1980

A Comparative Evaluation of Variations of Oral, Manual and Combined Approaches to Teaching Oral Expression to Non-Verbal Severely and Profoundly Retarded Institutionalized Adolescents

Madge L. Moody
Loyola University Chicago

A COMPARATIVE EVALUATION OF VARIATIONS OF ORAL, MANUAL AND COMBINED APPROACHES TO TEACHING ORAL EXPRESSION TO NON-VERBAL SEVERELY AND PROFOUNDLY RETARDED INSTITUTIONALIZED ADOLESCENTS

by

Madge L. Moody

A Dissertation Submitted to the Faculty of the Graduate School of Loyola University of Chicago in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

January

1980

ACKNOWLEDGMENTS

I wish to express my appreciation to the members of the committee, Samuel T. Mayo (Chairman), Pedro J. Saavedra, Jack A. Kavanagh, and Ronald R. Morgan.

A particular thanks to Eileen M. Baldeshwiler, Ph.D. and June L. Hadley, M.D. for their reading of the text and for their encouragement, and to Hope Scheftner for typing the manuscript.

VITA

The author, Madge L. Moody, was born December 14, 1931 in Milwaukee, Wisconsin.

Her education was obtained in the public schools of Milwaukee, Wisconsin. She was graduated from Riverside High School in 1949.

She received the degree of Bachelor of Science with a major in English from the University of Wisconsin in 1956.

She was granted a fellowship from NIMH to complete her Master of Arts Degree at the University of Minnesota in 1966.

For the past twelve years Miss Moody has been with the Illinois Department of Mental Health and Developmental Disabilities where she held various administrative positions; Director of Educational Clinical Services, Associate Director of Subregion Two and Deputy Director-Henry Horner Child and Adolescent Treatment Center.

TABLE OF CONTENTS

TABLE OF CONTENTS - CONTINUED

TABLE OF CONTENTS - CONTINUED

LIST OF TABLES

LIST OF TABLES - CONTINUED

LIST OF TABLES - CONTINUED

LIST OF GRAPHS

CONTENTS OF APPENDICES

CHAPTER I

THE PROBLEM

Lacking age-appropriate developmental skills and showing neurological abnormalities as well as medical, physical, and psychological problems, mentally retarded persons offer a unique challenge to those attempting to develop receptive and expressive language skills.

It is generally accepted that language retardation and mental retardation are correlated. To compensate for low intelligence, short attention span, short memory, perceptual deficiencies, and absence of social interaction, new intervention strategies need to be developed for the profoundly and severely retarded who have no language skills. These interventions must provide experiences for acquiring the developmental pre-language skills of the sensorimotor period described by Piaget (1970). Through Piaget's work (1967, 1969a, 1969b) psychologists have been made aware of the importance of the early developmental stages a normal child goes through prior to the onset of oral language production. This sensorimotor period for normal children is a time in which there appears to be much interaction between the child and objects within his environment, physical, motoric exploration, manipulation and play activity at the non-verbal level. During this period the child develops increasingly more complex cognitive structures. These more complex Piagetian level five and six schemata have been found by Uzgiris and Hunt (1975) to

be present in the retarded child with some oral language ability but not in the non-speaking retarded child. In addition to learning to speak specific words, the child must eventually acquire the conventions of a language system so that there can be interaction between the child and people in his environment and he can obtain what he needs, express what he feels, and exercise some control over his life.

For the child who has no expressive language skills, there is no universally acceptable language training program at this time. Most of these children have been thought to be unteachable once they have reached puberty. In the current literature there are studies describing a single therapist and a single non-verbal subject who has been successful in acquiring expressive language. Most of these studies describe subjects who have been singled out as having potential skill. Usually using or exploring various techniques and methods by trial and error over long periods of time, the subject has been able to acquire beginning language. It is impossible to isolate the treatment and techniques responsible for this language acquisition. The studies have not been replicated with groups; moreover, the time required and the one-to-one relationship make replication impractical. Individual successes do, though, provide hope, in that, if one student beyond puberty has acquired expressive language perhaps others may also.

Studies reporting success with groups of retarded almost always involve subjects categorized as mildly or moderately retarded who already have minimal language skills, indicating that they also possess the developmental pre-language skills of the sensorimotor

period. But the problems and methods of teaching are different when working with the non-verbal child or adolescent because the child is different.

Still other studies report teaching non-verbal deaf and autistic subjects who may also be functionally retarded. These studies may be useful in providing methods and techniques suitable for adaptation and modification for the severely and profoundly non-verbal subject.

Developmental, behavioral, and cognitive psychologists, along with linguistic experts and speech clinicians, have contributed to the development of theoretical models of language acquisition for the normal and slow-developing retarded, but the programs developed from these models, Guess, Sailor, and Baer (1973); Bricker and Bricker (1973); Carrier (1973); Miller and Yoder (1972); Kent, Falk, and Guenther (1972), have not proved useful with the severely and profoundly retarded because most programs assume the child has a developmental level beyond the sensorimotor period.

It may well be that some individuals will never acquire verbal skill, but this does not exclude the possibility of developing other forms of communication which require minimal cognitive development.

At any rate, there is a population of severely and profoundly retarded who possess no appropriate means of communication. The present study investigated the teaching of total communication to this population with oral expression as the goal to be obtained by the subject. A total language program with several treatment variations (oral/manual, oral and manual) was implemented with several groups (1, 2, 3) matched for developmental skills. The program

utilized available material from several disciplines, adapting it to meet the needs of the target population of non-verbal severely and profoundly retarded. The language program emphasis was on utilizing receptive ability and sensorimotor experiences and all the senses to provide a bridge from a motoric mode of expression to a manual and/or verbal mode of communication.

The interaction of child, object, and trainer are thought to be beneficial as Bricker and Bricker (1974) state:

> Support for the use of motor acts or mediators which involve the actual objects being trained comes from the theoretical writings of Bruner (1966) and Piaget and Inhelder (1969). As indicated earlier, for the young child, an object is what it does or what he can do with it. The child's development from inactive knowledge to symbolic knowledge about his world emerges from his direct interaction and action on his environment. Both Bruner (1966) and Piaget and Inhelder (1969) posited that before a child can manipulate symbols, language being one form of symbols, he must be able to manipulate the objects these symbols represent. For Piaget, as the child moves from simply waving or banging objects indiscriminately to using the object in discriminate, functional ways, he is learning the action-relevant nature of his world....Furthermore, training rote receptive vocabulary via a functional mediator or motor movement may facilitate the acquisition of conceptual receptive vocabulary.

The present study also borrowed from the behaviorist the imitative and shaping procedures with reinforcement shown to be successful in obtaining verbal utterances with many differing populations. It is important to note that language to be developed in this study was initially signs and single-word utterances symbolizing objects already present in the child's environment but was not concerned with the syntactical or semantic problems of a language system. It was hoped the treatments would produce single-word utterances. Further knowledge of the relationship between ability to acquire manual and/or verbal language and the child's developmental skills was another

objective. In addition, it was thought important to know whether the different treatments produced different effects and how the length of training affected the learning process.

CHAPTER II

REVIEW OF THE LITERATURE

Teaching which uses a total communication approach has only recently been of interest to researchers working with severely and profoundly retarded children. Only since the early seventies have they been looking to the integration of generally divergent approaches to teaching speech or language to this population. The integrative approach has come about largely as the result of the recognition and acceptance of Piaget's developmental findings as being important to the cognitive, linguistic, and psychological development of the child. Piaget's work provides a unifying structure on which different disciplines have been able to converge.

The review of literature will first cover articles on theory and observations by the cognitive psychologist and linguists on the development of the child during the pre and early developmental periods. This will provide information of the relationships between the development of intelligence and language, the contents and sequence of internal and external events affecting development, and hopefully, some insights into possible training of the study population in oral language.

Secondly, many investigators have been concerned with specific issues and areas of learning which are relevant to this study directly or indirectly. Some of these studies compare the normal

and retarded to determine if they are alike or different. The results of these studies provided information useful in developing the study treatments.

A total communication program by definition utilizes sign or gesture as well as oral techniques. A third area of literature review was of programs which have been employed with the deaf, autistic or higher level retardates to teach sign communication. These approaches or adaptations of approaches might be used with this study's target population.

Lastly, numerous experiments with a combination of behavioral approaches, modeling, shaping, and reinforcement have been used to stimulate oral language. The use of these will be examined to ascertain their effectiveness as part of a total communication program for the non-verbal severely and profoundly retarded child.

Cognitive and Linguistic Theory and Observations Related to Language Development

Bruner, in a series of articles (1972, 1973, 1974, 1976), discussed the nature of the human adaptions which are made from birth to the onset of language. Many of his ideas, as will be seen, are common to Piaget and others.

All species of young learn through a process of imitation and play prior to the onset of language. The child moved from the maternal buffering and protection to the observation of adult behavior with incorporation of what has been learned into patterns of play of his own. This process is dependent on the ability to differentiate or abstract oneself from what has been observed. Secondly, one has

to be able to construct a series of actions in sequence to duplicate that which had been observed. Quoting Dolhinow and Bishop (1970), in Bruner (1972):

> Many special skills and behaviors important in the life of the individual are developed and practiced in playful activity long before they are used in adult life....Play occurs only in an atmosphere of familiarity, emotional reassurance, and lack of tension or danger.

Play is a means of exploring and learning without consequences of one's actions. It is an opportunity to try many combinations of behavior without fear of reprisal. During interaction, usually with the mother, the child observes and selectively attempts in play to put the subroutines together, trying out various combinations of the new skill. During the process there is interest not so much in the goal, but rather in the act of performing. Initially, play precedes the use of an object as a tool. A child plays with the spoon long before he uses it as a means of getting food into his mouth. This play activity is also observable with language. After the child has been put to bed at night, one can hear the child's babbling and his enjoyment at hearing his own voice. Bruner (1973) feels that the..."simultaneous appearance in man of language and tool using suggests that the two may derive from some common programming capacities of the enlarging hominid nervous system".

The imitation of the child after having observed an adult speech model is not a copy of the adult; though similar in form, it fulfills the child's functional need. The initial structure of language is probably in support of and closely linked to action at this time. The language follows rather than leading his development of skill in

action and thought. Piaget (1967) states a similar point of view, "Language is not enough to explain thought, because the structures that characterize thought have their roots in action and in sensori-motor mechanisms that are deeper than linguistics". Language is more likely the outgrowth of the mastery of actions and perceptual discriminations. First language is used to denote an object in relation to action experiences. As language ability becomes more sophisticated it is less dependent on action. Language in humans moves to free the attention of the user from his immediate task and surroundings to what is being said. In this way language becomes a powerful mechanism for directing attention. Competence of action is achieved through a process which involves intention, feedback, and the patterns of action that mediate between them. Feedback here refers to internal feedback signaling intention to act, feedback proper during action, and feedback of results. A very young infant, when placed in front of an object, first spends some time looking at the object, but very shortly there is action of the mouth, tongue and jaws. This is followed by activity of the arms and hands. The goal is, of course, to get the object to the mouth. If the feedback is positive, the process will be often repeated and will be refined. This and similar play, when guided by verbal interaction with the mother, has the effect of "drawing the child's attention to communi-cation itself, and to the structure of the acts in which communication is taking place". 'For Elkonin (1971), play is the species-specific mode of dealing with language...The child is learning the function of utterances.' The prerequisite sensory, motor, conceptual and

social skills are coordinated through the mutual interaction to yield language. It is more and more apparent that language acquisition is aided by the child's prelinguistic grasp of concepts and meanings acquired through interaction and play. According to Luria (1974), "the basic assumption is that the acquisition of linguistic structures is rooted in the child's actions which serve as the background as well as an inseparable component of the first forms of a child's 'sympractic' speech". The child is not singled out and told how to speak; he is shown while the action is going on, using language as an auxiliary, as a marker of what is relevant.

Another analysis of language development comes from Piaget (1967) who states that "language development is predicated on the development of very general cognitive structures composed of systems of actions established during the first two years of life. These action systems underlie future cognitive and linguistic development". Limber (1977) suggests that during this period the linguistic symbols are first intuitively associated with elements of the action schema and then develops inductively into a formal syntactical system. If this is so for normal children, it can be assumed that in the retarded also, development of the cognitive structures must be achieved as a prerequisite to language development.

Piaget (1969) holds that a child is not born with readymade mental skills, but rather with an ability to respond to the environment by the process of developing defined sequences of actions which he calls schemas. New situations are integrated into the child's existing schemas by assimilation. Initially, these schemas are

only "perceptual" and "action" schemas. Eventually, the child can use symbols and words which Piaget calls "representational" schemas. At the same time a complementary process of accommodation is taking place which enables the child to modify the existing schema and solve new problems as he meets them through new experiences. When the child is able to internalize symbols, he develops memory, and language emerges. This first period of development, the sensori-motor, extends from birth until the appearance of language at about eighteen months.

Central to language acquisition, according to Piagetian principles, are several prerequisites. First, the child must be able to hear language and must have oral-motor mechanisms to produce speech sounds. In addition, there must be cognitively an ability to classify so that reality can be comprehended as well as an ability to perceive and assimilate data and to accommodate similar data into present schemas, Burns (1977).

It is believed that retarded children move through the same stages of development, and in a fixed order, but do so at varying rates, and may function in one stage for some things and in another for others. Burns (1977) has clearly described the difference between the expressive skills of retarded and non-retarded youngsters, drawing the conclusion that for the non-verbal child, being non-verbal does not mean that he cannot speak, but merely that he has not learned how. The reasons vary from child to child.

Piaget's sensorimotor period is divided into six stages, each paralleling age and each possessing specific characteristics as follows.

SENSORIMOTOR PERIOD

Stage I. Birth to First Month: Reflexive Stage.

This stage is characterized by an absence of control over movements. The child does make sucking movements when presented with a nipple and brushes objects away from his face. Language is confined to crying. Development of attention skills are initiated by others making sounds with a rattle or calling the child's name.

Stage II. Two to Three Months: Primary Circular Reactions.

Now the child repeats acts for their own sake, opening and closing his fist, fingering a blanket or sucking his finger for enjoyment. He makes cooing sounds or imitates single sounds. Activities of adults with the child during this period include much tactile and physical contact, such as rocking, swinging, or rolling the child.

Stage III. Three to Eight Months: Secondary Circular.

The beginnings of causality and memory now appear, for the child repeats acts that produce interesting effects. For instance, he swings toys and then repeats the action to see it again. The means have an end and the child can incorporate new events into old schema. The child now also has more purposeful eye contact and listening attentivenes. He pays more attention to his own movements. He makes babbling sounds, some of which may resemble purposeful sounds. Initation becomes more deliberate and systematic.

Stage IV. Eight to Twelve Months: Coordination of Early Schema.

Invention now begins as the child uses two schema, one as an instrument, the other as a goal. For example, the child and mother may interact physically and verbally in games like hide and seek with objects where the mother manually guides the child in finding a toy. During this period the child usually utters his first words, "Mama" or "Da-da". Now one can note the beginning of object permanence; that is, the child will look for vanished objects. He not only uses old schema to achieve his hidden goal but uses new ones with intermediary means to achieve his ends.

Stage V. Twelve to Eighteen Months: Tertiary Circular Reactions.

The child is experimenting to discover new properties of objects and events. He will look for new means to old ends. If an adult places an object behind his back, the child will go around him to find it. Objects have permanence. Activities in training might now be used to teach new means to ends.

Showing a child that a string attached to a toy will enable the child to pull it closer is one example.

Stage VI. Eighteen to Twenty-four Months: Inventing New Means to the Ends.

The child begins to replace sensorimotor groping with mental combinations. The world can now be dealt with symbolically and by thought manipulated processes without his having to use sensorimotor actions on actual objects. Play, imitation, and delayed initation are characteristic of this period. The child is now able to name objects and actions. He says "no", "all gone", and "more". In addition, he can use two-word phrases such as agent-action, action-agent, and location-object.

During the sensorimotor period the child communicates by means of direct actions or signals. Toward the end of the period he begins to use language to represent objects and actions he is familiar with and to communicate with persons in his environment. A child experiences and functions in his environment and our task is to provide suitable opportunities to insure his growth.

The normal process of language learning is complex and little understood. According to Bruner (1972), "though language springs from and aids actions, it quickly becomes self-contained and free of the content of action". Moreover, in simple societies, the young learn through the sphere of action and have little formal training but are shown how to perform during the course of an action. This pairing of action with speech for children at the sensorimotor level of development seems particularly appropriate for the retarded. The pairing might be achieved in two ways: by having the expression of the action take the form of gesture which in turn would act as a bridge to the learning of verbal symbols and reinforcing the sensori-motor skills.

Moving on to the work of Edwards (1973), one sees studies examining sensorimotor intelligence and language in an attempt to better understand how a one-and-a-half to two-year old conceives the world. Edwards' work indicates that sensorimotor development is directly related to early speech utterances, and it suggests that object permanence and causality are important concepts for language development.

Object permanence is central also in Piaget's theory. An object has permanence conceptually only insofar as it can be abstracted from other objects, from the action by the child and from the child's body itself. Schlesinger (1974), in discussing the child's learning to pose the question about where an object went, says "When the child is able to construct such questions (possibly this ability can be inferred by observing the child's searching for an object without asking the question), he is certain that an object does not cease to exist when it disappears from signt".

An interesting hypothesis arises out of Schlesinger's statement (1974) that--

> In the acquisition of object permanence the importance lies not only in the child's formulation of the question but in understanding the question when asked by another, that the child is learning not only the permanence of the object, but the semantic relationship between the object label and the locative, 'where' and at the same time the syntactic relationship between the locative and object in question formation. (Bowerman, 1974)

The significance of this possibility should be borne in mind when providing an instructional experience--we cannot expect the child to perform correctly until he or she unquestionably has the linguistic

basis to understanding the situation. If an object is hidden from the child's view, with a screen, and the child looks for it, we assume the child is aware of spatial relations and location because of his actions in looking for the object. If the child can remember the object, he has a concept and an understanding in terms of relationships. Research indicates this concept of object permanence is related to the capacity to attach verbal labels to objects.

Another important concept is that of causality, Piaget (1969), for example, hitting an object will put it in motion. The child learns that objects are not magically under his control, but that events can occur independently of the child's actions. The child is finally able to distinguish between outcomes of his own behavior and those of others. The syntactic relations of two-word speech are similar to the conceptual relations used in adult speech to the child in that they involve an agent as a causative actor. It, therefore, appears that the coordination of the sensorimotor schema are necessary to facilitate language. Bruner (1974) states that language is seen as emerging from--

> orderly changes that are nourished (though not shaped) by continued experience in acting in the world. In time, for example, the child comes to separate thought from action in his schemas, and his concepts of objects and events in the world become independent of the actions to be performed on them. Sensorimotor schemas also come with the experience to transcend space and time, so that the concept of an object is no longer tied to particular contexts, but becomes somewhat more context-free.

From the start of life the child communicates with others using several different modes, according to Bruner (1976). The child first makes demands on his caretaker by expressing discomfort-crying. Then

the child learns to request of the caretaker. The child waits until he hears the expectant arrival of his bottle before he cries or frets. By eight or ten months, the child can use gestures to sign along with his verbalizations. He reaches for the bottle, pushes it away, and reaches again. Finally, there is a reciprocal mode where the roles of the two are different and often exchanged by mutual agreement. This last mode indicates an ability to imitate, to delay imitation, and to socially interact with others. It might be noted that this interaction is largely gestural and pre-verbal. The gestural communication is present from early on, only dropping out as the verbal skills can replace it. The child should be encouraged to initiate, to venture and explore his environment. This kind of activity enables the child to get his own feedback and knowledge of results. "The first orderly, skilled behavior is virtually released by appropriate objects in the environment, presented under appropriate conditions of arousal", and not described by "the ordinaly operant-conditioning paradigm--choose any operant and bring it under the control of a stimulus and a reinforcer--is no more revealing of the growth of skill than the rate of learning of paired associates is relevant to the learning of language". (Bruner, 1973). Slobin, Brown, Schlesinger, and McNeill in Luria (1975) basically agree that "the acquisition of linguistic structures is rooted in the child's actions which serve as background as well as an inseparable component of the first forms of a child's sympractic speech".

Using a manual sign approach to language teaching, therefore, seems to be justified because gestures and motor activity are a

natural part of this period of a child's life. There is the often repeated notion that the child and the objects of his environment are the most crucial components. The learning is not formal but an outgrowth of the interaction, the child exploring, repeating, and perceiving the action and consequence of the action. Through this immediate feedback, schema are developed, grow, and are assimilated and accommodated too.

During the pre-verbal stage, there is a great deal of interaction between the normal child and his environment during which the child develops the cognitive structure necessary for speech. (Piaget 1969). Retarded children may or may not have had these experiences or been able to profit from them. It is possible that a retarded child needs to be exposed several times at a later age to these experiences in order to develop the cognitive skills. Many factors in the individual child would influence his ability to develop cognitively even at a later date. Church (1961) states that this discovery and development occurs in sequential order through what the child hears from others and what he tells himself. That which has impact on the child is only what he finds relevant. The police siren or fire engine is ignored, while mother's cough starts him crying. It is important that learning experiences be from within his life space.

The egocentric child, to use Piaget's term (1969), is incapable of understanding another's point of view or feelings. He does not experience himself experiencing; that is, he is not able to clearly differentiate inner (self) and outer (object). The child at this age uses imitative verbalizations and actions. The behaviorists have

reinforced, shaped, and emphasized this behavior. Church (1961) feels that it is important for the child to be in this experience actively, not as a means to acquire certain acts or skills, but because the child doing it himself can grasp more clearly that which has meaning in his own life.

Prior to the beginnings of expressive language, the child has passive or receptive language skills. He can respond to the language of others without apparent formal training. The first quasi-communication is evident when the child finds ways to tell people what he wants. An example is usually in the form of motor activity and sounds. For example, to be picked up, the child approaches the adult and raises his arms or he brings an object to the adult to initiate a game. The child is clearly oriented to action. It seems logical to take the child with his well developed motor ability and use it in a positive, developmentally-oriented, sequential model so that the child communicates whether with signs or verbalizations or both in a purposeful way.

If one accepts the notion that there is a definite connection between pre-verbal, sensory-motor intelligence and a child's ability to speak, although cognitive structures are not linguistic structures, there must be a basis for the transition. According to Sinclair (1970), language, a symbolic function, develops after the sensori-motor period through simple motor-indicators as signifiers or symbols. From observations of over 100 12 to 26-month-old children, it was found that observations could be classified in three ways:

1. Knowledge about objects themselves (the discovery of their properties);

2. Introduction of organization into the object (any spatial or functional arrangement);
3. "Acting as if" (using an object as if it were something else).

Normal 12 to 16-month-old children's activities were very dispersed. The sight and touch of an object elicited action-patterns which could be applied to any object. Rapid changing of objects with activities which lead to discovery of properties of the object took place. Although some arranging of objects did take place, it appeared to be unorganized. In addition, there was no make-believe behavior. The child did continue oral exploration of the object and did involve other parts of his body in the activity with the object.

The 16 to 19-month child's activity was still diffuse. The activities at each level appear to be at times more purposeful and conventional.

The 19 to 26-month old appears to have discovered object properties and normal usage. He can order objects into arrangements having some classificatory quality. He can act symbolically, substitute, and use the objects as partners in play.

From these observations, Sinclair sees a progression. The object's properties are discovered, used conventionally, used as representatives of something else, and can be purposefully manipulated according to patterns. This means finally that the child has understood the difference between object and subject. He is a "knowing" rather than only an "acting" organism. It is at this time that the child begins to make one-word utterances.

Here then, we have observations which appear to substantiate a link between sensory-motor development and symbolic representation,

progressing through to more discriminating interactive behaviors of the child and objects.

On the same subject, Schiefelbush (1974) assesses the progress to date in the teaching of communication to the retarded, recognizing the difficulty that language learning, being a complex function, still needs to be simplified for the retarded child. Three prelinguistic functions as described first by Premack (1970) appear to be necessary. "First, he must determine that a symbol stands for a referent (usually an object, action, or agent). Second, he must discriminate between two or more symbols. Thirdly, he must discriminate between different referents."

Summary of Cognitive and Linguistic Theory and Observation Related to Language Development

What is clear theoretically is the importance of the prelinguistic developmental skill. These skills are acquired by the child through interaction of the child with objects in his environment and with the primary care taker providing descriptive input and feedback to him.

A child's first communications are through motoric modalities and vocal utterances. Through play activity the child discovers the properties of objects, develops adaptations, assimilates and accommodates schema into increasingly more complex levels of functioning. Thoughts which start in action lead to the development of, among others, object permanence and causality enabling symbols to be internalized, memory to develop, and finally, as one of the outcomes, language to emerge.

In the last decade, the linguists and behaviorists have approached language from different perspectives. The linguists have focused on discovering and defining the process of language acquisition while the behaviorists have attempted to demonstrate that language is under control of environmental contingencies of reinforcement. What appears to be needed according to Bricker (1970), Bruner (1972), and Kent (1972), among others, is an approach which would integrate these divergent points of view. Bruner (1972) suggests we use the linguists' theory to specify program content, the behaviorists' approach and Piaget's developmental stages to develop instructional procedures. Any program should contain opportunities to master sensorimotor skills, improve receptive skills and provide the child with feedback. The most logical activity to provide this opportunity for learning is supervised play activity.

Literature Dealing with Precursive Areas of Language Development in the Retarded Child

Because it cannot be assumed that normal and retarded learn in the same manner or respond to specific techniques in the same way, it is necessary to investigate the literature dealing with such areas as modeling, discriminative ability, receptive language and prelinguistic skills to learn how retarded are positively or negatively effected.

Because a child develops motor skills prior to verbalization, (Piaget, 1969) it has been suggested that motor imitation be used as a bridge. Cognitive theorists have shown that there is a relationship between sensorimotor development and adaptive behavior and speech acquisition. Specifically, Kahn (1975, 1976) found that object

permanence and concept of means-ends are significantly correlated to verbal learning. Receptive language skill and motor imitation also play an, as yet, undefined role. There is also evidence to suggest the use of verbal descriptive input and tactile object play as it facilitates learning. Whether this activity should be "free" or structured is still a question.

The use of predictor scales for limiting factors in language development has been explored by Wachs and Remmer (1978) but is only a beginning.

The sensory period of normally developing children is the period important to developing appropriate cognitive structures necessary for the development of meaningful expressive language by the time the child reaches Stage VI. (Piaget, 1964). Children who do not learn at the normal time are, perhaps, still capable of learning in the same manner except at a slower rate. (Inhelder, 1968). Kahn (1975) compared developmental level and ability to speak in a sample of severely and profoundly retarded children in a public day-care program. Those children who had no expressive language were functioning below Stage VI. It is reasonable to expect that these children would probably benefit more from training activities directed toward raising their cognitive skill level prior to initiating any language program.

Kahn (1976) found the Uzgiris and Hunt Scale of Cognitive Development valid and reliable with a sample of 63 severe and profound subjects he tested. He found these scales and the study's results lend support to Piaget's theory that development comes in a given order but more slowly in the retarded. Research, he suggests, is

needed to establish the relationships of the sensorimotor period functioning and the readiness to learn various language skills. The present study will attempt to provide an environment conducive to the improvement of developmental skills as part of the teaching process. Comparison of developmental levels before and after treatment and tests of association may shed light on which abilities appear to be related to ability to learn language or manual signs.

The Infant Psychological Development Scale, Uzgiris and Hunt (1975), was developed for use with infants from Piaget's theoretical work on the sensorimotor period. Wachs and Remer (1978) used it and the Alpern-Boll Development Profile (1972) to investigate the relationship between cognitive-intellectual functioning and adaptive behavior. Test results from 25 children ranging in age from 11 to 50 months and having severe to borderline retardation were submitted to transformation by the multivariate analysis technique of canonical correlation. Significant correlations were found between adaptive behavior and the Object Permanence and Foresight subscales (a part of the mean scale in the original Uzgiris and Hunt Scale). The canonical analysis showed that a combination of Object Permanence and Foresight best predicted adaptive behavior as exemplified by self-help and social skills. The authors feel the ability to anticipate consequences i.e. foresight, has a relationship to the child's ability to adapt to his environment.

There needs to be further exploration of the relationship between adaptive and cognitive skills to determine whether there is a causal relationship and which is the cause. This and Kahn's work

provide beginnings for the possible development of predictors of verbal learning with a retarded population.

Another study dealing with developmental precursive skills using factor analysis was conducted by Evans (1977). Evans looked at the various developmental aspects of language in a sample of 101 adolescent mongols whose mean mental age was about four years three months. Chronological age ranged from 8 to 31 years. These subjects were from a day program and an institution. The tests or adaptions of tests were used to assess spontaneous speech, a test of morphology, and Illinois Test of Psycholinguistics (1961), language comprehension, and cognitive ability.

The principal components analysis produced a large first factor of general language, accounting for 45.6% of the total variance. The second and third factor, each accounting for 9% and 8% of the variance respectfully, were a disfluency score and a speech measure containing negative visual loading.

Evans subjected the data to a Varimax Rotation. The first factor now accounted for 28.9% of the variance and was largely loaded by the Stanford-Binet Intelligence Test. Evans called this factor general verbal ability. The second factor was labelled disfluent speech. The third factor, bi-polarity, was removed and it was largely loaded by measures of structures of speech.

A fine-grain graphical analysis was made using standardized scores on certain representative measures against chronological age groups. The graph showed that visual/motor skills tended to level off at about the age of 20, and intelligence tended to level off

before the speech structure scores. No differences were found on Visual Decoding and Visual Motor Sequential subtests of the I.T.P.A. between the "old" or "young". Overall verbal ability was significantly higher in the "old" group.

The overall results verify what has been found elsewhere, "that high correlations are found between 'vocabulary' and 'intelligence'". Additionally, for mongoloids the development of language is more closely linked with chronological age than with intelligence.

Because of the large number of variables affecting language acquisition, and not yet reliable measures for this population, caution must be exercised in using information of this kind. According to Evans, one might safely see implications for a specific population which may be helpful in the development of language programs, or for a starting point for underlying causes of language disabilities.

The third study reported was conducted in order to determine whether severely and profoundly retarded were capable of using symbols to represent environmental events, necessary and basic to any verbal communication. Carrier (1974) used pieces of masonite cut into various shapes to teach noun usage to a sample of 60 retarded. Words were added, up to 10, as the subject met the criterion of 15 consecutive correct responses. Fifty-seven were able to learn noun usage using this method and to discriminate among classes and to use geometric forms as symbols for classes of events. Carrier believed that if his sample is representative, most severely and profoundly retarded can complete the training in less than three and one-half hours with fewer than 900 responses at 85% or better correct during

training. In addition, they should be able to generalize to other pictures representing the same concepts.

Relevant to this author's experiment is the fact that this population can establish and discriminate among classes (pictures of objects), use symbols to represent classes, and discriminate among various symbols (geometric forms).

Both Luria (1963) and Piaget (1969) have pointed out that discrimination ability is a prerequisite to language not regulated by it. A fourth study by Katz and Rosenberg (1969) was an experiment with moderately retarded and normal children to determine the effects of verbal training upon the perception of the two matched MA groups. In a game-like situation the S's were randomly assigned to one of three treatment groups. One treatment was taught a common label to associate two nonsence syllables with four similar forms, i.e., two forms per label. Another treatment group learned to associate four distinctive labels to the same four forms. The third group was the control. All were given a maximum of 150 trials. The results indicated only that all subjects improved over trials. Retarded were more inaccurate in their perceptions than the normal when making perceptual judgments. Labels had a different effect on normal and retarded. The retarded were not influenced in discrimination learning by labels. The point to be made here is that verbal mediation training was not particularly effective in modifying the perception of the retarded. It may be that verbal cues are less effective and have little secondary reinforcement value for them.

On concept acquisition tasks Yoder and Forehand (1974) found

the effects of modeling and verbal cues to be different for simple and difficult items. With 40 non-retarded and 40 educable retarded, subjects received one of four treatments: no modeling, modeling only, modeling plus low meaning verbalizations, and modeling plus conceptual verbalizations. With the simple items there were no treatment differences. On difficult items all three modeling treatments did better than the no modeling group, and the modeling plus conceptual verbalization group did significantly better than the other two modeling groups. The tasks from the Leiter International Performance Scale involved matching objects and designs on blocks with designs on a form board. An interesting finding was that the retarded and non-retarded were affected by the modeling and verbal cues in the same manner. This suggests that the retarded can use these cues in the same manner as non-retarded children. On the abstract cognitive tasks the adding of verbal concepts was helpful to learning.

Wilson (1966) wanted to know if regular speech therapy would produce different effects than a program of indirect communication therapy. The sample consisted of educable mentally retarded children in public school. Four hundred fifteen children having speech deviations, age six to sixteen, were divided randomly into three groups; Experimental (N=140), Placebo (N=130), and Control (N=145). The program was limited to specific articulation therapy. The experimental group received two one-half hour sessions of direct therapy per week. The placebo group received two half-hours of language stimulation per week. The control group were given articulation tests but no therapy. All children were seen individually

and in small groups.

The results indicated that speech therapy progress, as provided in the study, was not different than expected changes due to maturation over a three year period.

Wilson's study concentrates on only a small area of possible speech therapy and the population were educable retardates. It does not appear to be an approach applicable to this target population.

Summary of Precursive Areas of Language Development of the Retarded Child

These studies indicate that the retarded child has the ability to discriminate between verbal sounds. This will enable the child's utterances to come under control with behavioral techniques such as imitation and shaping.

With the onset of language there are also present certain cognitive skills of the sensorimotor period, object permanence and foresight. Also it appears that the best predictor of language learning ability is intelligence.

It was also found that the retarded would be helped by modeling but verbal cueing was only effective with difficult material.

Studies Involving Sign Language Training

For many years sign language has been taught to the deaf as an alternative to oral language or to facilitate oral language development. Recently researchers have begun to study this approach with the retarded. In one study non-verbal severely retarded children with low receptive and expressive language functions were the subjects for a program of sign training at Parsons State Hospital by Stremel-

Campbell, Cantrell, and Halle (1977). The nine students, ages 10 to 18 years of age, were essentially non-verbal. The signing program consisted of three components: (a) a language system, (b) a speech initiator, (c) a language facilitator. Only the first two components were discussed in this article. After an assessment of discrimination of objects, motor dexterity, vocal imitation, and intelligence, students were placed in the first part of the program. The criterion behavior (imitation) and controlling stimulus (handshaping) were presented simultaneously in a timed-delay procedure using noun signs for objects and events which were common to the subjects' experience and environment--objects such as pop, ball and shoe. These were classified as "touch", "non-touch" and "motivational" words. Touch signs indicate that hands touch one another or the body in their execution. When a criterion was met, the student was given the next set of words.

The results indicated that "touch" signs were learned more rapidly than "non-touch" signs. Signs which are in the same conceptual class should not be taught within the same training period, as they confused the subjects. The majority of students began to pair speech with their signs during the middle of their second group of words. The authors felt the pairing of the motor response with a word having specific meaning may be a transfer effect rather than a facilitation of speech through signs. These results raise questions about the function of touching and comprehension of the sign and in the rate of learning. There appear to be conflicting results between Garcia et. al. (1971) and the authors of this study as to whether signs are facilitators or whether a transfer effect is present.

In another study, the use of signs with non-speaking apraxic adult patients was reported by Skelly (1974). The use of signs has been shown to be useful with various etiological groups of speechless patients. Six patients suffering cerebrovascular trauma were given simultaneous sign and speaking demonstrations. Then this was repeated with the patient performing the sign and looking at the clinician's vocalization. The group sessions were held two hours twice a week. Within the first month some speech was elicited from all six patients. Verbal reinforcement was given for all attempts to sign and vocalize. Within the first two months all patients had mastered 50 signs. By the end of six months all but one patient was using two or three word phrases. Progress was greater in the oral level than the sign as measured by the pre-post scores on the Porch Index of Communicative Abilities (PICA) (1971). It might be noted that all but one had at least six months up to 20 months of prior traditional speech therapy with no results.

Skelly's experiment demonstrates progress with a group who had normal motor strength and coordination but were unable to connect ideation and motion. While it cannot be demonstrated that the retarded suffer from this specific clinical entity, it might be pointed out that some retarded who can demonstrate concepts behaviorally but have no speech capability might profit from this type of format.

Several studies have explored the use of sign language as a facilitator of language. Among them is the research of Bricker and Bricker (1974), Kent (1974), and Miller and Yoder (1974) which have

been concerned with the teaching word-object pairing as part of verbal and receptive language acquisition. Bricker and Bricker (1970, 1971) indicate that subjects with few receptive and production skills have great difficulty when standard techniques have been utilized. Van Blervliet (1977) designed a study to determine whether sign-object and sign-word training would improve word-object association skills. Six institutionalized males having some receptive and productive speech were the subjects of this study. "All participants were sequentially trained to: (a) pair the objects with their identical matches, (b) imitate the manual signs, (c) pair the manual signs with the objects, (d) imitate the nonsense words, and (e) pair the manual signs with the words." All participants could receptively and productively perform with above 70% accuracy. They could associate the word with the object.

The subjects were randomly assigned to treatments which were performed individually in 15 minute daily sessions, five days a week.

The results through pre and post-testing showed that the combined use of signs and spoken language may be an effective means of teaching spoken language to some individuals. The authors did not investigate whether this procedure was more effective than speech or sign alone. Studies with different populations using various combinations of techniques are still needed.

Facilitation through pairing of sign and oral speech is examined in this next study. Gestural modeling was used to develop looking and imitation. Once this was accomplished, vocal sounds were paired with the gestural model in the hope of increasing the probability of imitative vocal responses as suggested by Sherman (1965). The verbal

responses were developed using shaping, cues and prompts and the object itself. Several techniques were used to develop concept formation. The first was object identification. The second was object description where the object was presented as "doing" some kind of activity. This was followed by a training stimulus. The child first observed, then was an actor separate from the object, and lastly, he was an actor who did something with the object.

Primary reinforcers and praise were given for desired behavior. Withdrawal of reinforcers, including the clinician leaving the room, were instituted when the child exhibited inappropriate behaviors. The specific programs were devised following the format described but tailored to the specific needs of the individual child.

All subjects made substantial increases in the number of correct responses. Relevant to the retarded population of this study is the use of gestures and the sequence of concept formation activities, a developmental approach.

In a study comparing a manual approach with hearing and non-hearing retarded, Hall and Tarkington (1970) found the non-hearing to be more like the normal than the retarded. A matched group of 30 hearing retarded and 30 non-hearing retarded (mean age approximately 16 years, I.Q. approximately 43) were given pre and post-testing with the Verbal Language Development Scale (1968). All received four hours of group schooling for six months in which the curriculum was a manual sign approach. A control group of hearing retarded received the same amount of time in conventional classroom instruction. Results for the deaf retarded group were significantly

higher than the hearing retarded group in both the use of manual sign language and VLDS performance. It appears that the hearing impaired retardate was more like the normal child in his response patterns than like the retarded. The hearing deficit appears to give a pseudo-retarded condition. The program of signing with the deaf retarded appears to overcome this pseudo-condition to provide the child with a means of communication. It is important to recognize the need for differing programs to meet the specific and unique needs of a subgroup of retarded.

In the three following sutdies sign language was explored as a singular method of communication.

At the Southbury Training School, sign language alone was taught to nine severely or profoundly retarded individuals. Since progress at the end of the first year was encouraging, i.e., a range of 400-word vocabulary by one student to a receptive vocabulary of 20 words by the lowest, the enrollment in the program was increased to 23. Progress was achieved by 75% of the students in comprehension and expression. (Richardson, 1975.)

Because Kopchick, Rombach, and Smilourtz (1975) noted that a child taught signs in the classroom reverted to silence in his residence, it was decided that signs would be used in the total environment. In this pilot project, 11 non-verbal hearing loss children were placed with aides who used simultaneous sign and verbal communication. Pre and post-test results indicated an average 20-month increase in language level ability after a 12-month period.

Other examples from the literature include the simple introduction of signs in a classroom of severe and profound (N=23) over a

two year period, increasing expressive vocabulary for 75% of the students. (Topper, 1975). Working with one student 21 years of age in the high-profound low-severe range was successful in producing a 50-word sign vocabulary. Over a two-month period, working 15 minutes a day, three times a week, gestures were introduced by showing the subject a picture, labeling it, and producing a gesture. The subject began to initiate signs and appeared to be generally less frustrated. The use of this motoric mode with this severe and profoundly retarded subject brought better results than the use of verbal methods alone.

Summary of Studies Involving Sign Language Training

Sign language was, as an end in itself, a usable means of communication and served as a facilitator of oral speech with higher level retarded individuals. Retarded were able to learn signs that involved the touching of fingers more rapidly than signs of words that did not.

The use of a developmental sequencing in the pairing of sign-object and sign-word was effective in increasing the ability to associate words with objects.

It was found that treatment involving gesture may produce positive behavioral effects as well as a means of communication.

Studies with Combinations of Behavioral, Linguistic and Developmental Techniques for Sign and Oral Language Learning

The approaches most frequently suggested in the theoretical writings have involved behavioral training and linguistic content based on a developmental sequence. One of the first to experiment

using an eclectic approach was Bricker and Bricker (1973).

Basic to the language learning are phonemes and morphemes of which language is composed. Because there is a direct relationship between the severity of speech impairment and the degree of cognitive impairment, Piaget's work (1952, 1967, 1969) is having its impact on the development of language programs along with Skinner. Piaget states that a child with delayed language is also delayed in other aspects of representational development. The knowledge of objects and their relations must precede symbolic and representational knowledge, and symbolic knowledge must precede the use of signs or language. Bricker and Bricker (1973), recognizing this, began training "with object functions, vocal and motor imitations, and simple forms of receptive speech".

Bricker and Bricker (1971) found that sensorimotor and imitation training is needed because of the low discrimination levels of these children. It was felt that attending behavior as well as motor and vocal imitation need to be stressed along with simple receptive abilities. An eclectic model would combine behavioral, cognitive, and linguistic components. Schiefelbusch (1974) suggests an eclectic model might be best for experimental purposes and there is considerable empirical validation for this. One such combined method study was conducted by Bricker (1972) who used a group of 26 severely language impaired, low functioning children, (the mean I.Q. for the experimental group was 32.9, and the control group 30.23) and put them through a three stage training program while the control group was tested but received no training. The experimental group

received imitative sign training on five motor movements. During this phase, if the child needed it, he was given physical prompts. All phases used edible reinforcers. In the next phase of training, the child was given a verbal cue followed by movement. If the subject did not imitate, he was again prompted until the criterion was reached. The final phase consisted of presentation of a three-dimensional object and a verbal cue, "Do this", followed by the modeling. If imitation was not immediate, shaping procedures were employed. Between each training phase, a test was administered to both the control and experimental groups. The results indicated that the training procedure operated as a facilitator for the development of word-object association for this group of children. Bricker also concluded that expansion of the examination of the use of motor movements as an educational technique for children with severe language handicaps is justified.

Although few studies are conducted with as low functioning subjects as those proposed for this target population, adaptations might be made based on their findings as they offer the most promising direction available at this time. The work of Guess, Sailor and Baer (1973); Bricker and Bricker (1971); Miller and Yoder (1972) and Kent (1972) are comprehensive models of language training for subjects with somewhat more predictable promise and, who it is assumed, have a higher developmental level than this sample or population. Relevant experiments utilizing comprehensive approaches and techniques in them will be examined.

Studies currently being reported have largely involved retarded

children who have at least minimal language skills. Behavioristic approaches to verbal language acquisition with this population have produced an increase in verbal skills which is bound to stimulus control. Ahart (1975, 1977) indicated that when pairing manual and verbal language, a fading of signs occurs naturally as the verbal skill is improved. Burns (1976) thinks this method is more iconic and, therefore, more successful. These methods, while successful in increasing vocabulary, still do not provide the child with a spontaneous language system.

Operant techniques have been widely used in experiments and reviewed by Hartung (1970), Peterson (1968), and Sherman (1971) among others. It is generally agreed by learning therapists that imitation is an important first phase of functional speech. Secondly, the speech must be functional and spontaneous. Operant techniques involving shaping and contingent reinforcement work in phase one but not in phase two. Some researchers, Baer, Peterson and Sherman (1967) have successfully introduced simple motor imitation before verbal imitation training. Whether this motor imitation has a facilitating or a generalizing effect is still not known, but the effects have been positive. The work of Risely and Wolf (1967) and Hekkema and Freedman (1978) show the importance of contingent reinforcement in learning object labeling. The work of Guess and Baer (1973) points to the need of further research to determine how receptive language affects ability to learn verbal expression. In another study, immediate response training with verbal and primary reinforcement was found by Hekkema and Freedman (1978) to produce

more imitative verbal behavior than delayed and non-contingent reinforcement with 16 severely retarded non-imitative subjects. The treatment group received verbal descriptions of what the trainer was doing and was guided to perform if a response was not given. The control group received the same training with non-contingent reinforcement. Progress was contingent on performing four consecutive responses. Training with immediate imitation was sufficient to produce delayed imitation with these subjects. Contingent reinforcement appeared to be necessary for the training. Oddly, those subjects who received only verbal descriptions and no primary reinforcement did more verbal imitation even when the verbalizations were not relevant. It appears that the effect is to focus the subject's attention rather than to supply information.

Several short reports of studies are included to illustrate further use of behavioral techniques.

Case studies on four autistic mentally retarded are reported by Marshall and Hegrenes (1970) and are included here to illustrate the successful use of operant conditioning with this type of child. Subjects were four males ranging in age from 6 to 14 with a mean I.Q. of about three years. Speech was present in all cases but typically autistic. The primary goals of therapy were to develop looking and initative behaviors, vocal responses, verbal responses, and concept formation.

Many studies report the efforts of clinicians working with individual children in an attempt to discover approaches to specific problems. Jeffrey (1972) described a procedure to increase and

maintain verbal behavior in a subject age 11. The treatment consisted of 15 30-minute individual sessions. It included time-out for inappropriate behavior and contingent reinforcement for appropriate behavior. Shaping of sounds and phoneme imitation were also included. Objects and pictures were presented to elicit imitative sounds. Results were a significant increase in verbalization.

One has to wonder if the individual attention could account for increases in vocabulary. The study raises more questions than it provides answers for. One-subject studies are insufficient for drawing conclusions applicable to the training of larger groups of children.

Bricker and Bricker (1970) describe an elaborate operant conditioning procedure involving operant audiometry and receptive vocabulary imitation. Bricker states that the operant conditioning procedure will help to evolve valid and efficient language training procedures. "However, a successful language trainer cannot depend solely on an operant orientation since that technology only provides some assistance for developing the content of an instructional program. Other sources, such as linguistic models should be investigated in order to develop the content of language programs." This appears to be sound reasoning in light of results of other behavioristic studies.

In another study Hartung (1970) brings together some cogent suggestions for consideration in setting procedures for teaching autistic children which may also be applicable to the retarded. Hartung, reviewing Goldstein, Risely, and Peterson's (1967) research

indicated that motor imitations should precede vocal training, this imitation proceeding from gross to fine motor to facial responses. Secondly, he found reinforcement useful when generally proceeding from reinforcing all vocalizations to shaping and reinforcing specific utterances. He also found, in an attempt to get generalizations, that the child should be reinforced in a variety of situations by many different individuals. Bornstein (1974) indicates "there is a need for a linguistically appropriate basis and substitute for spoken English when sensory or perceptual impairment prevents the development of verbal behavior". He specifies the need for comprehensive approaches to language development especially when the goal is spoken rather than manual communication. Signed English was not designed to replace other educational tools and techniques which have been used successfully with deaf children. Auditory and speech training are essential elements of a comprehensive program for perceptually impaired children. It may be true that the better developed language base a child has, the more able he is to profit from such training.

A most relevant experimental study is that of Brody, Thomas, Brody, and Kucherawy (1977). Because operant conditioning is dependent on responses which can be shaped and reinforced, developmental psychologists have looked for alternative methods of training such as play therapy, motor stimulation, and sign facilitation. Sensory-motor activities and operant conditioning were used by Brody et al. (1977) with profoundly retarded adults to elicit vocalization. Three treatments (operant, sensory integration, or combined)

were designed to determine whether one method produced greater results and could be a useful predictor with non-speaking subjects. Twenty-seven non-verbal subjects ranging in age from 23 to 62 were subjects for four sessions a week for approximately two months. The operant program used imitation, shaping, social and food reinforcement, and physical guidance as one might expect.

The sensory integration consisted of tactile stimulation of body surfaces including head, face, back and feet, and also slow rocking and fast spinning. Lastly, rolling and prone board exercises were performed by the subjects. The combined operant and sensory integration techniques were used alternately and for a short period combined with vocalizations and with the exercise. No control group was possible because of institutional limitations of staff time.

Using the pre-test and post-test results for an analysis of variance produced no differences between treatment procedures. All subjects made significant gains in vocal responses and there was a significant eye contact/vocalizations interaction (vocalizations increased while eye contact did not). No significant interaction between therapy and pre-post measures was found. Tests showed that pre-post operant differences were not significant but combined and sensory groups were significant at the .05 and .01 levels, respectfully.

For those subjects who had minimal vocalizations, the operant techniques produced greater increases, but there were no gains if there were no initial vocalizations. The sensory-integration methods were associated with every client, though less so for the operant

group. The sensory-integration methods resulted in changes in the rate of vocalization equal to the operant method but appeared to be less dependent on pre-test performance. The combined group achieved in a similar way to the operant. The combined technique was more difficult for the therapist and so the authors thought it could be used to produce initial vocalizations and then operant conditioning alone could be used thereafter.

Brody's study is similar to this author's study in that sensory-motor activities are to be used. For Brody, this was done to the subject's body. For the proposed study the motor activity will be performed by the subject on articles in the form of play. In addition, the subjects will be asked to perform responses in the form of signs. Brody did not attempt to increase developmental skills as a means of increasing verbalizations, while the present study will be concerned with the sensory-motor skill development as it has been found to be related to vocal development. Brody achieved results without it but it may have been because the subjects at that age possessed skills (they were not tested) or the procedures, in fact, did enhance development.

Summary of Combined Technique Studies

The combined approaches have produced better results than singular approaches. It has not been shown that any one of these is any better than any other for an identified group. More experimentation with variations of treatment on subjects whose language and cognitive skills have been identified may lead to more viable treatment procedures.

Summary of Literature Review

There has been only about four years of experimentation using comprehensive models. In general, they are impractical for institutional use because those studies thus far reported take many staff hours working with individual children but produce minimal results. Programs need to be simplified, be less costly, and be usable for groups before institutions and schools can implement them. Comprehensive programs, at this time, do offer the most hopeful direction.

The research literature indicates that no single approach--operant, linguistic, cognitive or psycholinguistic--provides satisfactorily for the development of a language program for non-verbal severely and profoundly retarded. The models developed which integrate portions of the available theoretical knowledge hold more promise. Bruner (1974) points up the increasing importance of Piaget's work in the formulation of integrative models such as those of Bricker (1973) and Kent et. al. (1972) and Yoder (1972). These models cover the developmental spectrum focusing on motor and cognitive processes, social development and concept formation. In addition, they should stimulate developmental growth.

The synthesis of linguistic theory specifying content for behavioral procedures of instruction, with the integration of cognitive development for both content and sequence of success stages which approximates normal development, might at this state of knowledge provide better training programs and better opportunities for obtaining answers to the multitude of questions arising from this complex problem of learning speech.

Experimentation has just begun to yield answers for the severely and profoundly retarded. It also raises many more questions for future experiments.

With the development of reliable predictors, those children who achieve little verbal language might be taught manual communication with much less cost and effort by both the staff and child.

Sailor, Guess and Baer (1973) suggest four deficiencies which should be targets for future studies. The teaching program should provide for transfer and generalization from the training setting to the natural environment. The program should have practical and functional application. Existing behaviors might serve as predictive variables. Finally, direct comparison should be made of various training techniques that can be applied to the same type of language problems and deficiencies.

CHAPTER III

METHOD

Hypothesis

The methods, procedures, and design of this study were to test the hypothesis stated in the null form.

1. There will be no significant differences in the number of oral or sign words in the subject's vocabulary due to treatments.
2. There will be no significant differences between treatments.
3. The pre-test data will not be usable to predict ability to learn oral or sign language.
4. The length of time in treatment will not significantly effect treatment result.

Institutional Setting

The sample was drawn from a 350-bed state residential institution for severely and profoundly mentally retarded completed four years ago to relieve the overcrowding in other state institutions and to serve the continuing needs of residents of a geographic area covering the northeast quarter of the state. The home-like buildings provide a less restrictive, more normal appearing setting than the state's older institutions while keeping the student closer to his family and within a residential area of a medium-sized city where, it was hoped, there might be frequent opportunity for student participation in community activities.

The institution's primary program focus was to provide the training and education necessary to enable the student to function in a less restrictive environment in the community, with his family, or in a small group setting. To this end, the staff of the institution provides combinations of training programs to meet the individual needs in the areas of self-help skills, compliance training, socialization, education and vocational skills.

The institution was divided into five programmatic units, each with its own director and staff. The 80 residents of any unit live in ten townhouses staffed by 96 technicians, one psychologist, one social worker, one speech and hearing therapist, one activity therapist, and two educators.

Within the study unit's ten homes of eight students each, are four homes to house females, five house males and one houses prepubescent males and females. The students were in heterogeneous groupings using age, size, behavior, social skills, medical problems, and level of function as criteria for selection. Thus, no one home included only problem children.

The Sample

The sample for this study was drawn from a unit which has students ranging in age from 12 to 20. Over 91% of these students were institutionalized prior to transfer to this institution three years ago.

Few students within the unit have ever had formal language training and few at the present time have any means of communication. Amelioration of behavior problems and the improvement of the self-

help skills over the last three years have made it feasible to initiate language acquisition programs.

TABLE I presents a numerical description of the subjects according to sex, race, religion, and age.

The sample contains approximately the same proportion of subjects in each area as does the population. Approximately one-half the sample is male (N=27), and the other female (N=21). The sample is predominately white and between the ages of 15 to 17. All sample subjects' individual test scores may be found in Appendix A.

A number of tests were administered to obtain pre-test data on the sample. TABLE II presents those tests, their primary content emphasis, and subtest headings.

All preassessment scales were given by appropriate professional staff. The Local Assessment Scale and the R.E.E.L were administered by the speech therapist; the Adaptive Behavioral Scale and Fairview were given by the psychologist. All treatment evaluations were administered by an educator who had no other function during the running of the program. Testing utilizing the Uzgiris and Hunt Scale was done by a master's level practicum student who was trained and checked out for proficiency on this test at the University of Illinois. The whole preassessment period took place approximately the three months prior to the matching of the groups. All standardized scales followed the procedures of the test authors. All pre-test scores, the local preassessment scale, individual student scores, and the subjects meeting criteria on the local scale are found in Appendices C, D, E, and F.

TABLE I

Numerical Description of Population and Sample

by Sex, Race, Religion, and Age

	POPULATION		SAMPLE	
Trait	Number	Percent	Number	Percent
Sex				
Male	42	61	27	56
Female	27	39	21	44
Race				
White	63	91	45	93
Black	2	2	2	4
Other	4	5	1	2
Religion				
Protestant	34	49	26	54
Catholic	29	42	17	35
Jewish	6	9	5	10

Age	Male	Female	Male	Female	Male	Female	Male	Female
12-14	6	3	9	4	5	3	10	6
15-17	24	15	35	22	15	11	51	23
18-20	11	10	16	15	7	7	15	15

Note: Population n = 69
Sample n = 48

TABLE II

Tests and Content Breakdown of Instruments

to Obtain Pre-Training Data

Test	Primary Content	Subtests
Uzgiris-Hunt Scales of Sensorimotor Development	prelinguistic cognitive ability	visual pursuit, object permanence, means for obtaining environmental ends, vocal and gestural imitations, operational causality, construction of object relations in space.
(Bzoch-League) Receptive-Expressive Emergent Language Development	language	receptive, expressive language
Fairview Self-Help Scale	survey of behavioral skills	self-help, social, motor, language
Adaptive Behavior Scale	developmental survey of behavioral skills	independent functioning, language development, domestic activity, self-direction
Local Scale	attention	visual and auditory attention, visual and auditory imitation

A description of each scale and subject scores follows.

The Fairview Self-Help Scale (1970) was used as an observational assessment of the behavior age of functioning in the areas of motor dexterity, self-help skills, social interaction, communication, and self-direction. A single behavioral age score in months was obtained for each subject. TABLE III shows the functional behavioral age of each child as measured by the Fairview.

The subjects have an average chronological age of 16 with overall functioning age of approximately two years. From the students' individual Fairview profiles it is clear that all of the students are profoundly or severely retarded as retardation is defined by the American Association of Mental Deficiency. As indicated by individual scales of the test, the subjects have good motor dexterity, which means that persons are ambulatory, have good large muscle ability in arms and legs and are fairly well coordinated. Twenty-one (27%) have verbal skills ranging from the ability to make simple vocalizations to saying three words together appropriately. Only six (8%) can interact in socially appropriate ways by repeating or answering simple questions. Ten (12%) have independent functioning skills, which means they can play independently or perform menial household tasks such as dusting or putting dishes into the dishwasher.

Another scale used to evaluate emergent language was the Bzoch-League Receptive-Expressive Emergent Language Scale (1970). The scale was developed to be used with infants up to 36 months and, therefore, is of questionable validity for the present sample, but was utilized here because there was no more appropriate test.

TABLE III

Functional Behavioral Age (in months)

of Sample as Measured by the

Fairview Self-Help Scale

	TREATMENT GROUPS			
Subjects	Manual	Oral	Oral-Manual	Control
1	17.6	17.2	14.0	22.8
2	30.0	15.4	40.2	22.5
3	26.8	23.9	9.4	39.4
4	32.0	16.5	26.8	22.1
5	45.0	30.0	23.2	24.6
6	28.8	24.6	44.2	26.0
7	34.9	9.0	13.1	22.5
8	23.5	27.0	39.4	39.0
9	57.0	17.6	42.6	28.0
10	53.0	13.5	26.8	28.8
11	35.6	18.4	20.6	12.4
12	50.0	9.4	18.7	19.9

TABLE IV gives the age, in months, for Receptive and Expressive Language of each subject. The population mean for receptive language is 20 months, for the sample 18 months. The expressive language mean for the population is 12 months, the sample 8 months. (The population means are obviously higher because the population contains students who were excluded from the study because they do have speech.) The receptive language of our sample is the same as would be found with a year-and-a-half-old normal child. Thus, on the average, our sample of students have the following developmental patterns of auditory responses.

1. They will make gross reflex responses to sudden noise and identify the source of the sound.
2. They can differentiate and recognize sounds and voices which are familiar to them.
3. They can understand the general meaning of speech with different rates and inflections; that is, they can tell the difference between an angry or a friendly message.
4. They can respond to the names of some objects appropriately as indicated by being able to choose a verbally labeled toy from a box, and can act on commend to stand or sit.

Expressively, the group does not perform as well. They are able to signal discomfort and comfort with specific vocal signals and may attempt to imitate specific sounds. Some students have the ability to use a few words imitatively to satisfy needs. Once again, it is clear that these students function at an extremely low level. Even though several students' scores would indicate the ability of a

TABLE IV

Receptive and Expressive Language Ages (in months)

of Sample by Treatment Group

Subjects		TREATMENT GROUPS			
		Manual	Oral	Oral-Manual	Control
1.	receptive	10	20	11	14
	expressive	5	0	3	6
2.	receptive	10	16	30	18
	expressive	7	6	7	5
3.	receptive	9	24	11	36
	expressive	3	8	1	11
4.	receptive	27	6	11	24
	expressive	18	1	0	16
5.	receptive	20	18	12	18
	expressive	20	6	3	5
6.	receptive	27	20	36	11
	expressive	20	4	18	2
7.	receptive	22	8	6	27
	expressive	9	6	·6	24
8.	receptive	10	22	20	1
	expressive	1	6	5	2
9.	receptive	36	18	27	24
	expressive	20	8	2	14
10.	receptive	24	9	20	
	expressive	3	7	4	
11.	receptive	24	20	18	7
	expressive	5	7	1	0
12.	receptive	33	6	8	24
	expressive	22	1	4	2

three-year-old, it is important to indicate that this group does little or no spontaneous or self-initiated appropriate vocalization.

Another descriptive measure of the sample was their level of cognitive development based on Piaget's model. Uzgiris and Hunt (1975) developed the scale to measure: 1) the Development of Visual Pursuit and Permanence of Objects, 2) the Development of Means for Obtaining Desired Environmental Events, the Development of Causality, the Construction of Object Relations in Space, the Development of Schemes for Relating to Objects, and 3) the Development of Imitation. This scale, although developed for normal children, has been found to be reliable with severely and profoundly retarded (Kahn, 1976). The scores here indicate developmental levels according to Piaget's schema of the sensorimotor period. TABLE V shows the mean schema levels by group for each scale.

The sensorimotor period in normal children starts at birth and extends to approximately 18 months. With this time frame as a reference, it appears that the sample subjects have skills appropriate to normal children who are capable of beginning vocalization but have not done so. Individual sources are found in Appendix B. The individual variability across scales is greater than appears in the TABLE V and may more accurately pinpoint developmental weakness in individuals.

The Adaptive Behavior Scale scores allow comparison of center residents to a large number of residential retardates of comparative age in institutions across the country. Approximately 90% of the study population and sample fall into the lower third of the retarded

TABLE V

Group Mean Scores on

Subscales of Uzgiris-Hunt

Scales of Sensorimotor Development

	TREATMENT GROUP			
Subscales	Manual	Oral	Oral/Manual	Control
1. Visual Pursuit Object Permanence	6	5	5	5
2. Means Ends	5	6	5	5
3a. Vocal Imitation	3	2	2	2
3b. Gestural Imitation	4	3	3	3
4. Causality	5	4	4	4
5. Object Relation in Space	6	5	5	5

TABLE VI

Number of Population and Sample

Compared to Percent Level of Functioning

of U.S. Institutionalized Population

			TREATMENT GROUP			
U.S. % Levels	Sample	Population	Manual	Oral	Oral-Manual	Control
0-10	17	22	5	1	7	4
11-20	17	21	3	8	2	4
21-30	10	18	4	2	2	2
31-40	2	2			1	1
41-50		1				
51-60						

institutionalized population. Over a third of this group is in the lowest 10%, indicating the homogeneity of the group as shown in Table VI. Scores for individuals on each scale are found in Appendix C. Although there are ten scales in part one, scale number three is most relevant to this study as it is a measure of language development. Our sample's language development in each group averaged between the 11th and 16th percentile as compared to the norm group.

Because the students in the study population function at such a low level, there are no valid language assessment tools available to measure pre-language skills or language. The Uzgiris and Hunt Scale has been shown to be possibly valid with this population as a pre-linguistic measure of cognitive development of the sensorimotor period. Because the Uzgiris-Hunt Scale is very lengthy, a scale was developed by the author and the staff of the institution. The scale, referred to as the Local Scale, has face validity as it is based on the theoretical and practical work of Chatelanat, Henderson, Robinson, and W. Bricker (1971); Kirk, McCarthy, and Kirk (1968), and Lynch and W. Bricker (1972) and Piaget. The local test was developed to determine if subjects had pre-language skills thought to be important to language learning. The subtests of the local scale are described as follows:

A. The Exploration Subtest:

Objects are placed before the subject which he can explore for three minutes. From observation, the hand dominance, most frequent level and the highest level of function, is determined. Scoring levels 0-6.

Visual Attention:

The subject is asked to visually attend to the examiner and objects for a maximum of five seconds.

Score 0-10.

C. Visual Memory:

The subject is asked to duplicate designs which become more complicated to determine his visual memory of color and spatial order.

Score 0-22.

D. Auditory Attention:

The subject is requested to turn his attention from play activity to the examiner on verbal command.

Score 0-6 and 0-10.

E. Auditory Memory:

The subject is verbally requested to select first one, then two, then three objects from a group.

Score 0-18.

F. Manual Imitation:

The student is asked to imitate hand, arm, and finger movements.

Score 0-18.

G. Speech and Sound Imitation:

The subject is asked to imitate sounds modeled by the examiner.

Score 0-50.

The complete test is found in Appendix C.

Group mean scores on the Local Scale are given in TABLE VII.

TABLE VII

Attention Group Mean Scores from Local Scale

Subtest	Maximum Score	TREATMENT GROUP			
		Manual	Oral	Oral-Manual	Control
Exploration					
most frequent level	6	3.5	2.9	3.6	3.2
highest level	6	4.9	3.9	4.5	4.5
Visual Attention	10	7.4	8.0	7.4	7.0
Visual Memory	22	3.5	1.7	3.8	1.5
Auditory Attention 1	6	2.4	3.0	1.8	2.7
Auditory Attention 2	10	8.4	8.3	7.8	6.9
Auditory Memory	18	2.8	1.2	3.8	1.5
Manual Imitation	18	8.1	4.8	5.2	5.6
Speech/Sound Imitation	50	16.5	7.3	9.4	12.5

On this scale the only areas where students evidenced any ability was in auditory attention and visual attention. They also show some potential for gestural imitation but little for verbal imitation, both thought to be necessary prerequisite skills to total communication learning.

SUMMARY DESCRIPTION OF THE SAMPLE

The sample is predominantly white, 60 percent male, with a mean age of 16.

From the behavioral scales, the Fairview Self-Help Scale and the Adaptive Behavioral Scale, it is determined that the sample functions at approximately a two-year level and compares to the lowest 30 percent of all institutionalized retardates of the same age.

Language development, as evaluated by the Receptive Expressive Emergent Language Scale, indicates a higher level of receptive than expressive ability. Understanding is approximately at a two-year level, while expressive language is at a pre-verbal level of one year. This level obtained by the individual without benefit of formal educational training indicates the possibility that the receptive level is sufficient enough to work within a language program to develop total communication skills.

The Uzgiris and Hunt Scale indicates sufficient developmental skills in all areas except vocal imitation and gestural imitation.

The local test of attention, memory, and imitation indicate no ability with visual and auditory concepts, areas which will have to be considered in the development of a treatment program.

PROCEDURE

Procedure for Obtaining Inter-rater Reliability on the Local Scale

The staff-designed Local Scale was used in the preassessment of the population to match subjects into groups. To obtain reliability of rater's measures, four or five raters independently rated five subjects. The raters were seated at small tables to the examiner's side at an angle to insure a clear visual field and close enough to hear the subject's responses. A copy of the Local Scale is found in Appendix D.

The following procedure was used with each subject:

The subject was brought into the examiner's office and seated at a small table next to the examiner. Behind the subject, easily accessible to the examiner, were the materials needed during the session.

For the Exploration subtest, the examiner placed the first group of objects on the table before the subject, the examiner inviting the subject to "play" with them. The subject's behavior was recorded for three minutes. The objects were then removed and a second group containing three new objects and the most frequently used object from the first group were placed on the table. Again the subject was encouraged to "play", and behavior was recorded for the three minute period. This procedure was repeated with a third group of objects. The observed behavior enabled us to place the child at the appropriate sensorimotor developmental level as described by Piaget.

For the Visual Attention section, the subject's chair was turned

to face the examiner. Using a spoon of pudding or a known and acceptable reinforcer, the examiner requested the subject to first attend to the reinforcer for five seconds and then to the examiner for five seconds. This procedure was repeated four times and the subject was reinforced each time he performed correctly for the ten seconds.

For the Visual Memory section, the subject was again placed facing the table. The subject, for each exercise, first observed the examiner perform as he verbally described his actions. The subject started with a simple duplication of a pattern using two colored blocks and then progressed to increasingly difficult patterns involving additional numbers of colors. With each exercise the task was performed first on the card itself, then next to the card with the card in view, and then off the card with the card hidden from view. There were five exercises of three levels each.

The Auditory Attention section allowed the examiner to see whether the subject could react to an auditory cue and then maintain attention on the examiner for up to five seconds. The examiner allowed the subject to play with objects at the table while he moved out of the child's field of vision. The examiner then called the child's name and recorded the response. In a second part of the exercise the examiner sat next to the subject and requested verbally that the subject look at him for first one second then up to five seconds and recorded each result.

Memory and Discrimination were demonstratable in the next section. Again the subject was requested to perform progressively more complex tasks. The examiner placed five objects on the table

before the subject, labeled it, and handed it to the subject for a few seconds before replacing it on the table. The examiner then requested the subject to give him a single object at a time, then two, etc., recording the subject's response to each request.

The next section assessed the subject's ability to imitate both gross and fine motor movements. The examiner demonstrated each movement and requested the subject to do the same thing. If there was an inappropriate response the first time the examiner manually guided the subject, demonstrated again and requested the subject to repeat the movement. This was done for the first two tasks only. Thereafter, the examiner demonstrated and recorded the response.

In the last section, the examiner attempted to induce imitation of vocalization, both sounds and words. To encourage responses, all attempts at vocalization were verbally reinforced. All of the sounds and words in the list were requested regardless of performance on prior sounds or words.

During the testing session the subject was given short breaks during which he was verbally reinforced for his participation.

Results of these testings showed that all raters were able to agree, on the average, 93% of the time. Percent agreement varied from 87 to 98. Differences occurred on those subscales (B and D2) where vocalizations by the subject had to be judged as to his saying a word or sound correctly. Individual ratings are found in Appendix E.

Procedure for Obtaining Inter-Rater Reliability Measure on the Evaluation Test

The evaluator and four additional raters rated five students

not to be in the study on five words, eat, drink, ball, cookie, and pop. A copy of the evaluation sheet is found in Appendix G.

The four raters were seated to the side of the examiner at small tables within hearing range of the subject. They independently rated and recorded the stimulus and acceptable response. Individual rater responses are found in Appendix H. Average agreement was reached for all subjects 95% of the time. Percentages varied from 88 to 100 percent.

The procedure for testing each word followed the same format.

The evaluator placed the object (ball) before the subject and presented the first stimulus, "What's this?" If the subject said and signed, or said, or signed the correct response, the rater recorded the word stimulus and response. If there was no response or an incorrect response was given, the examiner named and signed and then said "What's this?" If a correct response was given the word, stimulus, and response were recorded. If an incorrect response was given, the examiner placed four additional objects on the table in front of the subject and said and signed "Point to the (ball)." If a correct response, pointing, was not given, the examiner placed two objects in front of the subject. He said and signed the name of the object giving the following orally, "Point to the (ball)." If an incorrect response was given, the examiner showed the subject the object, then hid it behind his back and said "Where did it go?" "Show me where it went." If the subject gave an inappropriate response, the examiner put the object in front of the subject and said "(subject's name, point to the (ball))." If the subject still

did not respond correctly, the examiner manually guided the subject giving a verbal description of the object, "This is a ball. The (ball) is soft, I can bounce the ball (he does). I can roll the (ball), etc."

At any time a correct, that is appropriate response, is given to the stimulus, testing for that word is complete. For the first two stimuli saying and signing, signing or saying are correct responses. For the next two stimuli the subject's correct response is pointing, looking or pointing is correct for the hidden object. A copy of the evaluation recording form is found in Appendix I.

Each word to be evaluated followed the same procedure.

The content of the treatment programs were based on the theory and material found in McLean, Yoder and Schiefelbush (Ed., 1972) and Schiefelbush and Lloyd (1974). Most relevant was the program of L. Kent in McLean, etc. (1972). A content table of the oral-manual treatment follows.

TABLE IX shows the contents of the Kent program and the oral-manual treatment program, as specified in TABLE VIII.

Kent's program was designed to deal with higher level subjects and contains verbal training only. Both programs contain a motor component which is designed to teach pointing and the manipulation of objects and a vocal component which teaches imitation and shaping of sounds and combinations of sounds to form words.

TABLE VIII

Content of Oral-Manual Training Program

	Program Inventory	Desired Training	Final Criterion
A.	Does the child look at the object?	repeated shaping	looks at object for five seconds.
B.	Does the child appropriately play with the object?	manual guidance	plays with object several seconds.
C.	Does the child point to object?	manually guide	points to object three out of four times.
D.	Does the child look for hidden object?	teach	seeks object three out of four times.
E.	Does the child point to correct object?	shaping	points three out of four times.
F.	Does the child sign given imitative cue and object?	shaping	signs three out of four times.
G.	Does the child sign given more general cue and object?	shaping	signs three out of four times.
H.	Does the child verbalize the name of object?	shaping	three out of four approximations.
I.	Does the child sign and say imitatively?	imitation shaping	three out of four.
J.	Does the child sign and say when given object and an incomplete sentence as cues?	minimal prompting and guidance	three out of four.

TABLE IX

Content Comparison of Study

Treatment and Kent's Program (1972)

Study Subtest	Kent Content	Training	Trials
A	1.1.2.0. Looking at objects	shaping	three consecutive successes
B	1.2.1.0. Motor	teach imitation	90% - two trials
C	2.1.1.0. Recognition of objects	teach prompting	90% - one trial
D	2.3.1.1. Naming concealed object	teach prompting	90% - one trial
E	2.2.1.0. Giving two objects	teach	
F	No comparison		
G	No comparison		
H	1.3.1.0., 1.3.2.0., 1.3.3.0., Vocal imitation	teach imitation shape	three consecutive 90% - two trials
I	No comparison		
J.	2.4.2.0., 2.4.3.0., discrimination of possession and place	teach shape	2.4.2.0. - 90% two trials 2.4.3.0. - 90% fourteen trials of eight pairs

Procedures for Training Staff in Treatment Procedures

The content of the author's programs was taught to the trainers in pairs using only the treatment they would be teaching the student. A copy of each treatment is found in Appendices J and K. Trainers were not made familiar with other treatment programs. The unit speech therapist and educator taught 17 pairs of trainers in the following manner: After all preassessment tests had been completed, the initial evaluation was done on the five words and subjects had been matched and treatments assigned. Technicians were assigned to students. They were from the students' homes and worked the first or second shift. Assignments had to be made to insure availability of time, compatability and familiarity with the student and his current schedule.

Staff was trained in pairs for a minimum of three hours, with two trainers in the speech therapy room on the unit. Training consisted of two phases.

Phase I. Program Theory and Objectives

Technicians were given a copy of only the program they would be using. They were told the rationale for the approach to be used and given the objectives and overall procedures to be followed in the treatment and data collection.

Phase II. Training Program Procedure

Together they went over this program word by word and discussed each part so that they would understand what they would be doing and why they would be doing it. In turn, each technician practiced the program as trainer and then acted as subject for the other technician

while the trainers observed and corrected. This was continued until the trainers felt the technicians were ready to be checked out. Each technician was checked out by performing as "trainer" on the object permanence section of the treatment. The two official trainers observed and recorded the verbal performance and physical performance on a checklist of behaviors they had developed to follow the section of the treatment. The checkout sheet is found in Appendix M. When the technician met the criteria of three consecutive (90%) correct demonstrations of the section, they were ready to begin the treatment program with the student. If the technician failed, practice was continued for an additional hour, at least, before another checkout.

Procedure for Making a Basic Vocabulary List

A Basic Vocabulary List was developed to be used as the source of vocabulary for the treatments. This list is found in Appendix P. The words represent objects found in the child's environment which would be useful to his communicating with others to obtain necessities or satisfy needs. The list was compiled by the speech therapist from texts and materials commonly used by professional speech therapists working with retarded. Words to be used in the treatments were decided on by the speech therapist in consultation with the trainer. Words which were simplest for form orally were to be used first. These words are formed at the front of the mouth with the lips. Such words as ball and pop are examples.

Procedure for Establishing Treatment Groups

The sample was taken from a possible 71 students. Excluded from the study were those students (N=11) who already knew all the

words on the Basic Vocabulary List to be taught in treatment and/or could converse in sentences. Two students were eliminated because of severe medical management problems which made it impractical for them to receive treatments. Because of potential changes beyond our control, administrative or clinical, it was decided to try for the best matching of 12 students and a total sample of 48. This left a few extra students to fill in if it was necessary for a student to be dropped.

Using the preassessment scale scores, each student was designated as having met passing criterion or failed for each subtest. This profile for each student was used to match the groups so that each group had equal numbers of subjects meeting criterion as possible. TABLE X shows the number of subjects, population and sample meeting criterion on each subtest. TABLE XI indicates number of subjects meeting criterion in each group after matching. At this time, treatments were determined for each group by placing a slip of paper in a box for each treatment (oral, oral-manual, manual, and control) and drawing out one at a time to be the treatment for each group, drawn from a slip in a second box.

Procedure for Treatments

Treatments were designed to have the same content and form of presentation. The only difference was in the utilization of verbal and/or manual designations of the words to be taught. In the oral-manual treatment, words were presented with simultaneous verbal and sign designations throughout the total treatment period. The oral program had only oral designation of words throughout the total treat-

TABLE X

Number of Subjects from Population and Sample

Meeting Criterion on Local Pre-Assessment Scale

	Subjects	
Subscale	Population	Sample
B	46	29
C	5	2
D1	6	1
D2	48	31
E	12	3
F	16	8
G	30	18

Note: Sample N=48
Population N=80

TABLE XI

Subjects Meeting Criterion on Local Scale

Found in Each Treatment Group

	TREATMENT GROUP				
Subscale	Manual	Oral	Oral/Manual	Control	Total
B	8	8	7	6	29
C	0	1	0	1	2
D1	0	0	0	1	1
D2	7	8	9	7	31
E	0	0	3	0	3
F	3	1	2	2	8
G	6	3	4	5	18
Total	24	21	25	22	

ment program. Progress to a new word was dependent on verbalization of the word. The manual treatment had only manual presentation for the first ten hours and then oral-manual for the last five hours. Words learned manually were now combined with their verbal designations. Movement from word to word in the manual group was dependent on the learning of the oral designation during the last five hours. The control group received no formal instruction at any time. Control students were at times in the home when instruction of other students was in progress or when communication between student and staff possibly included vocabulary or signs contained in their treatment program.

At this time, a schedule was set by the technician and speech therapist for the total treatment. It included the days, the time and place for each session. This was done to insure the carrying out of the program having taken into consideration both the students' schedule and the technicians' schedule. In addition, the speech therapist could plan observation time and keep track of scheduled progress. The speech therapist planned observation of each technician at least once during each five hour period. She was in the homes daily and available for consultation on request or when staff indicated on data records that there were problems in carrying out the students' program. Records for each session of training were turned in two days after the session and progress was recorded on a master chart by the speech therapist. The evaluator was then able to note when evaluations were to be done and program time for completing them. All individual records were placed in the student's program file

after the speech therapist checked them for accuracy and progress. Schedule of sessions is found in Appendix Q.

For each treatment session the same procedures were followed. A particular area of the home was chosen to provide a quiet place where interruptions and distractions would be at a minimum. The technicians set up for each session insuring that table and chairs were in place and objects and reinforcers were accessable. At the beginning of each session they would review pronouncing or signing any words learned in the last session and review five additional words in order from the list of those learned in previous sessions.

Each session started with section A and proceeding through the programs until time ran out. If criterion was reached, a new word was added. Occasionally when a student was unable to perform during a session, the session was stopped for a brief period and resumed. If, after two attempts, the student was not able to perform, the session was discontinued and a statement recorded on the data sheet to indicate the reasons for such action. If sessions were missed because of special events or illness, they were made up so that each student participated in the same number of sessions (60). Schedule changes were noted on the data sheet and were discussed with the speech therapist when appropriate. Staff could request consultation at any time or received consultation when the speech therapist felt it was appropriate. Reasons for consultation were usually for slow progress, choosing new words or not following correct procedures. Because all technicians are trained in behavioral modification techniques in their inservice training programs of 150 hours shortly

after being hired, and most of the programs used in the institution are of this kind, the speech program was not unlike other programs they carried out in their daily work schedule.

Evaluations

The evaluator, using the master chart as a guide, kept track of the sessions and scheduled evaluations in consultation with the speech therapist and technicians. The evaluations were conducted after each five hour training period in the designated area of the student's home where materials were already available. The evaluator was already familiar with each of the students so her presence in the home was not unusual or novel to the student. All evaluations were done by this one staff member.

For each evaluation, the subject was presented with the first stimulus word. If the subject responded correctly, that is, with a verbal and sign or verbal or sign response, the evaluator went on to the next word. When the response was not appropriate, the evaluator presented the next stimulus. This was continued until there was an appropriate response or the list of stimuli was exhausted. The examiner tested all of the words the subject had worked on during the course of treatment each time plus the five words used for the initial evaluation. All evaluations for each subject were done by a single individual not involved in the treatment process. The control group was tested in parallel to members of the oral-manual group having been paired at the time the groups had been set up.

A post-test evaluation was also done on the 17 words of the

local pre-test. The procedure for this was the same as that of the initial testing except sign responses were recorded. This evaluation was performed by the same person who performed all the evaluations.

Design

All 80 students were first given the pre-assessment scales described in the beginning of Chapter III. Subjects were matched on the Local Scale scores to form four groups. Treatments were assigned to each group. Pre-test data was obtained for five words, 17 words, and total words. The 17 words were part of the Local Scale. The evaluator tested for the five words and the trainer assigned to the subject determined the total words by checking the subject's ability to say any words on the Basic Vocabulary List or any words they knew to be in the subject's vocabulary. This was not as difficult as it may appear because the trainer was very familiar with the child and most of the children's total vocabulary was limited to a few words.

Assigned trainers were trained to criterion in the treatment procedure they would be using, plan the treatment schedule, and commence with the treatment program.

At the end of each five hours the evaluator tested the five words and any words worked on in the treatment up to that time. The last testing of total words or signs was used for the post scores.

The 17 word list was tested for within one week of the time the program was completed.

17 Words

Measures to be obtained were 17 words pre and post. The pre-measure was taken as part of the Local Scale while the post was

given as a separate test.

Trials on 5 Words and 5 Signs

The five words, cookie, pop, ball, eat, and drink were tested prior to treatment and then after each five hours of treatment. This was termed trials on five words and signs on five words.

Pre- Post- Total Words - Total Signs

Total words and total signs were measured pre and post. Total words were the total ordinary words in the child's vocabulary. Subjects had not had any sign words prior to treatment.

Statistical Design

A principal component analysis was run on the pre-assessment score data and an unrotated principal component score was obtained for each subject. This score was used to match subjects for the analysis. The first four principal components were submitted to a varimax rotation. Factor scores were interpreted.

The dependent variables were all transformed using $X' = \log_{10}(X+1)$ to minimize the effect of subjects zero scores and a few extremely large scores.

Spearman rank order correlations were calculated between the factor and the dependent variables, as well as with pre-post difference scores, separately for each group and for the combined sample.

CHAPTER IV

RESULTS

To test the third null hypothesis, that pre-test data would not allow prediction of success in learning oral or sign language, a principal components analysis was run on the 28 scores generated by the preassessment tests. The Gorsuch scree test of Cattell (1975) of the eigenvalues showed the first four factors accounted for 65% of the variance. The first principal component score was used to match subjects by rank to be then used as the added block for the statistical design. To further identify the sources of variance, a varimax rotation was performed on the first four principal components and these were then identified.

The principal component analysis was conducted on the 28 pre-test scales. Examination of the eigenvalues of the correlation matrix through the use of the scree test appeared to indicate that four factors were adequate for a parsimonious interpretation of the data. The four factor solution accounted for 66.5 percent of the total variance. Four components were then submitted to a varimax rotation. Factor loadings on the first unrotated component and the four rotated factors are presented in TABLE XII.

The pre-test scores are from the Bzoch-League Receptive-Expressive Emergent Language Scale (1970), the Uzgiris-Hunt Scales of Sensorimotor Development (1975), the Fairview Self-Help Scale (1969), and A.A.M.D. Adaptive Behavior Scale (1975), and a Local

TABLE XII

First Principal Component and Varimax Rotated Factor Loadings

Test Scales	First Unrotated Principal Component	Varimax Rotated Factors I	II	III	IV	h^2
R.E.E.L.						
receptive	.930	.540	.531	.522	.210	.890
expressive	.700	.353	.390	.639	.133	.690
Uzgiris-Hunt						
1 - Visual perm.-obj. perm.	.607	.095	.901	.090	.118	.828
2 - Means-ends	.616	.051	.904	.129	.049	.838
3 - Vocal & gesture imit.	.719	.103	.369	.633	.413	.717
4 - Causality	.654	.172	.723	.143	.223	.622
5 - Obj. rel. in space	.778	.313	.632	.206	.399	.699
6 - Schemas for relating to object	.634	.169	.825	.064	.118	.727
Fairview A.B.S.						
1 - Ambulation	.744	.791	.365	.131	.075	.782
2 - Motor Dexterity	.486	.212	.329	.270	.143	.247
3 - Toilet Training	.053	.550	-.201	-.551	.310	.743
4 - Dressing	.618	.750	.101	.118	.214	.632
5 - Eating	.646	.739	.023	.338	.144	.682
6 - Grooming	.730	.794	.301	.167	.083	.755
7 - Communication	.148	1446	.006	.100	-.422	.387
8 - Social Inter.	.403	.296	-.216	.623	.165	.550
9 - Self-Direction	.716	.778	.169	.319	.075	.741
10 - Total	.608	.337	.240	.573	.026	.500
Local Scale						
A1 - Level of Func.	.668	.091	.383	.409	.560	.636
A2 - Highest Level	.776	.175	.606	.317	.501	.749
B - Visual Atten.	.567	.158	.198	.190	.746	.656
C - Visual Memory	.786	.547	.235	.485	.305	.683
D1 - Auditory Atten.	.398	.180	.158	-.058	.633	.461
D2 - Auditory Atten.	.450	.123	.034	.176	.753	.613
E - Auditory Memory	.786	.510	.256	.446	.381	.670
F - Manual Imitation	.810	.562	.391	.329	.312	.673
G - Speech	.853	.389	.426	.620	.266	.788

Scale developed by center staff. The scales are designed to yield descriptive measures of the child's language, behavior and cognitive development. Missing values were deleted pairwise in calculating the correlation matrix and were set equal to the mean of the variable in calculating component scores. The first principal component was used to obtain a factor score for each subject. This score was then used to rank all subjects within each treatment group. TABLE XIII contains rankings and principal component scores for all subjects by treatment group.

Factor I, Behavioral Activity: is a measure of the child's ability to perform simple tasks on his own or on command. Included might be his ability to toilet himself, get a drink of water or walk to school. Factor loadings were higher on scales of the Adaptive Behavior Scale ranging from .79 to .55. Domestic Activity (.79), Independent Functioning (.79), Responsibility (.77), and Knowledge of Space and Time (.74) were the highest loadings. Loadings ranging from .56 to .51 respectively, were on manual imitation, Local Scale F; economic activity, A.B.S. 3; visual memory Local C; Receptive Language, R.E.E.L. Receptive, and Auditory Memory, Local E.

Factor II, Cognitive Ability: This factor appears to be a measure of pre-language skills such as the ability to find an object hidden under a box or to imitate gestures or match block designs. Factor II appears to have its highest loadings ranging from .90 to .61 on the scales of the Uzgiris-Hunt Scale. These scales measure means-ends (.90), visual perception and object permanence (.90), object relations in space (.82), gestural imitation (.77); and causality (.63). These were followed by Local Scale A2, most

TABLE XIII

Rank and Factor Score from

First Principal Component

for Each Subject

Rank Within Group	TREATMENT GROUPS			
	Oral-Manual	Oral	Manual	Control
1	2.597	.866	2.156	1.487
2	1.117	.604	1.541	.809
3	.679	.375	1.493	.714
4	.672	.042	1.014	.420
5	-.190	.030	.928	.053
6	-.448	-.031	.582	-.038
7	-.555	-.270	.379	-.090
8	-.642	-.363	.243	-.121
9	-.860	-.628	-.554	-.561
10	-.985	-.783	-.733	-.690
11	-1.046	-.941	-.878	-1.789
12	-1.204	-1.343	-1.151	-1.887

frequent Piaget sensorimotor level (.61); Fairview (.55); and R.E.E.L. Receptive Language (.53).

Factor III, Language Skill: Variable loadings high on this factor seem to be related to the subject's ability to repeat sounds or words, communicate by answering a question or understand receptively by being able to carry out a command behaviorally.

Factor III loadings cluster around language skill as represented by several different scales. The loadings range from .69 to .52. Expressive Language Uzgiris and Hunt Scale 1 (.69); followed by Uzgiris-Hunt 3 (.63) vocal imitation, self-direction, A.B.S. 8 (.62) vocal imitation local scale G, (.62), socialization A.B.S. 10 (.58) and lastly receptive language (.52) as measured by the R.E.E.L. scale. One significant negative loading on A.B.S. 3, economic activity was found (-.55).

Factor IV, Attention: is simply a measure of the subject's ability to focus visual attention or auditory attention for a short period of time on a person or object. The local scales A1, A2, D1, D2, respectively measure auditory attention over time (.75); visual attention (.75); auditory attention (.63); highest Piaget level during play (.56), and most frequent level (.50). There was a negative loading (-.42) on local scale E, auditory memory. A complete list of loadings for all factors is found in Appendix R.

Factor scores on the four varimax factors were calculated for each subject. These may be found in TABLE XIII. This was to account for the variability on all factors for each subject and to determine if treatment groups matched on the first unrotated principal component factor were similar on the rotated factors. A one-way analysis of

variance was run with each factor for all treatment groups. TABLES XIV, XV, XVI, and XVII summarize this data. For each factor there was no significant difference between treatment groups.

To achieve normality of data all dependent variables were transformed using $X' = \log_{10} (X + 1)$. This transformation minimized the effect of a large number of zero scores and a few extremely large scores achieved by a small number of subjects.

Spearman Rank Order Correlations were run on all factors and difference scores for the total sample and then for each treatment group and the control group.

From TABLE XVIII for the total sample it appears that the first unrotated principal component factor is the best predictor of both oral and sign learning. Cognitive and language ability are also associated with sign learning and oral language. Neither behavior nor attention are significantly associated with sign or oral learning for the sample taken as a whole.

The Spearman correlation for the oral-manual group as shown in TABLE XIX indicate a significant association between the unrotated principal component and both difference measures of sign learning ($r=.69$; $p.<.01$ and $r=.80$; $p.<.001$). The first unrotated principal component is associated with two of the three oral language measures ($r=.62$; $r=.51$ both $p.<.05$). The cognitive rotated factor is significantly associated to total sign ($r=.62$; $p.<.05$) and sign trials ($r=.53$; $p.<.05$). Language is also associated to sign trials ($r=.56$; p. .05).

Language ($r=.75$; $p.<.01$) and attention ($r=.64$; $p.<.05$) are associated with the difference measure of the 17 words.

TABLE XIV

Analysis of Variance:

Four Varimax Rotated Factors

ANOVA: Factor I, Behavior

Source	S.S.	d.f.	m.s.	F.	p.
Between	.381	3	.127	.125	.945
Within	44.742	44	1.017		

TABLE XV

ANOVA: Factor II, Cognition

Source	S.S.	d.f.	m.s.	F.	p.
Between	4.118	3	1.373	1.416	.251
Within	42.670	44	.970		

TABLE XVI

ANOVA: Factor III, Language

Source	S.S.	d.f.	m.s.	F.	p.
Between	3.983	3	1.328	1.443	.243
Within	40.488	44	.090		

TABLE XVII

ANOVA: Factor IV, Attention

Source	S.S.	d.f.	m.s.	F.	p.
Between	1.520	3	.507	.513	.675
Within	43.438	44	.987		

TABLE XVIII

Spearman Correlations on Difference Scores

and Factors for Total Sample

Rotated Factors	Difference Scores				
	17 Words	Signs Total	Words Total	Words Trials	Sign Trials
Behavior	.10	.11	.24	.16	.18
Cognitive	.32*	.38++	.19	.17	.45+++
Language	.47+++	.30*	.44+++	.65+++	.35++
Attention	.15	.04	.18	.19	.16
First Unrotated Principal Component	.62+++	.55+++	.60+++	.68+++	.68+++

* p. < .05
++ p. < .01
+++ p. < .001

TABLE XIX

Spearman Correlations on

Difference Scores and Factors

Oral-Manual Treatment Group

Rotated Factors	Difference Scores				
	17 Words	Sign Total	Word Total	Word Trials	Sign Trials
Behavior	.10	.48	.46	.30	.31
Cognitive	.45	.62*	.10	.28	.53*
Language	.75++	.44	.25	.43	.56*
Attention	.64*	.26	.00	.14	.36
First Unrotated Principal Component	.62*	.80+++	.38	.51*	.69++

* p. < .05
++ p. < .01
+++ p. < .001

For the oral learning group, TABLE XX, it can be seen that the first unrotated principal component is significantly related to all sign and word difference measures.

Behavior is negatively correlated to total words ($r=-.60$; $p.<.05$) and word trials ($r=-.62$; $p.<.05$) with this oral group. Language is predictive of successful learning for oral language, $r=.57$; $p.<.05$, $r=.77$; $p.<.01$, $r=.80$; $p.<.001$). Attention is associated with oral trials ($r=.54$; $p.<.05$) and cognitive ability with 17 words ($r=.57$; $p.<.05$).

For the manual treatment group, TABLE XXI, the first unrotated principal component is again the best predictor ($r=.81$; $p.<.001$, $r+.85$; $p.<.001$) of both sign and oral accomplishment ($r=.88$; $p.<.001$, $r=.82$; $p.<.001$). In addition, it appears that behavior is also associated to both modes of learning on all measures. Language is the only other factor which was significant in total signs ($r=.54$; $p.<.05$), and total words ($r=.66$; $p.<.05$).

With the correlations for the control group shown in TABLE XXII, we do not have as many strong correlations. The first unrotated principal component is associated with 17 words ($r=.83$; $p.<.001$) and both word ($r=.73$; $p.<.05$) and sign ($r=.62$; $p.<.025$) trials. Cognitive ability ($r=.53$; $p.<.05$) is predictive of sign success as measured in trials, while language ($r=.53$: $p.<.05$) is associated with word trials. Attention ($r=.58$; $p.<.05$) is correlated to the 17 words.

From the Spearman correlations shown for the total sample and each group, it appears that different factors are predictive of success with different treatments.

TABLE XX

Spearman Correlations on

Difference Scores and Factors

Oral Treatment Group

Rotated Factors	Difference Scores 17 Words	Sign Total	Word Total	Word Trials	Sign Trials
Behavior	-.38	-.21	-.60*	-.62*	.06
Cognitive	.57*	.16	.33	.44	.29
Language	.57*	.28	.77++	.80+++	.13
Attention	.29	.35	.43	.54*	.44
First Unrotated Principal Component	.67++	.56*	.55*	.64*	.66++

* p. < .05
++ p. < .01
+++ p. < .001

TABLE XXI

Spearman Correlations on

Difference Scores and Factors

Manual Treatment Group

Rotated Factors	Difference Scores 17 Words	Sign Total	Word Total	Word Trials	Sign Trials
Behavior	.53*	.60*	.55*	.53*	.56*
Cognitive	-.22	-.12	.03	-.33	.27
Language	.25	.54*	.47	.66*	.37
Attention	-.38	.23	.32	.00	.49
First Unrotated Principal Component	.42	.81+++	.88+++	.82+++	.85+++

* p. < .05
++ p. < .01
+++ p. < .001

TABLE XXII

Spearman Correlations on

Difference Scores and Factors

Control Group

Rotated Factors	Difference Scores 17 Words	Sign Total	Word Total	Word Trials	Sign Trials
Behavior	-.07	.20	.48	-.06	.37
Cognitive	.41	.44	.13	.23	.53*
Language	.46	-.39	.13	.53*	-.20
Attention	.58*	-.13	-.04	.40	.17
First Unrotated Principal Component	.83+++	.29	.48	.73*	.62*

* p. $<$ .05
+++ p. $<$ .001

Those students who were successful in learning signs by the oral-manual method possessed cognitive and language skills. Only language was found predictive of sign learning if a manual approach was used. Behavior and language appear to be the best predictors for oral language learning when an oral approach is used.

The best overall predictor of oral and sign learning for all methods is the first unrotated principal component.

Those students who are somewhat behaviorally independent but have low cognitive ability predictably do better with a manual approach. Those with some cognitive and language skills would do well with the oral-manual approach. For the oral language technique it appeared that the first unrotated principal component is still the best indicator of the ability to learn by any of the techniques, and the best overall predictor in general.

Two hypotheses state there will be no trial effects and no differences between treatments. To test these hypotheses several analyses of variance were run on pre-post measures of 17 words, total words and total signs.

None of the subjects were exposed to all the 17 words as part of their treatment. All subjects but two were exposed to the same words. The two exceptions each had one additional word the others did not receive. The two-way analysis of variance with subject block added on 17 words is summarized in TABLE XXIII.

There were no significant differences between treatments. There was a significant pre-post difference ($F.=13.0$) but no significant interaction between trials and treatments. To further examine

TABLE XXIII

ANOVA Summary: Pre-Post on Seventeen Words

	S.S.	d.f.	M.S.	F.	p.
Blocks	3.996	11	.363		
Treatments	.626	3	.209	2.743	NS.
Block by Trials	2.508	33	.076		
Trials	1.067	1	1.067	13.017	p. .01
Blocks by Trials	.901	11	.082		
Treatment by Trials	.210	3	.070	2.289	NS.
Blocks by Treatment by Trials	1.011	33	.031		

the data, Fisher's least squared difference technique was run on all appropriate data reported in this chapter. Hereafter the term t-test will be used to designate scores of this two-tailed technique. From Graph 1, drawn from data in TABLE XXIV, the treatment groups transformed mean scores. The manual treatment group made the largest gains followed by the oral group. Both groups show about the same rate of increase.

Another measure of learning was obtained from the pre-post measures on total oral words. The analysis of variance design was again used and is summarized in TABLE XXV.

The treatment effect was not significant. There was a significant pre-post difference ($F=7.52$) and a significant treatment by trial interaction ($F=3.14$).

Graph 2 illustrating the transformed mean scores found in TABLE XXVI show the manual group and oral groups to have significant pre-post differences, TABLE XXVII ($t=-2.34$; $p.<.05$ and $t=-2.62$; $p.<.05$ respectfully) with the manual group superior to all other groups, but not significantly so. A comparison of the pre-scores between treatments, TABLE XXVIII, indicates the control group was initially significantly higher than the oral group ($t=-2.29$; $p.<.05$). These differences were not evident at the time of post-measurement. The oral-manual and oral groups appear to have done equally well, while the control group did not show much change at all.

A comparison of the results of these two measures of oral learning show that the manual group is superior in both instances. The control group appears to be the same on both measures. The oral-

TABLE XXIV

Treatment Groups

Transformed Mean Scores $X'=\log_{10}(X+1)$

and Mean Scores for Pre-Post on Seventeen Words

	Trials		
Groups	Pre	Post	Total
Oral-Manual	.25(.05)	1.17(.18)	.71(.12)
Oral	.00(.00)	1.42(.27)	.71(.14)
Manual	.67(.15)	3.58(.48)	2.13(.31)
Control	.01(.19)	2.42(.30)	1.71(.25)
Total	.48(.01)	2.13(.30)	1.31(.20)

Note: Numbers in parentheses are transformed mean scores.

GRAPH 1

Treatment Groups Transformed Mean Scores

for Pre and Post on Seventeen Words

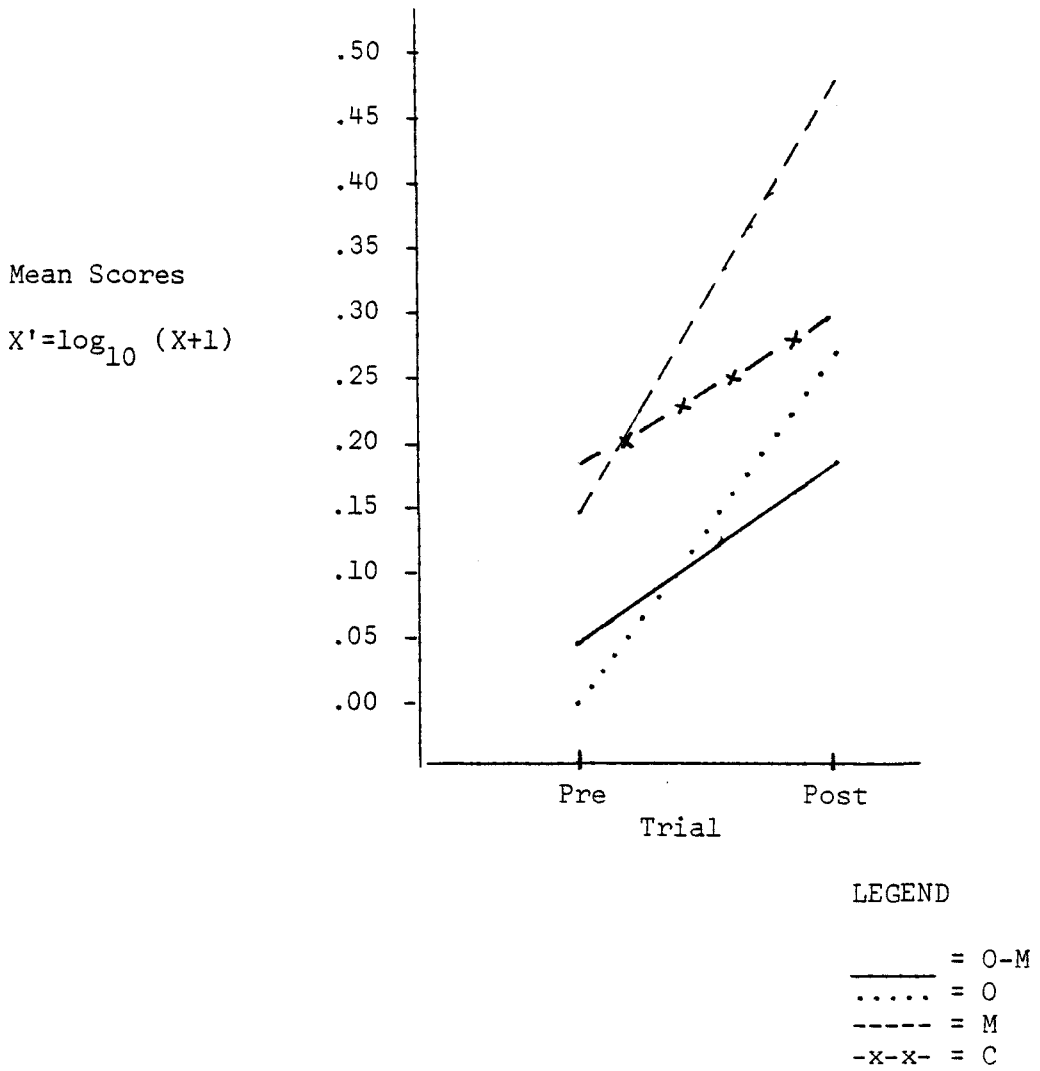


TABLE XXV

ANOVA Summary: Pre-Post Measure

on Total Oral Words

Source	S.S.	d.f.	M.S.	F.	p.
Blocks	4.99	11	.454		
Treatments	.421	3	.140	1.567	NS.
Blocks by Treatments	2.952	33	.089		
Trials	.885	1	.885	7.524	$p.<.05$
Blocks by Trials	1.299	11	.118		
Treatment by Trials	.316	3	.105	3.140	$p.<.05$
Blocks by Treatments by Trials	1.105	33	.033		

TABLE XXVI

Treatment Groups Transformed Mean Scores

and Mean Scores for Pre-Post

on Total Words

Groups	Pre	Post
Oral-Manual	.25(.05)	4.58(.26)
Oral	.00(.00)	1.17(.22)
Manual	.58(.12)	4.83(.45)
Control	1.08(.20)	1.16(.22)
Total	.48(.10)	2.94(.29)

Note: Numbers in parentheses indicated transformed mean scores.

GRAPH 2

Treatment Group Transformed Mean Scores

for Pre and Post on Total Words

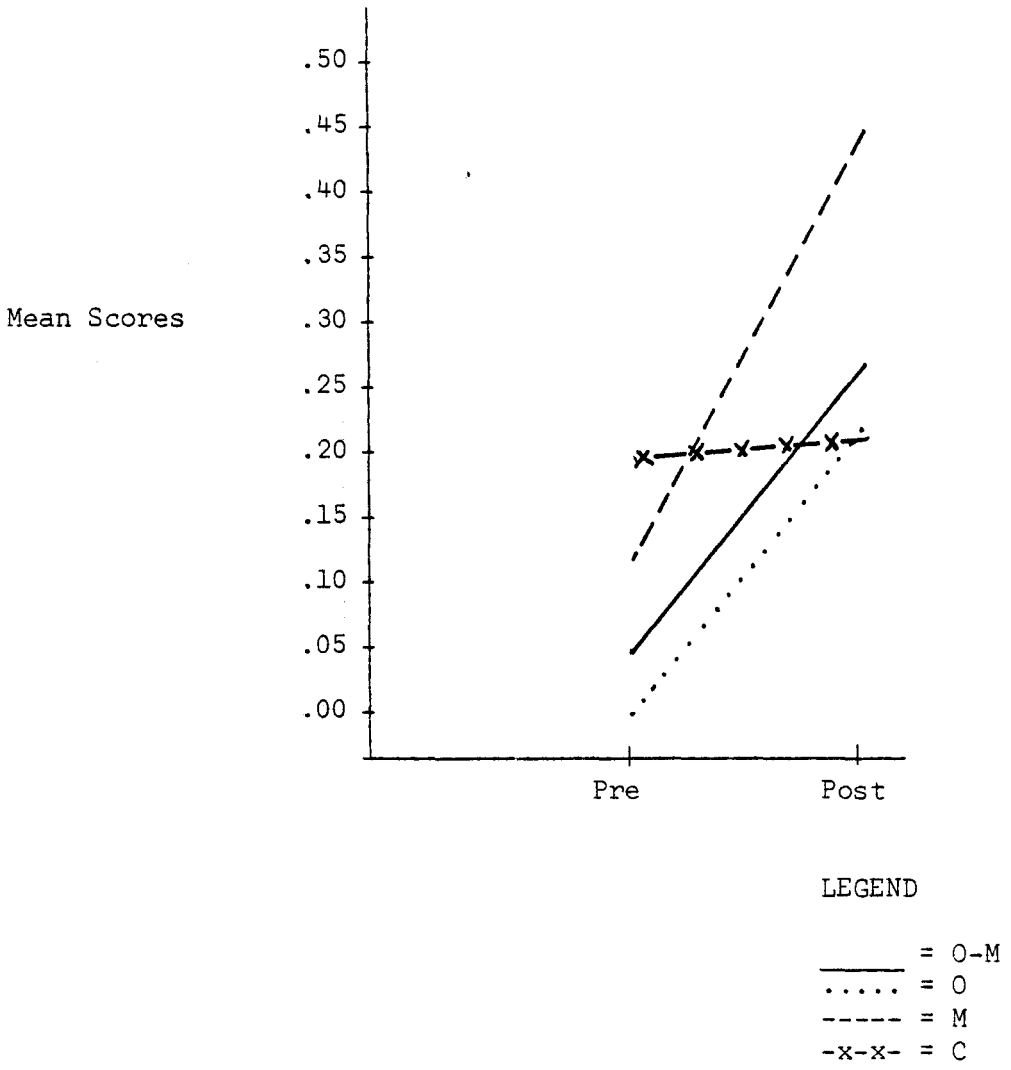


TABLE XXVII

Significant t-tests Between Pre-Post

Measures on Total Words

	Treatment Groups#			
Comparison	Oral-Manual	Oral	Manual	Control
Pre-Post		.2.34*	-2.62*	

Note: Negative values indicate post scores higher.
only significant scores reported.
* p.<.05

TABLE XXVIII

Significant t-tests Between Groups

for Pre and Post Measures on Total Words

Comparison Treatment Group	Pre#	Post
Oral-Manual vs. Oral		
Oral-Manual vs. Manual		
Oral-Manual vs. Control		
Oral vs. Manual		
Oral vs. Control	-2.29*	
Manual vs. Control		

Note: Only significant scores reported.
negative values indicate second group is higher.
* $p < .05$

manual groups reverse position with the oral appearing superior on total words and the oral-manual better as measured on the 17 words.

A third measure of oral word learning was the trials on five words. An evaluation of these words was made prior to treatment and after each five hours of treatment with all subjects. All subjects in the treatment groups, without exception, started treatment with one of these words. How many words were a part of the treatment was dependent on their progress. Some subjects only worked on a single word during the total treatment while others were able to move on to more words.

An analysis of variance was run (S_{12} X 4 X 4) and is summarized in TABLE XXIX.

No significant treatment effect was present. There was significant trial effect ($F.=5.98$; $p.<.01$) and a significant treatment trial interaction ($F.=2.00$; $p.<.05$).

TABLE XXX contains the untransformed and transformed mean scores illustrated on Graph 3.

The three treatment groups show progress over trials. One must speculate that because oral language is always present in the home that initially they were dealing with at least receptively familiar words. During the second ten hours the manual group did not show any progress while the oral-manual and oral groups continued to show gains. In the third ten hour period, the oral component was added to the manual treatment and progress was similar to that of the oral-manual group. For the first 20 hours, the oral-manual group looked more promising, but the oral group finished slightly higher by the end of the total treatment.

TABLE XXIX

ANOVA Summary: Trials on Five Oral Words

Source	S.S.	d.f.	M.S.	F.	p.
Blocks	6.587	11	.599		
Treatments	.350	3	.117	1.671	NS.
Blocks by Treatments	2.303	33	.070		
Trials	.775	3	.258	5.956	p. .01
Blocks by Trials	1.432	33	.043		
Treatments by Trials	.331	9	.037	2.001	p. .05
Blocks by Treatments by Trials	1.817	99	.018		

TABLE XXX

Untransformed and Transformed Mean Scores

on Trials of Five Words

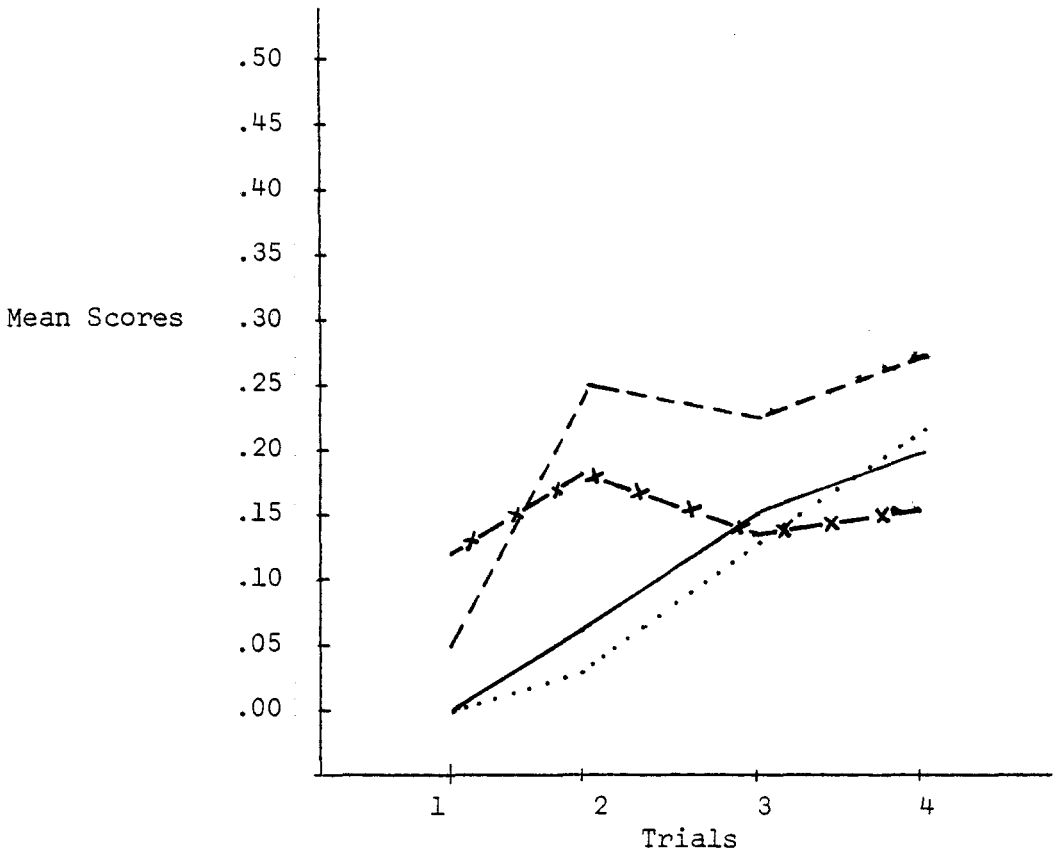
Treatment Groups	Trials				
	1	2	3	4	Total
Oral-Manual	.00(.00)	.25(.06)	.92(.15)	1.08(.20)	.56(.11)
Oral	.00(.00)	.08(.03)	.66(.14)	1.25(.22)	.50(.10)
Manual	.16(.05)	1.58(.25)	1.33(.23)	1.67(.28)	.01(.20)
Control	.50(.12)	1.08(.18)	.75(.14)	.833(.15)	.79(.15)
Total	.16(.04)	.75(.13)	.92(.16)	1.21(.22)	.76(.14)

Note: Numbers in parentheses are transformed mean scores using the transformation $X'=\log_{10}(X+1)$

GRAPH 3

Treatment Group Transformed Mean Scores

on Trials of Five Words



To further identify significant differences, t-tests were run. TABLE XXXI summarized the significant t-tests on oral trials. The total group shows significant differences between Trials 1 and 2, and 3 and 4, ($p.<.01$). All except the control group show significant differences across all trials ($p.<.05$). The oral-manual and oral treatments show significant differences between Trials 2 and 4 ($p.<.05$). These differences coming late in the treatment do not allow early prediction of oral learning.

Between trials t-tests for each group produced no significant differences for any group on any trials, as shown in TABLE XXXII.

The hypothesis which stated there would be no differences between treatments was not rejectable. The length of treatment as measured by trials did have significant effects and, therefore, the hypothesis was rejected.

Two sets of measures of sign learning were submitted to analysis of variance. The first was the pre and post on total signs summarized in TABLE XXXIII. (Transformed and untransformed means are in TABLE XXXIV.)

A significant treatment effect ($F.=12.01$; $p.<.001$) exists as well as a trial effect ($F.=51.34$; $p.<.001$) and an interaction effect ($F.=20.37$; $p.<.001$). Once again the oral-manual and manual techniques appear more effective in the teaching of signs. TABLE XXXV t-tests indicate a pre-post difference for the oral and control groups. The largest gains were made by the manual group and the oral-manual was next. Between groups t-tests, TABLE XXXVI, indicate pre-test differences between the oral-manual and control groups, the oral and control

TABLE XXXI

Between Trials t-tests of Five Words:

Total Sample and by Groups

Comparison Trials	Total[b]	Treatment Groups[#]			
		Oral-Manual	Oral	Manual	Control
1 & 2	-2.80*				
1 & 3	-3.22*				
1 & 4	-4.29*	-2.39*	-2.30*	-2.57*	
2 & 4	-2.70*	-2.70*	-2.23*		
3 & 4	-2.26*				

Note: Only significant t-values reported.
Negative t-values indicate second group is higher.
* $p < .05$

TABLE XXXII

Significant t-tests Between

Pre and Post Measures on Five Words#

Oral-Manual	Oral	Manual	Control
	-2.99*	-3.07*	

Note: Only significant values reported.
Negative values indicate post score higher.
*p. .05

TABLE XXXIII

ANOVA Summary: Pre-Post on Total Signs

Source	S.S.	d.f.	M.S.	F.	p.
Blocks	2.653	11	.241		
Treatments	1.994	3	.446	12.014	p. .001
Blocks by Treatments	1.281	33	.039		
Trials	6.321	1	6.321	51.339	p. .001
Blocks by Trials	1.354	11	.123		
Treatments by Trials	2.387	3	.796	20.365	p. .001
Blocks by Treatments by Trials	1.289	33	.039		

TABLE XXXIV

Transformed Mean Scores

and Mean Scores for Pre and Post

Sign Learning

Groups	Pre	Post
Oral-Manual	.00(.00)	6.25(.59)
Oral	.00(.00)	1.83(.31)
Manual	.00(.00)	12.50(.99)
Control	.91(.20)	1.75(.36)
Total	.23(.05)	5.58(.56)

Note: Numbers in parentheses indicate transformed mean scores.

GRAPH 4

Treatment Groups Transformed Mean Scores

for Pre and Post Total Signs

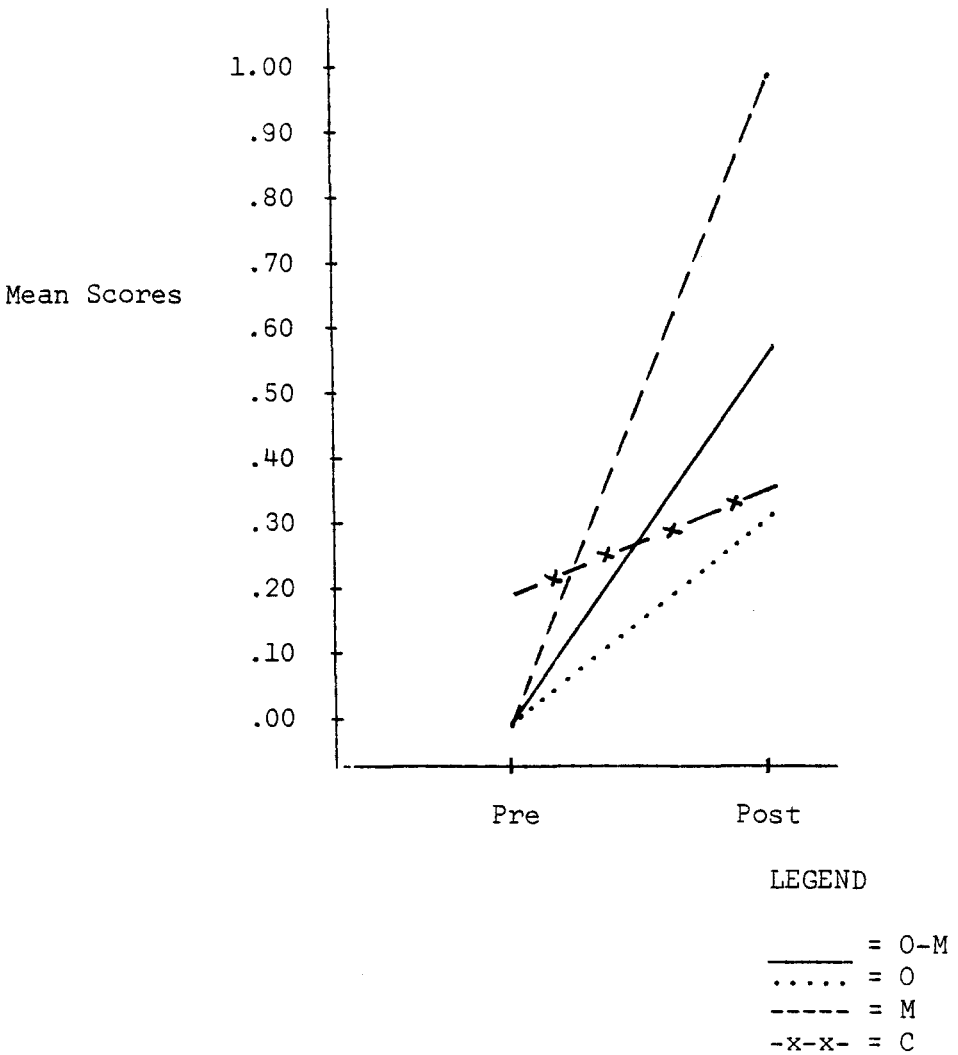


TABLE XXXV

Significant t-tests Between

Pre and Post Measures

on Total Signs

	Treatment Groups			
Comparison	Oral-Manual	Oral	Manual	Control
Pre-Post	-4.90+++	-3.03*	-9.05+++	-2.97*

Note: Negative values indicate post score higher.

*p.<.05
+++p.<.001

TABLE XXXVI

Significant t-tests Between Groups

on Pre-Post Measures of Total Signs[b]

Comparison Group	Pre	Post
Oral-Manual vs. Oral		2.49*
Oral-Manual vs. Manual		5.24+++
Oral Manual vs. Control	-2.69+	
Oral vs. Manual		-5.45+++
Oral vs. Control	-2.69*	
Manual vs. Control	-2.69*	7.45+++

Note: Negative values indicate second group higher.

[b]Only significant values reported.

* $p. < .05$

+++ $p. < .001$

groups, and the manual and control. In all instances the control group has higher pre-test scores. On post-test comparisons the oral-manual is significantly higher than the oral; the manual higher than oral-manual; the manual higher than oral, and manual higher than control. Graph 4 more clearly shows post scores in the following rank order: manual, oral-manual, control, and oral. Although the control group initially is significantly higher than all groups, the oral and control group come out about the same in the post measure. Neither the oral or control group was taught signs as a part of their treatment.

The second analysis of variance was run on the sign trials of five words. Here there was a significant treatment effect (F.=.20.82), a significant trial effect (F.=34.91), and a significant treatment by trial interaction (F.=11.40). The summary appears in TABLE XXXVII.

Graph 5 of the transformed mean scores shown in TABLE XXXVIII indicate the manual approach is effective. It cannot be compared to the other two treatment groups because progress by the oral and oral-manual groups was dependent on their learning words orally. As might be expected, the oral-manual approach does show potential as a method of sign teaching.

A comparison of trials of the treatment group TABLE XXXIV indicates significant progress was made early in the treatment of the oral-manual and manual groups. It would, therefore, be possible to make decisions quite early as to whether a child could learn signs with one of these two methods. The results suggest that shorter periods of treatment may be indicated.

TABLE XXXVII

ANOVA Summary: Sign Trials of Five Words

Source	S.S.	d.f.	M.S.	F.	p.
Blocks	6.959	11	.633		
Treatments	5.871	3	1.957	20.821	p. .001
Blocks by Treatments	3.102	33	.094		
Trials	8.448	3	2.816	34.911	p. .001
Blocks by Trials	2.662	33	.081		
Treatment by Trials	2.370	9	.263	11.396	p. .001
Blocks by Treatments by Trials	2.288	99	.023		

TABLE XXXVIII

Treatment Group Transformed Mean Scores

and Mean Scores on

Trials of Five Signs

	Trials				
Groups	1	2	3	4	Total
Oral-Manual	.00(.00)	2.50(.38)	3.42(.47)	6.25(.59)	3.04(.36)
Oral	.00(.00)	.91(.15)	1.33(.24)	1.50(.26)	.94(.16)
Manual	.00(.00)	4.92(.64)	8.17(.85)	12.75(.99)	6.46(.62)
Control	.00(.00)	1.33(.31)	1.08(.24)	1.83(.38)	1.06(.23)
Total	.00(.00)	2.42(.37)	3.50(.45)	5.58(.56)	2.88(.34)

Note: Numbers in parentheses are transformed mean scores.

GRAPH 5

Treatment Group Transformed Mean Scores

on Trials of Five Signs

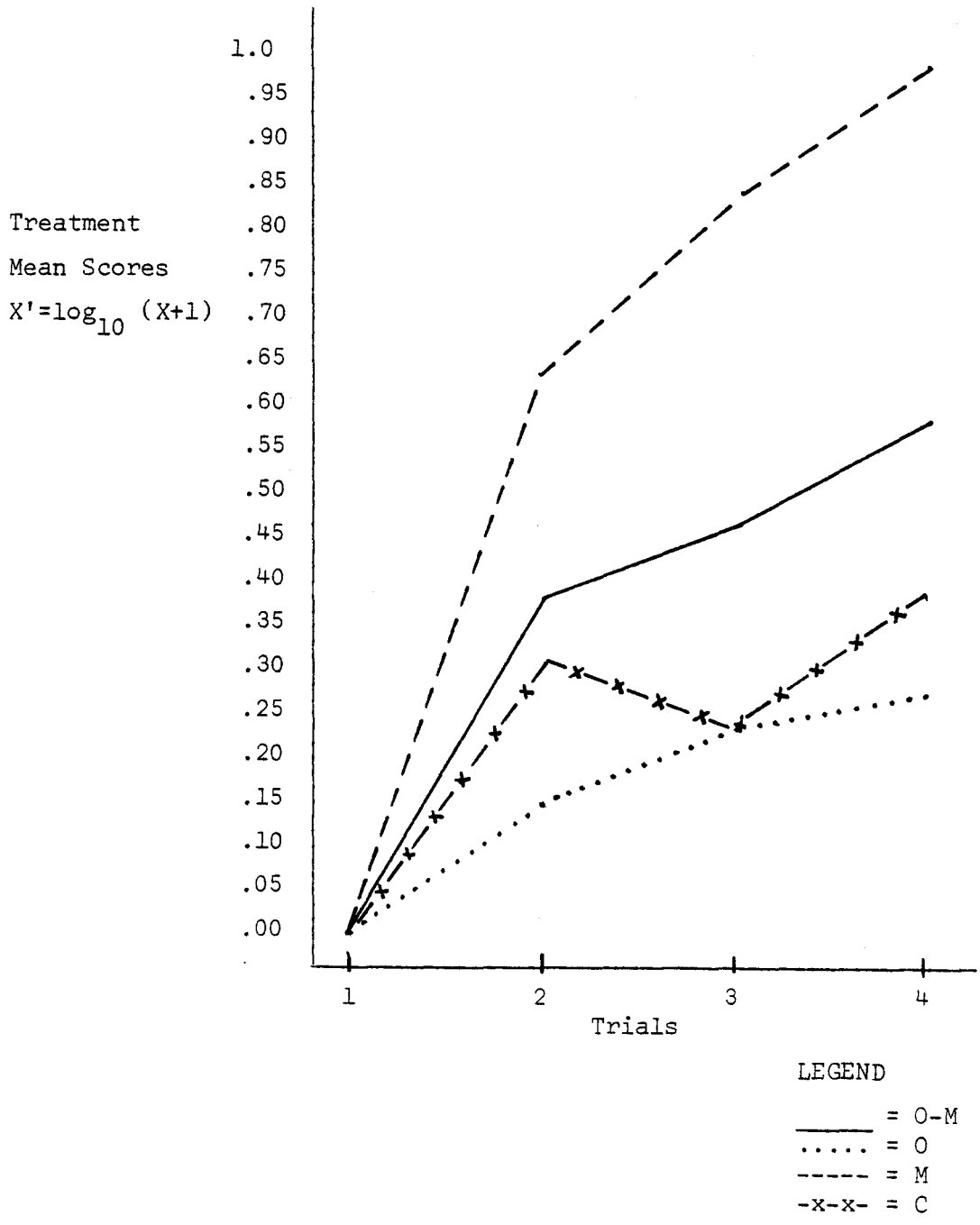


TABLE XXXIX

Significant t-tests Total and Groups

on Trials of Five Signs

Comparison Trials	Total	Oral-Manual	Oral	Manual	Control
1 & 2	-5.14+++	-3.72++		-5.83+++	-4.36+++
1 & 3	-5.70+++	-4.16++	-2.47*	-9.05+++	-3.08++
1 & 4	-6.73+++	-4.90+++	-2.55*	-9.14+++	-5.11+++
2 & 3	-3.82*			-3.52++	
2 & 4	-6.74+++	-4.84+++		-5.52+++	
3 & 4	-4.12+++				-2.70*

Note: Negative values indicate second group is higher.
only significant t-values reported.
* p.<.05
++ p.<.01
+++ p.<.001

From the t-tests between groups, TABLE XL, we see that the manual group was consistently better than the oral-manual group and the oral group. Second best results were by the oral-manual treatment group as compared to the oral group across all trials.

From our results with sign learning we reject both hypotheses. The interpretation of between treatment differences must be looked at skeptically because of the limitations placed on the oral and oral-manual groups' ability to progress only with oral learning.

Summary of Results

Oral Learning: Five Words

The number of words learning was associated with length of time in treatment for the sample as a whole. The three treatments groups, oral-manual, oral, and manual, showed significant differences between trials one and four. It appeared that the last five hours of treatment did not show significant gains for these groups. The control group showed no significant results over trials. For the manual group, the first five hours and the last five hours with the added oral component were most productive. The oral group showed an increase in the number of words learned as treatment progressed. During the last five hours of training the oral, oral-manual, and manual groups' learning progress was similar.

Pre-post examination of the results by groups indicated that the control group, which was higher than the oral group initially, was lower at the end of the treatment. The oral-manual and manual groups, which were not significantly different at the beginning of training, were so at the end. The manual group was superior to the oral-manual.

TABLE XL

Significant t-tests Between Groups

on Trials of Five Signs

(Transformed Means)

	Trials#		
Comparison Groups	2	3	4
Oral-Manual vs. Oral	2.65*	2.46*	3.59++
Oral-Manual vs. Manual	-2.87*	-3.65++	-5.27+++
Oral-Manual vs. Control		2.46*	
Oral vs. Manual	-4.67+++	-6.60+++	-6.21+++
Manual vs. Control	3.02*		

Note: Only significant t-values reported.
Negative values indicate second group is higher.
* $p. < .05$
++ $p. < .01$
+++ $p. < .001$

The same comparison holds true for the oral and manual groups, where the manual is significantly higher by post-test measurement.

Oral Learning: Seventeen Words

With the seventeen words, as with the five words, there was no significant difference between treatments. The length of time in treatment resulted in a significant difference as did the interaction of treatment and time. With a pre-post measure, the manual group appears to be the best.

Total Oral Words: Pre-Post

The length of training and the interaction with treatments resulted in significant pre-post differences. Once again there was no treatment effect.

Sign Learning: Five Words

An examination of the data shows a significant treatment effect. Because of the procedures used this result is not valid. The oral and control group should be similar because they were not exposed to sign learning. This was shown to be the case. The data suggests that the manual and oral-manual groups might produce similar effects. Further comparisons would have to be made under the same conditions before any statements might be made in this area.

Results indicate the first ten hours of treatment more effective than the last five hours for all groups.

One can only speculate that there was incidental sign learning going on with the oral and control groups who may have been exposed to signs in the home.

Total Signs: Pre-Post

The significant treatment effect found here must be looked at cautiously because of the limitation in design. There was a significant trial and interaction effect. The manual approach looks most effective. Both the oral and manual groups show significant pre-post differences. At pre-test there was a significant difference between the oral and control group. The differences between all groups at post-test were not significant.

All approaches produced significant pre-post differences. It appears that in this sample all were able to learn some signs. The best results appeared with the manual and oral-manual approaches.

Principal Component and Varimax Rotated Factors

The first principal component is the best predictor of learning oral and sign language. The higher the score, the better the subjects' results.

The subjects with higher scores in cognitive and language ability did better with the oral-manual approach.

The oral approach was more successful with subjects who were high in language and low on behavior.

Manual approach results were effective for subjects high in behavior for both oral and sign learning. It appears that cognitive skill is not as necessary a prerequisite with this approach.

CHAPTER V

DISCUSSION

The severely and profoundly retarded having reached the age of puberty have had little success in learning oral language. If it is meant that they will not acquire the language skills of normal children of the developmental age of three or four years, this study's results substantiate this to be the case. The few children of this study who developed 50 or more word vocabularies, not having spoken before, can best be understood as having already had the skills. The staff had not stimulated or related to these children in the way that would encourage speech. Instances of this type are not uncommon in institutionalized populations. Frequently a single, well-developed skill has been latent and discovered quite by accident. Some of the children in this study were able to learn several oral words denoting objects found in their everyday environment. The question is whether the results warrant the expenditure of staff time for a program for all the children or for some identifiable group of children.

Trials

Although there were no significant differences between the treatments for oral words, there were significant differences over trials to consider further modifications and experimentation. The oral-manual, oral, and manual treatment groups showed significant differences between trial one and four on a measure of five oral words and on the pre-post measures. To account for this one must

take into consideration the effects of staff attention.

Signs

Many more children of varying ability were able to learn signs. These results show that learning takes place earlier in the treatment and at a more rapid rate than oral language. This may be the best choice of communication for most of the children in this population for several reasons. It provides feedback to the staff early, and for this reason, is motivation for continuing for the staff and child. This may sound odd to those who have not worked with this type of population where the smallest gains are monumental events, the result of many repetitions of boring and unstimulating behavioral programs by the staff.

The success in learning oral and manual communication were associated to the subject's principal component score. Those subjects with the highest scores made the greatest gains. Where subjects did not reach expected potential as predicted from their scores, there must be some possible reasons for the lack of progress. As Bricker has suggested (1970) not only are individual skills necessary but the ability to coordinate these skills in meaningful ways is necessary for learning to take place. Investigation in this area is needed to understand how language learning is facilitated.

Limitations of Study

There are several limitations to this study which have bearing on the results of both the oral and manual methods. First, the subjects were not given the same words as a part of their treatments. Words were chosen to meet the clinical needs of the child. Because

the five words were clinically important, all but two subjects had them as part of their treatment program. Because most subjects were not capable of learning more than five words, this limitation was of minimal consequence and the measures of the five words valid. Another limitation of the study of manual learning was due to the fact that the oral-manual treatment groups' progress from word to word was dependent on their learning the word orally. This means that the measure of manual signs is limited and not comparable to the other groups. The oral treatment group was also limited as to the sign learning because they were taught orally. It is interesting to note that learning of signs was going on without formal teaching. This may be explained partially by the fact that they may have been exposed to signs being used in the home by staff and students. It was not uncommon to have a child spontaneously imitate what he saw, a sign, to get the reinforcer being given to another student for signing. This would further support the using of an environmental approach to teaching the total staff communication with each other and students in the home with oral language and signs simultaneously. Because of these limitations, conclusions retarding sign learning need to be investigated further in order to develop better manaul sign training strategies.

Principal Component Factors as Predictors

Significant results of this study are to be found in the area of selection and prediction of learning for this low, non-speaking population. The best overall predictor of learning is the principal component, accounting for 65 percent of the variability. The principal

component predicts success for both oral and sign learning. With the varimax rotated factors it is possible to further predict which type of learning is most likely to be successful. Both cognitive and language skills are predictive of oral and sign learning. Attention is not significantly correlated to learning oral words and behavior is not negatively correlated.

For all methods of teaching oral language it was found that having some language skills or pre-language skills was the best predictor of success. Behavior is a negative predictor with an oral teaching technique but positive for a manual technique. If motor skills, lower on the developmental scale, are present, a child could begin with sign learning. If a child has sufficient cognitive ability but a short attention span, an oral method might be tried.

Direction for Further Study

The language factor appears to be predictive of both sign and oral language learning and for combined methods or singular methods. Language as measured by the R.E.E.L. is the receptive skill. It appears that the receptive ability of the child is important in three of the four varimax factor and the principal component. The importance of receptive ability, while not clearly understood, warrants further investigation as a prerequisite and as part of a treatment program. It has been this author's observation at this institution that there is little, if any, spontaneous receptive language training going on in the subject's home. This may be due to the over reliance on formal behavioral modification training as "the only viable" way to teach severely and profoundly retarded. There are considerable

opportunities for staff to develop receptive skills of the students. As they carry on their chores in the home they might describe their actions out loud through a simple monologue technique. As a child engages in his own activities the staff might describe his actions to him out loud. This might serve in the same way the internal speech of a normal child does as described by Piaget. Further studies constructed along these lines should clarify the need for receptive language as a prelinguistic skill.

Bricker, (1970) in his investigation of receptive vocabulary, did not find the answer to what role receptive language plays in learning. In this same study Bricker suggested the use of a motoric modality as a mediating facilitator to learning. The current study's attempt to look at this dimension has not shown it to be better than other treatment techniques. At this time, behavior is shown to be important in learning sign language and should be studied further.

Earlier studies of Kahn (1975) have shown the importance of object permanence with learning oral communication by higher level retardates but he did not find means-ends as important. For the severely and profoundly retarded there are several developmental skills highly correlated to learning as shown in the varimax rotated cognitive factor, means-ends (.90), visual perception, and object permanence (.90). The importance of these as a prerequisite to language are only now being explored and identified. To fully understand the nature of these skills in the severely and profoundly retarded, more work must be done. Methods to help this population acquire these skills must also be found.

Bricker, (1970) as mentioned earlier in the discussion section, suggests that in addition to specific skills, there is a need to coordinate or integrate these skills into more complex functional system. This Piagetian concept of accommodation and assimilation is little understood. Cognitive psychologists have identified what skills are present in a child but not the process of learning them. One avenue of research might be to experiment with objects in a structured play situation, using a variety of forms of a single object; that is, a toy represented in different sizes, colors, textures, and shapes. Then have the child use them in different ways.

From this process it may be possible to learn if a child can benefit from a structured situation to first learn the skills and then to integrate them. It appears that with this target population, more effort should be placed on the prelinguistic skills rather than the language skills.

The results of this study with its emphasis on oral language learning did not clarify which treatment technique was the best for teaching signs. Further investigation using the oral-manual and manual approaches for the learning of signs as the criterion for moving from one sign to the next would answer this question.

Another area of further study is indicated because of the findings in this study--that test data can be used to predict successful learning. First, other commonly used tests with this population could be looked at as potential predictors and then a selection of tests or parts of tests could be developed, hopefully, reducing the amount of pre-test data needed to make more accurate predictions. These

predictors might be useful in choosing who would be best suited to the learning of oral communication and who might best learn sign communication, or a combination of both.

The signs used in this study and the methods of presenting them have been those common to a deaf population of normal intelligence. These particular signs are necessary for those people who will be communicating with the general public. Most of the subjects of this study will remain in the institutions for the rest of their lives. There are less universally used gestures to represent the common objects used in this study. Most of these gestures were developed to simplify learning and understanding and look more like the shape or function the gesture represents. Experimentation might be conducted to ascertain if these gestures are learned more easily by this low a level of functioning child, and secondly, to see if the child uses them spontaneously with more frequency.

Training periods of 15 minutes, twice a day, were used in this study. There is no impartial evidence at this time to suggest that optimal learning is achieved with this schedule. Experimentation of length and frequency per day might produce different results. From informal observation, it appears that the 15 minute periods were frustrating for staff and child. Secondly, the optimal total program length was not evident from the results of this study. Variations of length and frequency might be different with different levels of students and with different treatment approaches.

Postscript

This study does lead to the conclusion that learning signs is a

more economical and efficient means of communication for a larger number of children in the severely and profoundly range of retardation who are post-pubescent. Because most of these children will remain in the institution for life, it gives them an opportunity to communicate not only with staff but with each other. In light of the current emphasis on normalization, it is a step in the right direction.

As is generally the case, more questions are raised than answers found. This study does provide a prediction measure which could be applied currently in most institutions. The pretests are those commonly used to measure student progress and they are standardized measures acceptable to accreditation groups. The predictive score enables staff to place the child in a treatment modality most likely to produce results, thereby saving both staff time and student frustration. Further refinement of these predictive measures would enable better utilization.

SUMMARY

The Problem

Few severely and profoundly retarded adolescents are able to communicate orally or by an alternative method such as sign language. The literature illustrates a number of approaches which have been successful with deaf and autistic individuals of normal or near normal intelligence. These approaches or adaptations of these approaches may be useful in training this target population to speak or to sign.

The Purpose

This study investigated three variations of approaches to teaching oral and sign language with a sample of non-speaking severely and profoundly retarded adolescents.

The Hypotheses

The hypotheses stated in the null form were:

1. There will be no significant differences between the number of words or signs learned as a result of treatments.
2. There will be no significant differences between treatments as they effect oral or sign learning.
3. There will be no significant differences in the number of words or signs learned due to length of time in treatment.
4. Pre-test data does not allow prediction of success of oral or sign learning or a best method.

The Instruments

Preassessments were made with standardized scales and one study

staff scale. They included the A.A.M.D. Adaptive Behavior Scale, the Receptive-Expressive Emergent Language Scale, the Fairview Behavior Scale, and the Uzgiris-Hunt Scales of Sensorimotor Development.

Treatments and evaluations were developed by study staff by adapting materials and procedures from existing materials used with other populations.

The Design

After preassessing subjects, they were matched and assigned to one of four groups, three treatment groups and one control group.

The treatment groups received 15 hours of treatment in 15-minute sessions, twice a day. All group's progress was assessed after each five hours of treatment.

Data was subjected to an adaptation of a two-way factorial with repeated measures design in which matched subject blocks were added.

Preassessment data was subjected to a principal components analysis and a varimax rotation.

The Findings

1. There were pre-post differences in a number of words or signs learned with the treatment groups.
2. There were no significant differences between groups on oral words. There were differences between groups in sign learning.
3. The length of treatment does effect and interact with treatments to effect oral and sign learning.
4. The principal component and varimax rotated factors do predict ability to learn and suggest most appropriate approaches.

BIBLIOGRAPHY

Barton, E. Operant conditioning of social speech in the severely sub-normal and the use of different reinforcers. British Journal of Social and Clinical Psychology, 1972, 11, 387-396.

Beard, R. M. An Outline of Piaget's Developmental Psychology. New York: Basic Books, 1969.

Berger, S. L. A clinical program for developing multimodel language responses with atypical deaf children. In J. E. McLean, D. E. Yoder, and R. L. Schiefelbusch(Eds.) Language Intervention with the Retarded. Baltimore: University Park Press, 1972, 212-235.

Berkson, G., and Landesman-Dwyer, S. Behavioral research on severe and profound mental retardation (1955-1974). American Journal of Mental Deficiency, 1977, 81(5), 428-454.

Bloom, L. One word at a time: The use of single-word utterances before syntax. The Hague: Mouton, 1972.

Blount, W. R. Language and the more severely retarded: A review, American Journal of Mental Deficiency, 1968, 73, 21-29.

Bonvillian, J. D., Charrow, V. R., and Nelson, K. E. Relationship between manual sign language and natural language sign: Psycholinguistic and educational implications of deafness. Human Development, 1973, 16, 321-345.

Bowerman, M. F. The acquisition of word meaning: An investigation of some current conflicts. Paper presented at the Third International Child Language Symposium, London, September, 1975.

Bowerman, M. F. Semantic factors in the acquisition of rules for word use and sentence construction. In D. Morehead and D. Morehead (Eds.), Directions in Normal and Deficient Child Language. Baltimore: University Park Press, in press.

Bowerman, M. F. Word meaning and sentence structure: Uniformity, variation and shifts over time in patterns of acquisition. Paper presented at the Conference on Early Behavioral Assessment of the Communicative and Cognitive Abilities of the Developmentally Disabled, Washington, 1976.

Bricker, D. D. Imitative sign training as a facilitator of word-object association with low functioning children. American Journal of Mental Deficiency, 1972, 76(5), 509-516.

Bricker, D. D., and Bricker, W. A. Early childhood intervention. Unpublished manuscript, George Peabody College, 1973.

Bricker, D., Ruder, K., and Vincent, L. An intervention strategy for language deficient children. In N. Haring and R. L. Schiefelbusch (Eds.) Teaching Special Children. New York: McGraw-Hill, 1976.

Bricker, D. D., Vincent-Smith, L., and Bricker, W. A. Receptive vocabulary: Performances and selection strategies of delayed and non-delayed toddlers. American Journal of Mental Deficiency, 1973, (77). 579-584.

Bricker, W. A. A systematic approach to language training. In R. Schiefelbusch (Ed.) Language of the Mentally Retarded. Baltimore: University Park Press, 1972.

Bricker, W. A. and Bricker, D. D. Development of receptive vocabulary in severely retarded children. American Journal of Mental Deficiency, 1970, 74, 599-607.

Bricker, W. A. and Bricker D. D. Assessment and modification of verbal imitation with low-functioning children. Journal of Speech and Hearing Research. 1972b, (15), 690-698.

Bricker, W. A. and Bricker, D. D. An early language training strategy. In R. L. Schiefelbusch and L. L. Lloyd, (Eds.), Language Perspectives-Acquisition, Retardation and Intervention. Baltimore: University Park Press, 1974.

Bricker, W. A. and Bricker, D. D. A program for language training for the severely handicapped child. Exceptional Children, 1970, 37, 101-111.

Bricker, W. A. and Bricker, D. D. Receptive vocabulary as a factor in the discrimination performance of low functioning children. American Journal of Mental Deficiency, 1971, 75, 599-605.

Brody, J. F., Thomas, J. A., Brody, D. M. and Kucherawy, D. A. Comparison of sensory integration and operant methods for production of vocalization in profoundly retarded adults. Perceptual and Motor Skills, 1977, 44, 1284-1296.

Bruner, J. S. From communication to language--A psychological perspective. Cognition, 1974/1975, 255-287.

Bruner, J. S. The nature and uses of immaturity. American Psychologist, 1972, 27(8), 1-22.

Bruner, J. S. The ontogenesis of speech acts. Journal of Child Language, 1975, 2(1), 1-19.

Bruner, J. S. Organization of early skilled action. Child Development, 1973, 44, 1-11.

Buddenhagen, R. G. Establishing vocal verbalization in mute mongoloid children. Champaign, Il: Research Press, 1971, (a).

Burns, M. J. A cognitive approach to language facilitation, 1977.

Bzoch, K. R., and League, R., Receptive-Expressive Emergent Language Scale (R.E.E.L.), 1970.

Campbell, R., and Wales, R. The study of language acquisition. In J. Lyons (Ed.), New Horizons in Linguistics, London: Penguin, 1970.

Carrier, J. K. Application of functional analysis and a non-speech response made to teaching language. Parsons (Kansas) Research Center Report No. 7. Parsons, Kansas, Parsons State Hospital and Training Center, 1973.

Carrier, J. K. Non-speech noun usage training with severely and profoundly retarded children. Journal of Speech and Hearing Research, 1974, 17, 510-517.

Carrier, J. K. and Peak, R. NON-SLIP (Non-Speech Language Initiation Program). H & H Enterprises, Inc. Box 3342, Lawrence, Kansas 66044.

Carrow, E. Assessment of speech and language in children. In J. E. McLean, D. E. Yoder, and R. L. Schiefelbusch(Eds.), Language Intervention with the Retarded. Baltimore: University Park Press, 1972.

Carrow, Sister Mary Arthur. The development of auditory comprehension of language structure in children. Journal of Speech and Hearing Disorders, 1968, 33(2), 99-111.

Chatelanet, G., Henderson, C., Robinson, C., and Bricker, W. Early classification skills of developmentally delayed toddlers. In D. Bricker and W. Bricker (Eds.) Toddler Research and Intervention Project Report: Year 1. IMRID Behavioral Science Monograph No. 20, Institute on Mental Retardation and Intellectual Development, George Peabody College, Nashville, 1971.

Church, J. Language and the discovery of reality: A developmental psychology of cognition. New York: Random House, 1961, 4-121.

Clark, E. Non-linguistic strategies and the acquisition of word meaning. Cognition, 1973a, 2(2), 161-182.

Edwards, D. Sensory-motor intelligence and semantic relations in early child grammar. Cognition, 1973 2(4), 395-434.

Elkonin, D. B. Development of speech in A. V. Zaporozhets and D. B. Elkonin (Eds.), the psychology of preschool children, 1971. Cambridge, Mass.: MIT.

Evans, D. The development of language abilities in mongols: A correlation study. Journal of Mental Deficiency Research, 1977, 21, 102-117.

Flanders, J. P. A. A review of research on imitative behavior. Psychological Bulletin, 1968, 69, 316-337.

Furth, H. G. Research with the deaf: Implications for language and cognition. Psychological Bulletin, 1964, 62, 145-164.

Garcia, E. G., and DeHaven, E. D. Use of operant techniques in the establishment of generalization of language: A review and analysis. American Journal of Mental Deficiency, 1974, 79, 169-178.

Gardner, R. A., and Gardner, B. T. Teaching sign language to a chimpanzee. Science, 1969, 165, 664-672.

Gitlis, K. R. Rationale and precedents for the use of simultaneous communication as an alternative system of communication for non-verbal children. Paper presented at 50th Annual Meeting of the American Speech and Hearing Association, Washington, D.C., 1975.

Gorsuch, R. L. Factor Analysis. Philadelphia: W. B. Saunders Co., 1974.

Greenfield, P. M., Smith, J. H. and Laufek, B. Communications and the beginnings of language: the development of semantic structure in one-word speech and beyond. New York: Academic Press, in press.

Guess, D., Rutherford, F., and Twichell, A. Speech acquisition in a

mute, visually impaired adolescent. The New Outlook for the Blind, 1969.

Guess, D., Sailor, W., and Baer, D. M. To teach language to retarded children. Unpublished manuscript, University of Kansas, 1973.

Guess, D., Sailor, W., and Baer, D. M. To teach language to retarded children. In R. L. Schiefelbusch and L. L. Lloyd (Eds.), Language perspectives: Acquisition, retardation and intervention. Baltimore: University Park Press, 1974.

Hall, S. M. and Talkington, L. W. Evaluation of a manual approach to programming for deaf retarded. American Journal of Mental Deficiency, 1970, 75(3), 378-380.

Hartung, J. A review of procedures to increase verbal imitation skills and functional speech in autistic children. Journal of Speech and Hearing Disorders, 1970, 35(3), 203-217.

Hekkema, N. and Freedman. Effects of imitation training on immediate and delayed imitation by severely retarded children. American Journal of Mental Deficiency, 1978, 83(2), 129-134.

Hughes, J. Acquisition of a non-vocal 'language' by aphasic children. Cognition, 1974/1975, 3(1), 45-55.

Jeffrey, D. B. Increase and maintenance of verbal behavior of a mentally retarded child. Mental Retardation, 1972, 10(2), 35-40.

Jordon, T. E. In R. L. Schiefelbusch, R. H. Copeland, and Smith, J.D. (Eds.), Language and Mental Retardation, New York: Holt, Rinehart and Winston, 1967.

Kahn, J. V. Relationship of Piaget's sensorimotor period to language acquisition of profoundly retarded children. American Journal of Mental Deficiency, 1975, 79, 640-643.

Kahn, J.V. Utility of the Uzgiris and Hunt Scales of sensorimotor development with severely and profoundly retarded children. American Journal of Mental Deficiency, 1976, 80, 663-665.

Kaplan, E. and Kaplan, G. The pre-linguistic child. In J. Eliot (Ed.), Human Development and Cognitive Processes. New York: Holt, Rinehart and Winston, 1971.

Katz, R. A. and Rosenberg, S. Effects of labels on the perception and discrimination learning of retardates. Journal of Abnormal Psychology, 1969, 74(1), 95-99.

Kent, L. Language Acquisition Program for the Severely Retarded. Champaign, Research Press, 1974.

Kent, L. R., Klein, D., Falk, A., and Guenther, H. A. Language acquisition program for the retarded. In J. McLean, D. Yoder and R. L. Schiefelbusch (Eds.), Language Intervention with the Retarded. Baltimore: University Park Press, 1972.

Kent, L. R. Language acquisition program for the severely retarded. Champaign, Il., Research Press, 1974.

Kirk, S. A., McCarthy, J. S., and Kirk, W. D. The Illinois test of psycholinguistic abilities (revised). Urbana: University of Illinois Press, 1968.

Kopchick, G. A., Rombach, D. W., and Smilovitz, R. A total communication environment in an institution. Mental Retardation, 1975, 13(3), 22-23.

Leonard, L. B. Developmental considerations in the management of language disabled children. Journal of Learning Disabilities, 1975, 8(4), 44-49.

Limber, J. Language in Child and Chimp? American Psychologist, 1977, 32(4), 280-295.

Lovaas, I. A program for establishing speech in psychotic children. In H. Sloane and B. MacAulay (Eds.), Operant procedures in remedial speech and language training. Bostom: Houghton-Mifflin, 1968.

Luria, A. R. Scientific perspectives and philosophical dead ends in modern linguistics. Cognition, 1974/1975, 3(4), 377-385.

Lynch, J., and Bricker, W. A. Linguistic theory and operant procedures: Toward an integrated approach to language training for the mentally retarded. Mental Retardation, 1972, 10, 12-17.

Lyons, J., and Wales, R. (Eds.) Psycholinguistic Papers. Edinburgh: Edinburgh Press, 1966.

MacAuley, B. D. A. A program for teaching speech and beginning

reading to non-verbal retardates. In H. Sloane and B. MacAuley (Eds.), Operant procedures in remedial speech and language training. Boston: Houghton-Mifflin, 1968.

Mann, D. Local Scale. Unpublished Attention Scale. Waukegan, 1977.

Marshall, N. R., and Hergrenes, J. R. Programmed communication therapy for autistic mentally retarded children. Journal of Speech and Hearing Disorders, 1970, 35(1), 70-83.

Mathews, J. Speech problems of the mentally retarded. In L. E. Travis (Ed.), Handbook of Speech Pathology. New York: Appleton-Century-Crofts, 1957.

Mayberry, R. If a chimp can learn sign language, surely my non-verbal client can too. Journal of American Speech and Hearing Association, 1976, 223-228.

McCarthy, D. Language development in children. In L. Carmichael (Ed.) Manual of Child Psychology. New York: 1954.

McNeil, D. Comments. In K. Connoly and J. S. Bruner (Eds.), Competence in Early Childhood. CIBA Foundation Conference. New York: Academic Press, 1972.

Mecham, M. J. The development and application of procedures for measuring speech improvement in mentally deficient children. American Journal of Mental Deficiency, 1955, 60, 301-305.

Miller, J. and Yoder, D. A syntax program. In J. McLean, D. Yoder, and R. Schiefelbusch (Eds.), Language Intervention with the Retarded. Baltimore: University Park Press, 1972.

Miller, J. F. and Yoder, D. E. On developing the content for a language teaching program. Mental Retardation, 1972, 10(2), 9-11.

Miller, J. and Yoder, D. Teaching language to retardates: A format, not a receipt. In R. L. Schiefelbusch and L. L. Lloyd (Eds.), Language perspectives: Acquisition, retardation and intervention. Baltimore: University Press, 1974.

Morehead, D. M. and Morehead, A. From signal to sign: A Piagetian view of thought and language during the first two years. In R. L. Schiefelbusch and L. L. Lloyd (Eds.), Language perspectives: Acquisition, retardation and intervention. Baltimore: University Park Press, 1974, 153-190.

Mussen, P., Conger, J. J. and Kagen, J. Child Development and Personality. New York: Harper & Row, 1974.

Nihira, K., Foster, R., Shellhaas, M. and Leland, H. AAMD Adaptive Behavior Scale, American Association of Mental Deficiency, Washington, 1969.

Peterson, R. Imitation: A basic behavioral mechanism. In H. Sloane and B. MacAuley (Eds.), Operant Procedures in Remedial Speech and Language Training. Boston: Houghton-Mifflin, 1968.

Piaget, J. The Origins of Intelligence in Children. Margaret Cook, trans. New York: International University Press, 1952.

Piaget, J. The Language and Thought of the Child. Cleveland: World Publishing, 1969.

Piaget, J. Six Psychological Studies, D. Elkind, (Ed. and trans.) New York: Random House, 1967.

Piaget, J. Structuralism. London: Routledge & Kegan, 1971.

Piaget, J., and Inhelder, B. The Psychology of the Child. London: Routledge and Kegan Press, 1969.

Reynolds, P. C. Play, language and human evolution. In J. Bruner, A. Jolly, and K. Sylva (Eds.), Play: Its Role in Evolution and Development. Harmondworth: Penguin, in press.

Richardson, T. Sign language for the severe and profound mental retardate. Mental Retardation, 1975, 13(3), 17.

Risley, T. R., Hart, B. M., and Doke, L. Operant language development: The outline of a technology. In R. L. Schiefelbusch (Ed.) Language of the Mentally Retarded. Baltimore: University Park Press, 1972. 107-123.

Ross, R. T. Fairview Self-Help Scale, Fairview State Hospital, Fairview, California, 1970.

Ruder, K. and Smith, M. Issues in language training. In R. L. Schiefelbusch and L. L. Lloyd (Eds.), Language perspectives: Acquisition, retardation and intervention. Baltimore: University Park Press, 1974.

Sailor, W., Guess, D. and Baer, D. M. Functional language for verbally deficient children. Mental Retardation, 1973, 11(3) 27-35.

Schiefelbusch, R. L. Language. Mental Retardation and Developmental Disabilities: An Annual Review, 1974, 6, 249-272.

Schiefelbusch, R. L. The basis of language intervention. 1972.

Schiefelbusch, R. L. and Lloyd, L. L. Language perspectives: Acquisition, retardation, and intervention. Baltimore: University Park Press, 1974.

Schiefelbusch, R. L., Ruder, K. and Bricker W. Training strategies for language deficient children, Chapter 8. In N. Haring and R. L. Schiefelbusch (Eds.), Teaching Special Children. New York: McGraw-Hill, 1976.

Schlesinger, I. M. Production of utterances and language acquisition. In L. I. Slobin (Ed.), The ontogenesis of grammar. New York: Academic Press, 1971, 63-101.

Schneider, B. and Valcon, J. A. A speech therapy program for mentally retarded children. American Journal of Mental Deficiency, 1954, 58, 633-639.

Silverman, F. H. A bibliography of literature relevant to non-speech communication modes for the speechless. Marquette University, 1976.

Sinclair, H. The transition from sensory-motor behavior to symbolic activity. Interchange. 1970, 1(3), 119-126.

Sinclair-deZart, H. Developmental psycholinguistics. In D. Elking and J. H. Flavill (Eds.), Studies in Cognitive Growth: Essays in Honour of Jean Piaget. New York: Oxford University Press, 1969.

Sinclair-deZart, H. Language acquisition and cognitive development. In T. E. Moore (Ed.) Cognitive Development and the Acquisition of Language. New York: Academic Press, 1973, 9-25.

Sinclair, deZart, H. Sensorimotor action patterns as a condition for the acquisition of syntax. In R. Huxley and E. Ingram (Eds.) Language Acquisition: Models and Methods. New York: Academic Press, 1971.

Skelly, M., Schinsky, L., Smith, R. W. and Fust, R. S. American Indian sign (AMERIND) as a facilitator of verbalization for the oral verbal apraxic. Journal of Speech and Hearing Disorders, 1974, 39(4), 445-454.

Sloane, H., Johnson, M., and Harris, F. Remedial procedures for teaching verbal behavior to speech deficient or defective young children. In H. Sloane and B. MacAuley (Eds.) Operant Procedures in Remedial Speech and Language Training. Boston: Houghton-Mifflin, 1968.

Stremel-Campbell, K., Cantrell, D., and Halle, J. Manual signing as a language system and as a speech initiator for the non-verbal severely handicapped student. Educational Programming for Severely and Profoundly Handicapped, 1977, 335-347.

Stokoe, W. C. The shape of soundless language. In J. F. Kavanagh, and J. E. Cutting (Eds.), The Role of Speech in Language. Cambridge, Massachusetts: M.I.T. Press, 1975.

Sugarman, S. A description of communicative development in the pre-language child. Unpublished thesis, Hampshire (England) College.

Talkington, L. W., Hall, W., and Altman, R. Communication deficits and aggression in the mentally retarded. Journal of Mental Deficiency, 1971, 76, 235-237.

Topper, S. T. Gesture language for a non-verbal severely retarded male. Mental Retardation, 1975, 13(1), 30-31.

Uzgiris, I. C. and Hunt J. McV. An instrument for assessing infant psychological development. Unpublished manuscript, University of Illinois, Chicago, 1966.

Uzgiris, I. C. and Junt, J. McV. Assessment in infancy: Ordinal scales of psychological development. Urbana: University of Illinois Press, 1975.

Van Bieruliet, A. Establishing words and objects as a functionally equivalent through manual sign training. American Journal of Mental Deficiency, 1977, 82(2), 178-186.

Wachs, T. D. and DeRiemer, P. Adaptive behavior and Uzgiris-Hunt scale performance of young developmentally disabled children. American Journal of Mental Deficiency, 1978, 83(2), 171-176.

Wilson, G. B. Efficiency of speech therapy with educable mentally retarded children. Journal of Speech and Hearing Research, 1966, 9, 423-433.

Yoder, P. and Forehand, R. Effects of modeling and verbal cues upon concept acquisition of non-retarded and retarded children. American Journal of Mental Deficiency, 1974, 78(5), 566-570.

Yoder, D. E., and Miller, J. F. What we may know and what we can do: Input toward a system, Chapter 5. In J. E. McLean, D. E. Yoder, and R. L. Schiefelbusch (Eds.), Language Intervention with the Retarded. Baltimore: University Park Press, 1972.

APPENDIX A

Demographic Data

Sample by

Age - Rank - Sex

St. No.	Age*	Rank	Sex	St. No.	Age*	Rank	Sex
1	207	43	M	25	210	31	F
2	210	6	F	26	187	44	F
3	196	39	M	27	214	40	F
4	228	45	F	28	200	4	F
5	192	27	M	29	213	15	M
6	221	1	F	30	222	8	M
7	179	42	F	31	211	17	F
8	224	12	M	32	224	37	F
9	190	13	M	33	223	2	M
10	214	30	M	34	229	7	F
11	191	32	F	35	201	19	M
12	210	35	M	36	209	3	F
13	184	20	F	37	201	33	M
14	221	28	M	38	211	21	M
15	220	9	F	39	171	5	M
16	215	34	M	40	217	24	F
17	219	18	M	41	158	25	F
18	158	23	M	42	211	36	F
19	209	46	M	43	170	11	M
20	211	14	M	44	218	48	M
21	205	22	M	45	197	10	M
22	198	38	M	46	170	16	M
23	151	29	F	47	155	47	M
24	225	41	F	48	198	26	F

*Age in Months

APPENDIX B

Pre-Test Scores for Each Subject

R.E.E.L. - Uzgiris-Hunt - Fairview

St. No.	R.E.E.L. Rec.	R.E.E.L. Expr.	Uzgiris-Hunt Scale 1	2	3	3A	4	5	Fairview Total
1	11	3	3	5	2	0	3	5	14
2	30	7	6	6	2	4	6	6	40
3	11	1	5	4	2	0	3	3	9
4	11	0	5	4	0	0	0	5	27
5	12	3	6	6	0	4	4	6	23
6	36	18	6	6	5	4	6	6	44
7	6	6	5	5	0	3	0	3	13
8	20	5	7	7	3	4	6	6	39
9	27	2	6	6	3	4	6	6	43
10	20	4	6	6	3	4	3	6	27
11	18	1	6	5	0	4	3	5	21
12	8	4	5	5	0	3	3	3	19
13	20	0	6	6	2	4	5	6	17
14	16	6	5	6	2	4	4	5	15
15	24	8	6	6	5	4	4	5	24
16	6	1	5	4	0	4	4	6	16
17	18	6	6	6	5	4	6	6	30
18	20	4	6	6	0	4	3	6	25
19	8	6	3	5	0	0	4	3	9
20	22	6	6	6	5	4	6	6	27
21	18	8	6	6	0	4	6	6	18
22	9	7	4	4	2	3	4	5	13
23	20	7	5	6	2	4	3	5	18
24	6	1	3	5	0	0	3	3	9
25	10	5	6	6	0	4	3	5	18
26	10	7	6	6	2	0	0	6	30
27	9	3	6	6	0	4	4	3	27
28	27	18	6	6	2	4	6	6	32
29	20	20	6	6	6	4	6	6	45

St. No.	R.E.E.L. Rec.	R.E.E.L. Expr.	Uzgiris-Hunt Scale 1	2	3	3A	4	5	Fairview Total
30	27	20	6	6	3	4	5	6	29
31	33	9	6	6	5	4	5	6	35
32	10	0	6	5	2	3	3	5	23
33	36	20	6	6	5	4	6	6	57
34	24	3	6	6	3	4	6	6	53
35	24	5	6	6	3	4	6	6	36
36	33	22	6	6	6	4	6	6	50
37	14	6	4	5	2	0	3	6	22
38	18	5	6	6	0	4	6	6	22
39	36	11	6	6	5	4	6	6	39
40	24	16	6	6	0	4	5	5	22
41	18	5	6	5	2	4	6	5	24
42	11	2	6	5	0	0	0	3	26
43	27	24	6	6	6	4	4	5	22
44	1	2	3	3	0	0	0	3	5
45	24	14	6	6	5	4	6	6	28
46			6	6	3	4	6	6	29
47	7	0	0	0	0	0	0	0	12
48	24	2	5	5	0	4	4	3	20

LEGEND

R.E.E.L. - Age in Months
Uzgiris-Hunt - Piaget Level
Fairview - Behavioral Age in Months

PRE-TEST (Continued)

A.A.M.D.

Subscales

St. No.	1	2	3	4	5	6	7	8	9	10
1	0	20	39	1	21	21	32	0	28	0
2	30	99	39	21	26	65	38	8	58	12
3	8	18	39	9	21	22	32	18	39	2
4	22	7	39	0	21	21	46	18	28	19
5	27	20	38	21	21	55	37	39	3	19
6	39	99	55	34	52	77	32	57	92	48
7	6	32	20	19	21	21	32	2	39	1
8	20	67	28	2	18	42	45	12	32	12
9	18	65	28	5	16	28	28	30	32	32
10	11	9	28	5	18	15	26	30	25	0
11	25	11	39	15	21	28	38	44	28	1
12	18	12	39	5	21	21	32	18	28	0
13	12	15	39	15	21	21	32	39	28	1
14										
15	20	32	30	15	22	27	35	42	45	78
16	15	20	65	21	21	32	32	0	28	0
17	14	23	28	10	18	22	28	18	26	22
18	24	41	38	18	22	38	38	22	28	8
19	7	13	40	11	21	21	32	18	27	23
20	10	22	38	15	25	32	22	9	50	32
21	22	65	38	15	22	43	32	22	50	18
22	7	12	39	16	21	21	32	8	28	2
23	9	15	39	12	21	28	36	31	28	1
24	8	13	40	21	21	35	62	28	2	0
25	3	11	27	4	17	28	25	3	25	5
26	8	19	28	5	17	38	28	2	27	5
27	6	10	28	5	17	18	25	3	25	21
28	30	65	39	32	35	68	49	45	59	40
29	4	18	30	12	30	22	52	22	25	4

St. No.	1	2	3	4	5	6	7	8	9	10
30	22	65	0	20	35	35	40	70	28	18
31	0	8	28	0	13	59	27	38	27	32
32	8	11	38	13	21	25	34	21	28	0
33	46	35	40	28	52	89	62	39	92	25
34	38	42	46	30	25	55	34	11	50	0
35	22	11	39	6	21	48	32	18	40	3
36	33	33	38	28	25	55	32	52	51	41
37	12	65	39	0	21	21	33	2	28	2
38	18	32	39	11	25	38	38	18	28	0
39	30	18	46	32	22	55	38	52	59	55
40	15	23	27	10	17	38	83	7	46	42
41	18	22	38	15	22	38	32	32	38	32
42	15	18	38	11	21	32	34	6	25	1
43										
44	9	5	39	5	21	21	32	8	28	1
45	22	18	40	18	22	28	35	44	38	38
46	18	20	39	18	26	21	28	3	28	9
47	2	9	39	9	20	21	32	80	28	1
48	10	12	39	30	22	49	48	21	50	23

LEGEND

Percentile Scores

APPENDIX C

Local Assessment Scale Scores for Each Subject

Student No.	A_1	A_2	B	C	D_1	D_2	E	F	G
1	3	3	6	0	2	10	0	0	0
2	4	5	10	6	3	10	10	20	25
3	4	4	10	0	0	10	2	0	0
4	0	0	8	1	0	4	0	0	0
5	3	4	6	0	2	10	1	1	0
6	6	7	10	22	4	10	18	20	36
7	2	4	5	0	1	0	0	0	0
8	5	6	10	5	3	10	10	6	25
9	4	6	10	12	2	10	4	6	25
10	4	6	4	0	0	0	0	6	2
11	3	4	0	0	3	0	0	3	0
12	5	5	10	0	3	10	0	0	0
13	4	5	9	2	3	10	4	12	8
14	4	4	6	0	3	6	0	0	0
15	5	6	10	5	3	10	4	20	26
16	1	5	7	0	3	10	0	0	0
17	4	6	10	3	4	10	4	6	26
18	3	4	10	4	3	6	0	6	0
19	0	0	0	3	2	0	0	0	0
20	4	6	10	7	3	10	2	8	27
21	0	4	10	0	3	10	0	2	0
22	2	4	4	0	3	10	0	0	0
23	4	4	10	0	2	6	0	2	1
24	4	4	10	0	3	10	0	0	0
25	4	4	10	0	3	10	2	4	0
26	0	0	0	0	0	0	0	0	0
27	0	4	4	0	3	4	0	1	0
28	4	6	10	4	3	10	7	20	30

Local Assessment Scale Scores (Continued)

Student No.	A_1	A_2	B	C	D_1	D_2	E	F	G
29	4	6	10	4	3	10	4	0	34
30	4	6	10	6	2	10	4	6	28
31	5	5	8	6	3	10	1	18	0
32	4	4	0	0	0	8	0	0	0
33	4	6	10	12	3	10	4	20	31
34	4	6	10	2	3	10	3	20	26
35									
36	6	6	10	5	3	10	6	8	33
37	4	4	10	0	7	0	0	0	0
38									
39	4	6	10	9	3	10	5	20	30
40	3	6	0	0	0	0	0	2	25
41	3	4	2	0	3	10	0	4	0
42	4	6	9	2	3	10	0	0	0
43	5	6	10	1	4	10	5	6	33
44	0	0	0	0	0	0	0	0	0
45	5	6	10	2	3	10	4	12	27
46	4	6	10	3	2	10	2	18	35
47	1	1	6	0	2	10	0	0	0
48	3	5	10	0	3	6	1	6	0

LEGEND

A_1 Exploration-Frequent

A_2 Exploration-Highest Level

B Visual Attention

C Visual Memory

D_1 Auditory Attention

D_2 Auditory Attention

E Auditory Memory

F Manual Imitation

G Speech

C. VISUAL MEMORY

MATERIALS: Cubes - 4 Green, 1 Yellow, 1 Orange, 1 Red, 1 Purple, and 1 Blue

There are four procedures: 1) on colored-square card; 2) on table, card in view; 3) on blank-square card, colored card in view; 4) on table, card gone.

E. "Look at all our blocks to play with. Let's see what we can build with them."

PROCEDURE CARD 1

A. On Card

E

_____

_____

S

1.) E. doing, says "look at my picture of the blocks. We need a green one and a red one to build one just like my picture."
E. removes blocks from picture, saying, "You make one on the picture." (Allow 30 seconds)
Record student's response.

yes no

(to B)

CARD 1.

_____

2.) E. manually guides student and repeats direction above.
E. record result

yes no

G
R

(to B)

_____

3.) E. manually guides again and repeats direction.
E. record result.

yes no

(to B)

STOP!
Go to Auditory Attention Page.

B. Off Card, Card in View

1.) E. shows the student the card, points saying, "I want you to build it again. Look at the card and look where the green one is and where the red one is. Try to remember. Here are the blocks, look at the picture and build one just like it here on the table. (Allow 15 seconds for looking

and 30 seconds for building.)

Record response.

yes	no
(to C)	(on to 2)

2.) Manually guide the student in building off the card.

yes	no
(to C)	(on to 3)

3.) Put the uncolored card in front of the student, and show the colored card. Place the blocks in the appropriate squares saying, "See where the green one goes and where the red one goes. Try to remember."
E. removes the blocks and says, "Now you put the blocks on the squares just like my picture."

Record response.

yes	no
(to C)	(on to 4)

4.) Manually guide the student in building on the blank-squared card. Repeat the instructions above in (3).

Record response.

yes	no
(to C)	STOP! Go to Auditory Attention Page.

C. Off Card, Card Gone

1.) E. does and says, "First I want you to look at where the green one goes, then where the red one goes. Now I'm going to hide the picture and you build one here. (Allow 10 seconds for looking, and 30 seconds for building.)

Record response.

yes	no
(Go on to card 2)	(On to Step 2)

2.) Place the uncolored card in front of the student. E. does and says, "I want you to look at where the green one goes, then where the red one goes. Now I'm going to hide the picture and you build one right here on this card." (Allos 10 seconds for looking and 30 seconds for building.)

Record response.

yes	no
(Go on to card 2)	STOP! Go to Auditory Attention Page.

CARD 2

A. On Card — PROCEED AS IN CARD 1, RECORDING RESPONSES.

1.) yes — (to Off Card)

no

2.) Manually guide

yes — (to Off Card)

no

3.) Manually guide again

yes — (to Off Card)

no — STOP! Go to Auditory Attention Page.

B. <u>Off Card, Card in View</u>

1.) PROCEED AS IN CARD 1, RECORDING RESPONSES.

yes — (to C., off card, card gone)

no

2.) Manually guide

yes no

(to C.)

3.) Using uncolored card.

yes no

(to C.) (to 4.)

4. Manually guide using uncolored card.

yes no

(to C.) STOP! Go to Auditory Attention Page.

C. Off Card, Card Hidden

1.) PROCEED AS IN CARD 1, RECORDING RESPONSES.

yes no

(to card 3.)

2.) Using uncolored card.

yes no

(to card 3) STOP! Go to Auditory Attention Page.

CARD 3

A. On Card 1.) PROCEED AS IN CARD 1, RECORDING RESPONSES.

yes no

(to Off Card, card hidden, Step B)

2.) Manually guide

yes (to B.) no

3.) Manually guide again.

yes	no
(to B)	STOP! Go to Auditory Attention Page.

B. Off Card, Card Hidden

1.) PROCEED AS IN CARD 1, RECORDING RESPONSES.

yes	no
(to Card 4)	

2.) Using uncolored card.

yes	no
(to Card 4)	STOP! Go to Auditory Attention Page.

CARD 4

A. Off Card, Card Hidden

1.) PROCEED AS IN CARD 1, RECORDING RESPONSES.

yes	no
(to Card 5)	

2.) Using uncolored card.

yes	no
(to Card 5)	STOP! Go to Auditory Attention Page.

CARD 4

A. Off Card, Card Hidden

1.) PROCEED AS IN CARD 1, RECORDING RESPONSES.

yes	no
(to Card 5)	

2.) Using uncolored card.

yes	no
(to Card 5)	STOP! Go to Auditory Attention Page.

CARD 5

A. Off Card, Card Hidden

1.) PROCEED AS IN CARD 1, RECORDING RESPONSES.

yes	no
	STOP! GO TO AUDITORY ATTENTION PAGE.

2.) Using uncolored card.

yes	no
	STOP! GO ON TO AUDITORY ATTENTION PAGE.

D. AUDITORY ATTENTION #1

Examiner places several objects on the table and allows the student to play with them. The examiner stands behind the student out of his field of vision.

1.) As the child engages in play (after several seconds) the examiner calls the child's name. Record response.

None Looks Verbal Other _____ describe

2.) Repeat and record.

None Looks Verbal Other _____ describe

3.) Repeat and record.

None Looks Verbal Other _____ describe

AUDITORY ATTENTION #2

EXAMINER REINFORCES EACH CORRECT EYE CONTACT RESPONSE.

1.	E says "five."	yes	no
		(Continue with 2.)	(Repeat)
		yes	no
		(Continue with 2.)	(STOP! GO ON TO AUDITORY MEMORY)
2.	E says "one, five."	yes	no
		(Continue with 3.)	(Repeat)
		yes	no
		(Continue with 3.)	(STOP! GO ON TO AUDITORY MEMORY)
3.	E says "one, two, five."	yes	no
		(Continue with 4.)	(Repeat)
		yes	no
		(Continue with 4.)	(STOP! GO ON TO AUDITORY MEMORY)
4.	E says "one, two, three, five."	yes	no
		(Continue with 5.)	(Repeat)
		yes	no
		(Continue with 5.)	(Repeat)
5.	E says "one, two, three, four, five."	yes	no
		(STOP! GO ON TO AUDITORY MEMORY)	(Repeat)
		yes	no

STOP! GO ON TO AUDITORY MEMORY

E. AUDITORY MEMORY

GENERAL PROCEDURE: CALL STUDENT'S NAME, THEN SHOW THE STUDENT THE OBJECT, TELLING HIM WHAT THE OBJECT IS. THEN GIVE THE OBJECT TO THE STUDENT. REPLACE THE OBJECT ON TO THE TABLE.

1. E. "NAME, look ball."
2. E. "NAME, look block."
3. E. "NAME, look puppy."
4. E. "NAME, look doll."

RECORD RESPONSE BELOW CORRECT RESPONSE IF STUDENT TOUCHES OR GIVES THE OBJECT TO THE EXAMINER.

5. E. "NAME, please give me the ball.

yes	no
(Go on to 6.)	Repeat, manually guide.
yes	no
(Go on to 6.)	Repeat, manually and verbally guide.
yes	no
(Go on to 6.)	STOP! GO ON TO MANUAL IMITATION.

6. E. "NAME, please give me the block and the ball.

yes	no
(Go on to 7.)	STOP! GO ON TO MANUAL IMITATION.

7. E. "NAME, please give me the puppy and the block.

yes no

For the remainder of Auditory Memory, if "yes" continue, if "no", then stop and go on to MANUAL IMITATION.

8. E. "NAME, please give me the ball and the puppy."

yes no

9. E. "NAME, please give me the ball, puppy and the block.

yes no

10.	E.	"NAME, please give me the doll, puppy and the ball."	yes no
11.	E.	"NAME, please give me the ball, puppy, block, and the doll.	yes no
12.	E.	"NAME, please give me the puppy, doll, block and ball."	yes no
13.	E.	"NAME, please give me all of the toys."	yes no

F. MANUAL IMITATION

EXAMINER AND STUDENT STAND FACING EACH OTHER, APPROXIMATELY AT ARMS LENGTH OR LESS.

1. E says "do this." (ARMS RAISED ABOVE HEAD)

yes	no
(to 2.)	(repeat with modeling)
yes	no
(to 2.)	(repeat model and manually guide)
yes	no
(Continue with 2.)	

2. E says "do this." (BOTH ARMS AT FULL LENGTH DIRECTLY OUT TO THE SIDE FROM THE SHOULDERS.)

yes	no
(to 3.)	(repeat with modeling)
yes	no
(to 3.)	(repeat model and manually guide.)

yes no

(Continue with 3.)

FOR THE REMAINDER OF MANUAL IMITATION, IF YES, GO ON TO NEXT GESTURE. IF NO IN 3 THROUGH 7, STOP. IF NO IN 8 THROUGH 10, CONTINUE.

3. E says "do this." (PALMS FLAT TOGETHER)

yes no

4. E says "do this." (BACKS OF HANDS TOGETHER)

yes no

5. E says "do this." (TIPS OF RIGHT FINGERS TO OPEN PALM OF LEFT HAND)

yes no

6. E says "do this." (FLAT 'O' IN BOTH HANDS, FINGERTIPS TOGETHER)

yes no

7. E says "do this." (RIGHT FOREFINGER CROSSWISE OVER LEFT FOREFINGER)

yes no

8. E says "do this." FORM 'S' IN BOTH HANDS)

yes no

9. E says "do this." FORM 'T' IN RIGHT HAND)

yes no

10. E says "do this." (SIGN FOOD WITH RIGHT HAND)

yes no

G. SPEECH

Responses to Speech Stimulation

	Imitated Correctly	Attempted imitation but could not approximate modeled cue	Did not attempt imitation	Looked away from examiner	Transcribed response
A. Looked Y N					
1. "uh" (1st)					
2. "uh" (2nd)					
3. "ah"					
4. "ee"					
5. "aa" (at)					
6. "it"					
7. "puh"					
8. "muh"					
9. "moo"					
10. "my"					
11. "bah"					
12. "boy"					
13. "dee"					
14. "doo"					
15. "no"					
16. "two"					
17. "pop"					
18. "not"					
19. "mama"					
20. "baby"					
21. "daddy"					

Student _____

Unit _____ Home _____

B/D _____ Date Eval. _____

Examiner _____

INSTRUCTIONS:

1. Sit facing student. No table between you. Have pudding reinforcer and spoon handy.
2. Say student's name while holding reinforcer in your line of sight.
3. Record response at A. (yes or no)
4. With the student looking at you, hold the reinforcer close under your mouth and say, "Say 'uh'."
5. Record response #1.
6. Hold reinforcer as before and repeat as follows: "uh".
7. Record for #2.
8. Repeat the procedure for each of the rest of the stimuli.
   a. get eye contact.
   b. provide modeled cue.
   c. record response by checking in the appropriate column.

22. "bottle"
23. "paper"
24. "cookie"
25. "candy"

TOTALS

NOTE: A negative response should be followed by another trial. Use #1 to record first response, #2 to record second response.

GO THROUGH EVERY STIMULI, EVEN IF THE STUDENT FAILS EACH ONE OF THEM.

APPENDIX D

Local Assessment Scale

NO. _____ DATE _____ EXAMINER _____

NAME: LAST, FIRST _____ HOME _____ TIME STARTED (CLOCK) _____

A. EXPLORATION

1. E. "Look at these things here."
   E. "Let's play with them."
   E. "You take one."

Choice of object	DOLL	CUP	BALL
	BOTTLE	COOKIE	BED-DOLL
	BLOCK	PUPPY	CAR
	BEADS		
Dominance	R L B	R L B	R L B

Record student's actions as they occur vertically using numbers to left. Repeat for each group.

1) Throws object
2) Holds object 30 seconds +
3) Hits object on table top
4) Shakes or waves object
5) Brings object to mouth
6) Looks at held object 30 seconds +
7) Hits object with hand
8) Hits two objects together
9) Turns object for visual and tactual examination
10) Pats object gently
11) Slides object on table
12) Stretches object
13) Tears object

A. EXPLORATION (Continued)

14) Drops object repeatedly

15) Puts one object into another

16) Shows object to examiner

17) Points object at another object

18) Demonstrates appropriate use of object

19) Names the object

20) Tells what the object does

21) Eats object

22) No response

2. If no response, repeat directions above, "look at these things here...etc." If no response proceed as follows:

3. Examiner picks up the doll, does and says, "I am looking at it. I am listening to it. I am feeling it." The examiner hands the doll to the student, saying, "You do it." Record dominance and any of above actions.

B. VISUAL ATTENTION

REINFORCE EACH CORRECT RESPONSE (PUDDING REINFORCER)

			CHECK ( ) RESPONSE	
			YES	NO
1.	E. "Look at me."	(5 seconds)		
2.	E. "Look at this."	(wave object 5 seconds)		
3.	E. "Look at me."	(5 seconds)		
4.	E. "Look at this."	(5 seconds)		
5.	E. "Look at me."	(5 seconds)		
6.	E. "Look at this."	(5 seconds)		
7.	E. "Look at me."	(5 seconds)		
8.	E. "Look at this."	(5 seconds)		
9.	E. "Look at me."	(5 seconds)		
10.	E. "Look at this."	(5 seconds)		

APPENDIX E

Inter-Rater Reliability

Local Pre-Assessment Scale
on Five Students by Five or Six Raters

Raters	Subject 1						Subject 2						Subject 3					Subject 4					Subject 5					Total Percent Agreement
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	
Sub-Scales																												
A_1	d	d	d	d	d	d	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	
2	c	c	c	c	c	c	p	p	p	p	p	p	b	b	b	b	b	b	b	b	b	b	b	b	b	b	b	
3	d	d	d	d	d	d	c	c	c	c	c	c	d	d	d	d	d	d	d	d	d	d	b	b	b	b	b	
H	4	4	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5	3	3	3	3	3	
MF	2	3	4	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	3	3	.93
B	5	6	6	6	6	6	3	0	0	0	2	2	10	8	9	9	10	10	10	10	10	10	5	5	5	4	5	
C	1	1	1	1	1	1	0	0	0	0	0	0	3	3	3	3	3	3	3	3	3	3	1	1	1	1	1	
D_1	1	2	2	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2	
D_2	4	4	5	5	5	5	1	1	0	1	1	1	5	5	5	5	5	5	5	5	5	5	1	2	1	1	1	
E	5	5	5	5	5	5	6	6	6	6	6	6	7	7	7	7	7	6	6	6	6	6	5	5	5	5	5	
F	2	2	2	2	2	2	0	0	0	0	0	0	3	3	3	3	3	3	3	4	3	3	2	2	2	2	2	
G	0	0	0	0	0	0	0	0	0	0	0	0	25	25	25	25	20	25	25	25	25	25	0	0	0	0	0	
Percent Agreement	.87						.94						.93					.98					.96					

APPENDIX F

Local Assessment Scale Record Sheet

Student _____

Home _____

Date _____

A_1	Exploration F-level	A_1	_____	_____	_____
A_2	Exploration H-level	A_2	_____	_____	_____
B	Visual Attention	B	_____	_____	_____
C	Visual Memory	C	_____	_____	_____
D_1	Auditory Attention	D_1	_____	_____	_____
D_2	Auditory Attention	D_2	_____	_____	_____
E	Auditory Memory	E	_____	_____	_____
F	Manual Imitation	F	_____	_____	_____
G	Speech	G	_____	_____	_____

Column 1 _____

2 _____

3 _____

4 _____

Remarks:

APPENDIX G

The Evaluation Record

Student _____ No. 1 2 3 4 (Circle)

Home _____ Date _____

Stimulus	Response
1. Present object. E says, "What's this?"	A. Says and signs
2. Present object. E names and signs, "What's this?"	B. Says
3. Present five objects on the table. "Point to the _____." (and sign)	C. Signs
4. Present two objects. "Point to the _____?" (sign)	D. Points to object
5. Show object, then hide behind back. "Where did it go? Show me where it went."	E. Looks for object
6. Point to object. "(Subject's name"), point to the (object name)."	F. Cooperates in manual guidance
7. Present object and manually guide exploration with verbal description.	G. None of the above (note behavior)

RECORD

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

APPENDIX H

Inter-Rater Reliability on Evaluation

Five or Six Raters
Three Words Each - Five Subjects

Subjects			Ball Raters 1 2 3 4 5 6	Pop Raters 1 2 3 4 5 6	Cookie Raters 1 2 3 4 5 6	Percent Agreement
S_1	s	1	+ + + + + +	1 + + + + + +	1 + + + + + +	
	u	2	+ + + + + +	2 + + + + + +	2 + + + + + +	
	b	3	+ + + + + +	3 + + + + + +	3 + + + + + +	100%
	t	4	+ + + + + +	4 + + + + + +	4 + + + + + +	
	e	5	+ + + + + +	5 + + + + + +	5 + + + + + +	
	s	6	+ + + + + +	6 + + + + + +	6 + + + + + +	
	t	7	+ + + + + +	7 + + + + + +	7 + + + + + +	

			Ball Raters 1 2 3 4 5	Pop Raters 1 2 3 4 5	Cookie Raters 1 2 3 4 5	
S_2	s	1	+ + + + +	1 + + + + +	1 + + + + +	
	u	2	+ + + + +	2 + + + + +	2 + + + + +	
	b	3	+ + + + +	3 + + + + +	3 + + + + +	100%
	t	4	+ + + + +	4 + + + + +	4 + + + + +	
	e	5	+ + + + +	5 + + + + +	5 + + + + +	
	s	6	+ + + + +	6 + + + + +	6 + + + + +	
	t	7	+ + + + +	7 + + + + +	7 + + + + +	

			Ball Raters 1 2 3 4 5 6	Pop Raters 1 2 3 4 5 6	Cookie Raters 1 2 3 4 5 6	
S_3	s	1	+ + + + + +	1 + + + + + +	1 + + + + + +	
	u	2	+ + + + + +	2 + + + + + +	2 + + + + + +	
	b	3	o + o o + +	3 + + + o + +	3 + + + + + +	94%
	t	4	+ + + o + +	4 + + + o + +	4 + + + + + +	
	e	5	+ + + + + +	5 + + + + + +	5 + + + + + +	
	s	6	+ + + + + +	6 + o + + + +	6 + + + + + +	
	t	7	+ + + + + +	7 + + + + + +	7 + + + + + +	

Inter-Rater Reliability on Evaluation (Continued)

Subjects			Ball Raters 1	2	3	4	5	6		Pop Raters 1	2	3	4	5	6		Cookie Raters 1	2	3	4	5	6	Percent Agreement
	s	1	+	+	+	+	+	+	1	+	o	+	o	o	+	1	+	+	+	+	+	+	
	u	2	+	+	+	+	+	+	2	+	o	+	o	o	+	2	+	+	+	+	+	+	
S_4	b	3	+	o	+	+	+	+	3	+	o	+	+	+	+	3	+	o	+	+	+	o	88%
	t	4	+	+	+	+	+	+	4	+	+	+	+	+	o	4	+	+	+	+	+	+	
	e	5	o	o	+	+	+	+	5	o	o	+	+	+	+	5	+	+	+	+	+	+	
	s	6	+	+	+	+	+	+	6	+	+	+	+	+	+	6	+	+	+	+	+	+	
	t	7	+	+	+	+	+	+	7	+	+	+	+	+	+	7	+	+	+	+	+	+	

			Ball Raters 1	2	3	4	5		Pop Raters 1	2	3	4	5		Cookie Raters 1	2	3	4	5	
	s	1	+	+	+	+	+	1	+	+	+	+	+	1	+	+	+	o	+	
	u	2	+	+	+	+	+	2	+	+	+	+	+	2	+	+	+	+	+	
	b	3	+	+	+	+	o	3	o	+	+	+	o	3	+	+	+	+	o	94%
S_5	t	4	+	+	+	+	+	4	+	+	+	+	+	4	+	+	+	+	+	
	e	5	o	+	o	+	+	5	+	+	+	+	+	5	+	+	+	+	+	
	s	6	+	+	+	+	+	6	+	+	+	+	+	6	+	+	+	+	+	
	t	7	+	+	+	+	+	7	+	+	+	+	+	7	+	+	+	+	+	

APPENDIX I

Oral-Manual Treatment Program

General Instructions:

Sit across from the student. Have all your materials on hand before you begin.

If you lose the student's attention momentarily, regain it by repeating the command before going on.

Anytime you feel your student has reached the end of his attention span, complete the step you are on and then break for a brief recess before returning to the program.

Note: Be sure to SAY and SIGN the name of the object, or the chosen word simultaneously whenever you present the object.

A. THE STUEENT ATTENDS TO THE INSTRUCTOR'S EXPLORATION

1. Say "Look, (chosen word)"
   Hold the object up for the student to see.

2. Engage in appropriate action with the object.
   Be sure the student is watching.
   Describe what you are doing.
   "I'm holding _____." "I'm rolling the _____."

3. Put object down and say "Look, _____."

4. Repeat Step 1-4 if the student is not paying attention.

B. THE STUDENT ATTENDS TO THE ENTIRE GUIDED EXPLORATION OF THE OBJECT

1. Say/sign the word.

2. Manually guide the student in appropriate action with the object and describe what you are doing together: "We're holding the _____. We're bouncing the _____. We're putting on the _____."

3. Give the object to the student for a moment of exploration of the object. Describe what the student is doing and then take it back after several seconds.

4. Repeat Steps 1-3 only if the student has not been paying attention.

C. THE STUDENT INDICATES THE OBJECT WHEN THE INSTRUCTOR SAYS "SHOW ME (CHOSEN WORD)."

1. Say/sign the chosen word, then say "Show me the _____." If the student response correctly go on to D. If not, go to C.2.

2. Repeat the instructions. If the student does not self-initiate indicating the object within fifteen seconds, then manually guide the student's touching the object while you say and sign "show me the _____."

3. Repeat Steps 1 and 2 until the student self-initiates three out of four trials.

D. THE STUDENT DEMONSTRATES OBJECT PERMANENCE FOR THE OBJECT BY CONSISTENTLY LOOKING FOR THE OBJECT WHEN THE INSTRUCTOR ASKS, "WHERE'S THE_____?"

1. Say/sign "Look, (chosen word)."
Hold the object up for the student to see and give it to the student for exploration for several seconds. Say/sign its name often.

2. Take the object back from the student, put it down, and say/sign the chosen word.

3. Put a towel over the object.
Say, "(Student's name), where's the _____?"

4. Uncover the object immediately saying "Here's the _____."
Say/signing at the same time.

5. Cover the object again. Say "Where's the _____?"
If the student looks for the object after it is hidden, within 30 seconds, go on to E. If he does not self-initiate looking for the hidden object, repeat Steps 1-4 until the student responds correctly three out of four trials.

E. THE STUDENT INDICATES THE OBJECT FROM A DISSIMILAR OBJECT WHEN THE INSTRUCTOR SAYS AND SIGNS THE NAME OF THE OBJECT.

1. Put the object and a dissimilar object in front of the student. Say/sign the object and point to the object.

2. Say/sign the object name and say "(Student's name), point to the _____." If the student responds correctly within 30 seconds, go to F.

3. Repeat Step 2. If the student fails to respond within 15 seconds, manually guide the student to touch, point, or somehow indicate the correct object.

4. After the student has indicated the correct object, give it to him for a moment of exploration saying "Good, you pointed to _____." Go to F. after the student has given the correct response three out of four trials.

Note: If the student points to the wrong object, say "You pointed to (its name). Point to _____." (chosen word)

F. THE STUDENT PRODUCES THE SIGN FOR THE OBJECT

1. Pick up the object and show it to the student. Don't give it to him/her. As you hold the object say the object name, put it down and say/sign the object.

2. Tell the student, "Say _____." Wait 30 seconds for the student to self-initiate the sign. If he self-initiates, go on to G.

3. Repeat "Say _____." If the student does not self-initiate the sign within 15 seconds, manually guide the student in forming the sign.

4. Repeat Steps 1-3 until the student responds correctly three out of four trials.

G. THE STUDENT SPONTANEOUSLY SIGNS THE WORD WHEN THE INSTRUCTOR HOLDS THE OBJECT AND ASKS, "WHAT'S THIS?"

1. Show the object. Say "Look (chosen word). What's this? Tell me. It's a (n) _____." DO NOT FINISH THE SENTENCE. If the student responds within 30 seconds correctly, go to H.

2. Repeat Step 1. If the student fails to respond within 15 seconds prompt the student with minimal manual guidance. If his response is correct give the student the object for a brief free-play period.

3. Repeat until the student responds correctly three out of four trials.

H. THE STUDENT IMITATES THE INSTRUCTOR SAYING THE NAME OF THE OBJECT

Note: The student's VERBAL APPROXIMATION of the spoken word doesn't have to be an accurate production, but can be any vocalization which BEGINS with the INITIAL CONSONANT or CONSONANT-VOWEL combination of the actual word.

1. Say to the student, "Say _____." If the student responds with a verbal approximation within 30 seconds give him the object for a moment of exploration and then go to I.

2. Say to the student, "Say _____." If the student fails to respond correctly within 15 seconds, manually guide as follows:
   Put the student's hand on your jaw and neck so he can "feel" you speak. Say the word at least three times with a couple of seconds pause between repetitions.

   Reinforce immediately--with verbal praise--ANY vocalization the student makes. If the student does not vocalize at all, repeat until the student produces some vocalization.

3. Say/sign "Look (pointing toward your mouth) and say the object name as soon as the student is looking at you. Then place the student's hand on your jaw and neck as described in Step 2 and say, "(student's name) say _____."

   As soon as the student produces a VERBAL APPROXIMATION of the word, give him the object for a moment of exploration.

4. Repeat Step 3 until the student makes a verbal approximation three out of four trials.

I. THE STUDENT IMITATES THE INSTRUCTOR'S PRODUCTION OF BOTH SIGN AND ORAL APPROXIMATION OF THE OBJECT NAME

1. Say/sign the word. Say, "You say _____" and repeat the model for the speech/sign. If the student is successful producing speech and sign within 30 seconds, give the student the object for exploration as well as verbal praise for success and go to 3.

2. Say/sign the word. Say "You say _____" and if the student fails to imitate your speech/sign model within 15 seconds, place the student's hand on your jaw as described in Objective H. Say the word three times. Immediately reinforce any vocalization by the student with verbal praise.

3. Have the student imitate you saying the word without his/her hand on your mouth. Repeat the stimulus as many times as necessary until the student produces the word (as well as he can) without having his/her hand on your mouth. As soon as the student says the word, give the object for a moment of exploration.

4. Say/sign the word. As soon as the student produces a verbal approximation of the object name, manually guide his/her production of the sign for the word.

5. Repeat Steps 1-4 until the student responds correctly three out of four trials.

J. THE STUDENT SPONTANEOUSLY SIGNS THE WORD WITH ACCOMPANYING VERBAL APPROXIMATION WHEN THE INSTRUCTOR HOLDS THE OBJECT AND ASKS, "WHAT'S THIS?"

1. Show the object, say "Look! (chosen word)! What's this? Tell me. It's a _____. DO NOT FINISH THE SENTENCE. Allow up to 30 seconds for the student to respond with sign/speech. If the student responds correctly choose a new word and start the program from the beginning.

2. Repeat Step 1. If the student fails to respond within 15 seconds, use minimal prompting and guidance. If his response is correct, give him the object for exploration.

3. Repeat until the student responds correctly three out of four trials.

When you have reached this criterion you should choose the next word on the list and start the entire program again with the new word.

APPENDIX J

Oral Treatment Program

General Instructions:

Sit across from the student. Have all your materials on hand before you begin.

When you lose the student's attention momentarily, regain it by repeating the command before going on.

Anytime you feel your student has reached the end of his attention span, complete the step you are on and then break for a brief recess before returning to the program.

Note: Be sure you say the word whenever you present the object. There is no signing in this program.

A. THE STUDENT ATTENDS TO THE INSTRUCTOR'S EXPLORATION

1. Say "Look, (chosen word)."
   Hold the object up for the student to see.

2. Engage in appropriate action with the object.
   Be sure the student is watching.
   Describe what you are doing.
   "I'm holding the _____. I'm rolling the _____., etc."

3. Put the object down and say "Look, _____."

4. Repeat if the student is not paying attention.

B. THE STUDENT ATTENDS TO THE ENTIRE GUIDED EXPLORATION OF THE OBJECT

1. Say the word.

2. Manually guide the student in appropriate action with the object and describe what you are doing together: "We're holding the _____." "We're bouncing the _____." "We're putting on the _____."

3. Give the object to the student for a moment of exploration of the object. Describe what he is doing and take it back after several seconds.

4. Repeat only if the student has not been paying attention.

C. THE STUDENT INDICATES THE OBJECT WHEN THE INSTRUCTOR SAYS "SHOW ME (CHOSEN WORD)."

1. Say the chosen word and then say "Show me the _____." If the student responds correctly go on to D. If not, go to C.2.

2. Repeat the instructions. If the student does not self-initiate indicating the object within 15 seconds, then manually guide the student's touching the object while you say and sign "Show me the _____."

3. Repeat Steps 1 and 2 until the student self-initiates three out of four trials.

D. THE STUDENT DEMONSTRATES OBJECT PERMANENCE FOR THE OBJECT BY CONSISTENTLY LOOKING FOR THE OBJECT WHEN THE INSTRUCTOR ASKS, "WHERE'S THE _____._

1. Say "Look, (chosen word)."
   Hold the object up for the student to see and give it to the student for exploration for several seconds. Say its name often.

2. Take the object back from the student, put it down and say the name of the object.

3. Put a towel over the object.
   Say, "student's name, where's the _____?"

4. Uncover the object immediately saying, "here's the _____."

5. Cover the object again. Say "Where's the _____."
   If the student looks for the object after it is hidden, within 30 seconds, go on to E. If he does not self-initiate looking for the hidden object repeat Steps 1-4 until the student responds correctly three out of four trials.

E. THE STUDENT INDICATES THE OBJECT FROM A DISSIMILAR OBJECT WHEN THE INSTRUCTOR SAYS THE NAME OF THE OBJECT.

1. Put the object and a dissimilar object in front of the student. Say the object name and point to the object.

2. Say the object name and say "(student's name), point to the _____." If the student responds correctly within 30 seconds, go to H.

3. Repeat Step 2. If the student fails to respond within 15 seconds, manually guide the student to touch, point or somehow indicate the correct object.

4. After the student has indicated the correct object, give it to him for a moment of exploration saying "Good, you pointed to _____."

Go to H after the student has given the correct response three out of four trials.

Note: If the student points to the wrong object, say "You pointed to (its name). Point to _____." (the name of the word you are working on.)

F. OMIT

G. OMIT

H. THE STUDENT IMITATES THE INSTRUCTOR SAYING THE NAME OF THE OBJECT

Note: The student's VERBAL APPROXIMATION of the spoken word doesn't have to be an accurate production, but can be any vocalization which BEGINS with the INITIAL CONSONANT or CONSONANT-VOWEL combination of the actual word.

1. Say to the student, "Say _____." If the student responds with a verbal approximation within 30 seconds, give him the object for a moment of exploration and then go to J.

2. Say to the student, "Say _____." If the student fails to respond correctly within 15 seconds, manually guide as follows:
   Put the student's hand on your jaw and neck so he can "feel" you speak. Say the word at least three times with a couple of seconds between repetitions.

   Reinforce immediately--with verbal praise--ANY vocalization the student makes. If the student does not vocalize at all, repeat until the student produces some vocalization.

3. Say "Look (pointing toward your mouth) and say the object name as soon as the student is looking at you. Then place the student's hand on your jaw and neck as described in Step 2 and repeat. Then say "(student's name), say _____."

   As soon as the student produces a VERBAL APPROXIMATION of the word give him the object for a moment of exploration.

4. Repeat Step 3 until the student makes a verbal approximation three out of four trials.

I. OMIT

J. THE STUDENT SPONTANEOUSLY SAYS THE OBJECT NAME WITH VERBAL APPROXIMATION WHEN THE INSTRUCTOR HOLDS THE OBJECT AND ASKS, "WHAT'S THIS?"

1. Show the object, say "Look! (chosen word)! What's this? Tell me.

It's a _____." DO NOT FINISH THE SENTENCE. Allow up to 30 seconds for the student to respond with speech. If the student responds correctly choose a new word and start the program over from the beginning.

2. Repeat Step 1. If the student fails to respond within 15 seconds, use minimal prompting and guidance. If his response is correct, give him the object for exploration.

3. Repeat until the student responds correctly three out of four trials.

When you have reached this criterion you should choose the next word on the list and start the entire program again with the new word.

APPENDIX K

Manual Treatment Program

General Instructions:

Sit across from the student. Have all your materials on hand before you begin.

When you lose the student's attention momentarily, regain it by repeating the command before going on.

Anytime you feel your student has reached the end of his attention span complete the step you are on and then break for a brief recess before returning to the program.

Note: Be sure to sign only the word whenever you present the object. Do not say the word.

A. THE STUDENT ATTENDS TO THE INSTRUCTOR'S EXPLORATION

1. Say "Look, (chosen word)."
   Hold the object up for the student to see.

2. Engage in appropriate action with the student.
   Be sure the student is watching.
   Describe what you are doing (sign only the word--DO NOT SAY IT)
   "I'm holding the _____. I'm rolling the _____", etc.

3. Put object down and say "Look _____." (sign the word)

4. Repeat if the student is not paying attention.

B. THE STUDENT ATTENDS TO THE ENTIRE GUIDED EXPLORATION OF THE OBJECT.

1. Sign the word.

2. Manually guide the student in appropriate action with the object and describe what you are doing together: "We're holding the _____. We're bouncing the _____. We're putting on the _____." (sign the word)

3. Give the object to the student for a moment of exploration.

4. Repeat only if the student has not been paying attention.

C. THE STUDENT INDICATES THE OBJECT WHEN THE INSTRUCTOR SAYS "SHOW ME (CHOSEN WORD)." WORD IS SIGNED ONLY.

1. Sign the chosen word then say "Show me the _____." If the student responds correctly go on to D. If not, go to C.2.

2. Repeat the instructions. If the student does not self-initiate indicating the object within 15 seconds, then manually guide the student's touching the object while you say and sign "Show me the _____."

3. Repeat Steps 1 and 2 until the student self-initiates three out of four trials.

D. THE STUDENT DEMONSTRATES ACQUIRED OBJECT PERMANENCE FOR THE OBJECT BY CONSISTENTLY LOOKING FOR THE OBJECT WHEN THE INSTRUCTOR ASKS "WHERE'S THE _____?" Chosen word is signed only.

1. Say "Look, (chosen word)."
   Hold the object up for the student to see and give it to the student for exploration for several seconds. Sign its name often.

2. Take the object back from the student, put it down and sign the word.

3. Put a towel over the object.
   Say, "(Student's name), where's the _____?"

4. Uncover the object immediately saying "Here's the _____," signing at the same time.

5. Cover the object again. Say, "Where's the _____?"
   If the student looks for the object after it is hiddne, within 30 seconds, go on to E. If he does not self-initiate looking for the hidden object repeat Steps 1-4 until the student responds correctly three out of four trials.

E. THE STUDENT INDICATES THE OBJECT FROM A DISSIMILAR OBJECT WHEN THE INSTRUCTOR SIGNS THE NAME OF THE OBJECT.

1. Put the object and a dissimilar object in front of the student. Sign the word and point to the object.

2. Sign the word and say "(Student's name) point to the _____." If the student responds correctly within 30 seconds, go to F.

3. Repeat Step 2. If the student fails to respond within 15 seconds, manually guide the student to touch, point or somehow indicate the correct object.

4. After the student has indicated the correct object, give it to him for a moment of exploration saying "Good, you pointed to the _____." Go to F after the student has given the correct response three out of four trials.

Note: If the student points to the wrong object say "You pointed to (its name). Point to _____." (the name of the word you are working on.)

F. THE STUDENT PRODUCES THE SIGN FOR THE OBJECT.

1. Pick up the object and show it to the student. Don't give it to him. Put it down and sign the word.

2. Tell the student "Say _____." Wait 30 seconds for the student to self-initiate the sign. If he responds correctly, go on to J.

3. Repeat "Say _____." If the student does not self-initiate the sign within 15 seconds, manually guide the student forming the sign.

4. Repeat Steps 1-3 until the student responds correctly three out of four trials.

G. OMIT

H. OMIT

I. OMIT

J. THE STUDENT SPONTANEOUSLY SIGNS THE WORD WHEN THE INSTRUCTOR HOLDS THE OBJECT AND ASKS, "WHAT'S THIS?"

1. Show the object, say "Look! (chosen word)! What's this? Tell me. It's a _____." DO NOT FINISH THE SENTENCE. Allow up to 30 seconds for the student to respond with the sign. If the student responds correctly choose a new word and start the program over from the beginning.

2. Repeat Step 1. If the student fails to respond within 15 seconds, use minimal prompting and guidance. If his response is correct, give him the object for exploration.

3. Repeat until the student responds correctly three out of four trials.

When you have reached this criterion you should choose the next word on the list and start the entire program again with the new word.

APPENDIX L

Treatment Program: Student's Progress Record

Student's Name _____ Technician's Name _____

1. Slash (/) through each activity done this session.

2. Circle (o) activity you end the session with.

3. Mark only those steps the student has completed. Do not mark any steps that have been skipped; leave them blank. (Example: Student skips from Step 2 to Step 8 1 2 3 4 5 6 7 8)

4. If the student has completed through Step D. in a previous session, you will always begin a session with D.9. Complete level D and then complete the last step of each successive level until you reach the point where you left off last session. (Only one correct response to each level previously completed is necessary.)

A.	1 2 3 4 5	Step _____ repeated _____ times.
B.	1 2 3 4 5 6	Step _____ repeated _____ times.
C.	1 2 3 4 5 6 7 8	Step _____ repeated _____ times.
D.	1 2 3 4 5 6 7 8 9 10 11 12	Step _____ repeated _____ times.
E.	1 2 3 4 5 6 7 8	Step _____ repeated _____ times.
F.	1 2 3 4 5 6	Step _____ repeated _____ times.
G.	1 2 3 4 5 6	Step _____ repeated _____ times.
H.	1 2 3 4 5	Step _____ repeated _____ times.
I.	1 2 3 4 5	Step _____ repeated _____ times.
J.	1 2 3 4	Step _____ repeated _____ times.
K.	1 2 3 4 5 6	Step _____ repeated _____ times.
L.	1 2 3	Step _____ repeated _____ times.
M.	1 2 3 4	Step _____ repeated _____ times.
N.	1 2 3 4	Step _____ repeated _____ times.
O.	1 2 3 4	Step _____ repeated _____ times.

APPENDIX L (Continued)

NOTATIONS:

DATE

SHIFT

TIME BEGUN

TIME ENDED

SESSION #

WORDS THIS SESSION

APPENDIX M

Oral-Manual Treatment: Training Checkout Sheet

_____
Technician's Name

_____
Date

1.	Has necessary materials	
2.	Sets up material and subject	
3.	Sign _____	3. Say "Look _____."
4.	Hold up object--sign	4. Say object name "_____, _____, _____."
5.	Give object to subject	
6.	Take object back	6. Say "Name."
7.	Put towel over object--sign	7. "S's Name", shere's the (object)?"
8.	Uncover object--sign	8. "Here's the (object)."
9.	Cover object	9. "Where's the (object)?"

CIRCLE CORRECT RESPONSES

	Trials							
	1		2		3		4	
1		1		1		1		
2		2		2		2		
3	3	3	3	3	3	3	3	
4	4	4	4	4	4	4	4	
5		5		5		5		
6	6	6	6	6	6	6	6	
7	7	7	7	7	7	7	7	
8	8	8	8	8	8	8	8	
9	9	9	9	9	9	9	9	

APPENDIX N

Criterion for Acceptable Minimal Skill and Maximum Possible Scores for Sub-Tests of Local Pre-Assessment Scale

	Sub-Test	Maximum Possible Score	Criterion Score
A.	Exploration	6 (Level)	None
B.	Visual Attention	10	8
C.	Visual Memory	Card 6	Card 2
D1.	Auditory Attention	6	6
D2.	Auditory Attention	15	10
E.	Auditory Memory	18	8
F.	Manual Imitation	24	14
G.	Vocal Imitation	50	20

APPENDIX O

Students Meeting Criteria on Local Assessment Scale by Group - Student

Group Oral-Manual

Student	B	C	D_1	D_2	E	F	G	Student's Total	Group Total
1				+				1	
2	+			+	+	+	+	5	
3	+			+				2	
4	+							1	
5				+				1	
6	+			+	+	+	+	5	25
7				+				1	
8	+			+	+		+	4	
9	+			+			+	3	
10								0	
11								0	
12	+			+				2	
Subtotal	7	0	0	9	3	2	4	25	

Group Oral

Student	B	C	D_1	D_2	E	F	G	Student's Total	Group Total
13	+			+				2	
14								0	
15	+			+		+	+	4	
16				+				1	
17	+			+			+	3	
18	+							1	
19								0	
20	+	+		+			+	4	21
21	+			+				2	
22				+				1	
23	+							1	
24	+			+				2	
Subtotal	8	1	0	8	0	1	3	21	

Students Meeting Criteria
on Local Assessment Scale
by Group - Student
(Continued)

Group Manual

Student	B	C	D_1	D_2	E	F	G	Student's Total	Group Total
25	+			+				2	
26								0	
27								0	
28	+			+		+	+	4	
29	+			+			+	3	
30	+			+			+	3	24
31	+							1	
32								0	
33	+			+		+	+	4	
34	+			+		+	+	4	
35								0	
36	+			+			+	3	
Subtotal	8	0	0	7	0	3	6	24	

Group Control

Student	B	C	D_1	D_2	E	F	G	Student's Total	Group Total
37	+		+					2	
38								0	
39	+	+		+		+	+	5	
40							+	1	
41				+				1	
42				+				1	22
43	+			+			+	3	
44								0	
45	+			+			+	3	
46	+			+		+	+	4	
47				+				1	
48	+							1	
Subtotal	6	1	1	7	0	2	5	22	

APPENDIX P

Basic Vocabulary List for Treatment Programs

NOUNS

Basic Six

Eat

Drink

Bed

Toilet

Sick/Hurt

Play

NOUNS

Household

Book

Box

Bus

Broom

Ball

Cup

Chair

Door

Dust Pan

Fork

Glass

House

Knife

Light

Pan

Plate

Phone

Spoon

Sofa

Table

Window

Personal Items

Comb

Soap

Towel

Toothbrush

Washcloth

Clothing

Belt

Coat

Hat

Shoe

Sock

Shirt/Blouse

Pants

School Items

Paper

Pencil

Puzzle

Crayon

Car/Van

Food Items

Banana

Bacon

Butter

Bread

Cake

Candy

Cookie

Cereal

Egg

Hamburger

Hot Dog

Ice Cream

Juice

Milk

Meat

Orange

Peanut Butter

Pop

Potato

Pudding

Soup

Toast

Water

Sandwich

VERBS

Come

Finish

Give

Go

Jump

Look

Pick Up

Ride

Run

Sleep

Stop

Sit

Stand

Sign

Tell

Walk

Want

Wash

Work

Others

PREPOSITIONS

Beside

Behind

In

On

Over

Under

ADJECTIVES

Big

Bad

Clean

Cold

Dirty

Good

Happy

Hot

Sad

Others

APPENDIX Q

Student Treatment Schedule

X = DAYS OFF
T.O.D. = TIME OF DAY

DATE STARTED _____
DATE ENDED _____

NAME OF STUDENT _____
EXAMINER (AM) _____
(PM) _____

	Session:	Session:	Session:	Session:	Session:	Session:
AM	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:
	Session:	Session:	Session:	Session:	Session:	Session:
PM	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:
	Session:	Session:	Session:	Session:	Session:	Session:
AM	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:
	Session:	Session:	Session:	Session:	Session:	Session:
PM	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:
	Session:	Session:	Session:	Session:	Session:	Session:
AM	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:
	Session:	Session:	Session:	Session:	Session:	Session:
PM	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:	T.O.D.:

APPENDIX R

Programs Overall Schedule

By Trial Group	Pre-Assessment (one month)	Session 1-20 (5 hrs.)	Eval.	Session 21-40 (5 hrs.)	Eval.	Session 41-60 (5 hrs.)	Eval.
T1	Pre-assess & Eval.	Oral/Manual	"	Oral/Manual	"	Oral/Manual	"
T2	Pre-assess & Eval.	Oral	"	Oral	"	Oral	"
T3	Pre-assess & Eval.	Manual	"	Manual	"	Oral/Manual	"
T4	Pre-assess & Eval.	Control	"	Control	"	Control	"

APPENDIX S

Sources of Factors Loadings

Factor I Behavioral Activity

Description	Test Origin	Loading
Domestic Activity	A.A.M.D.	.79
Independent Functioning	A.A.M.D.	.79
Responsibility	A.A.M.D.	.77
Time Knowledge	A.A.M.D.	.74
Manual Imitation	Local Scale	.56
Economic Activity	A.A.M.D.	.55
Visual Memory	Local Scale	.54
Receptive Language	R.E.E.L.	.51
Auditory Memory	Local Scale	.51

Factor II Cognitive Ability

Description	Test Origin	Loading
Means-Ends	Uzgiris & Hunt	.90
Visual Perception-Object Permanence	Uzgiris & Hunt	.90
Object Relations in Space	Uzgiris & Hunt	.82
Gestural Imitation	Uzgiris & Hunt	.77
Causality	Uzgiris & Hunt	.63
Piaget Level (Most Frequent)	Local Scale	.61
Fairview	Fairview	.55
Receptive Language	R.E.E.L.	.53

Factor III Language

Description	Test Origin	Loading
Expressive Language	A.A.M.D.	.69
Vocal Imitation	Uzgiris & Hunt	.63
Self Direction	A.A.M.D.	.62
Vocal Imitation	Local Scale	.62
Socialization	A.A.M.D.	.58
Economic Activity	A.A.M.D.	-.55
Receptive Language	R.E.E.L.	.52

APPENDIX S (Continued)

Factor IV Attention

Description	Test Origin	Loadings
Auditory Attention	Local Scale	.75
Visual Attention	Local Scale	.75
Auditory Attention	Local Scale	.63
Piaget Level (Highest)	Local Scale	.55
Piaget Level (Most Frequent)	Local Scale	.52
Auditory Memory	Local Scale	-.42

APPROVAL SHEET

The dissertation submitted by Madge L. Moody
has been read and approved by the following committee:

Samuel T. Mayo, Director
Professor of Educational Foundations, Loyola

Pedro J. Saavedra
Assistant Professor of Educational Foundations, Loyola

Jack A. Kavanagh
Associate Professor and Chairman of Educational Foundations, Loyola

Ronald R. Morgan
Assistant Professor of Educational Foundations, Loyola

The final copies have been examined by the director of the dissertation and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the dissertation is now given final approval by the Committee with reference to content and form.

The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

November 7, 1979
Date

Samuel T. Mayo
Director's Signature