apparent that the closer severely handicapped students come to the end of their school experience, the less time they should spend on school ground and the more time they should spend in the variety of nonschool environments in which they will function upon completion of school. For example, while younger severely handicapped students might secure basic skills from a "Home Economics" room in a school, this same simulation strategy for many adolescent and young adult severely handicapped students will be inappropriate. Attempts should be made instead to provide direct instruction in real homes, in real group homes, or other real domestic settings. Additionally, while some part of a student's vocational training experience might consist of performing simulated tasks in a simulated public school workshop, the older the student becomes the greater is the need to provide direct vocational instruction in the natural vocational environments in which the student might function; e.g., real dishwashing settings, real maintenance environments, real workshops.

Finally, the implementation of this curriculum development strategy will require substantial changes in educational programs serving severely handicapped adolescents and young adults. Obviously, traditional curricular content and service delivery models will have to be scrutinized carefully and changed as the need for teaching chronological age appropriate functional skills in natural environments is recognized.

Lou Brown, Ph.D.
Department of Special Education
Univeristy of Wisconsin-Madison
Madison, Wisconsin 53706

References

Belmore, K. & Brown, L. A job skill inventory strategy for use in a public school vocational training program for severely handicapped potential workers. In L. Brown, N. Certo, K. Belmore & T. Crowner (eds.), Papers and programs related to public school services for secondary age severely handicapped students (Vol. VI, Part 1). Madison, WI: Madison Metropolitan School District, 1976, 143-219.

Brown, L., Nietupski, J. & Hamre-Nietupski, S. The criterion of ultimate functioning and public school services for severely handicapped students. In L. Brown, N. Certo, K. Belmore & T. Crowner (eds.), Papers and programs related to public school services for secondary age severely handicapped students (Vol. VI, Part 1). Madison, WI: Madison Metropolitan School District, 1976, 1-12.

Brown, L., Wilcox, B., Sontag, E., Vincent, B., Dodd, N. & Gruenwald, L. Toward the realization of the least restrictive educational environments for severely handicapped students. In L. Brown, J. Nietupski, S. Lyon, S. Hamre-Nietupski, T. Crowner & L. Gruenewald (eds.). Curricular strategies for teaching functional object use, nonverbal communication, problem solving, and mealtime skills to severely handicapped students (Vol. VII, Part 1). Madison, WI: Madison Metropolitan School District, 1977, 1-13.

Stokes, T. & Baer, D.M. An implicit technology of generalization. Journal of Applied Behavior Analysis, 1977, 10, 349-367.

Williams, W., Brown, L., & Certo, N. Basic components of instructional programs. In L. Brown, T. Crowner & R. York (eds.), Madison's alternative for zero exclusion: A book of readings (Vol. V). Madison, WI: Madison Public Schools, 1975, 8-28.

This paper was supported in part by Grant No. G007501004 to the University of Wisconsin-Madison from the Bureau of Education for the Handicapped, Division of Personnel Preparation; in part by Grant No. G0078019740 to the Univeristy of Wisconsin-Madison from the Bureau of Education for the Handicapped, Division of Personnel Preparation, and in part by Contract No. 300-78-0345 to the University of Wisconsin-Madison and the Madison Metropolitan School District from the Department of HEW, USOE, Bureau of Education for the Handicapped, Division of Innovation and Development, Washington, D.C.

This paper was previously published in the Journal of Special Education, 1979, 13, 81-90.
Office of Publication: 111 Fifth Avenue, New York, NY 10003
Editorial Office: 1950 Street Road, Bensalem, PA 19020

THE LOWER FUNCTIONING SEVERELY HANDICAPPED INDIVIDUAL: PROVIDING WORK SKILLS TRAINING DURING THE EDUCATIONAL YEARS

Gretchen Stone

One of the most timely issues parents, educators and rehabilitation personnel alike face when working with a severely handicapped population is whether or not a student has "vocational potential". It might be more accurate to ask, "Will the student fit into our established and traditional system of resources for residential and work placement? If so, how, where, and when?".

Is there a magic age for evaluating "vocational potential"? Which evaluators and what evaluations are appropriate? What happens to those students who do not have a place in the vocational system? Whose responsibility is it to create an alternative place? Parents are surely involved; but how far are others obligated and willing to aid in this process? Educators, education agencies and administrators; governmental departments such as Department of Human Resources, Department of Mental Health and Mental Retardation, Texas Rehabilitation Commission, Commission for the Blind, Housing and Urban Development, Texas Commission for the Deaf; and private rehabilitation and educational facilities all have a responsibility. That responsibility includes the willingness to listen to understand the needs and problems, and to be willing to break through the protective barrier called eligibility criteria.

For the deaf-blind population at least, sincere attempts have been made on a state and national level to draw together various agencies and professionals to discuss the problem of future placement. The results are discouraging: rehabilitation agencies have a ppor understanding of the level of functioning of some of the more disabled students. In some cases, parents and educators have been misled into thinking that rehabilitation agencies will serve their children in the future, when in fact, they will not. These agencies at present have neigher the resources nor the expertise to provide vocational services for the significantly lower functioning severely handicapped individual. The following suggestions are made for both educators and rehabilitation agency personnel in working with the more severely handicapped individuals.

1. Work activities should involve work materials. Bead stringing and stacking rings are fine classroom activities, but they are also used for play. Stringing ID cards onto packaging strips and placing large washers on a jig could be alternative activities utilizing similar skills.

2. Activities should be short (initially one minute or less). The length of activities may increase

to five minutes or perhaps longer; however, three 5-minute activities are more effective than one 15-minute activity. As programming continues and the child's tolerance increases, the number and duration of activities can be increased.

3. Although work materials should be authentic, they can also be selected to appeal to the individual interests of the child. Some children enjoy shiny metal objects, some the feel of smooth wood; some like to mash or manipulate, while others prefer materials with bright colors for visual effects. Materials should be inherently interesting to the child.

4. Work activities should occur in special designated places at regular times. The child should anticipate the work environment and the instructor should expect good work behaviors. While in the work environment, added gimmicks such as work aprons and textured chairs may help.

5. Accurate recordkeeping is a must. Records should include: a description of the task, number of trials and dates on which they occur, instructional vs. behavioral prompts on each trial (physical, gestural, or verbal), and the number of errors and time for each trial.

6. One-to-one instruction with the same person is optimal.

7. Teach skills by presenting activities in clusters. Ten activities using different materials to teach the same skill will help prevent "training" that does not generalize.

8. Activities should have a clearly defined beginning and end.

9. The end product should not be the most important consideration during the learning process. Good work behavior and increased involvement in the activity are measures of success.

10. Activities should be developmentally appropriate perceptually, cognitively, and motorically. Isolated work job samples drawn from sheltered workshops rarely provide the finely-graded clusters of activities needed to teach a skill.

11. Teachers and parents should trust themselves to be

creative and sensitive to the needs of the child. Dependence on structured prevocational curricula is often of limited use.

12. Start early. Vocational potential is developmental, just as visual, auditory, and motor skills are developmental. If a child has at least palmar grasp and can maintain (with support if necessary) a posture stable enough to fixate his or her attention, 4 years old is not too young to begin training. If an individual is older and has these abilities, training should still be provided.

13. Paperwork should be a help rather than a hinderance. Evaluations and individual educational plans should be an ongoing process. They should help determine where the child is now, and what comes next in his or her learning process.

14. Work skills are the result of cognitive-perceptual motor functions. During the learning process, tasks (work jobs) are not viewed as measurable end products as much as vehicles for providing developmental experiences. When a child in a classroom stacks rings correctly, the joy and sense of achievement the student and teacher feel is not because a correctly stacked pile of rings is present, but rather because the child demonstrated that he or she had acquired the size discrimination and motor and spatial abilities underlying the task.

Work skills that low functioning students can learn are:

1. Becoming physically and socially oriented to a work environment and internalizing a routine within that environment.

2. Sustaining work effort by demonstrating a consistent degree of speed/response rate and accuracy, attentativeness, and independence.

3. Demonstrating an understanding of task start and completion and following sequences in a work activity (usually taught by manipulation).

4. More advanced grasp and prehension patterns.

5. Fine motor planning and the desire to manipulate objects.

6. Matching by single attributes.

7. Positioning objects in space and basic directional discriminations (top from bottom, etc.).

8. Following directions and communicating needs in a workshop setting (including communicating toileting needs, following natural gestures, following pointing gestures).

There is a future for the lower functioning severely handicapped population, but not necessarily through traditional educational or rehabilitation services. Eventual placement may include private or Department of Mental Health and Mental Retardation sponsored day activity or work activity centers or residential farms, even though these are very scarce at this time.

It is the right of every severely handicapped child to have an appropriate place in which to live and occupy his or her time as an adult. It is also his or her right to be prepared for an opportunity that really does exist; an opportunity that, at the very least, enables him or her to maintain the skills acquired during the educational years--regardless of how limited those skills may be.

Gretchen Stone, OTR, M.Ed.
4310 Avenue H
Austin, Texas 78751

CAREER DEVELOPMENT NEEDS OF STUDENTS WHO ARE MULTI-HANDICAPPED

Frank Simpson

In program planning to meet the career development needs of students who are multihandicapped, the professional staff and student's family need to consider the many roles and positions that the student will occupy during his/her lifetime. Some students may eventually be involved in a paid work experience, while others may not. This will depend not only on the student's personal assets; but also on the availability of sheltered work experiences, transporation services, protective living environments, supportive social and psychological services, and appropriate recreational options.

Rather than viewing the prevocational needs of the students with whom we work, we need to consider all career development needs. The word prevocational implies that a vocation with pay will follow. This can be misleading. Vocations, like careers, can vary.

Brolin (1979) emphasizes the need to recognize the many roles that constitute one's total career pattern -- occupational, social, leisure, and interpersonal. If a student's occupational options are limited due to multiple disabilities and the environmental constraints, then programs to enhance the quality of leisure time experiences, family involvement, and social interaction become even more important.

Teachers and parents should not become discouraged when the outlook for highly paid employment for the student appears remote. Remember the goal is to prepare each student to maximize his/her potential and achieve the most meaningful existence possible. Employment is but one aspect of the future.

Rosen, Clark, and Kivitz indicate that the most serious deficit of the mentally retarded is their social inadequacy. Deficits related to social inadequacy are more limiting than their educational and vocational limitations. Without some degree of social competency, other long-term habilitation goals cannot be achieved.

When designing career development programs, emphasis must be placed on infusing activities to improve social competency. This does not always happen when staff initiate a prevocational program for students who have multi-disabilities, especially those who are labelled low-functioning. Conditioning students to complete simple to complex assemblies in a simulated work environment is but one aspect of a career development program. With most students, this is the easiest aspect of the program plan. Marc Gold has demonstrated that by using a systematic task analysis approach

("Try Another Way") severely handicapped persons can master complex tasks. Gold also emphasizes that vocational skill acquisition is but one aspect of a total habilitation process.

As we design a series of simulated work experiences, a parallel hierarchy of social experiences must be included. While we are "building in" (or conditioning) a series of assembly, sorting, and packaging skills using work samples, we can be developing a repetoire of appropriate social responses.

To use work-related jargon, social competency often means "work habits", and conditioned hand (motor) patterns approximate "work skills". Special educators and parents frequently focus on the development of social competence in a variety of activities around the school and home. Prevocational and career development activities are other tools aimed at accomplishing the same goal.

Social habilitation programs must simulate as closely as possible the environment in which the student will eventually live (Rosen, 1977). Likewise, career development activities should simulate as much as possible the likely future occupational options. Using this approach, the teacher may consider developing as many activities as possible that simulate the "world of work". All of this depends on the unique needs and abilities of each student.

At the New York Institute for the Education of the Blind, as well as other facilities, students who are multihandicapped respond positively to a structured environment that simulates a sheltered workshop or work activities center. This prepared environment provides a sense of security and a comfortable structure. Success experiences are more frequent for many students in this environment than those in other stressful "educational" activities. If the environment is not threatening, the student has more emotional energy to focus on the structured interpersonal interactions with staff and peers provided in this setting.

Each student will be capable of tolerating the stress of work pressure at his/her own rate. "Stress" activities can be programmed for by using a task analysis approach. Types of "stress" activities to plan for in this prepared environment might be (1) change in work station; (2) change in work activity; (3) change in waiting time; or (4) change in instructor. In most cases, it is recommended to introduce only one "stress" at a time.

The types of activities included in a simulated work environment should vary depending on student needs and potential future occupational options available in the local community. Likewise, activities that relate to future housing options, transportation options, and recreation options must be developed parallel to activities related to future occupational options.

When planning a simulated work environment, remember the importance of including activities to develop work habits. The

simulated work environment should be separate from the general classroom, preferably in a different building. This provides a natural, appropriate experience in mobility. The students will need to prepare to get their coats, hats, or boots depending on the weather. If they are not yet capable of independently moving to the work environment, they can learn to travel with a sighted guide. Of course this takes a lot of time, but remember the program is designed to develop the student's potential, not for the convenience of the staff.

Once the students arrive at the work environment and remove their coats, they should "punch-in". Punching-in may vary; if an actual time clock is available, use it. If not, a sign-in sheet is also a possibility. For students who are more severely disabled, putting on a work poncho or work necklace can symbolize "punching-in". It is really a signal to the students that they are moving into the work environment. This signal is a physical cue to assist the students into a shift or change.

Next, the students should pick up a token container and move to their work stations. Initially, the goal is to have the students pick up any container (jar, small box, small purse, etc.). Later, they can be taught to discriminate their own container from the other containers.

The work station can be an individual table or a specific seat at a large table. This can initially be a matching activity; the students are given a completed work assembly (i.e., bicycle brake, flashlight, nut and bolt, etc.) and instructed to locate the same at a work station. Later, as the students learn (internalize) the location of their own work station, this becomes an automatic response.

Once the students are at the work station, the type of activity presented and the teaching methodology will vary greatly. The sequence of activities will depend on the creativity of the staff. Usually, a teaching phase for each activity is needed. The goal in the simulated work environment should not be just to develop production speed and accuracy. It is a natural environment for the development of work-related language and counting skills.

This setting can foster social interaction through structured group work projects. Children go through parallel play prior to cooperative play. In a simulated work environment, opportunities for "parallel work" prior to "cooperative (group) work" should be provided. A student may initially work cooperatively with a staff member. For example, the staff member can complete the initial four steps of an assembly with the student completing the final step five. (This is really backward chaining.) Later, two students can "work" together on this type of process.

Built into these activities can be the need to contact a staff person for more materials. Give only a few pieces for each assembly

and teach the students to raise their hand to indicate a need for more materials. This is only one of many work habits that can be patterned into a "work routine". This type setting is excellent for teaching students to make concrete choices. Efforts should be exerted to develop as much independence as is possible for each student in this work environment.

A token system can be readily used in a simulated work environment. Use of such a system needs to be caught (or conditioned). As each work activity is completed the students are given a token for their token container. They will later begin to attach meaning to this signal when they exchange the token for a reward (maybe food or a special toy). The amount of delay in gratification will depend on each student.

When the students finish their activities, they should "punch out" at the time clock, and remove their work poncho. This is the signal for a shift. Now the opportunity again exists to practice travelling back to the classroom or dormitory.

Evaluation instruments are usually developed by each program. Developing the instrument (which is usually a check list) is a good learning experience for the staff and parents. It is important to review evaluation instruments used by rehabilitation centers and sheltered workshops in the local community. Be sure you are evaluating similar work habits (social competencies) and work skills. Three evaluation instruments that may prove helpful in getting started are the following:

1. "An Education-Training Guide to Pre-Vocational Skills for Deaf-Blind Persons", T. Lockett, ed., Midwest Regional Center for Services to Deaf-Blind Children, P. O. Box 30008, Lansing, Michigan 48909.

2. Volume III, Vocational Skills Evaluation, Massachusetts Center for Program Development and Evaluation.

3. "P.A.C.G. Inventory", Mithaug, Mar, and Stewart (1978), Published by: Exceptional Education, P. O. Box 15308, Seattle, Washington 98115.

Several factors often determine the type of career development program you can realistically provide. The first consideration must be each student's needs. Other important factors are (1) number of students to be served; (2) availability of staff; (3) homogeneity of the student group; (4) family involvement; (5) support services available (i.e., mobility instruction, occupational therapy, physical therapy, rehabilitation counseling, etc.); (6) availability of space; and (7) availability of funds.

Use families, students, available support service personnel and community-based rehabilitation personnel in program planning

and implementation. A team approach produces the best program. When family and community personnel are given an opportunity to provide input, their committment to support the program is greater. During the development phase a prime opportunity exists to begin making community contacts that become even more vital as the students approach adulthood.

The family and community-based personnel should be involved in program planning for all aspects of career development. If an independent living experience area is being planned, involve personnel from local group homes. Use the rehabilitation teachers and mobility instructors from the local Office of Vocational Rehabilitation. Have as many of these personnel as possible attend student staffings and conferences. By initiating these contacts, close working relationships can develop.

You can begin to determine the types of habilitation services these agencies and personnel may provide for the adult who has multiple disabilities. Contact a variety of agencies. Although some agencies maintain separation by disability, the trend is to organize around commonly shared service needs.

Heightened staff, family, and community awareness of the needs of persons who will require a lifetime network of support services is important. We need to explore our attitudes. Are we willing to take on new roles as a part or our career? We should be aware of strategies needed to develop this network of services. It is time consuming but critical, if many of our students are to make the shift from appropriate educational programs to appropriate adult service programs.

References

Brolin, D.E., & D'Alonzo, B.J. Critical issues in career education for handicapped students. Exceptional Children, 1979, 45, 246-53.

Rosen, Clark, & Kivitz, (eds.). Habilitation of the handicapped. Baltimore, MD: University Park Press, 1977.

Frank Simpson
The New York Institute for the
Education of the Blind
999 Pelham Parkway
Bronx, New York 10469

A PRE-VOCATIONAL RESOURCE ROOM: A PROGRAM MODEL FOR SEVERELY HANDICAPPED STUDENTS

Betsy McGinnity

Prevocational training for the severely handicapped is a difficult topic to address in a definitive manner. Therefore, this paper will address that topic by describing one program model, the Prevocational Resource Room at the Charles V. Hogan Regional Center, which is a state residential facility for the mentally retarded in Hathorne, Massachusetts. In keeping with state and federal mandates, deinstitutionalization is a primary goal for the facility; over the past five years many clients have moved into the community. The majority of students who remain in the institution are multiply handicapped. Thirty-seven of these students are currently participating in the prevocational resource room program which opened in September 1978.

While all of the students involved in the program can be considered severely handicapped, they do not fit neatly at any one functional level. Their multiple handicapping conditions include mental retardation, deafness, and/or blindness, seizure disorders, emotional disturbance, behavior disorders, and various physical and medical problems. The primary issue that unites these students is their common need for long term appropriate services.

"Appropriate services" can be defined as some type of community residence, i.e., modified group home or supervised apartment, a day program, i.e., sheltered workshop, work activity center, day activity center, and structured supervised leisure time programs. It is acknowledged that these students will always require a great deal of supervision, will need the financial support of supplemental security income (SSI) and medicaid, and some level of therapeutic and medical support.

The individual goals and objectives developed for these students are all geared toward these projections. Their broad education programs are designed to develop the student's skills in a variety of need areas: Activities of Daily Living, Fine/Gross Motor, Communication, Emotional Stability, Leisure Time, etc. Prevocational training is one component of a total program designed to enhance their potential for successful placement in long term community residential and vocational settings.

The resource room is intended to offer what seems to be a critical transition from classroom to day/work activity center. The room design, accessibility of materials, noise level and general degree of distractors simulates an activity center environment. Students come routinely to the program with their classes and regular teaching staff. Classroom teaching techniques, behavior management programs, and reinforcement systems are imple-

mented within this program. The fundamental goal for each student is to have the opportunity to utilize and generalize classroom skills and behaviors in an environment which is markedly different from the classroom.

The average staff: student ratio is 1:2. Classroom programs average 5-6 students. Often 2 to 3 classes share the resource room simultaneously so that potentially 15-18 students with accompanying staff will be in the room at one time.

With respect to a time frame, the students spend from 15 minutes to 2 hours a day in the prevocational resource room. By design, a student enters the program as soon as readiness permits and gradually increases the amount of time in the program so that he/she would be spending 1-2 days in this program before transferring into a day/work activity center.

There are no specific entry criteria for this program. All of our students evidence some level of fine/gross motor ability, i.e., grasp and release with minimal assistance, attending skills, head control with/without adaptive equipment. Other factors and variables are difficult to categorize specifically but basically our students have developed beyond a level one would expect to find in a basic sensory stimulation program.

While in the prevocational resource room program the students are variously introduced to and/or engaged in a number of work activities. Briefly, any activity designed to teach a basic skill through age appropriate materials can be considered prevocational training. A wide variety of trays, boxes, containers and miscellaneous content items are utilized to teach grasp, release, put in and take out skills. Size, weight of materials, level of manipulative difficulty and work plan are varied to maximize the potential to generalize these basic skills. Specifically in working on a "put in" and "fill up" activity, they may be putting metal buttons in a plastic tube, tubes of toothpaste in boxes, cards in a library file, or crayons into a plastic bag.

Students also work on opening and closing skills. Materials employed for this skill include covered boxes, taped cartons, envelopes, jars, sealed plastic bags and items with caps.

Turning is another fundamental skill necessary for many work activities. Various sizes of stabilized nuts and bolts, and jars and tops, are utilized to work on this skill.

Practice items and work trays have been developed targeting each of these basic skills. In addition to the basic fine motor skill, attending behaviors and work flow continuance are crucial elements of these activities. It should be noted that initially antithetical skills like put in/take out are taught in isolation and with different materials thereby lessening the work flow confusion.

Simple assemblies are the first step toward integrating basic skills. By setting up three boxes, one with caps, one with bases, and the third for the assembled product, a basic "put on" skill becomes a simple assembly. Sorting skills and bilateral coordination are vital elements in this assembly. Assemblies can include syringe covers and bases, film caps and bases, erasers on pencils, ball point pens, flashlights, and sillcocks. Use of elementary hand tools can be included for students with a higher level of skill sophistication.

Stuffing envelopes, folding paper and other items, collating, and the use of office type instruments such as staplers and paper clips, are work functions included in the prevocational resource room. Items such as clamps, clothespins, cardboard jigs, tape, and styrofoam are used as necessary to adapt work activities according to the physical demands of our students.

Packaging is a central work action for our program. The final product distinguishes this activity from a simple "put in" task. The necessity of producing a defined product such as 4 items in a sealed bag lends a structure to a total work activity and forces integration of many basic skills. To this end we produce packages for a local recycle center. These items, a button package, a crayon package and an attribute set are then distributed to preschool teachers. We receive all necessary materials from the recycle center and the packaged products are returned to the center for distribution. We also produce packages for a special needs program in a Boston public school. This particular program has a token economy system; we generate products for their store.

We also received funds from a community service club to buy cosmetic-type items like toothbrushes, soap, and combs which were assembled and packaged in gift boxes and distributed to residents of area group homes at the holiday season. This project created six weeks of solid, viable work activity and encompassed a wide variety of work skills: assembling boxes, wrapping items in tissue, sorting and collecting items, and filling and sealing boxes.

By simulating subcontract experiences we have been able to identify a number of work skills which were not previously addressed in our basic skills area. Often by giving the student the opportunity to work at an involved work activity we can assess his/her skills and deficits more efficiently than with any existing assessment scale. In addition, the simulated subcontract provides ongoing activity and job variation.

In summary, the prevocational resource room program was developed specifically to accommodate the unique needs of the severely handicapped and to ease the transition from the traditional classroom setting to the activity center environment.

Prevocational training is deemed an essential component of a total program designed to prepare our severely handicapped students to function as self-sufficiently as possible within the least restrictive living and working environments available to them.

Suggested Readings

Bellamy, C.T., Inman, D.P., & Schwarz, R.H. Vocational training and production supervision: a review of habilitation techniques for the severely and profoundly retarded. Portland, OR: University of Oregon, 97201

Guldager, L. Life-time program for deaf-blind and other multiply-handicapped persons. Journal of Visual Impairment and Blindness, 1978, 72, 287-289.

Hagmeier, L.D., Greene, E.L., & Peterson, B.C. Prevocational stepping-stones for deaf-blind persons. Seattle, WA: Northwest Regional Center for Deaf-Blind Children, 1975.

Majors, M.M., Birge, B., & Walker, M.L. Skill tasks: handbook of prevocational activities. Watertown, MA: New England Regional Center for Services to Deaf-Blind Children, 1978.

Betsy McGinnity, M.Ed
Prevocational Resource Room Specialist
Charles V. Hogan Regional Center
P. O. Box A
Hathorne, MA 01937

PUBLIC SCHOOL SPONSORED COMMUNITY BASED WORK TRAINING PROGRAMS FOR DEAF-BLIND ADOLESCENTS

Dennis R. Dildy

Introduction

In 1973, Congress mandated the investigation of independent living needs for severely disabled persons through the Rehabilitation Service Administration. The authority for this activity is contained in Section 130 of the Rehabilitation Act of 1973 (P.L. 93-112).

The rehabilitation program authorized by Congress and administered through a variety of service providing agencies, including the public school system, has provided many needed services to the disabled in the United States. However, many severely disabled persons of school age, approaching adulthood, have failed to receive the type of service which would enable them to live more independently as well as to be fully employed, be it in a sheltered workshop or in competitive industry and business. Deaf-blind adolescents are a prime example of such severely handicapped persons.

In an attempt to develop as much as feasible the employability and independent living skills of deaf-blind adolescents in the public schools, Region XX Education Service Center in San Antonio, Texas, applied for and received an ESEA Title VI-C model grant for providing community based work training and independent living training to an identified number of adolescents in need of transitional training.

Based upon minimum entrance criteria (see appendix) to distinguish students who would best benefit and be work-ready within the developed intent of the community based program, 12 of an original 20 students in the Region XX area were selected for a variety of program options.

The program content consisted of the following services:

1. Screen all age appropriate deaf-blind adolescents to determine eligibility based upon the 15 required entrance criteria, including assisting local school districts in registering the students as deaf-blind with the Texas Education Agency.

2. Assist established school district deaf-blind prevocational programs by conducting work sample evaluation of students on campus.

3. Place appropriate deaf-blind adolescents off-campus into sheltered workshops based on work evaluations.

4. Conduct weekends of away-from-home group living situations to enhance independent living skills.

5. Conduct parent workshops for families of deaf-blind adolescents, with programming aimed to meet their needs.

6. Coordinate training of deaf-blind adolescents off-campus in sheltered workshops.

7. Train students to use the city-wide bus transportation system.

8. Place students in long term job training situations; both sheltered settings and, when possible, in the private employment setting.

9. Give feedback to public schools on strengths and needs of their students.

In summary, the proposed program approach is as follows:

The prevocational trainer will assess work skills of enrolled students both on and off campus and initiate, coordinate, and provide work training through a variety of systems and community based agencies. Local school staff will receive appropriate staff development for improving prevocational services to deaf-blind adolescents. Six parent meetings for parents of prevocational age students will be conducted to assist parents in terms of affective development, and to seek realistic expectations on their part with regard to their children.

Perspective on Program Bias

Dr. Lou Brown, from the University of Wisconsin (Madison Campus) and who is connected with educational programming for severely handicapped adolescents in the Madison Public School District, was a key philosophical and experienced advisor to the project staff.

The position papers of Dr. Brown (Brown et al., 1976, 1977, 1976, Gilhool and Stutman, in press, and Williams, Brown and Certo, 1975.) served as a summary of the bias of this particular program in approaching the training of deaf-blind adolescents for independence and employment.

Number one bias is to pursue as normal a work training situation and as full an independent living situation as possible, based upon the individual needs of the students served.

Number two bias is that one cannot assume whatever previous training has been done in the public school situation will necessarily transfer to the "outside" situation.

Number three bias that many parents and professionals are either ill-trained or over-protective and do not allow full independence seeking on the part of the severely handicapped student.

Number four bias is that there are few community resources being used for facilitation of independent living on a coordinated basis.

Number five bias is that most schools continue to serve severely handicapped students in self-contained settings until they are past school age. Then they sit at home doing nothing, or they eventually become institutionalized.

This program was set up to truly seek employability and independence for those previously unlikely to receive such opportunities.

Identification of Program Resources

The following agencies were willing to cooperate in this project's stated efforts:

1. Independent School Districts
2. Texas Commission for the Blind
3. Mental Health-Mental Retardation Workshops
4. Goodwill Industries
5. Easter Seal Society
6. Texas Department of Human Resources
7. VIA-Handilift Transportation System
8. Texas Rehabilitation Commission
9. Texas Commission for the Deaf
10. Regional Day Schools for the Deaf
11. Private Industries
12. Consumer Groups
    a. Insight (blind)
    b. Texas Council for the Deaf
    c. Society for Retarded Persons
    d. Coalition of Texans with Disabilities

An informal advisory board consisting of parents, professionals, and adult disabled persons representing the deaf, blind and deaf-

blind, gave input as to the appropriateness and goal direction of the program.

Parent meetings were set up with the initial meeting centered around handicapped adult consumers discussing what was helpful or not so helpful to them in growing up from adolescence into adulthood, especially related to their parent's role in their development.

Later the parents choose the remaining parent topics:

1. Communication Skill Development Via Total Communication
2. Sex Education
3. Independent Living Training
4. Work Employment
5. What the Future Holds

Work Evaluation

An additional bias of this program was that psychological assessments are not, enough nor do they even suggest, truly valuable data as to the employment potential of a client. All prospective clients in this project have been receiving work sample assessments prior to further development of their individual educational plan in the community based work training program. Data from the work sample assessment was analyzed and given back to the home school program along with the work sample assessment reports and a suggested individual educational plan based upon such data. For those students whom the schools and parents felt were ready for part-time and/or full-time work training, placements were and are being arranged in sheltered workshops and/or competitive employment.

Media Center Film Inspection Training

The most successful work placement, even for students who received low ratings in the work evaluation assessment, has been found in the Education Service Center's media department where training as a film inspector took place.

This particular job involves the operation by the trainee of a $13,000 automated machine for inspection, cleaning and repairing of 16mm films.

The operation involves up to 36 sub-tasks in order to complete the inspection and repair of each film. In working at a competitive rate, the film inspector handles $500 of film material every four minutes. The tremendous success rate of the severely handicapped students on this particular task has led the project staff to firmly believe that students given high prestige work tasks can produce far beyond previous expectations because their

self-concept is improved through the presentation of such opportunities.

Independent Living

Besides program suggestions made to the student's public school teachers for increasing the daily living skills essential to employment acceptance, three weekends of live-away experiences have been conducted for six of the students most likely to be able to seek independent living in the next few years.

The first two live-away experiences were done in hotel situations allowing the opportunity for further social skill development, restaurant ordering skills, leisure time activity planning, and a general raising of self-esteem due to the nature of the prestigious living situation. The last living experience is to be a camp retreat situation emphasizing food preparation and additional skill training needed for independent apartment living. This will be done in conjunction with parents in order that they may better see what their young adult is actually able to do. The goal of the program staff is to have each student make all of their own major decisions.

Tentative Conclusions

1. Eight students have received work evaluations, four more are scheduled.

    a. The best work evaluations were found through only one of the many service provider agencies: the agency which used total communication with all clients and was fully sanctioned for conducting work evaluations for hearing impaired population by Texas Rehabilitation Commission.

    b. Some service provider agencies provide only token service and demoralize or under-estimate the potential of some of their clients.

    c. Work evaluations themselves, even with other records, do not necessarily demonstrate the actual potential of a client. Only actual job placement which has been appropriately determined shows what can be done by a given client.

    d. Competitive job placements are much to be desired over sheltered job placements whenever feasible.

e. Many students need basic survival skill training to aid their acceptability in employment instead of pre-academic of pseudo-academic school training.

2. Six students have received away-from-home training experiences.

   a. Work skill training and job placement alone is not adequate. Independent living and personality development must be coupled with work training if the job placement is to be successful.

   b. The more one can do for oneself, the higher one's self-concept, due to an increase in self-esteem.

   c. Parents and particularly teachers limit deaf-blind youth in major decision making, causing an increase in dependence on those around them.

   d. Public schools institutionalize as much as state schools. All students need a transfer to independent living prior to reaching the age limit for receiving school services.

3. Parent Support.

   a. The "Camelot Behavioral Scale", which is normed on the adult retarded population, is one of the best tools for measuring teacher and parent input about the student's present functioning in all skill areas. There is some discrepancy between how the parent and the teacher view the student's abilities. This seems to indicate a lack of school-parent communication. The parent does not know what the student can do in school, and the school personnel do not realize what the student can do around the home.

   b. Region-wide parent meetings are difficult to hold when all participating parents are from different school districts.

   c. Most parents and teachers are not effectively using total communication to advance the language development of their child/student due to the fact that most parents and teachers are not adequately equipped to use total communication themselves.

      Both parents and teachers are well intended, but need more intensive training in order to increase their knowledge and use of total communication.

d. There are a number of reasons why many parents may not allow their disabled adolescents to live independently:

- overprotection
- adequate family housing available
- unaware of available and/or limited acceptable alternatives

e. Those parents who do desire such services presently have few options available in the San Antonio area:

- additional resources and funding need to be identified
- additional training for transfer to an independent living situation is needed

Summary

The project for Deaf-Blind Community Based Work Training was not only greatly needed, but at this time (2/3 through year one), has met its stated goals. It is anticipated that three of the 12 present participants will be working independently by the end of the 1979 summer. It is foreseen that one student will be living independently away from home by May of 1979. It is further anticipated that two or three additional students will be engaged in full-time work training this summer. The remaining seven participating students will receive part-time work training for this next year in conjunction with their regular school program. Continued support to their prevocational school program will be based upon the needs determined in their individual work training assessment.

Major efforts to encourage private employers to accept at least work training if not actual hiring of these students must be continued. This might best be done by providing a work training for three to five students at a time. Alternatives for independent living arrangements, such as the Texas Rehabilitation Commission's Extended Rehabilitation Services and programs involving apartment complex living are highly desired. Training in transition from school to adult life is not only needed, but vital, if 16-20 years of special education services are not to be wasted. The program effort described above is one attempt to make that transition as real and as feasible as possible. The spin-off possibilities for other severely handicapped adolescent independent living and work training programs are numerous.

Appendix

REGION XX MODEL PREVOCATIONAL COMMUNITY BASED

WORK TRAINING PROGRAM

Minimum Entrance Criteria

Students must meet twelve of the fifteen entrance criteria, including items 1, 13, 14, and 15.

1. Eligibility: The students must be determined eligible for Special Education as deaf-blind by their admission, review, and dismissal committee, and must be 14-21 years of age.

2. Language: Expressive: Students will be able to express the basic human needs of hunger, thirst, elimination and avoidance of pain using speech, total communication, body gestures, or finger spelling to adults in such a manner that their needs are correctly identified 80% of the time, as judged by the teacher(s).

   Receptive: The students are able to comprehend a three-step instruction delivered in an appropriat[e] communication system as evidenced by performance of the ess[ential] motoric responses indicated by that instruction, as judged [by] the teacher(s).

3. Span of Attending: After training the students can do an appropriate (i.e., the student has the prerequisite skills) work task unassisted for 30 minutes without supervision, as judged by the teacher(s).

4. Physical Stamina: The students are able to work a six hour day without showing gross loss in stamina or precipitating a health problem, as judged by the teacher(s).

5. Initiative: The students can initiate an appropriate work task once learned with only one reminder, as judged by the teacher(s).

6. Mobility: The students can maneuver independently within a several-room work environment without endangering themselves or others, as judged by the teacher(s).

7. Adaptive Behavior: The students demonstrate adaptive behavior by scoring at the 30th percentile or above on the Camelot Behavior Checklist.

8. Toilet Habits: The students can independently handle their elimination needs without creating a health problem for themselves or others, as judged by the teacher(s).

9. Personal Hygiene and Self-Care Habits: The students bathe and groom themselves as evidenced by being able to do at least four of the Camelot Behavioral Checklist "bathing" and two of the "grooming" items.

10. Directional Concepts: The students know the concepts: on-off, up-down, open-closed, left-right, front-back, as evidenced by their correct response to a simple command using the concept given in an appropriate communication system.

11. Dressing: The students will be able to dress and undress as evidenced by being able to do at least five of the Camelot Behavioral Checklist dressing and undressing items.

12. Eating: The students will be able to self-feed as evidenced by being able to do at least 10 of the Camelot Behavioral Checklist Self-Help (Eating Behavior) items.

13. Transporation: The students must be able to be transported by any means on-time everyday to their community based work environment.

14. Role Cooperation: The students are willing to cooperate as evidenced by their remaining at their work station and attempting to perform their assigned tasks the majority of the day during the first few days of work training.

15. Adaptability to Change: The students can leave their present placement to receive training without decreasing their functioning, as judged by the teacher(s).

Exit Criteria
(Subject to change as we gain field experience)

1. Eligibility in Age: The students must be a minimum age of 18 to be eligible for continued full time employment.

2. Language:

   Expressive: The students will be able to express their name, address, phone number, and communicate basic vocabulary regarding tools and concepts relevant to the job task by using either oral, total communication, body gestures or finger spelling in such a manner that the expressive message is understandable to adults 95% of the time.

   Receptive: The students are able to perform with no errors a four-step insturction in an appropriate communication system after two demonstration trials.

3. Span of Attending: The students, after training, can do an appropriate work task for 90 minutes without supervision, as judged by the teacher(s).

4. Physical Stamina: The students are able to work an 8-hour day for four successive weeks without showing gross loss in stamina or precipitating a health problem, as judged by the teacher(s).

5. Initiative: Given a schedule for the day the students initiate previously learned work tasks, with a reminder necessary for less than half the transitions from task-to-task, as judged by the teacher(s).

6. Mobility: The students can maneuver independently within a several-room environment including toileting, dining, and transportation facilities without endangering themselves or others, as judged by the teacher(s).

7. Adaptive Behavior: The students demonstrate adaptive behavior as evidenced by scoring at the 50th percentile or above on the Camelot Behavior Checklist.

8. Toilet Habits: The students can independently handle their elimination needs without creating a health or social problem for themselves or others.

9. Personal Hygiene and Self-Care Habits: The students bathe and groom themselves as evidenced by being able to do at least six of the Camelot Behavioral Checklist "bathing" and four of the "grooming" items.

10. Directional Concepts: The students show no confusion or conceptual difficulties in carrying out all trained job tasks, as judged by the instructor(s).

11. Dressing: The students are able to appropriately dress and undress themselves with the required safety garments and appliances for the specific job task, as assigned and judged by the instructor(s).

12. Eating: The students will be able to order and self-feed as evidenced by being able to do all 15 of the Camelot Behavioral Checklist Self-Help (Eating Behavior) items.

13. Transportation: The students must be able to get themselves by any means to their community based work environment on time every day, as reported by the teacher(s).

14. Role Cooperation: The students are willing to cooperate, as evidenced by the remaining at the work station and attempting to perform the assigned tasks at least seven out of eight hours for four successive weeks, as reported by the teacher(s).

15. Adaptability to Change: The students must be willing to change work rules with a minumum of frustration, as demonstrated by adapting to a new work situation within a one week period.

References

Brown, L., Branston, M.B., Hampre-Nietupski, S., Pumpian, I., Certo, N., & Gruenewald, L. A strategy for developing chronological age appropriate and functional curricular content for severely handicapped adolescents and young adults. Journal of Special Education, 1979, 13, 81-90.

Brown, L, Nietupski, J.,
rion of ultimate functioning and public school services for severely handicapped students. In L. Brown, N. Certo, and T. Crowner (Eds.). Papers and programs related to public school services for secondary-age severely handicapped students. Vol. VI, Part 1. Madison, WI: Madison Metropolitan School District, 1976.

Brown, L., Wilcox, B., Sontag, E., Vincent, B., Dodd, N., Gruenewald, L. Toward the realization of the least restrictive educational environments for severely handicapped students. AAESPH Review, 1977, 2, 195-201.

Gilhool, T.K. & Stutman, E.A. Integration of severely handicapped students: Toward criteria for implementing and enforcing the integration imperative of P.L. 94-142 and section 504. In S. Sarason, D. Gellar, and M. Klaber (Eds.), Least restrictive alternative: Moral, legal administrative dilemmas. New York: Free Press, in press.

Williams, W., Brown, L., & Certo, N. Basic components of instructional programs. In L. Brown, T. Crowner, & R. York (Eds.). Madison's alternative for zero exclusion: A book of readings. Vol. V. Madison, WI: Madison Public Schools, 1975.

Dennis Dildy
Project Manager
Low Incidence Population Services
Region XX Education Service Center
1550 N.E. Loop 410
San Antonio, Texas 78209

CONSULTING

HOW TO CONSULT WITH INSTRUCTIONAL STAFF

Ann Ivey

> Like apples of gold in settings of silver is a word spoken in right circumstances. (Proverbs 75:11)

Picture yourself, as a consultant, standing in the doorway of the classroom. Your program is funded, you have identified the students needing your services, you've assessed them individually, written long and short term goals, and you have thought of creative methods to implement your goals. Don't go into that classroom now to tell the teacher your ideas. You have more work to do. You have to adapt where you are coming from to where your information is going.

The three areas you need to look at now are the classroom, the teacher's background, and the teacher's goals for the students. Observe the number of students in the classroom, the amount of furniture and other equipment, the types of activities done in the room, and the types of students. Does the teacher have personal or professional experience with handicapped students? What are his or her plans and priorities for educational activities? Good consultation will fit into the setting, and will help the teacher work toward the education goals.

Next, let's look at our attitudes. Each of us has something to offer these students. None of us knows all we could about how to help them. And the more we know, the more aware we are of our limitations. Two different attitudes here will destroy a good program for the students. If we allow ourselves to feel defensive, this may come across as being competitive or overbearing. On the other hand, if we think that our programs are more important than the teacher's and other consultant's programs, we are wrong again. A lack of understanding of the importance of each discipline in working with these students will produce hostility. Who loses when we feel defensive and fail to share ideas with a teacher which will benefit the students? Who loses when we make the teacher hostile and defensive so that he or she doesn't want to try our suggestions?

My goals as a physical therapy consultant are for all students to be positioned and handled in the best way possible, in class and at home; for each motor activity in their normal routine to enhance their abilities; and for them to receive the specific therapy activities necessary for their motor development. Following are some examples of how I've adapted activities which will work toward these goals, to classroom settings.

Students are positioned and handled in the classroom all the time. We can help the teachers maximize this time. For example,

in our deaf-blind unit, I try to give each student four or five therapeutic positions. When Mrs. Nelson prepares her daily schedule for each of her students, she uses these position recommendations in the routine which she and her aides carry through each day. Even when the students are not following her regular program for some reason, they are positioned correctly, and this enhances their physical development. Positioning ideas may range from having students sit on a small barrel, sit backward in a chair, sit on a ball or on a one-legged stool; to special seating such as standing tables or prone standers. Handling suggestions include relaxation exercises before toilet training time, mouth relaxation before eating, and neck facilitation when moving with a child.

Students have many motor activities in their normal routines. Physical education teachers appreciate ideas about games, basic motor skill activities, new equipment, or new uses of available equipment. Many of these students are in physical education classes - help their teachers make the time as valuable as possible. Students must move from room to room. Beginning walkers may push a wagon or ride a scooter from the classroom to the bus. I pull my students on a scootor board to therapy. One student unlocks her braces for some of her walking, and practices using her wheelchair between other classes. I try to look at the student's normal routine, and enhance what is already done.

Up until now, none of my suggestions have taken up blocks of classroom time. They have been adapted to regular classroom activities. There are times when staff and equipment are available for a teacher, aide or volunteer to spend individual time, daily or weekly, doing therapy activities with a student. When we have the opportunity to consult at this level, we need to give the person who will be working with the student an overview of normal development, of what we want to see in the child, and of what we want to avoid. We need to speak in understandable terms. We need to give enough background to help the teacher see how this program will develop activities which relate to educational goals.

For example, one aide who provided an exercise program for a student just beginning to walk with a walker, would not complete the developmental exercise activities each morning before starting him on the walker. After I was asked to sit with her and talk about how her own children developed, and how these simple activities helped the student as much as walking, she consistently followed through correctly. She had been given an understanding of why these beginning activities were valuable, and could feel a sense of accomplishment about doing them.

Programs we outline should be simple enough to be effective, and yet provide enough variety to maintain interest. A choice of several comparable activities helps break up monotony. When

re-evaluating and giving new ideas, often times we do not let that teacher know how well the student has progressed. The people who work with these students daily deserve to feel personal accomplishment as the students progress! And since progress is often in small increments, we need to point it out and tell them just how valuable it is!

The families of our students are their most important care givers. They spend more time with these children than we ever will. When we take time to meet with families, we need to adapt our suggestions to their lifestyle. We need to let them know that we respect what they already do before giving them new ideas. And we need to explain their children's physical development in language meaningful to them. They deserve our compliments for the special things they do for their children. My favorite home program is a list of five or six positioning ideas for T.V. watching. Another well-received suggestion is a short list of reasonably priced Christmas gift ideas for motor activity equipment. Many times, the time we spend with family members is our best investment toward a student's motor development.

Don't forget, "Without consultation, plans are frustrated, but with many counselors they succeed." (Proverbs 15:22)

Sample Home Program

David M. - home activities which will improve his balance and strength.

1. Have David sit different ways when he watches T.V.

   a. on a small ball
   b. straddling a bolster.
   c. on his knees
   d. backward in a chair
   e. on his stomach, with two pillows under his chest

2. Scooterboard activities are super!

3. Playing ball is good. Have him throw, roll, and bounce it to you. Use different sized balls.

Call me if you have questions.

Ann Ivey, L.P.T.
1503 Van Couver
Arlington, Texas 76012

a.

b.

c.

d.

e.

176

CONSULTATION FOR RELATED SERVICE PERSONNEL

Cynthia G. Jones

With the advent of P.L. 94-142, the demand for the Related Service Professional has increased markedly. The number of identified students and/or educational agencies requiring the specialized related service skills is on the rise. One of the primary delivery systems for related services is through consultation. To understand one's role in the public school as a consultant, one must first have a clear understanding of what consultation is.

What is Consultation?

...a meeting to discuss, decide, or plan something (Webster's Dictionary)

...a process involving the giving and taking of help in interpersonal relationships (Towie, a social worker)

...the giving and taking of help on a professional problem in a professional relationship (Maddux, a physician)

...a helping relationship, taking place in a work-centered problem-solving situation, through which the consultant gives his/her knowledge, skill and breadth of experience to the end that planning can be done (Gilbert, a social worker)

To further put consultation into a proper light one must also understand what consultation is not. According to West (1973) consultation is not supervision, administration, teaching or collaboration. Let us look briefly at what the above four skills include. Supervision - a way of helping a worker grow and develop in his/her capacity to serve. Supervision carries with it responsibility for evaluation of performance. Administration - an enabling process, but carrying with it authority as an inherent component. Teaching - an organized process directed toward the development of knowledge about and skill in problem solving. Collaboration - a process of direct activity with different professions working together cooperatively.

In contrast with the processes stated above, consultation emphasizes solution of problems. It is true that enhancement of skill and knowledge may be an outgrowth of the consultation experience but it is not usually a prime objective. In short, according to Mial, the consultant contribution is to help the client to "see better", to "consider alternatives", to "find and use resources", and to make the most of "potential ability".

There are a few basic characteristics of consultation that should be kept in mind:

1. It is a two-way street. Both client and consultant are active participants with responsibilities.
2. Consultation is temporary.
3. Consultation is task oriented, not person oriented.
4. Consultation is a "take it-or-leave-it" type agreement. Some authorities feel the consultee is ethically bound to make every effort to use the outcome of consultation. This includes the need to modify and integrate it into his/her thinking and thence into doing some or all of it.
5. Consultation occurs on a peer relationship basis. Consultant and consultee must be "equal" on the conceptual level of acceptance of each other's experiences. That is to say, respect the level of knowledge and experience brought by both the consultant and the consultee. Decisions must be from across the board and not from one level to the other.

Consultation is a more than valid role for the Related Service Personnel in the public school setting. With the increase of specialization in all areas, it becomes more important to call on a specialist for help and/or advice. Let us look briefly at a few of the basic requirements of consultation.

1. A need must exist. That is, there must be a problem that can be stated. It may be the responsibility of the consultant to help sort through several comments or complaints to get to the base problem.
2. The consultant must have knowledge and experience, plus resources, in his/her own specialty. He/she must also understand the specialty's relationship to other services.
3. The consultant needs adequate advance preparation. Specifically, there should be a full orientation to the problem before attempting to offer alternatives.
4. The consultant must also understand the effect that the possibility of and the actual fact of change could have on the consultee.
5. Basic to all consultation is the establishment of rapport.
6. Effective communication and appropriate interpersonal interactions are essential for the consultant.
7. Fact and opinion should be clearly separated.
8. The consultation should aid in the posing of numerous alternatives as there is almost always more than one method to reach a given goal.

9. Consultation should take the form of recommendation and suggestions. This requires a release of the responsibility of the actions to another.

West (1973) is careful to state five additional requirements for a consultant. These recommendations are especially important for the Related Service person in the public schools who also has ethical responsibilities to the profession. They are:

...accepting the individual and moving at the individual's pace,
...listening with a third ear,
...understanding and coping with resistance and rejection,
...working within the agency structure, and
...commitment to confidentiality.

There is, of course, no one answer to the many questions about consultation as a part of the services available to the public schools. What is needed is a basic understanding of what consultation is, and what it is not. It then becomes the responsibility of the professionals planning to provide the service to set the limits within which they can function.

There is one more major consideration of which the related service provider must be aware. That is the issue of contract or written agreement. If one is to function as a true consultant and expect reimbursement, then the 'ground rules' must be outlined early in the process. The following seven suggestions are offered as "food for thought" before entering into a contract or agreement.

1. Complete description of service to be offered

   ...what are the required qualifications of the service provider?...who is the provider responsible to?...are there other consultants involved in the same or a related task?
2. Definitions of responsibilities for both the related service provider and the school or facility in terms of: scope of the program; limitation of service; supervision; records and reporting; supplies, equipment; and maintenance; and the location in which the services are to be rendered.
3. Insurance provisions
4. Time limit of the agreement or contract to include: dates the agreement/contract is to begin and end, and the termination clause.
5. Method and amount of reimbursement
6. Responsibilities for written products such as individual educational plans and evaluation summaries.
7. Signatures...please be sure that the agreement/contract is signed by both the consultant and a representive of the school.

Consultation in the public schools offers a wide variety of challenges that should be undertaken by the experienced related service person. The consultation process can be a mutually satisfying experience for both the consultant and the agency with the most pleasing endproduct of improved service for the student.

References

Mial, Curtis. "What is a Consultant?" New York State School of Industrial Relations, Cornell University Extension Division.

West, Wilma L. The principles and process of consultation Consultation in the Community: Occupational Therapy in Child Health, American Occupational Therapy Association, Inc., 1973.

Suggested Readings

Allis, John B. Orientation of consultant physical therapist to public health practice. Journal of American Physical Therapy Association, January 1965.

American Occupational Therapy Association. The Consulting Process for Occupational Therapists, March 1969.

Caplan, Gerald. "Principles of Consultation and Supervision-Organization and Administration of Mental Health Supervision." Lecture in Master of Public Health Sequence, Harvard 1961.

"Consultant's Role." Available from George Williams College, Center for Continuing Education, Downers Grove, Illinois.

Cook, Maxwell. "The Ten Commandments of Consultation". Public Welfare - Focus on Development (Journal). July 1970.

Gilbert, Ruth. Functions of the consultant. Teachers College Record, Vol. 61, #4, January 1960.

Stringer, Lorene A. Consultation-some expections, principles and skills. Social Work, Vol. 6, July 1961.

Cynthia G. Jones, M.S. O.T.R.
3205 Funston Street
Austin, Texas 78703