OE FORM 6000, 2/69

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF EDUCATION

ERIC REPORT RESUME

ERIC ACC. NO.	P.A.	PUBL. DATE	ISSUE
ED 039 379			
CH ACC. NO.			
AA 000 557		Apr 70	RIEOCT70

IS DOCUMENT COPYRIGHTED? YES ☐ NO ☒
ERIC REPRODUCTION RELEASE? YES ☐ NO ☒
LEVEL OF AVAILABILITY I ☒ II ☐ III ☐

AUTHOR

TITLE

Cognitive and Affective Characteristics of Exceptional Children. Papers Presented at the Annual International Convention of the Council for Exceptional Children (48th, Chicago, Illinois, April 19-25, 1970).

SOURCE CODE	INSTITUTION (SOURCE)
FGK19725	Council for Exceptional Children, Arlington, Virginia
SP. AG. CODE	SPONSORING AGENCY

EDRS PRICE	CONTRACT NO.	GRANT NO.
0.50;3.10		
REPORT NO.		BUREAU NO.

AVAILABILITY

JOURNAL CITATION

DESCRIPTIVE NOTE

60p.

DESCRIPTORS

*Exceptional Child Education; *Child Development; *Mentally Handicapped; *Cognitive Development; *Intellectual Development; Self Concept; Reading; Reading Readiness; Learning Processes; Language Development; Classification; Learning Disabilities; Definitions; Trainable Mentally Handicapped; Research Utilization

IDENTIFIERS

ABSTRACT

The Language Acquisition Device, or LAD, is related to reading and intellectual development in the first of five papers on cognitive and affective characteristics of exceptional children. A discussion of the intellectual processes involved in learning focuses on the developmental stages of Piaget. A report on a task force to discuss terminology related to minimal brain dysfunction is presented. Also considered are the implications of research for the education of the trainable mentally handicapped and the development of a positive self concept in the retarded. (RJ)

Cognitive and Affective Characteristics of Exceptional Children

Papers Presented at the

48th Annual International Convention

The Council for Exceptional Children

Chicago, Illinois

April 19-25, 1970

Compiled by

The Council for Exceptional Children

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LAD,* READING, AND INTELLECTUAL DEVELOPMENT

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One of the most significant findings of modern biological research, in terms of educational theory, is that sensitive periods are characteristic of all higher forms of animal life. That is, all animals, including man, have innate mechanisms pre-programmed to respond selectively to a particular range of stimuli within a certain time interval in the organism's life span (Driver, 1968, p. 276; Ganz, 1968, p. 366; Slukin, 1965, p. 4; Chomsky, 1966, pp. 64-65; Lenneberg, 1964, pp. 66-67). Sensitive periods in embryological development have been described and investigated for many years, but the study of sensitive periods as a necessary starting point for the development of specific behavior patterns, such as basic reading skills and other behavior patterns associated with the growth of intellect, is a more recent enterprise. Although a few individuals, for example, Montessori and Vygotsky, noted the behavioral evidence for sensitive periods 40 years ago, it is only since the late 1950's that a substantial number of workers have begun methodically to accumulate data on sensitive periods in man.

This neglect is understandable because educational psychology has not been particularly concerned with the time-dependent, stimulus-selective, perceptual-cognitive predispositions and abilities of

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* LAD, or "Language Acquisition Device," designates the theoretical construct developed by linguists to account for the empirical data on language acquisition in young children.

children. Further, there is little in educational psychology to which the evidence for biologically determined, i.e., genetically pre-programmed, sensitive periods may be meaningfully related. Neither the S-R orientation nor the more recent cognitive approach, as currently constituted, are compatible with the data and implications of sensitive periods; moreover, adequate accommodation of these data would impose extensive reconstruction in educational theory. The main deficiency in current frameworks is the lack of provision for bio-psychological processes temporarily overriding whatever reality resides in such conventional notions as mental age, IQ, and reinforcement with regard to certain specific areas of learning.

For the purposes of this paper, at least, the most important characteristic of sensitive periods is that they are merely the foundations on which learning will be built. The basic mechanisms which produce sensitive periods initiate, but do not complete the maturational processes alone. The foundations are laid down by the genetic material, but appropriate experience is essential if the superstructures are to arise and become operative (Hubel & Wiesal, 1963; Globus & Scheibal, 1967; King, 1968, p. 47; Ganz, 1968, pp. 367, 406-408).

I wish to focus on what is perhaps the most important sensitive period in man's individual and collective development: the sensitive period for language acquisition, occuring roughly between the ages of two and four (McNeill, 1966, p. 15; Fodor, 1966, pp. 106-107; Chomsky, 1966, pp. 59-60). This sensitive period is produced by an innate mechanism designated by transformational linguists as the Language Acquisition Device, or LAD (McNeill, 1966, pp. 38-39). The implications of this theoretical construct extend far beyond current concep-

tualizations of intellectual development, underscoring the need for a revised educational frame of reference. One upshot has striking implications for the teaching of reading; namely, readiness for learning to read is shown to be based, at least in part, on the innate predispositions and incipient abilities which underlie the sensitive period for language acquisition.

The transformational linguist holds as one of his basic assumptions that man has an inborn, intelligently responsive facility for language acquisition during a critical period early in his development. In other words, he believes that man's brain is organized so that is may absorb language very easily during his early years, but that this capacity fades until acquisition of a first language becomes very difficult or impossible after puberty (Lenneberg, 1967, pp. 376-377). What is the import of this conceptualization for reading instruction and intellectual development in general? At first glance it might appear that there is no special significance, but a close look at the work of transformational linguists and various other lines of evidence testifies to its emphatic relevance.

One rich source of evidence is the empirical data on early reading. An increasing number of children between the ages of two and five are learning to read (Fowler, 1968; Durkin, 1964; Doman, 1964). Although the research is meager at present, it suggests that when comparison is limited to children between the chronological ages of two and five, neither chronological age nor mental age are critical variables in the process of learning to read (Dunn, 1970; Chall, 1967, pp. 120-121). Should future research corroborate these tentative findings, orthodox learning theories and conventional conceptualizations of the nature of

intelligence will be powerless to explain them. On the other hand, although most children between the ages of two and five apparently are able to master beginning reading quite handily, it is worth observing that while relatively few of them do so, a very high percentage of eminent intellectuals learned to read during these early years. Recent research demonstrating the biological principle of physical change in response to environmental demand (Young, 1964, pp. 51-52, 274-275; Corning, 1968, pp. 14-15; Schapiro, 1968, pp. 239-244; Rosenzweig, 1966; Holloway, 1966), suggests the possibility that high adult achievement is usually dependent upon a CNS substantially enhanced by pertinent early stimulation (Fowler, 1968, p. 17; McCurdy, 1975; Mayer, 1964; Pressey, 1955). That is, eminence in the sphere of ideas may ordinarily depend upon a CNS structurally and physiologically enhanced by appropriate early experience, such as reading and other forms of generative perceptual-cognitive stimulation.

The above observations pose an incomprehensible mosaic of data to present-day educational psychology. However, they are precisely what would be inferred from the concept of sensitive periods, given the typical learning conditions now prevailing in reading instruction. First, assuming the existence of a sensitive period for learning to read which is more or less congruent with LAD, one would expect children to learn to read with about the same facility and at approximately the same time as they learn to understand and speak their mother tongue. Second, it is anticipated that those who learn to read during this sensitive period would benefit from concomitant physiological and structural changes in the CNS that would not occur if the skill of reading were acquired at a later time. Therefore, it is not surprising

that adults manifesting very high intellectual achievement so often learned to read during the years between two and five. Third, it also follows from the theory of sensitive periods that those who wait until school-age before learning to read will be deprived of a built-in facilitation and thus may experience more difficulties. In all likelihood, children who learn to read after the sensitive period has passed must learn by a somewhat different internal process from those who learn while it is operative. Young children, for instance, learn a second language differently, and usually more efficiently, than do adolescents and adults. But a more basic reason for this expectation is the recent evidence, at least in embryonic development, that different sets of genes are responsible for the various stages of development and that nearly all of them become dormant soon after their particular stage is completed (Davidson, p. 60). In brief, if the sensitive period for language acquisition also facilitates the process of learning to read, it follows quite reasonably that the usual criteria of readiness would become less important, and timing instruction to coincide with the sensitive period more important.

Other lines of evidence have to do with the general nature of sensitive periods as described by ethologists (Hinde, 1966; Lorenz, 1965; Scott, 1962; Thorpe, 1963), the study of built-in sensitivity to stimuli in individual neurons (Hubel & Wiesel, 1963), and the study of different kinds of cortical growth as a function of stimulation during various stages of maturation (Holloway, 1966; Riesen, 1967; Ganz, 1968, p. 407; Valverde & Marcos, 1967; Gyllensten, 1959).

A central factor is that all children, barring gross pathological impairment, spontaneously learn to analyze the auditory stimuli of

spoken language between the ages of two and four (McNeill, 1966, p. 15). That is, they learn a working vocabulary and the basic syntactical meanings conveyed by sentences. This spontaneous acquisition of the basic aspects of language is probably the best clue we have for throwing light on the whole subject of reading instruction, particularly readiness for reading. In its implications, it goes far towards accounting for the increasing prevalence of early reading among children who vary widely in ability, and in making clear the theoretical and practical significance of the young child's ability to profit from instruction in reading. It may well be that children would learn to read as effortlessly and unconsciously as they learn to speak if the environment provided comparable exposure to both aspects of language. This belief is apparent in the autobiographical writings of those who read early (Mill, 1924; Wiener, 1953; Miles, 1926), and in the descriptions of adults who have observed young children learn to read (Fowler, 1968; Moore, 1961; Callaway, 1965; Doman, 1964).

It is important to note that the brain function involved in understanding representational auditory stimuli, that is, the sounds of speech, is essentially the same at the cognitive level as that required in the reading process. Except for such relatively minor conceptual operations as sequencing from left to right, and correlating auditory and visual stimuli, the only additional skills needed in order to begin reading are perceptual, not cognitive, in nature. The perceptual skills used in decoding sound by means of visual stimuli are the only skills needed with the minor exceptions noted, in learning to read. In other words, by facilitating the understanding of representational auditory, LAD helps remove the most significant cognitive obstacle the

child must face in learning to read. This fact, plus evidence that the perceptual tasks necessary for reading easily can be mastered even earlier by taking advantage of the sensitive period for form perception (Callaway, 1970), suggests the very reasonable possibility that most, if not all, children would profit immensely from appropriate instruction in reading during the pre-school years. A close look at the concepts of "mental age" and "readiness" will help clarify the significance of the empirical data and the necessity of a new orientation toward reading instruction.

Early reading cannot be explained in terms of mental age. After all, a child on his third birthday would need a 200 IQ to be of the same mental age as an average child who has just become six years of age. In addition, the increasing number of reports concerning the ease and naturalness with which three-year-olds may learn to read is impossible to pass over when one considers the reading difficulties which beset so many children in the first grade. Of particular interest along this line is the observation that two, three, four, and five-year-olds learned to read equally well in a recent experiment at a California State College (Dunn, 1970); also, in an experiment in England, four-year-olds learned to read as well as five-year-olds (Chall, 1967, pp. 120-121). The evidence seems to indicate that the ability to learn to read waxes and wanes according to laws very different from those governing the development of mental age, and follows instead the curve worked out for LAD--the fact that children with widely varying mental ability learn to understand and to speak their first language at approximately the same time is instructive on this point. It seems fair to say that the empirical data of early

reading is unavoidably discordant with any theory of development and learning that omits the construct of a sensitive period for reading that largely overrides the effects of general intelligence.

Readiness depending primarily on mental age would be seen as generally increasing with age, while the facts suggest that readiness may also decrease with age. As Montessori urged, we should not only look ahead for readiness to develop, but we must also consider whether optimum readiness would be found at an earlier age. Testimony from studies of early reading indicates that we have been looking in the wrong direction. Our concept of readiness, being tied so closely to mental age, has long caused us to overlook the possibility of optimum reading readiness being found in children younger than school age rather than older. The behavioral evidence concerning early reading logically requires a sensitive period.

To summarize, we have derived two key ideas from the concept of sensitive periods as it applies to the teaching of reading and to intellectual development in general. One idea is that the innate mechanisms which facilitate language acquisition between the ages of two and four also produce readiness for instruction in reading--readiness, it must be remembered, that is not closely related to general intelligence. The second idea, and perhaps the most important, is based on the principle that since pertinent experience very easily becomes a part of one's behavioral repertoire during a sensitive period it, ipso facto, very easily becomes a part of one's biology during a sensitive period. One of the prime assumptions of modern brain research is that learning is dependent upon the capacity of the genome to "physically" assimilate experience by means of biological modification (Young, 1964,

pp. 280, 293; Magoun, 1964, p. 2). Therefore, it is quite probable that the most important result of early reading is the changes induced by this experience in the CNS, changes mediated by genes highly sensitized to appropriate stimuli. In other words, it is not unreasonable to assume that by learning to read when LAD is most effective, the genes involved are able to transduce the mental events relative to reading into adaptive physical changes very easily and efficiently--and that the structural and physiological changes thus produced may contribute substantially to general intellectual superiority in adulthood.

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WHAT INTELLECTUAL PROCESSES ARE INVOLVED IN LEARNING

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As the twentieth century prepares to enter its final quarter the two persons regarded as the major contributors to psychology for this hundred year interval are Sigmund Freud and Jean Piaget. Freud considered the effects of conflict, repression, unconscious motivation and symbolism. Piaget has been interested in genetic epistemology, the scientific study of knowledge, how a person develops intellectually, the course of cognitive development from infancy onward. Just as there was marked professional attempt during the first half of the century to inculcate Freudian findings into everyday efforts in behalf of our fellow man, so today during the last half of the century there is attempt to relate Piaget's contributions to present educational efforts. In doing so three of his tenets bear review: (1) cognitive development is marked by a succession of hierarchical stages, i.e., attainment of a higher level is not achieved without accomplishment of the various stages that precede it in the sequence of development, (2) cognitive development proceeds as the individual interacts with his environment; the specific aspect of logical thinking resides in the interaction of the thinking person with reality, (3) thought precedes language; data from the Geneva School indicates that language does not constitute the source of logic, but is on the contrary, is structured by it. Piaget (Furth, 1966) rejects the notion that logical thinking finds its explanation or base in the verbal symbol; he does acknowledge, however, that language may increase the powers of thought in range and rapidity.

Stages of Intellectual Development

As the child proceeds through life, inwardly organizing or assimilating and outwardly coping or accommodating to environmental experience, he becomes more capable in his adaptations. Thought is elaborated and organized. Indirect learning and problem solving become possible. Such is the generation of the mind. (Stephens, 1966). Piaget examines this cognitive development in terms of stages for which he advances the following criteria:

1. Each stage of a child's functioning is a necessary result of the previous one (except for the first, which must be due to a process of coming-to-be) and prepares the following one (with the exception of the last which must be considered a process of passing-away).

2. Each stage in the child's development must be defined by a unity or organization that characterizes all his new conduct at that stage (and not a single dominant property).

3. The organization of the child's functional structures at each stage integrates the structures that prepared for the new stage.

4. The succession of the stages are universal, although tempo may vary from individual to individual (Langer, 1969, 8).

Change from a reflexive to an inventive organism is defined by the four stages presented in Table 1. Within these stages substages are distinguished. More extended discussion of the thought processes characteristic of the various stages is provided by Hunt (1961), Inhelder (1968), Langer (1969), Piaget and Inhelder (1969) and Stephens (1966).

Through exploration and experimentation, which is suggested by theory and which in turn either reaffirms and extends or revises a theory, Inhelder's efforts make major contributions to Piaget's psychology of intelligence. It is Inhelder's findings that indicate how his theory can be applied to the diagnosis of reasoning (Inhelder, 1968).

In both Piaget's and Inhelder's research, the child is presented with a

TABLE 1

PIAGET'S STAGES OF INTELLECTUAL DEVELOPMENT

Stage and Approximate Age	Characteristic Behavior
I. Sensory-Motor Operations	
1. Reflexive (0-1 month)	Simple reflex activity; example: kicking.
2. Primary Circular Reactions (1-4.5 months)	Reflexive Behavior becomes elaborated & coordinated; ex.: eye follows hand movements.
3. Secondary Circular Reactions (4.5-9 months)	Repeats chance actions to reproduce an interesting change or effect; ex.: kicks crib, doll shakes, so kicks crib again.
4. Coordination of Secondary Schema (9-12 months)	Acts become clearly intentional; ex.: reaches behind cushion for ball.
5. Tertiary Circular Reactions (12-18 months)	Discovers new ways to obtain desired goal; ex.: pulls pillow nearer in order to get toy resting on it.
6. Invention of New Means through Mental Combinations (18-24 months)	Invents new ways and means; ex.: uses stick to reach desired object.
II. Pre-Operational	
1. Preconceptual (2-4 years)	Capable of verbal expression, but speech is repetitious; frequent egocentric monologues.
2. Intuitive (4-7 years)	Speech becomes socialized; reasoning is egocentric; "to the right" has one meaning - to his right.
III. Concrete Operations (7-11 years)	Mobile and systematic thought organizes and classifies information; is capable of concrete problem solving.
IV. Formal Operations (11 years upward)	Can think abstractly, formulate hypotheses, engage in deductive reasoning, and check solutions.

problem, which in most instances involves manipulation of objects. Following this his attempts to obtain a solution are observed. Their clinical approach permits emphasis on the method used by the child to obtain a solution (process) rather than on the correctness or incorrectness of the solution (product) (Stephens, 1966). Through the child's performance it becomes possible to determine his current level of cognitive development.

Originally Piaget utilized a questioning method which was primarily verbal. His use of this approach was criticized because the child had been found by others to be much more logical in his actions than in his verbalizations. Assuming this to be correct, Piaget, in collaboration with Barbel Inhelder, developed concrete materials which the child could handle, observe, and reason about.

The clinical method is different from the normal test method in that the child is permitted repeated opportunities to correct his first statement on the basis of further experience. He is also given repeated opportunities to check the accuracy of his statements, and this introduces a learning possibility. Suggestion and counter-suggestion may be presented to determine the consistency of the child's behavior. In other words, much greater flexibility is used, than can be incorporated in the more rigid standardized procedure.

The examiner tries to adapt to the reactions of the child and to follow the child's line of thinking. In this clinical method the child is given the opportunity to express himself in a spontaneous and personal manner and the examiner makes an effort to use the child's language. He tries to see things as the child sees them without imposing his own perceptions (Stephens, 1969).

Not only has the clinical method been found to be useful in determining an individual's level of cognitive development; it has also been employed to define the thought processes characteristic of retardates as compared to those of normals (Stephens, Miller and McLaughlin, 1969), and to determine that despite

language difficulties the thought processes of the deaf proceed in much the same way as those of normals although the tempo of development may result in a developmental delay equivalent to one or two years (Piaget and Inhelder, 1969). Through use of the method it also has been determined that still greater delays (frequently amounting to four years) occur in the cognitive development of the visually impaired.

> The sensory disturbance peculiar to those born blind has from the outset hampered the development of sensori-motor schemes and slowed down general coordination. Verbal coordinations are not sufficient to compensate for this delay, and action learning is still necessary before these children develop the capacity for operations on a level with that of the normal child or the deaf-mute (Piaget & Inhelder, 1969, 88,-89).

A majority of the instruments provided by the Geneva School are designed to measure thought at the concrete and formal stages. Work by others has provided means for assessing cognitive development at the sensori-motor and pre-operational levels. Uzgiris and Hunt (1966) supplied a measure of cognitive growth during the first two years of life; criteria are situations discussed by Piaget in his writings on the sensori-motor period, situations which can be reliably observed by different people. Films demonstrating assessment with the Uzgiris-Hunt scale are available. Use of the measure in a project concerned with the intellectual stimulation of culturally disadvantaged infants (Stephens, Kirk, and Painter, 1967), ages eight months to two years, revealed differences in the cognitive development of motor impaired infants that were not revealed by performance on the Cattell Infant Intelligence Scale (Stephens, in press).

The pre-operational stage, which in normals occupies the period from approximately two to seven years is viewed as one of prime importance; during this time language normally is acquired and pre-logical thought is evidenced. Workers in the field of retardation are particularly interested in assessment of the stage because trainable retardates generally do not develop beyond this point. Currently Educational Testing Services has announced the develop-

ment of procedures, Cognitive Growth in Preschool Children (Melton, Charlesworth, Tanaka, Rothenberg, Pike, Bussis and Gollin, 1968) which measures areas previously identified by Genevan research as prime contributors to the intellectual development of the pre-operational child. The areas assessed include classification skills, time, distance, number conservation, and basic language structure (Stephens, in press).

Thus it becomes possible through use of these various scales to determine the level of cognitive functioning achieved by an individual. Provided with this information a teacher could engage in what Hunt terms a "skillful cut and try method", i.e., tasks could be analyzed in terms of the level of cognitive functioning required for their mastery, and a child could be presented with those appropriate for his level of functioning. In curriculum for exceptional children, nowhere is a method, which is designed to provide a child with activities appropriate to his level of development, better demonstrated than in Connor's and Talbot's An Experimental Curriculum for Young Mentally Retarded Children (1966).

Whether or not an individual pupil has achieved "reversability" in his thought processes should be of interest to his teacher.

The concrete stage of cognitive development, which normally occurs approximately between the ages of seven to eleven, is characterized by an increasing flexibility and reversability of thought processes. In an assessment designed to measure reversability the child is shown two clay balls equal in quantity. After the child agrees they are identical one of the balls is rolled into a long hot dog. The child is then asked if the amount of clay in the hot dog is the same, more, or less, than that in the clay ball. If the child has achieved reversability of thought processes, he can think back and remember that the hot dog was a clay ball equal in size to the other ball at the start of the experiment and that nothing has been added or taken away, therefore they are still equal. When this concept of reversability is applied to academic

tasks it becomes apparent that subtraction involves reversability; 4+5=9; reverse the process and 9-5=4. Frequently children are found who exhibit ease in adding 4+5 to obtain the sum 9, yet have extreme difficulty in subtracting because they have not achieved reversability of thought processes.

Lack of flexibility in thought processes also serves to inhibit reading skills.

> The problem faced by an English speaking child is that one letter can stand for more than one sound, such as "ate" and "arm", and one sound can be represented by more than one letter, such as "sees" and "seize". Therefore, the English speaking child needs to multiply logically all sound and letter combinations and from these possible combinations determine those which are utilized in English. To cite the illustration by Elkind, Larson, and Vandeerninck (1965) "l" can represent any single letter or letter combination, and "s" any single sound or sound combination. When the two are subjected to logical multiplication the result is: l multiplied by s = sl, $s\bar{l}$, $\bar{s}l$, and $\bar{s}\bar{l}$ (sl = the combined sound and letter, $s\bar{l}$ = the sound but not the letter, $\bar{s}l$ - the letter but not the sound, and $\bar{s}\bar{l}$ neither the sound nor the letter). The process must be applied to all the sounds and letters used in English phonetics in order to master reading.
>
> The success of the 44 letter Initial Teaching Alphabet (ITA) stems from the fact that it eliminates the need for logical multiplication, a task difficult for slow and retarded persons. Instead the ITA has a single letter for every sound and vice versa. Gains achieved by retarded readers through use of the ITA suggest that previous reading difficulty for these persons was not due to perceptual discrimination, because the addition of 18 letters to the ITA alphabet eases rather than complicates the reading process for them (Elkind, Larson, and Vandeerninck, 1965). It appears, rather, that their cognitive structures are not sufficiently advanced to engage in logical multiplication (Stephens, 1967, 117).

At the stage of formal thought it becomes possible for a person to operate on operations rather than on concrete objects. He can engage in abstract thought. It has been assumed, and school curriculum reflects this assumption, that the normal person achieves this level of functioning by the time he is eleven or twelve years of age. Yet in a study by Stephens, Miller, and McLaughlin (1969) only approximately four of a group of 25 persons, IQ 90-110, CA 14-18 performed at the level of formal operations. Similar findings are noted in work by Elkind (1961). Is it not possible that secondary school mathematics which requires performance at the formal or abstract level demands thought operations that are not available to the average 14 to 18 year old pupil?

Furthermore, we as special educators know that if a pupil continues to be presented with tasks that require abilities which he does not possess the ensuing frustration may assume various deleterious forms.

Cognitive Development Requires Interaction with the Environment

> Cognitive development is seen by Piaget as evolving from the child's interaction with his environment, and from his interaction there occurs a gradual awareness of self. The neonate knows not that he and the world are separate, different entities, but as intellectual development proceeds, boundaries are set up between self and surrounding objects. Intelligence is seen as beginning, (Flavell, 1963) not with awareness of self or things per se, but with a recognition of their interaction (Stephens, 1966).

As the child interacts with the environment the ongoing processes of adaptation and organization result in constant reorganization of the structures of the mind, reorganization which involves two complimentary processes, assimilation and accommodation. The function of assimilation is to modify or integrate the "food for thought" obtained through interaction with the environment. To assimilate the child restructures the relevant environmental data so that it can be incorporated into this existing schemes or mental structures. Assimilation serves to ensure that experience will have significance. The function of accommodation is to revise, extend or modify, but not destroy, the child's schemes or mental structures so that they may integrate new information and be consistent with the external environment. Through interaction the person actively takes in and digests "food for thought" that is present outside himself (Langer, 1969).

Piaget's adage " a child knows an object only to the extent to which he has acted upon it" implies that learning will best occur in a laboratory type situation where the child is free to manipulate objects, explore space, become aware of time, and determine causal relationships. In fact, Piaget posits that it is through such experiences that the child constructs four fundamental forms of knowledge: objects, space, time, and causality. The underlying genetic

hypothesis with respect to the relationships between the construction of the practical concepts of objects, space, time, and causality is that their development is correlated. For example, at the sensori-motor stage, the child's formation of object concepts is correlated with his organization of the spatial field (Lunzer, 1969).

> The agreement found between Jean Piaget's theory of intellectual development and the functional psychology of John Dewey has done much to further a receptive atmosphere for the Geneva school in the United States. Acknowledgment of agreement is found in Piaget's statement:
> If then we had to choose from the totality of the existing educational systems those which would best correspond with our psychological results, we would turn our methods in the direction of what has been called "group work" and "self-government" and advocated by Dewey (Piaget 1962, 405) (Stephens, 1966, 75).

Articulation between the work of Piaget and Montessori is found in the emphasis both give to interaction. Indeed, Montessori Schools are workshops where the child manipulates objects, explores causes and relationships, where he discovers the principles of thinking through activity. An American counterpart to this approach is the mathematics laboratory for elementary school children designed by Rasmussen (1964). In this laboratory the child comes to understand "twoness" and "threeness" by manipulating two objects, then three objects. Liquid measure is arrived at by the actual pouring of water from several small containers to a larger one. Scales provide opportunity for experimentation with objects, experimentation which leads to the discovery of the principles of weight. Basic to these approaches is the belief that the child is an active operator whose actions are the prime generator of his own cognitive development (Langer, 1969).

Thought Precedes Language

Normally during the second year of life certain behavior patterns appear which indicate representation of objects or events not present. At least five of these behavior patterns appear almost simultaneously (Piaget and Inhelder, 1969, 53-54):

1. Deferred imitation or imitation of a model after its disappearance. An hour after the occurrence a child may imitate a parent who became angry, yelled, and stamped his foot.

2. Symbolic play or the game of pretending - A child may pretend to be cold, to shiver, and then proceed to get a blanket and wrap himself in it.

3. Drawing or graphic image - Children's drawings serve as intermediaries between play and mental image.

4. Mental image results from internalized imitation. An image is an internal representation of a symbol, a copy of perceptual data. Mental imagery makes it possible for a child to search for a toy no longer in sight, and to recognize it when he finds it.

5. Verbal evocation of events that are not presently occurring is possible through nascent language. A child may look out of the window, wave, and say "Bye-bye, da-da" several hours after his father's departure.

Language normally appears at about the same time as other forms of semiotic thought. In the profoundly deaf, however, language generally is preceded by imitation, symbolic play, and mental image: moreover, these other forms of symbolic thought can and do occur independently of language. Frequently a gestural language is employed with an intent that is not merely playful.

> A wise educator of the deaf once remarked that the more intelligent deaf child may be hindered by his very intelligence from acquiring verbal language. By this he implied that linguistic competence is rooted in the beginnings of intellectual life as an acquired symbolic medium and frame of social expression. If society does not provide the child

> with conventional symbols, he can still develop intellectually, but the symbol system (devised by him) which embodies his thinking will be different from the verbal system, so much so that the two systems may be actively opposed (Furth, 1966, 209).

Conclusions advanced by Furth from his research on the thought processes of the deaf serve to question present educational methods which almost exclusively emphasize verbal skills. Instead, increased use of audio-visual and other concrete aids is suggested. In making his statements, Furth's intent is not to devaluate language, but to promote "scientific appreciation of the thinking process upon which verbal learning shall take place" (Furth, 1966, 212).

> The amount of unthinking verbal learning in our schools at every grade level from kindergarten to university is still vast. For every student who thinks clearly and has difficulty communicating his thought verbally, there are easily a hundred others who say things they have not thought through. Such use of linguistic behavior is expected in ordinary conversation or routine everyday life, but it plays havoc with an education which purports to train thinking.
>
> Leaving the general educational situation aside, society is still faced with great numbers of children who for one reason or another are deficient, not in linguistic competence as the deaf are, but in various linguistic skills. There are the millions of mentally retarded, the millions of culturally deprived, the emotionally disturbed, and the children with articulation disorders, or reading difficulties. All these and other children with linguistic deficiencies pose special educational problems. We admit such children are particularly deficient in linguistic behavior, and then, as if to punish them for this, we focus our educational curriculum on their weakest point.
>
> How many hours are wasted because instructions are framed in a verbal medium whose linguistic meaning baffles the child so that he does not even come to the point of considering the subject matter under discussion? How can thinking ensue from the recognition of a problem if the message does not get through and the real problem is the linguistic obstacle of comprehending the message? In a similar vein, many wrong verbal answers reveal a lack of verbal skill more than a lack of thinking...
>
> Just as linguistic competence cannot be drilled into the growing deaf child, ineptness in linguistic usage cannot be remedied by constant exposure to formal verbal teaching. On the contrary, the net effect of such a procedure is to make formal teaching even more distasteful to the child, widening the gulf between language and the development of thinking. For children in any way deficient in linguistic usage, educational procedures should concentrate on the stronger part of their intellectual structure, not exclusively on verbal means.
>
> This plea for nonverbal teaching methods is no longer completely novel, as is demonstrated by the recent upsurge of interest in the Montessori method, and by new teaching methods for mathematics which practically eliminate verbal language. The need for letting children discover principles of thinking through activity is now frequently mentioned (Furth, 1966, 213-214).

The position stated here is that thinking consists of action, doing, internal operations, rather than just speaking the right word. If the aim of education is to promote optimum potential then there should be regard for non-verbal teaching methods, particularly for use with pupils whose linguistic skills are either retarded or absent. In the past there has been a tendency to determine what linguistically handicapped persons could not do. Through use of Piaget's clinical method of assessment, however, there is indication that thinking is in process in the deaf and others who are linguistically handicapped. There is need to study the limits of this thinking, to observe more closely its processes and strategies and to relate these findings to training and education (Furth, 1966, 215).

Im summary, neither language, nor imitation, nor play, nor drawing, nor image, nor even memory can develop or be organized without the constant help of the structuration (mental structures) characteristic of intelligence (Piaget and Inhelder, 1969, 91).

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Report on Task Force I - "Child with Minimal Brain Dysfunction" (Terminology and Classification)

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Task Force I, an interdisciplinary group composed of pediatricians, psychiatrists, neurologists, educators, and service agency representatives began its mission on October 1, 1964. The Committee was co-sponsored by the National Society for Crippled Children and Adults, and by the National Institute of Neurological Diseases and Blindness (now Stroke). Their concern was the child with minimal brain dysfunction.

(Children with minimal brain dysfunction are those who, without evident lowering of general intellectual capacity, show deviations of learning and behavior of such a nature as to require special resources for their management and education.)

The Committee's specific objectives were to:

1. define the problem
2. suggest nomenclature
3. identify the child
4. delineate the relationship of this problem to other handicaps
5. outline diagnostic criteria

These objectives, when met, would provide the foundation for further considerations by Task Forces II and III.

In attempting to "define the problem" the Committee found that first, for a variety of reasons, there are an increasing number of children with minimal brain dysfunction. Schools must provide programs for them, regardless of the exact cause of their disability. Parents, alone and in groups, have demanded increased public and professional recognition of this large number

of handicapped youngsters. They have asked for specialized academic training for professionals, so that each child may reach his potential. A further concern of parents and professionals has been the general lack of knowledge, understanding, and agreement among clinicians responsible for diagnosis and treatment of children with learning and behavior disorders.

Second, the concept of brain dysfunction as a primary causative factor in learning and behavioral disorders has received increasing attention over the past twenty years. This concept has reached particular prominence in the fields of medicine, psychology, education, and the language specialties. Few subject areas have occasioned such wide multi-disciplinary concurrence and collaboration while simultaneously provoking professional disjunction and discord. In fact, the role of brain injury within the constellation of physical, intellectual, and behavioral deviations has not been determined with precision.

Certain basic issues hinder agreement on the concept of brain dysfunction. The Committee considered two such issues at length. The first issue, Organicity vs. Environment, resulted in a somewhat broadened definition of organicity. The Committee also concluded that the diagnostic team must determine as accurately as possible, the amount of impairment that each classification is contributing to the child and his clinical symptoms. Organicity is often recognized as contributing to the child's difficulties. It is frequently ignored in the final diagnosis and in the treatment planning unless it is grossly obvious. The Committee felt that if the "whole child" approach to diagnosis is deemed essential to the earnest understanding of a "difficult" youngster, then equal weight must be given to both organicity and environment.

Also recognized as a basic issue was the uncertainty surrounding the very existence of a condition such as "minimal brain dysfunction" in the types of children with which the Committee was concerned. Viewpoints ranged from considering "minimal brain dysfunction" as an unproved presumptive diagnosis, to a belief that "we cannot wait until causes can be unquestionably established by techniques not yet developed. We cannot postpone managing, as effectively and honestly as possible, the large number of children who present chronic differences that seem to be more related to organicity variables than others." These two views were considered to be extreme versions of the situation--The Committee felt that clinician's viewpoints would probably reflect one attitude more than the other, but with less rigidity.

A second objective of the Committee was to "suggest nomenclature" as an essential for effective communication. In order to encourage mutual understanding, terminology used must define accurately and distinguish clearly one condition from another. Terms used in the case of children with minimal dysfunction attempted to satisfy the diverse demands of at least four groups:

1. the clinicians (usually of several different disciplines) who diagnose, outline, and execute treatment;

2. the researchers who are concerned with descriptive accuracy, validity and preciseness of the central nervous system deviations;

3. educators, who deal with the children and fulfill portions of the treatment plan;

4. parents and others who are personally involved with the child.

Children with learning and behavioral disorders have been described in the past as having "minimal brain damage," "brain dysfunction," "cerebral dysfunction;" or as being "brain injured" or "brain crippled." The term "minimal brain dysfunction" seemed to better describe the subtle effects on learning and behavior that minimal neurological impairment can produce. The Committee, after much consideration, agreed on the following definition of the Minimal Brain Dysfunction Syndrome:

> "The term 'minimal brain dysfunction syndrome' refers to children of near average, average, or above average general intelligence with certain learning or behavioral disabilities ranging from mild to severe, which are associated with deviations of function of the central nervous system. These deviations may manifest themselves by various combinations of impairment in perception, conceptualization, language, memory, and control of attention, impulse, or motor function."

For its third objective, "identifying the child," the Committee reviewed over 100 publications in a search for symptoms attributed to children with minimal brain dysfunctioning. An attempt was made to classify some of the descriptive elements into fifteen preliminary categories. However, there were difficulties, as many of the descriptive terms were used to describe the same symptoms, some of the terms were too broad in scope, too general, or too judgmental. Ten characteristics most often cited by the various authors in order of frequency, are:

1. Hyperactivity
2. Perceptual-motor impairments
3. Emotional lability
4. General coordination deficits

5. Disorders of attention (short attention span, distractibility, perseveration)
6. Impulsivity
7. Disorders of memory and thinking
8. Specific learning disabilities (reading, writing, arithmetic, spelling)
9. Disorders of speech and hearing
10. Equivocal neurological signs and electro-encephalographic irregularities

The authors noted that variability beyond that expected for age and measured intelligence appears throughout most of the signs and symptoms. They also mentioned that many of the characteristics tend to improve with the normal maturation of the central nervous system.

The last objective of the Task Force was to outline diagnostic criteria. Here, the Committee believed that differences exist in the nature and objectives of the "medical diagnosis" as opposed to the "educational diagnosis." The goal of the medical diagnosis is to demonstrate the existence of any causative factors of disease or injury capable of amelioration or prevention. The goal of the educational diagnosis involves the assessment of performance and capabilities. Its objective is to make possible the establishment of appropriate remedial programs of management and education. Guidelines were prepared by the Committee which include a separate section for the medical and the educational diagnosis. Both are necessary for a complete diagnostic evaluation. However, at the present time, a lack of scientific knowledge may make it impossible to provide a precise medical or educational diagnosis. Broad and imprecise categories may still be used. The development of multidisciplinary diagnostic programs, and the increase of scientific knowledge will do much to dispel the existing uncertainties.

In summary, Task Force I noted the plight of an increasing number of children with learning and behavior problems who need competent diagnosis and adequate help. It considered various terminologies used to identify these children, and determined that minimal brain dysfunction seemed best suited to describe their learning and behavioral disabilities. The Committee began a descriptive categorization of characteristics of these children. It also suggested guidelines for a complete medical and educational evaluation. A more complete and detailed consideration of the specific management and educational programs which will be required for these children is part of the mission of Task Force II.

"Research Implications for the Education of the Trainable Mentally Retarded"

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The purposes of this paper are to review selected research pertaining to the education of the trainable mentally retarded and to suggest implications relevant to instructional programs for this group of children and young adults. The intent is not to be a comprehensive review of the literature but rather to focus on implications dealing with motor, language, and social-perceptual training and methodology. Other curriculum areas are not considered to be less important, but are not discussed due to limitations on the length of the presentation.

A Changing Focus on Classification

The term trainable mentally retarded has, for some years, referred to those individuals falling within the moderate and upper levels of the severe retardation category of the American Association of Mental Deficiency measured intelligence classification (Heber, 1961). Although some emphasis was placed on the adaptive behavior classification, it is only recently that a concerted effort has been undertaken to develop a means for accessing adaptive performance. Adaptive behavior "...refers to the effectiveness of the individual in coping with the natural and social demands of his environment" (Nihira, et.al., 1969, p. 5). As Nihira and colleagues indicate in the first section of their "Adaptive Behavior Scales," IQ scores really have little contribution to make to those responsible for helping the retarded to meet social expectations. While the "Vineland Social Maturity Scale," the "Cain-Levine Social Competencies Scale," the "Personal-Social and Vocational Scale for the Mentally Retarded" and the "TMR Performance Profile for the Severely and Moderately Retarded" were useful in identifying performance in some areas, they were limited in scope and were lacking in a number of competencies deemed relevant to training programs for the trainable mentally retarded.

The "Adaptive Behavior Scale" includes ten behavior domains and twenty-three sub-domains including such areas as self-help skills, physical development, money handling and shopping skills. Part II of the Scale includes fourteen domains "...to provide measures of maladaptive behavior related to personality and behavior disorders" (p. 6). While not all these domains have relevance for all TMR children

and youth in school programs, they provide a suitable basis for accessing performance and establishing appropriate educational objectives. Classification according to adaptive behavior for categorization into functional groups becomes possible through the use of this scale and is more meaningful than classifications based on measured intelligence. Leland (Nihira, et.al., 1969) has proposed seven levels of adaptive behavior. It appears that most children in public school classes for the TMR will fall within levels II, III, and IV of this proposed definition, with the bulk of the children being in level III. "Individuals of this level are capable of limited social and economic functioning in a noncompetitive or sheltered environment, and are dependent upon continuing support and quasi-sheltered living" (Nihira, p. 27).

Although the utilization of adaptive behavior measures as opposed to the use of the intelligence quotient is not a new development in the field of mental retardation (Brison, 1967), it appears to this writer that educators who are concerned with specifying objectives based on assessment procedures should focus their attention on adaptive measures. This focus may enable us to plan for the heterogeneous nature of the TMR rather than classifying these children and youth by an apparent homogeneous and relatively narrow range of IQ scores.

Developing an Instructional Program

Hofmeister (1969) recently completed a study designed to provide data appropriate to the development of an instructional program for young adult TMR persons. His subjects included 22 TMR teenagers and adults from a community training facility and the data was collected over a period of 33 weeks. Pre- and post-test data was collected and a system of progressive testing was utilized to monitor each subject during the treatment phase of the study. One of the unique aspects of this study was the ongoing modification of the program based on the feedback obtained from the progressive testing. The treatment phase extended over 15 weeks and a retention assessment was made 14 weeks later. Among the outcomes of the Hofmeister study was a model for program development and six aspects of this model are listed as follows:

"1. The learning task should be determined and then defined by the development of a criterion test which could be used to objectively assess successful completion of the learning task.
2. The learning task should then be analyzed into a sequence of instructional units.
3. Instructional materials and methods should be developed on a system of developmental testing, field testing, and modification based on the results of these testing procedures.
4. Prior to commencement of instruction, the position of each student in the learning sequence is determined. This is done by administering a pretest developed from the final sequence of instructional tasks.

5. As a part of the instruction process, the pupil's progress should be monitored by a system of objective criterion tests. This is done to provide data on the progress of the student and the nature of the problems encountered. Intervention and material-and-method modification should occur, depending upon the feedback obtained from this monitoring process.
6. At the conclusion of the instruction program the pupil should be evaluated by means of a criterion test to assess the effectiveness of the instruction."

The implementation of Hofmeister's model should be at least partially effective in overcoming some of the weaknesses that have been attributed to programs for the TMR. Guskin and Spicker (1968) reviewed the educational research relating to school arrangements for the TMR and concluded "...that two of the major reasons why special education programs for the TMR have not been shown to facilitate social competency are inadequacy of curriculum content and poor teaching" (p. 269). The inadequacy of curriculum content is probably not due to the lack of courses of study or curriculum guides for the TMR, for there is an ample source of recommended goals and objectives for this group of children; the inadequacy appears to lie in the lack of efficient means to implement the curriculum content. Both the Cain and Levine study (1963) and the Hudson study (1960) suggest that the amount of time actually devoted to instruction in the various areas of the curriculum is not always consistent with the relative emphasis given to each of these areas in guides and courses of study. The implication appears to be that we need to develop the teachers' skills in assessment, in analysis of learning tasks, in the selection and modification of materials, in methodology for arranging the learning environment, and in evaluation of the entire process -- in other words, we must help teachers to become adept as managers of the educational program. Most teachers probably have a pretty good idea of what ought to be taught, but some teachers are less than proficient in the actual process of teaching.

A "model" comprehensive curriculum for TMRs has been suggested by Evans and Apffel (1968) and 21 content areas have been listed for TMR children below the age of eight as follows:

"1. Sense training and stimulation
2. Motor development, including some rhythmics
3. Body-image development (beginning)
4. Intersensory integration exercises (beginning)
5. Attention training
6. Self-help skills (basic)
7. Perceptual training
8. Exercises in concept formation
9. Language development
10. Intersensory integration (advanced)

11. Visualization practice
12. Body image (advanced); use of rhythmics, personal appearance improvement
13. Reading
    (a) Rebus
    (b) i.t.a.
    (c) traditional
14. Self-help skills (advanced)
15. Writing and drawing
16. Arithmetic
17. Socialization skills (manners)
18. Speech therapy
19. Music
20. Gymnastics
21. Creative Thinking ("brainstorming")"

It becomes readily apparent that if teachers are to become adept as managers of the educational program for TMRs, they need to know a lot about content in many areas of the curriculum. They must be skillful as "managers," but first they must know what to manage.

Motor Training and Physical Education

The importance of motor training for retardates has been suggested by Baumeister (1967) in the following statement: "Quite possibly the acquisition of motor skills has more relevance for a consideration of mental retardation than any other area of learning" (p. 188). The rationale supporting this view stems from the idea that many retardates will rely upon their ability to successfully carry out motor-dependent tasks as adults in a work environment. Other educators, such as Kephart, stress the importance of motor training as a basis for all other learning.

A review of the research in motor learning of retardates by Baumeister (1967) led to a number of conclusions. Among them are the following: (1) Retarded individuals are less deficient in motor learning than in other areas; (2) "...The deficiency in motor skills is specific to certain types of tasks or processes"; (3) on pursuit rotor tasks, retardates improve with practice, "...they perform better under distributed than under massed conditions," and "their performance is facilitated by verbal reinforcement"; (4) "...the simpler the motor task, the less at a disadvantage is the retardate as compared with the normal"; and (5) retardates "...appear to improve at a faster rate than normals or, at least, for a longer period" (p. 189).

The implications for educators that may be made from the above conclusions are as follows: (1) with proper training procedures, we may expect to bring some TMRs up to, or near, a normal level of performance on some motor tasks; (2) motor tasks should be analyzed

into the simplest components and each component taught separately prior to teaching a more complex motor task; (3) practice should be distributed rather than massed over time; and (4) verbal reinforcement should be included as a part of the training procedures.

More gross motor training in the form of physical education programs has been studied by Funk (1969). Most studies on the effect of physical education on the performance of the mentally retarded have been conducted with educable subjects. The few studies reviewed by Funk, plus the results of his own study, lead to the following conclusions: (1) The performance of TMR youngsters on tests of physical fitness are significantly inferior to the performance of normals; (2) general type programs of physical education do not have an effect on body strength but do improve skills which require speed of movement; (3) general type programs do not have an effect on fine motor movements; and (4) general type programs do have a positive effect upon awareness of body concept and self-image as reflected in drawings.

The implication suggested by this evidence is that although general type physical education programs may be appropriate for a part of the school day, some time should be devoted to specific practice in developing specialized skills and in acquiring strength in the various parts of the muscular system.

Language Training

The list of studies of verbal learning with retardates is extensive and as Goulet (1968) has stated in his summary, "A general, inclusive statement summarizing the entire span of verbal learning research with retardates is impossible. However, it may be stated with some certainty that retardates and matched-MA normals learn verbal tasks at comparable rates. The lone exception to this conclusion may be normal-retardate contrasts involving serial learning" (p. 129). This latter exception provides a clue to the educator searching for the means to enhance verbal learning of the retardate and suggests that whenever possible, materials should be developed utilizing a paired-associate procedure rather than a serial learning procedure if this is feasible.

Baumeister (1967) suggests several implications for the education of retardates in the verbal area, although it should be noted that tentative conclusions are not based solely on studies of TMR children, since a majority of studies utilized EMR subjects. For the sake of being able to make some statements of possible implications for TMRs it is necessary to generalize the results of a number of studies beyond the limits of the population investigated. The following implications then, are based upon Baumeister's review of research, but this writer takes the responsibility for any over generalizations which exist and any incorrect statements of conclusions.

1. The teacher should attempt to increase the meaningfulness of the material to be learned since meaningful material is learned more rapidly and retention is improved when meaningful materials are utilized. This may be accomplished by assisting the TMR to become thoroughly familiar with the individual items to be associated or learned before the actual process of association is attempted.

2. Assisting the learner in providing verbal mediators (supplying labels) to the task will improve learning. A teacher may help a child to "talk himself through" a learning task, even applying complete statements rather than mere labels to the material.

3. Distributed practice assists the retardate and appears to be more beneficial to his performance than massed practice.

4. Increasing the length of exposure of material over the normal time usually allowed for average learners is desirable. The implications for presentation of both auditory and visual materials is obvious and may be equally applicable to materials presented via other modes.

5. Overlearning facilitates retention and should be built into programs and materials. The suggestion is not that drill becomes the overriding criteria for material construction, but that a systematic provision is made for overlearning a task once the minimal level of performance has been achieved.

6. Proactive and retroactive inhibition should be minimized by properly ordering the material with relation to similarities and differences and by attention to the structure of the school day. The distinctiveness of certain items of the materials may be increased and thus limit the degree of inhibition which occurs.

Social-Perceptual Training

There seems to be considerable agreement among educators that TMRs require help in developing social skills which enable them to adapt effectively to a non-retarded environment -- in other words, to learn to adjust to a normal situation apart from the special school or special class. What appears to be lacking is a collection of materials and proven strategies for accomplishing this objective. One set of materials which has been developed and field tested with EMR youth is the "Social Perceptual Training Kit for Community Living" (Edmonson, Leach and Leland, 1967). This material was developed at the University of Kansas Medical Center and is now available commercially. Both the

objectives and format appear appropriate for use with older TMR youngsters. The objectives are stated as follows: "The first objective for this unit of educational material is to make social cues or signals clearer and interpretable by the retarded subject. A second objective is to clarify the behaviors that would be appropriate in response to the cues or signals. The overall objective is to make portions of the activities of the adult world visible and more comprehensible to the school aged retarded youth" (pp. 1-2). The implication to be drawn from the research supporting this material is that social-perceptual training can be taught in a systematic manner and materials can be developed and modified to meet the special requirements of TMR young people.

Methodology

Operant conditioning with retarded children and adults has been the subject of numerous studies over the past decade. The effectiveness of these principles have been demonstrated beyond question and if a gap exists, it is in the utilization of knowledge about operant conditioning rather than in the lack of knowledge *per se*.

Six principles of operant conditioning as they apply to retarded learners have been described by Baumeister (1967):

"1. The desired response must be potentially available.
2. Desirable behaviors (i.e. improvements) should be reinforced and undesirable ones ignored.
3. Reinforcement should be immediate.
4. In establishing the behavior, the reinforcement should be administered on each occasion of the response. Then, as learning progresses, reinforcement should be delivered on an intermittent basis.
5. The desired behavior should be "shaped" by rewarding successive improvements in the components that constitute the behavior.
6. The subject's environment during the initial stages of learning should be held as constant as possible" (pp. 196-198).

An obvious implication from the research is that operant conditioning is effective in many circumstances, so use it. Less obvious, perhaps, is the need for the teacher to determine what reinforcers should be used with each child and on what schedule. Of equal importance is the requirement of knowing what the entering behaviors are and the optimal steps within the task which suit the learning characteristics of each learner. These needs lead to the conclusion that a teacher must acquire considerable expertise in assessment, in task analysis, and in application of principles of learning. Of help to the teacher in these respects are the refined techniques of "Precision Teaching" developed by Lindsley, Haughton and others. These rather efficient ways of handling data and of portraying it graphically have been demonstrated to have

implications for use with TMRs in a recent study by Waechter (1970). Waechter utilized the following steps in precision teaching with 28 TMR subjects:

1. Pinpointed behavior
2. Obtained daily, direct records of the movement
3. Computed the rate (number of responses over the elapsed time)
4. Charted the rate
5. Accelerated or decelerated the movement in the desired direction
6. Continued or modified the plan until the desired change had been achieved

In applying these principles to recreation and leisure time behaviors with TMRs, ages 9 to 18 years, Waechter demonstrated "...that through systematic event changes and an analysis of tasks, the special student would reach what was defined, for the purpose of this study, as proficiency levels" (p. 157).

Conclusion

Although many of the above implications are based on research conducted with EMRs and on studies which are less than conclusive, they are presented as tentative guides for improving the educational programs of TMRs. Some of the implications may be found to be valid, others will require modification, and still others will be in error; nevertheless, it is the role of the special educator to attempt to move the findings of research from the pages of journals and professional books to the classroom as rapidly as possible. The risks of overgeneralizing and of making misinterpretations must be taken -- otherwise TMR children and youth continue to proceed through our programs without the benefit of what little we do know about how they learn.

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DEVELOPING A POSITIVE SELF CONCEPT IN THE MENTALLY RETARDED

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The mentally retarded are affected by society in much the same way as other human beings. The mentally retarded, as you know, are faced with many problems that other people do not face in our society. This is because the retarded are identified as being different in certain areas of their social and emotional and vocational adjustment. The retarded face many problems similar to those that are faced by physically handicapped children; however, children with physical handicaps evoke sympathy and at least attempts on the part of society to understand their problems. The child who is mentally retarded has a non-visible handicap and is merely thought of as being an inferior human being. Children who are treated as though they are inferior soon accept this treatment as a fact and look upon themselves as being unworthy individuals. Clearly it is the role of the school to counteract the negative views that the child has of himself and help him to hold values and behave in such a way that the general image that society has of him is positive rather than negative.

Before proceeding further, let us define our terms to make certain that we understand what is being discussed. By self-concept, we mean a system of beliefs which a person has about himself. All of us have hundreds of ways in which we perceive ourselves and when these are summed together, we refer to it as the

self-concept. The self-concept is the product of one's experiences, therefore it is learned, and once it is learned it helps to determine our future experiences. So in this context, the self-concept also becomes a process.

For those of us in education it is tremendously important that we understand how significant the self-concept is in determining behavior. All of us behave in terms of how we see ourselves. For example, if we perceive of ourselves as being manly, then we behave like men, and if we perceive of ourselves as being feminine, then we behave like women. Those of us who are not quite sure of ourselves behave in a mixed-up fashion. Once we have established a firm self-concept, then it helps us determine those things we see and those things we hear. It acts as a selective factor on almost everything that we do.

To see how important self-concept is let us relate self-concept to behavior, to learning, to adjustment, and to intelligence. In relating self-concept to behavior, we can most assuredly say that probably the most important single cause of a person's ability to succeed or to fail has to do with how he feels about himself. As we look at how the mentally retarded regard themselves in the case of reading, we see that most retardates read far below their mental age. Actually, this is not a necessary outcome. If the child acquires the idea that he cannot read, then he doesn't try. And because he doesn't try, he doesn't get enough practice. And if he doesn't get enough practice, then he can't read very well. If the teacher should say, "Honey, you sure don't read very well," it only proves what he believed about himself in the first place, and the vicious cycle is repeated again. Perhaps the child gets a failing grade in reading, and when he gets home his parents reinforce this fact also. Here we find the child involved in a

conspiracy that continues to reinforce the negative feelings that he has about himself. In general, behavior is considered to be a result of two things--how he sees the situation in which he is involved, and how the individual sees himself. If the child is mixed up about either of these, generally he will behave then as though he is mixed up. In a study of children's ability to read at the University of Florida, Arthur Combs found that a child's self-concept is a better predictor of success in reading than his IQ scores.

Probably one of the most basic principles of learning is that "any information will affect a person's behavior only in the degree to which he has discovered the personal meaning of that information for him." (Arthur Combs, 1967) The first step in learning is to acquire new information. The next step is to discover the meaning of that information which we have acquired. In our schools we seem to have done a much better job of carrying out the first step than we have the second. When we teach something new to a child we have to try and make that new learning as personal as possible. Relate the new learning to the life of the child. Make certain he can perceive it as something he can use now--today. Do not hold up long range goals of two, three or four years hence because this will negate any learning on the part of the child. When we find children being bored in our classrooms, high school kids who are eager to drop out of school, it means only one thing. It means that the information we have conveyed to these children is the wrong kind of information. In essence what we have said is, "In school you learn about things that don't matter." So often we might comment to a child as follows: When he volunteers some information we'll say, "That's very interesting, Sam, but what does the book say?" In essence, then, we're telling the child that it's not important what he thinks. We can relate this information to

ourselves by asking ourselves whether we eat the foods we know are good for us. Can we resist eating the blueberry cheesecake when we know we're supposed to be on a diet? How effective are we at stopping smoking when all the doctors and television shows drum at us the idea that smoking is injurious to our health? How many of you actually can quit and do that which you know is best for you? If we were to read an article in the paper about a case of mononucleosis it would probably go in our eyes and out our ears. Or if we get to the office and our secretary should tell us that her son has mononucleosis, it suddenly gets a little closer to us and we start becoming curious about what mononucleosis is. Later in the day when you go home you find that your son has mononucleosis--then the meaning is even more clear to you, and for certain you are going to learn about this disease.

It's an assured thing that self-concept is strongly related to an individual's adjustment. If a person is well-adjusted, then he usually perceives of himself as such. If he thinks of himself as being capable, worthy, and appreciated by others, chances are he will behave as though he is. If, however, an individual perceives of himself as being maladjusted, as being unliked, uncapable, then that person will perceive of himself as being bad. Upon close examination of people who appear for psychotherapy, usually it's because these people have a bad self-concept about themselves. They cannot stand the truth about themselves. How often has the black child had the idea of black given to him in a negative context? Probably many more times than we would like to count.

For many years in education we had labored under the idea that intelligence was fixed and immutable. It was something we inherited and couldn't do anything about. Innumerable pieces of research during the last decade have proven this notion

to be completely false. Arthur Combs believes that this is probably the most exciting idea about American education in our generation. He says that we should perceive of ourselves in our teaching situation as not being the victims of the students we are working with, but being the creators of intelligence. Millions of people walk around as victims of their own self-perceptions, and we actually look for situations to reinforce these ideas. For example, a large proportion of you in the audience believe that you are terrible at math. Because you do not believe you are good at it you don't get any practice, and because you don't get any practice, you don't become good at it. Probably the only time you have much to do with arithmetic is when you are computing your income tax, and you make just enough mistakes to convince yourself that you're bad at mathematics. This idea helps us to understand why the culturally deprived have such a difficult time overcoming their environments. They have grown up believing that they are unable, unliked, unwanted, undignified, and unworthy. This is why the new movement of black power and black is beautiful has much to be admired in it. With the mentally retarded which we have in our classrooms, we should not be content to raise their level of performance up to what is expected for a normal child of their mental age, because many, many instances can be given where children have performed far in excess of what their mental age would indicate. Not too long ago I was teaching a high school class in Portland, Oregon, and had a boy with a 68 IQ in that class. The family continued to give him moral support in all his endeavors and the child was highly motivated and had a genuine positive self-concept of his own ability. This child improved his reading skill to the point where he was reading at approximately the seventh grade level and was

taking such complicated subjects as mechanical drawing and getting A's and B's in these subjects. This child eventually drew up plans for a summer cottage which his father built, and the last time I had seen the boy he was drawing plans for a bowling alley which his father intended to build, also. All of this with a 68 IQ. Very few people ever lived up to their potential, and we as teachers of the mentally retarded must ever strive in this direction with our students.

If as educators we can see the relationship between self-concept and behavior, learning, adjustment and intelligence, certainly we should also see that we have a responsibility to our students to develop favorable self-concepts in them. It is therefore important for the school program to place a heavy reliance on providing the experiences within the school setting for developing social skills which will help the retardate gain self-respect and obtain the understanding and respect of others. The teacher's attitude, the climate in the classroom, and all activities must be conducive to creating an atmosphere which allows the mentally retarded to gain skills in living successfully with others. Let's look at some of the ways in which this can be accomplished.

Teachers, like other people who work with others, need to develop sensitivity for the other fellow's feelings in the world. A few years back there was a best-selling novel which became an academy award winning movie entitled, "To Kill a Mockingbird," in which the hero of the story, Atticus Finch, an attorney, stated, "To understand a man we have to walk around in his shoes a while." And recently there has been a hit record entitled, "Walk Around in my Shoes." Both of these creative works emphasize the need for empathy amongst all men. If we had to

evaluate teachers probably the most important criteria that we could use is the degree to which teachers are able to understand and be sensitive to the children's needs. This means to be concerned over the child's personal problems. In supervising student teachers I often find that they have a child in the class whom they have a difficult time liking. In fact, they sometimes downright dislike certain kids. I always encourage them to visit the homes of those children who irritate them the most, and almost in all cases once the student teacher sees the kind of environment in which the child is raised, that student teacher suddenly can appreciate the efforts the child is making to adjust to a sometimes hostile world. Every teacher of retarded children should visit each home of her students at least once a year. In so doing we sometimes are amazed to find that so-called little monster is actually a much better child than we would expect him to be considering his environment.

In learning as much about a child as we can, we sometimes have to find the person in the child's life who exerts the most influence over him, and work through that person to reach the child. This might be one of the parents, it might be an older brother or sister, an uncle, a grandparent, or even a neighbor.

We must also consider the consequences of our relationship to the children we teach. We must be very careful in everything that we say, in everything we do, that we do not ridicule the child. Teachers are able to do this without being aware of it. For example, how often have you heard teachers say to a child, "Come on, Jimmy, you can do that. It's easy!" Well, let's examine what that teacher is saying to the boy. By saying that the work is easy, she's telling him that he is stupid if he cannot accomplish it. And if he does accomplish it because it is easy,

he's not really been too successful. A more correct strategy to employ would be to tell the child, "Here, Jimmy, this is some tough work. However, I know you can do it if you try real hard." Now in this case, if Jimmy is successful, his self-concept improves because you told him it was difficult to begin with. On the other hand, if he should fail, and not be able to accomplish the task, he has not lost face, because he knew it was difficult. But at least he tried hard. By the same token, if we tried to make a gift of charity to a person, sometimes our attempts at help only increase the other person's feelings of inadequacy. However, if you allow a person to earn what he gets, then what he obtains is not charity, and is earned by the sweat of his brow. In the South, for generations it has been necessary for the Negro to be sensitive to the attitudes and needs of the whites. Now is the time for reciprocity, and the time for each man to be sensitive to the needs of his brother.

A second thing which we as educators must recognize, is the fact that children always bring their self-concepts with them. Everything we do has its effect on the self-concept of a child. One of the most interesting pieces of research conducted in recent years was the study which later became known as "Pygmalion in the Classroom," and was conducted by Rosenthall. It has almost become a cliche amongst educators. If you recall, this is a study where intelligence test scores to all children in a certain school system were filed away, and names of children were selected at random and teachers were told that 20% of their children were due to make remarkable gains in intelligence in the coming year. Sure enough, despite the fact that they were picked at random without reference to their intelligence scores, their intelligence increased because the teacher had anticipated

that it would. The fact the teachers believed and were sensitive to the fact made the difference in behavior. Although no one knew exactly what they did, evidently a more hopeful attitude toward children produced more tangible results.

A third responsibility of educators is to humanize the schools. Ever since Sputnik there has been pressure on the schools to stress the giving of information. Students are now drowning in information they are being fed by teachers. In fact, most research in innovations in the schools stress giving information more quickly and more efficiently. During one of the demonstrations on the campus of the University of California in Berkeley, a sign carried by one of the students appeared which said, "Don't fold, spindle, or mutilate me." Evidently the students on that campus were feeling the terrible process of de-humanization. To compensate for large classes, emphasis is being placed on guidance counselors to maintain personal contact with students. This is probably one of the few areas where special education has been very successful because it has been able to maintain a small ratio of students to teachers.

Recently I had the privilege of visiting John Adams High School in Portland, Oregon, which was written up in Newsweek magazine this past month and accused of possibly being the best high school in the United States. I'm not certain whether this title is deserved or not, but I can tell you I was tremendously impressed by several of the things that I saw there. Although the school has thirteen hundred students, they are able to divide the school into four separate houses so the students have some permanent contact with regular teachers, and some affiliation to his own "house." I am certain that the education world is going to hear a lot more about this high school in the future. One of the main goals of this school is in increasing the personal contact that students have with their teachers and in giving students a greater

voice in what type of education they are to receive.

A fourth thing we must do in the schools is to combat the "fallacy of failure." Do you know there are actually people, including teachers, who believe that because a child is retarded, he ought to learn how to accept failure early. There are still administrators among us who believe that every child ought to have the chance to succeed in a regular class, and they're willing to subject children to three, four, and five years of failure in order to. These people have grown up with the idea that failure is good for people, and that this will help them to adjust to a cruel world much more quickly. Combs, 1966, claims that failure is like a psychological disease, whereas a physical disease is failure of the physical organism. We don't give the child all the diseases we can as soon as possible. We give him a vaccination or an innoculation which generally is a small dose of a disease with which he can cope, so that he can be successful with it. This is given to him in order to build up strength in order to combat a tougher dose of the disease later on. So he is actually strengthened by dealing with the weakened form so that he can handle the real thing when it comes along. It is also similarly true with psychological failure. The best guarantee that a person will be able to deal with difficulties in the future is if he is successful in dealing with problems in the present. The famous psychologist Maslow has defined this situation by saying, "Human maladjustment is the screaming of the victim at the crushing of the psychological bones." One thing which we should all agree upon is that human failure is debilitating, destructive, and destroying.

A fifth responsibility of the school is to insure that the child has successful experiences. Julian Rotter has conducted excellent research regarding this idea. He has found that children who experience success often look forward to new

experiences anticipating further success, whereas children who have failed in the past look forward to new experiences with hopes of avoiding failure. Retarded kids who have been in regular classes develop this psychological outlet of trying to avoid failure rather than becoming success strivers. It has also been noted that retardates who have been transferred to special classes soon acquire success-striving outlooks mainly through having successful experiences, one right after the other. Whenever a teacher meets a new student she should always look for opportunities to ensure that the child can be successful, and when he is, to lavish praise and other forms of reinforcement on him. This is the only way in which the child can learn a positive view of himself. How can a person feel wanted unless somebody wants him? How can a person feel acceptable unless somewhere he is accepted? How can a person feel he is a person of dignity and integrity unless somebody treats him so? And how can a person feel that he is able unless somewhere he has success?

A seventh thing we must strive to do is as Arthur Combs puts it, remove the educational barriers to learning. Things we must change to remove or to lose preoccupation with facts instead of meanings in our teaching, and not be preoccupied with grades in our evaluations. We convey the information to our students that grades are worthy ends in themselves. We pressure children into conformity instead of allowing creativity and are often overwhelmingly preoccupied with order, neatness, quietness and goodness, assuming that these are all contributing to education. Too many teachers of the retarded ask for help in how to teach certain subjects, and in asking for help they want a solitary learning cookbook to follow, where everything is spelled out for them, rather than having guidelines for them so they can develop their own approach to teaching. We also create unfair competition for our kids instead of

having them compete against themselves. Competition is good as long as it is kept fair.

The school can also help children build self-concept in another fashion -- that is by encouraging them to be committed to solving problems and to accept responsibility for self-direction. Responsibility is something that can be learned just like any other subject if we start with small responsibilities and work up to larger ones. Children can learn to direct their own activities. Too often we are fearful of letting people take the consequences of their own behavior, and quite often small failures can teach as much to a child as success. As long as it's his choice he will learn from it. But we certainly must be a lot more willing to let children grow in the directions which are significant to them. Too often we set up goals for our children instead of allowing them to choose something worth while to work toward.

We must begin where children are and not demand that they be what we hope they will be when we get through with them. The first day of school some children might walk through that door and the teacher reacts to them in a negative fashion at the beginning, rather than accepting the child where he is and looking below the surface and trying to understand how the child got to be that way.

Another thing a school can do is to try and evaluate teachers on their ability to develop self-concepts as well as their ability to teach academics. If I had to choose between two teachers, and one of them could develop healthy self-concepts in her children but had difficulty in teaching academics, and another teacher who could teach academics, but did not do much in the way of building self-concepts, I would tend to prefer the former. However, it is quite possible that one who teaches academics well also can uplift the self-concept.

One of the most important things a school can do to improve self-concept is to work with the parents. Recently researchers at Michigan State University reported findings that gave considerable emphasis to the idea that parents are important in developing self-concepts. These investigators measured the effectiveness of three different methods of changing the self-concepts of students, mainly through (1) formal large group information sessions, (2) group and individual counseling and (3) training parents on how to improve the self-concepts of the children. The first two methods produce little significant changes in the children, but by training the parents in their role, significant changes were produced in the self-concepts of their children in a one-year period, and this change was reflected in significant changes in the children's academic achievement for the same period. We can help parents in this role by helping parents to be aware of how self-concepts are developed, pointing out that it is not only verbal expression that conveys an image to the child, but actions as well, and by helping the parents to enhance the self-concept and confidence in their children by refraining from negative statemenets such as calling a child stupid or chastising him before he ever engages in misbehavior. For example, parents too often say, "Well, I suppose you're gonna get your clothes all dirty when you go outside and play," which is assuming guilt before the fact has every occurred.

In another important study by Hess, 160 mothers and their four-year- old children were observed. Forty-eight of them came from middle-class backgrounds, 40 were working-class mothers from unskilled occupational levels, 40 from unskilled occupational levels, and 40 mothers on public assistance. The mothers were studied

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along several dimensions, one of which was the mother's self-concept and her view of herself in relationship to the community and to the school. It was observed that children of working-class mothers tended to have a higher level of aspiration for their children than those they actually expected the child to accomplish, indicating that there is a large gap between the desired occupational level and what they think their children are capable of doing. Evidently parents see that the world offers a wide range of opportunities, but they are convinced that their child is not going to reach these desirable goals, either through lack of opportunity, lack of schooling, or lack of ability. And when these same mothers were asked about their own educational and occupational experience, they obtained a similar response--less preparation than needed and much higher aspiration than they were able to achieve.

Conclusion

When you put your hand out and say, "Come with me, let me show you how. I'll hold your hand, I'll teach you, but friend, then you do it."--that's a sense of accomplishment and that's the only way you can lift people up. As the teacher, you'll enjoy the rewards that come with this type of accomplishment like nothing else could every give you. You never help a person by talking down to him--only by extending a hand and saying, "Come with me. I won't carry you, but I'll lead you and by your own steps you'll make it."

Our country is in serious danger right now, and I don't mean from Russia, but I mean from within. Our value systems have been weakened by people who demand a maximum of benefit with a minimum of effort. Our country was built on the idea of doing something better than the next guy. (Value given for value received.) To me, this

means doing the best job that one is capable of. Vince Lombardi, former coach of the Green Bay Packers and now of the Washington Redskins, has been able to develop a strong desire and commitment to success in his football teams which is well documented by their fabulous records during the past decade. The Green Bay Packers have developed a reputation for rising up after defeat and performing their best when the odds against them were greatest. In order to do this, he has emphasized the development of self-concepts in the players, a self-concept clearly imbued with pride. To quote Mr. Lombardi, "Confidence grows in direct proportion to preparation. If you are ready, you will be confident you can do your best. If you are prepared to do even the unexpected, you will not be jolted even by the unexpected." He also says, "If any of us does not make the most of his individual abilities, he is cheating himself, his associates, his family, and his God." If we can instill self-concepts strengthened with pride in retarded children, they can be assured of having a good chance to be successful.