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A STUDY TO DETERMINE THE EFFECTS OF THE USE OF SIGN LANGUAGE
WITH MILDLY MENTALLY RETARDED STUDENTS ON
SOCIAL INTERACTION AND COMMUNICATION

by
Catherine Serafinelli

A THESIS

Submitted in partial fulfillment of the requirements of the
Master of Arts Degree in the Graduate Division
of Rowan College of New Jersey
1995

Approved by _____
(Advisor)

Date Approved 5/12/95

ABSTRACT

Serafinelli, Catherine

A Study to Determine the Effects
of the Use of Sign Language
With Mildly Mentally Retarded
Students on Social Interaction
and Communication, 1995
Advisor: Dr. J. Kuder
Special Education

The purpose of this thesis was to determine if the use of sign language with mildly mentally retarded children would increase their social interaction and communication. All the children in the study have been described as having moderate to severe language delays. Pre and post intervention observations were conducted for five consecutive days during free play in the classroom setting. After the completion of data collection, intervention was begun. Intervention consisted of a selection of basic signed vocabulary pertinent to classroom activities which were introduced during a sign circle three afternoons a week for ten minute sessions. After the signs were introduced, the children were given the opportunity to practice the signs. The children were also continually exposed to sign, due to the fact that there is a deaf child among the classroom population.

The results of this study indicate that using sign language to increase communication and interaction among mildly mentally retarded students had positive results. Overall initiations of interaction increased as well as positive responses to interactions. While the sign used in this study was limited, it should be viewed as a basis upon which a more complex use of sign can be built.

MINI-ABSTRACT

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ACKNOWLEDGMENTS

I would like to express my gratitude and appreciation to Dr. Jay Kuder for his guidance, encouragement, and assistance in the writing of this thesis.

I would like to express my heartfelt thanks and love to my family for their patience and understanding of the time required to complete this study, as well as the graduate program.

I would like to express my gratitude to my sister for taking the time to edit my thesis and for her unending patience and understanding of my computer illiteracy.

I also would like to acknowledge my colleagues, administrators, and classmates for all their support and encouragement throughout the completion of this thesis.

Finally, I wish to acknowledge my parents, Rose and Patrick Carbone, for their years of unconditional love, guidance, and faith in me that gave me the confidence to believe that I could accomplish anything with a little hard work.

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CHAPTER I

RATIONALE AND STATEMENT OF THE PROBLEM

Rationale

The use of sign language with severely and mildly mentally retarded children has been a subject of research since the 1970's. In general, researchers have found that sign language can be an effective way to initiate language use in handicapped children who have not acquired verbal language skills. Kouri (1989), states that studies have supported the belief that sign training may be advantageous to children who appear capable of eventually acquiring spoken language because signing may effect a transition into oral language usage.

The problem of acquisition of language within the handicapped population has also been an issue for researchers over the years. In reviewing the language development of mentally retarded children, Haring, McCormick, and Haring (1994), state that among this population language deficiencies are common due to the fact that speech and language development is closely related to intellectual development. Difficulties include delayed oral language development, difficulties in articulation, restricted vocabulary, and incorrect grammatical usage.

The use of sign language to help this population acquire language skills to communicate can be traced to early research with chimps (Bryen & Joyce, 1986). Because chimps had been taught to communicate with signs, it was felt that signing may be a possible means to facilitate communication with handicapped students. Bryen and Joyce state that communication is a most important, complex skill that humans possess. My interest is in determining whether the use of sign language will increase interaction and

communication in a multiply handicapped classroom. Research is rather limited in this area.

With the onset of inclusion, educators are having to address a variety of handicapping conditions within their classrooms. Students in these classes need to be able to communicate with one another. Teaching them sign language may be a means that allows them to interact socially and academically. The purpose of this paper is to explore the possibility that using sign language will increase interaction and communication of handicapped children in a multiply handicapped classroom.

Statement of Problem

Do students in a multiply handicapped classroom who are exposed to the use of sign language in their educational environment increase interaction and communication with their peers?

Sign language will be used within a multiply handicapped classroom population. The classification is applied to the program because of the variety of handicapping conditions that are served within this setting. In addition, all the students have been classified as having moderate to severe receptive and expressive language delays. In order to communicate with the deaf student, a one-on-one assistant who signs has been assigned to the classroom.

Statement of the Hypothesis

The use of sign language will increase social interaction and communication among children with moderate to severe language delays in a multiply handicapped classroom. The social interaction and communication of students during free time will increase due to the ability to communicate with one another.

Significance of Study

Many factors have made the inclusion of severely handicapped students in regular classes a reality. Communication with these students will be a salient problem.

Regardless of the methods of communication used, American Sign Language, Seeing Exact English, augmentative devices, etc., all the students in the classroom will be effected in some way. The exploration of advantages as well as disadvantages of a communication system will enable educators to confront and plan for all contingencies.

If additional advantages are found to be inherent in the use of sign language, more educators will be receptive to its use. Teachers who are concerned with social interaction and communication among disabled students will find the results of this study significant. If children are found to interact more frequently through the use of signed and signed and oral language, future research could be applied in the area of signing to increase communication skills as well as social interaction.

Research in this area could be expanded to include communication between handicapped and nonhandicapped students. Positive interaction among these students could possibly increase the social status of the handicapped students as well as acceptance into the peer groups of the nonhandicapped children.

CHAPTER II

REVIEW OF THE LITERATURE

The use of sign language with the mentally retarded has been a subject of research for more than two decades. Results have been varied. Opinions as to whether or not it is an effective means of facilitating speech and language has grown from this body of research. Although this study is not being done to decide whether or not signing will increase speech and language in the mentally retarded, the research serves as important background information.

Bryen and Joyce (1986), give a valuable overview to the use of sign language and the mentally retarded. It is stated that sign language use is based on the following rationales: sign language can bypass the oral-motor speech mechanism, the cognitive and conceptual demands are not as great, and manual signs are easier to teach. It is cautioned however, that the populations using this means of communication form a heterogeneous group. Individual differences as well as social and environmental factors need to be taken into consideration when a decision is made to use sign language to facilitate language development.

Because the mentally retarded generally have the ability to produce speech, a most common method of using sign language is Total Communication. This method uses sign and speech together to aid in the development of speech. Theresa Kouri (1989) conducted research using this method to determine how manual sign input relates to the early development of spoken language. Her single case study was done with a two year, eight month Down Syndrome female.

A parental rating scale (Minnesota Child Developmental Inventory) was used to determine the subject's skill range. Results indicated a range of seventeen and a half months to twenty-four months for skills. Other formal measures could not be administered because of lack of compliance. The subject had been enrolled in an early intervention program and received clinical speech and language services throughout the year. It was reported that the subject had four to five consonant vowel syllable shapes, but had limited results when asked to imitate spoken words.

The subject attended a university clinic setting twice weekly for individual, forty minute sessions. In the treatment session, the clinician waited until the subject focused on a particular object and then modeled a simultaneous one or two word form. During the treatment the subject was allowed to play with objects and activities of her choice. The group of materials was maintained and gradually expanded throughout treatment.

Eight months of investigation was conducted with the sessions video recorded. Responses of the subject were recorded by the mode of communication used: sign alone, verbal, and sign plus verbal. Results indicated that using sign plus verbal input facilitated the onset and development of speech. It was further concluded that the use of simultaneous input did not impede the acquisition of oral speech. Finally Kouri states that the relationship between signed and oral communication seems to be a supportive one in the initial stages of speech acquisition.

Gibbs and Carswell (1991) found similar results when conducting a single case study of a fourteen month old Down syndrome only child. Testing results indicated a receptive language of ten years and eleven months and an expressive language of seven years and eleven months using the Receptive-Expressive Emergent Language Scale (REEL). The subject's hearing was determined to be normal.

Treatment design consisted of four half hour play sessions each week where the parent named objects from a list of words. Ten pairs of words were randomly assigned to a sign and not signed list. The words were selected from a list of developmentally

appropriate toys and objects. Words were added to these lists as the parents expressed an interest in learning more words. This method of research with the parents alternating Total Communication and oral play sessions continued for fourteen months.

Results indicated that using the Total Communication method the subject made greater progress acquiring the target signs than the target oral words in the early months. It was also felt that using manual signs did not inhibit use of oral speech production, because at the end of the intervention the subject began to use speech at a similar rate for both sets of words. Gibbs and Carswell concluded by stating that the use of manual signs with words is an effective method for increasing receptive and expressive communication in children whose verbal ability is not developing spontaneously.

A much earlier study conducted by Barrera, Barrera, and Sulzer-Azaroff (1980), also found that the Total Communication method was superior to both oral and sign alone training models. This study was done with an autistic child in a single subject design. The subject was a healthy four and a half year old male who attended a local special education preschool program for severely handicapped children. Before this intervention, the subject received only minimal formal language training. For the most part, prior language training was conducted informally by either teacher or parent. No training had been previously given in sign language communication.

The study was conducted in three stages. Stage one allowed for a period in which the child could adapt to the treatment environment. Stage two emphasized the two prerequisite attending behaviors of sitting quietly and making eye contact. Finally in stage three, a list of fifty nouns representing familiar and common objects was compiled with the help of parents and teachers.

The actual training model was twenty minutes of direct language training within each mode of language on every day. The three language modes were defined as oral, total communication, and sign alone. Training within all three models continued until the subject's responses met a predetermined set of criterion for acquisition. At the end of

training a posttest was given to assess the most successful method. The testing was followed by another stage which consisted of a period of intensive training of sixty minutes for three consecutive days using the method that achieved the best performance in testing. A final stage completed the research with the child being asked by verbal direction to produce the signs for each of the trained words in the total communication model.

Results showed that the total communication method was the most successful model for this particular subject. The researchers felt that the success of this method could be contributed to the multi-sensory approach that total communication allows. The authors also cautioned that more research is needed before this method could be perceived as the best technique for language training.

Methods of signing have been used for other purposes to determine its effectiveness when used with the mentally retarded. Sensenig, Mazeika, and Topf (1989) used Signed Exact English to investigate the effectiveness of using sign language to facilitate reading with the Trainable Mentally Retarded population. The subjects of the study consisted of eight males and seven females ranging in age from fifteen to nineteen years. Individual IQ's ranged from thirty to fifty. The students were randomly assigned to either a sign or nonsign group for intervention.

Prior to intervention a pretest was given to determine a list of previously unknown words. The words were prepared for presentation on three by five inch note cards. Intervention continued for twenty-two nonconsecutive sessions. At the end of the twenty-two sessions, the entire groups were switched for an additional twenty-two nonconsecutive sessions. Six weeks after intervention a posttest was given to assess long term word recognition.

Results showed that learning to read words with an accompanying sign enabled subjects to identify and retain significantly more vocabulary than the subjects learning to read in a more traditional manner. Sensenig et al concluded that the results of their study

argued for more research in the utilization of sign language to facilitate reading with persons classified as Trainable Mentally Retarded.

Proponents for the use of signing systems to facilitate language cite several reasons for why signing may increase the speech and language of the mentally retarded. Penner and Williams (1982), offered these reasons after conducting research comparing sign versus symbol training in retarded adults: signs are more visible to the learner than oral structures which makes imitation of signs easier than imitation of speech; signs can be held in place for an extended time but little or no auditory image may be held by the retarded learner after the word is spoken; and finally, the sign itself often carries a cue to its meaning.

Penner and Williams research was conducted on ten institutionalized severely retarded adults who were determined to have no hearing loss. Further requirements were that the subjects had at least some spontaneous meaningful verbal language to assure that they were potentially able to learn spoken words. The subjects were six males and four females with an average chronological age of twenty-eight. Their average mental age was three years and ten months and the average IQ was twenty-eight.

The ten subjects were randomly assigned to one of three training groups: sign only, verbal only, or sign and verbal. Training sessions were held four times per week for thirty minutes and progressed through four phases: matching, imitation, receptive identification, and expressive identification. Materials used were common objects such as a comb, a cup or a shoe, and seven colors. The subjects were able to move through the phases only when one hundred per cent accuracy was obtained within the previous phase. At the end of the three week training period each subject was tested to determine success in learning the sign and/or verbal color names expressively and receptively. In addition, after four weeks subjects were retested to determine their retention of the learned color names. Both post-testing tests were identical in design to that of the baseline test.

Results from post testing indicated that the subjects of the sign and verbal group retained from ninety-three percent to complete retention receptively and expressively in both modes. The sign only group retained only sixty-two percent of their expressive signs but did retain ninety percent of their receptive signs. The verbal only group retained about seventy-five percent of the expressive and receptive color words after four weeks.

Penner and Williams concluded from these results that the sign stimulus added to the verbal appears to increase the verbal learning. If the goal of signing is to increase the receptive and expressive verbal language of a subject, then pairing a sign with the verbalization might increase the verbal learning both receptively and expressively.

Although research appears to support the use of sign language with the mentally retarded there is also a body of research which cautions educators in the use of signing. Research conducted by Clarke, Remington, and Light (1986), evaluated the relationship between receptive speech skills and expressive signing. Although the subject base was very small, the results suggest that educators look more fully into the use of sign language to acquire speech.

Three children, one girl and two boys, from schools for the severely educationally retarded participated in the study. The ages of the subject were six years old for the girl and eleven years two months for one boy and eleven years three months for the other. Their expressive language skills ranged from ten months to two years and three months. Their verbal language skills ranged from two years four months to two years ten months.

Training and testing sessions were conducted daily in two conditions; using five signs corresponding to words in the child's receptive vocabulary, and five signs corresponding to unknown words. Throughout the training it was determined that signs corresponding to known words were generally learned faster than signs corresponding to unknown words. Follow-up tests conducted two months after training showed a higher level of retention of both receptive and expressive signing in the known words condition than in the unknown words condition.

These results have serious implications when using sign to initiate speech in mentally retarded children. Clarke et al caution that the assumption that receptive speech skills will be acquired incidentally may be ill-founded in some cases. Basing training on words that are known to the subject are generally learned faster, and a greater percentage are retained, than signs corresponding to unknown words.

Other researchers feel that the jury is still out as far as the effectiveness of using sign language with the mentally retarded. In 1983, Weller and Mahoney conducted research on the comparison of oral and total communication modalities on the language training of mentally handicapped children. Results found that although children in the total communication group successfully acquired signs, there was no significant differences between the groups in their rate of language and cognitive development.

The subjects of the study were fifteen children between the ages of eighteen and thirty-six months and their mothers. The children were functioning at or below the one word stage of language development and had no previous sign training. Two groups were formed based on which infant stimulation program they had attended in their area. None of the programs had formal language training or used manual communication.

The oral language group had three boys and four girls and the total communication group consisted of five boys and three girls. No significant differences existed between the groups. The mothers were taught to teach language to their children either by total communication or oral language for five months in their homes.

Based on this study, the authors concluded that mothers can teach young children to learn manual signs but the addition of signs does not increase that rate at which they actually acquire oral language. Also it does not seem to impede their rate of oral language development. Actually what results indicate is that there is no significant difference in the language training devices. Weller and Mahoney did not deny the possibility that total communication may have resulted in superior oral language skills had the study occurred over a longer period of time or with different language training procedures.

In more recent years, Bryen, Goldman, and Quinlisk-Gill, (1988), developed and sent a questionnaire to all speech/language clinicians in one Eastern state who were currently serving severely and profoundly mentally retarded students in segregated nonresidential educational facilities. The purpose of the questionnaire was to obtain information about students who had sign language goals as part of their most recent Individual Education Plan.

Questions included the duration of the signing programs, the students' level of competence in signing, the level of competence of the caregivers in signing, and what communication systems had been used prior to intervention with signs. Completed questionnaires were received from sixty-three percent of therapists from fifty-seven percent of the facilities polled, which constituted one hundred and eighteen students.

Results indicated that despite signing programs of many year's duration, there were few signs learned that were used spontaneously and that could serve these students when communicating. Bryen et al do not deny that the fault may not lie in the sign training alone. Other factors needed to be considered, such as programs which were inappropriately or incorrectly implemented and the fact that the learning environment may not have adequately supported the use of signs.

As a final thought, this study suggests that signing is being used without full consideration of facts that indicate its use or determine its success. More research is needed because they could not determine whether the fault lies in the incorrect implementation of the program or because sign training is an ineffective alternative for this population.

Individual differences may play a more important part in the decision to use sign language with the mentally retarded than the determination as to whether it should be used at all. A study by Barrett and Sisson in 1988 sought to promote alternating treatment designs to aid the decision making process in the selection of language training strategies commonly employed with mentally retarded.

In this study, two mentally retarded children with substantial language delays were chosen as subjects. Both subjects were inpatients in a psychiatric hospital treatment program for multiply disabled children. One child was five years, three months old and the other was thirteen years of age. Both functioned intellectually and adaptively in the moderate range of mental retardation with Stanford-Binet IQs of thirty-eight and thirty-seven respectively.

A speech therapist estimated language ages from performance on several speech and language assessment instruments at the twelve month and thirty month level respectively. Both children were involved in individual speech therapy three times per week for thirty minutes per session. In addition, both children were exposed to the use of functional signs within the course of their daily classroom activities.

Daily training sessions were conducted for twenty to forty minutes duration. Sentences were created to be equivalent in design. Examples included "The tree is green" and "The shirt is blue". Twenty sentences were randomly assigned to either the oral speech group, modified total communication group, and the total communication group. The sentences were presented in alternating treatment designs. A new treatment design was not instituted until assessment in the previous design was conducted. Treatment continued for forty-five to eighty days depending on the subject.

Results indicated that one child responded best to total communication with the use of signs generalized to other sentences. Anecdotal observations by a therapist and observer showed that this subject became more involved when allowed to sign.

Conversely, the other subject was unable to master signs and showed most improvement when signs were not used. Additionally this subject became noncompliant when total communication procedures were used and appeared to be frustrated by the motor effort required to produce signs and coordinate them with oral speech.

The researchers felt that the results of this study argued for the use of alternating treatment designs as an additional means of deciding the most appropriate language

training program for a single subject. These results appear to agree with the results of the Bryen et al study in that it is important to look at individual differences when selecting a language training program. What works for one may not work for another.

Sign language training has been used for other purposes other than language acquisition. Another area of research is in the area of interaction of handicapped and nonhandicapped peers. Children with poor language skills lack the ability to effectively communicate with one another. If sign language can provide a means to facilitate communication among the mentally retarded, educators may be more inclined to utilize this method of communication.

Sommer, Whitman, and Keogh (1988), maintain that the lack of language skills inhibits social communication and increases the social isolation that mentally retarded persons experience. It is also possible that this lack of language inhibits their intellectual development. In reviewing research, they suggest that language training programs can increase social interaction while facilitating learning.

The purpose of Sommer et al's research was to develop an interactive signing dialogue between mentally retarded individuals. As a result a behavior script was developed. It was maintained that if this script was successful, it would carry over into other social play situations.

The participants in this study were six residents from a state facility for developmentally disabled children whose vocal expressive communication skills were very limited. They used few words and manual signing was the preferred mode of communication. It was additionally reported that the subjects rarely spontaneously signed and when they did, they signed to an adult staff member. Their ages ranged from eight to twenty-five with level of functioning as defined by the Leiter International Performance Scale, ranging from four years, nine months to six years, six months. The IQ's, as measured on the Stanford Binet, ranged from thirty to thirty-five.

The participants were divided into three groups according to age and signing ability. Each group was trained in a behavioral script for play situations. A sample of dialogue is as follows: "Do you want to play?", "Yes, I want to play", etc. Training took place four times a week with training sessions lasting approximately twenty minutes. After the subject achieved perfect performance in the dialogue, the second phase of training took place. At this point, the two members were brought together to interact with one another in the play situation.

The total training ranged among the three groups from twenty-two sessions to twenty-eight sessions. After training, maintenance probes were conducted to assess whether the participants continued to utilize their interactive signing skills.

At the end of training and maintenance probes all participants showed an increase in their interactional signing skills in the target social play situation. Additionally, they showed generalized use of these signing skills in a second play situation and good maintenance over a two to four month period. Sommer et al feel that these results show that mentally retarded students can be taught functional sign to use and can respond to signs as they interact with peers in several play situations. Even though the skills taught in this study were rudimentary, they can be viewed as a foundation upon which more complex signing skills can be built. Just as oral language advances through stages, signed communication may well develop in a similar fashion.

Besides looking at interaction among mentally retarded, research also looks at signing improving interaction between handicapped and nonhandicapped peers. Communication among these two groups is an important issue when dealing with the prospect of full inclusion. Ideally we would like to believe that normal, healthy children will accept their handicapped peers without question. Looking at the limited research in this area may enable educators to facilitate communication and interaction within the students in their classroom.

In 1980, Jeanene Custer, conducted a study to determine whether training handicapped students to tutor their nonhandicapped peers would increase their social interaction. The method of tutoring selected was sign language because it was felt to be an unknown topic to most nonhandicapped children. This allowed the handicapped tutors to master a cognitive task which would be unfamiliar to their tutees.

The subjects were divided into two groups. The first group consisted of fifteen fifth and sixth grade handicapped students between the ages of nine and thirteen. Their mental ages ranged from four years to nine years of age. Twelve of the students were classified as educable and three as trainable. The second group consisted of fifteen nonhandicapped sixth grade students who attended the same school as the handicapped group. The only criterion for the nonhandicapped group was a lack of sign language knowledge.

The handicapped students were trained for two weeks initially in the alphabet. At the end of the two weeks, the nonhandicapped students were invited into the self-contained classroom to learn sign language. From then on, the handicapped students were trained for four days and tutored on the fifth day.

To measure the social contact between handicapped and nonhandicapped students, their lunch hours were changed to allow both groups to be together in a free play environment. Additionally the researchers developed a social acceptance form to record social interaction. Two observers recorded contact time between the groups during their forty-five minute lunch break. These observations were made for three consecutive days prior to the sign language tutoring and then for three consecutive days eight weeks later at the end of the tutoring session.

Results indicated that there was an increase in the minutes of social interaction following the tutoring. The average percentage of interaction increased from five percent to forty-six percent of their available free time.

Although this study was not conducted to specifically see if sign language will increase interaction among handicapped and nonhandicapped peers, the results can be used to argue the point that sign language training may have additional benefits to handicapped students.

Another study which was designed to specifically see if sign language training would increase interaction among handicapped and nonhandicapped peers was conducted by Vandall, Anderson, Ehrhardt, and Wilson (1982). The subjects of this study were hearing and deaf preschoolers. The researchers felt that if the hearing children would modify their initiations and responses to their deaf peers during free play, if they were made more aware of the meaning of being deaf, and if they were specifically given the techniques for interaction, they would be more likely to interact with their deaf peers.

The subjects of this study were sixteen deaf and sixteen hearing students at the University of Texas at Dallas/Callier Center for Communication Disorders laboratory school. Both groups were equally divided into eight boys and eight girls. Their ages ranged from fifty-three to fifty-five months. The hearing children were enrolled in a program for normal children and had hearing and language skills atypical of normal preschoolers. The enrollment was open to any normal hearing child whose parents wanted him or her to participate in a university lab school involving experience with deaf children. The intelligence level for all children in the study was in the normal range.

Eight hearing children and eight deaf children were randomly assigned to the experimental group. In the experimental group, the deaf children had classes as normal with a focus on total communication within a fairly structured academic program. The hearing children were given an intense deaf awareness program including classes where stories were read about deaf children and then discussed, instruction in sign language, and classes in which hearing children had to do activities without speaking. In all sessions there was an attempt to get hearing children to use more gestures, touches, and signs. In the hearing control group the children were involved in similar activities but without the

deaf focus. Hearing and deaf children were combined throughout the day for lunch, recess, and sometimes the teachers combined classes.

Prior to intervention all children were observed three times to obtain baseline data. Intervention consisted of fifteen sessions given on consecutive school days. Each session lasted between fifteen and thirty minutes. At the end of the intervention period the children were brought to a playroom where they were told that they could play for a few minutes with any of the toys in the playroom. These same instructions were given to the deaf children verbally and in sign language. Free play was videotaped for fifteen minutes.

The results were rather interesting and contrary to the expectations of the researchers. Hearing children did not respond positively to the intervention. In fact the children who had been in the hearing treatment group had less initiations of interaction and of briefer duration with deaf peers than did the children who were given no treatment. Also it was noted that the deaf children had greater success interacting with the hearing control group.

Although this research appears to point out that attempts to get children to integrate across handicaps may not positively affect children, it is noted that neither the treatment nor control group performed as well with a child of a different hearing status as with a child of the same hearing status. Reasons for this could be explained by the forced setting of interaction or the hearing and deaf children's lack of sign language proficiency.

A more recent study designed to test the interaction between young children with hearing impairments and their peers was conducted by Anita, Kreimeyer, and Eldredge (1993). It was felt that there is a clear need to develop intervention programs to promote interaction between these two groups because over fifty percent of hearing impaired children are educated in public schools. The subjects of this study were one hundred and five children with and without hearing impairments drawn from thirteen different preschool, kindergarten, and first grade programs in California, Oregon, Washington State, Pennsylvania, and the District of Columbia. The programs included one private and

ten public schools where children with hearing impairments were mainstreamed into regular classrooms for part of the day. Also included were two preschool programs for children with hearing impairments that included hearing children in a reverse mainstreaming situation and one child-care program on a college campus that included children with hearing impairment during part of the day. Twenty-five children with hearing impairments and twenty-six children without hearing impairments received social skills intervention, and twenty-four children with hearing impairments and thirty children without hearing impairments received an integrated activities intervention. All children were between the ages of three and seven.

Data collection consisted of videotaping three free-play periods which occurred at four times during the day. Data was collected four times. The first time immediately before the intervention, the second after approximately fifteen interventions sessions had been conducted, the third time immediately after the intervention ceased and finally the fourth time was approximately two to four weeks after the intervention stopped. The researchers were looking for five different types of interaction and the subjects were given scores in three categories. The three categories consisted of total positive peer interaction, interaction with different-status peers, and interaction with same-status peers.

Results of this study indicated that increasing interaction between children with and without hearing impairments appears to be a much more complex process than increasing interaction of children with hearing impairments among themselves. Interaction among the two groups increased from pre-intervention to post-intervention but decreased after the intervention was withdrawn. Also interventions that provide children opportunities to become familiar with a stable group of peers frequently working and playing together are likely to be more effective than interventions that provide children without hearing impairments with information about hearing loss. Anita et al do conclude that familiarity appears to be a factor that positively influences peer interaction.

The previous research provides a basis for the study that will be undertaken by this researcher. The study will be looking at the benefits of sign language training in improving the interaction among a small group of handicapped children. Since sign language training has been shown to sometimes help in the acquisition of language among handicapped populations and that familiarity may be a contributing factor to the success of interaction among handicapped children, it is expected that using sign language with multiply handicapped children will increase their social interaction during free play situations.

CHAPTER III DESIGN OF THE STUDY

The use of sign language with mentally retarded children has been supported in the research for over two decades. Most research deals with the benefits of acquisition of language among this population. The purpose of this study is to see if the use of sign language will increase social interaction.

Setting

The setting of this study is in a Multiply Handicapped Transitional Kindergarten Program in the Gloucester County Special Services School District. The classification of multiply handicapped is given to the classroom due to the variety of classifications of the students in the program. The classroom is self contained with limited opportunity for integration into the mainstream. The children are only integrated into the regular education population in the lunch room and on the playground.

Gloucester County Special Services School District rents classroom space in various sites within the county's public school systems. Most of the children are in out of district placements. The role of the district is to serve the needs of low incidence handicapping conditions or children who do not fit into placements within their home districts.

Subjects

The subjects of this study include eight males ranging in age from five years six months to seven years three months old. Their IQ's range from thirty-five to ninety-two.

Because of the nature of the classification of the classroom, there are many varied types of classifications among the students. The classifications include two multiply handicapped, two educable mentally retarded, two communication handicapped, one trainable mentally retarded, and one preschool handicapped. The one shared disability among all the subjects is their moderate to severe receptive and expressive language delays.

Andy - Andy was classified at five years of age as multiply handicapped. His receptive speech is at the twenty-seventh percentile and his expressive language is at the fourteenth percentile as measured by the results of the Receptive One Word Picture Vocabulary Test and the Expressive One Word Picture Vocabulary Test respectively. His age equivalence at the time of evaluation was four years three months receptively and three years eight months expressively. Andy is now six years, five months of age.

Andy's IQ, as measured by the Stanford Binet Intelligence Scales, was eighty-nine. A higher level is suspected due to his severe hyperactivity. A psychiatric evaluation revealed a diagnosis of Attention Deficit Hyperactivity Disorder. Forty milligrams of Ritalin and 0.03 milligrams of Clonidine are taken daily. Additionally, Andy has an identical twin brother who shares his diagnosis. They were originally in a preschool handicapped program together, but were separated on the recommendation of the Child Study Team due to severe fighting among themselves.

Steve - Steve was classified at the age of four years and eleven months as Preschool Handicapped. Results of the Stanford Binet Intelligence Scale, Fourth Edition, indicated that he is functioning within the borderline range. His strongest area was verbal reasoning. His short term memory is reported to be very weak. Adaptively he has average self-help skills, but socially and emotionally he scored a zero. Steve is now five years, eleven months old.

The Beery Buktenica Developmental Test of Visual Motor Integration yielded a chronological age of three years, eleven months, and a percentile rank of fourteen. The Test of Early Reading Ability had Steve scoring at the first percentile. Recent testing by the Speech Language Specialist in the classroom yielded a receptive language percentile rank of two and an expressive language percentile rank of one as measured by the Kaufman Survey of Early Academic Language Skills

Steve has also been diagnosed as having Attention Deficit Hyperactivity Disorder and takes twenty milligrams of Ritalin daily. At the time of evaluation he was unmedicated.

Mike - Mike is a five year eight month old Downs Syndrome child. He is classified as Trainable Mentally Retarded with an IQ of thirty-five as measured by the Stanford Binet. Results indicated a mental age of two years, five months. The Woodcock Johnson Test of Cognitive Abilities yielded a percentile score of less than one percent. He was chronologically five years and one month at the time of evaluation of the Child Study Team.

Mike's speech evaluation yielded expressive and receptive language scores of two years as measured by the Peabody Picture Vocabulary Test, Revised. Additional information states that the subject speaks in one to two word phrases and that his articulation is very difficult to understand. The results of the Receptive One Word Picture Vocabulary Test indicated a language age of one year, ten months and a raw score of six. The expressive score was unable to be obtained due to Mike's limited speech.

John - John is presently six years, five months of age. At the time of evaluation he was five years, three months old. He is classified as Communication Handicapped. Results of the Peabody Picture Vocabulary Test, Revised indicated an age equivalence score of four years, four months, and a twenty-first percentile ranking. This places him in

the low average to moderately low range. The Test of Language Development yielded that his language age across all subtests was below four years of age.

John's IQ as measured by the Wechsler Preschool and Primary Scale of Intelligence, Revised, is seventy-six. The profile is relatively flat across subtest scores. There were no significant deviations in individual skill areas reported. According to the Learning Accomplishment Profile, Diagnostic Edition, John's scores were in the poor to very poor range in all tasks presented.

Additionally, the emotional climate within the home is strained and John has very limited contact with the children in the neighborhood because of his aggressive behavior. His parents, as yet, have refused to comply with the home district's request for a neurological evaluation.

Lou - Lou was classified at the age of five years, four months. He is presently five years and nine months of age. He is classified as Educable Mentally Retarded with an IQ of 67 +/-5 as measured by the Stanford Binet Intelligence Scales, Fourth Edition. The ranges in age equivalency scores are from two years, two months to four years, eight months. His highest area was vocabulary, while his lowest was memory for sentences. According to testing, Lou appears to be functioning two to two and a half years below his chronological age.

The Peabody Picture Vocabulary Test, Revised yielded an age equivalence of four years at the tenth percentile. His score on the Expressive One Word Picture Vocabulary Test was three years, seven months at the seventh percentile. The Arizona Articulation Proficiency Scale rates his articulation within normal limits. However, he exhibited significant delays in receptive and expressive vocabulary, language comprehension, and expressive grammar. Results of the Test for Auditory Comprehension of Language, Revised, indicated an age equivalency score of forty-three to forty-five months, a standard T score of thirty-one and a third percentile ranking.

Additional information sites poor adaptive behavior scores according to the Vineland Adaptive Behavior Scales and significant problems in the areas of Learning Problems, Impulsive Hyperactivity, and the Hyperactive Index according to the Connors Parent Rating Scale.

Ted - Ted is currently five years, six months old. He was classified at the age of five years, three months as Communication Handicapped. He was previously in a regular education Kindergarten class and was referred to the Child Study Team due to severe articulation problems. He had no previous preschool experience.

Results of the Wechsler Preschool Scale of Intelligence indicate a performance score of forty-four and a full scale score of ninety-two. An accurate verbal score could not be obtained due to severe speech and language difficulties. The Detroit Test of Learning Aptitude, Primary yielded an overall learning aptitude in the poor range, with significant strengths and weaknesses identified. Nonverbal aptitude was significantly superior to verbal aptitude. The examiner felt that Ted's scores could be indicative of a specific language disability.

The Preschool Language Scale yielded a total language age equivalent of three years, one month and a percentile rank of one. These scores represent a moderate receptive language delay and a severe expressive language delay. An age equivalency of three years, two months was indicated from the results of the Expressive One-Word Picture Vocabulary Test, Revised. The Goldman Fristoe Test of Articulation was attempted, but discontinued due to such poor intelligibility on the part of the subject. Examiners felt that it should be noted that due to unintelligibility, expressive language test scores may have been affected.

Dave - Dave is a hearing impaired Downs Syndrome child. His current age is seven years, three months. He was evaluated at the age of four years, eight months and

classified as Multiply Handicapped. According to the learning evaluation, his performance was one to two years younger than his chronological age. Visual discrimination skills were found to be his strongest area, while expressive language skills were his weakest area. The CID Preschool Performance Scale yielded an IQ of eighty which indicates a borderline range of ability.

His most recent scores are in the area of speech and language. This testing was done when the subject was six years, nine months old. Testing was administered using American Sign Language. According to the Preschool Language Scale, his language skills are significantly below what would be expected for a child of his age with normal hearing. His scores for understanding and expressing language are similar. His total language score was two years, eight months age equivalency.

Chad - Chad is currently five years, seven months old. At the time of evaluation he was four years, nine months old. He is classified as Educable Mentally Retarded. Results of the Woodcock Johnson Psycho-Educational battery, Revised, indicate that Chad appears to be functioning at about the two to three year old level, with some scattered skills at the four year old level. According to the Differential Ability Scales, Preschool Record, Chad is well below age level expectations.

His speech is described as having moderate to severe receptive and expressive language delays. Result of the Peabody Picture Vocabulary Test, Revised, yielded a first percentile score. It was felt by the examiner that this is an extremely low score for his age. Chad had six correct out of a possible twenty-five responses on the Structured Photographic Expressive Language Test, Preschool Edition.

Additional information from the neurological testing states that the subject exhibits a clinical neurologic/neurodevelopmental pattern of a child with a neurologically based learning disorder. Although Chad has very poor attending skills and is easily distracted,

his profile is not that of a true Attention Deficit Child. These traits appear to be related to his overall developmental immaturity.

Table Number One - Subjects Language Information

Name	Age	IQ	Classification	Language Score	Test
Steve	5yr. 11mo	borderline	PSEI	2%	Kaufman Surv. of Early Lang Skills
Mike	5yr. 8mo.	35	TMR	1%	Receptive one word pic. voc.
Low	5yr. 9mo.	67	EMR	10%	Peabody picture vocabulary
John	6yr. 5mo.	76	CH	21%	Peabody Picture vocabulary
Ted	5yr. 6mo.	92	CH	1%	Preschool Language Scale
Dave	7yr. 3mo.	80	MH	1%	Preschool Language Scale
Chad	5yr. 7mo.	58	EMR	1%	Peabody Picture vocabulary
Andy	6yr. 5mo.	89	MH	14%	Expressive one word pic. voc.

Instrument

In order to record the interaction among the children, a chart for recording data was developed. The chart was designed to record data according to who initiates the interaction, the recipient of the interaction, the type of interaction, and whether or not there is a response. The type of interaction was divided into four sub-headings: a signed response; a spoken response; a nonverbal response; and a signed and voiced response.

Procedure

Prior to intervention, each child was observed for five consecutive days for ten minute intervals during free play in the classroom setting. The children were allowed to select toys, puzzles, or books freely. No restriction was put onto the areas of play or the number of children within the group. Interaction of teachers and assistants were kept at a minimum. All interactions were recorded and responses were also noted. A maximum of two children per ten minutes were observed.

Initiations of interactions and whether they received a response were recorded for all children. Therefore children could be either an initiator or an intended partner. A response of any type was recorded, as long as the intended partner acknowledged the initiator. If there was no acknowledgment of the attempted interaction, a no response was

marked. For each initiation, a check was made. Each interaction to a specific child was checked only once, even if the initiator spoke to that same child several times within the ten minutes. This procedure resulted in types of responses to interactions, but not the overall frequency of interactions to a specific child. Each new interaction to a new child was recorded and his response was noted.

After the completion of data collection, intervention was begun. Intervention consisted of a selection of basic signed vocabulary pertinent to classroom activities to be introduced to the class. Nouns, verbs, and adjectives were all selected for use. These signs were introduced and used during a sign circle three afternoons a week for ten minute sessions. After the signs were introduced, the children were given the opportunity to practice the signs.

In addition to the sign circle, the students would review the signs and vocabulary during morning circle five days a week. Circle times are defined as a time when all students come together and sit in a circle to share activities. Signing was just one part of a structured circle time of activities. Other activities could include letter and number recognition, calendar, weather, and stories and poems.

American sign language is also used regularly within the classroom by the teacher, the speech language specialist, and the assistants due to the fact that there is a deaf child among the classroom population. Therefore, the children are continually exposed to sign in an everyday situation. The children are encouraged to respond to Danny in sign whenever appropriate. It is explained to them that Danny cannot hear, so they must speak to him with their hands.

After two months, data collection will be done as previously reported.

Analysis

The data will be analyzed according to the number of interactions for each child observed, the type of interaction used, and whether or not there was a response to

the initiator. Increases or decreases in interactions per child will be reported as well as any changes in the number and types of responses to attempted interactions.

Frequency of types of responses will be analyzed. The number of signed, verbal, nonverbal, and verbal plus sign will be studied to note differences after intervention

CHAPTER IV

ANALYSIS OF THE DATA

The purpose of this study was to determine if the use of sign language with mildly mentally retarded children would increase their interaction and communication during free play. The children within the study were identified as having moderate to severe receptive and expressive language delays. Sign was incorporated into the curriculum because of the presence of a deaf student within the classroom.

Baseline data was obtained according to the number of initiations, the recipient of the interaction, the type of interaction, and whether or not a response was received. After two months of intervention data was collected and recorded. Results were analyzed within each category.

Table number one reflects the pre and post scores of initiations of interaction. Initiations were identified as being made by the student himself, an adult, a peer, or a student helper. Student helpers are in the class during free time as a part of a self-esteem project within the district. The total overall initiations were one hundred twenty-one in pre intervention and increased to one hundred forty-two in post intervention.

Individual breakdown of categorical scores reflects a rise in all areas except student himself initiations. These scores remained the same at one hundred two. Initiations by adults increased from two in pre intervention to fifteen in post intervention. Peer and student helper initiations increased from fifteen to twenty-one and two to four respectively.

Table Number One - Initiations

Name	Pre Intervention				Helper	Total	Name	Post Intervention					
	Student	Adult	Peer	Helper				Student	Adult	Peer	Helper	Total	
Ted	12		1			13	Ted	12		1			13
Lou	23					23	Lou	13	2	4			21
Mike	10		4			14	Mike	8	1	1			10
John	12		3	2		16	John	13		3			18
Steve	15		2			17	Steve	17		4	1		22
Andy	8	2	2			12	Andy	17	2	4	2		25
Chad	12		2			14	Chad	15	1	2	1		19
Dave	10		2			12	Dave	5	9				14
Total	102	2	15	2		121	Total	102	15	21	4		142

Overall initiations increased by fifteen percent. Although overall numbers reflect an increase in initiations, there are individual categorical differences which account for the increase. Student initiations remained the same, but initiations by adults and peers increased by eighty-seven percent and twenty-nine percent respectively. Initiations by student helpers also increased by fifty percent.

One individual, Andy, had a fifty-three percent increase in initiations. In contrast, two individuals, Lou and Dave had significant decreases in the number of initiations. All other subject's initiations remained relatively the same.

The recipients of the interactions was charted in table number two. The recipients were also divided into the student himself, an adult, a peer, and a student helper. Total recipients of interactions increased from one hundred twenty-one in pre intervention to one hundred forty-two in post intervention. Students themselves being the recipient of interactions increased from twenty to thirty-nine, while adults and student helpers being the recipients did not reflect such a large increase. Their numbers increased from seventeen to twenty-one and eight to nine respectively. Peers being the recipients of interactions decreased slightly from seventy-six to seventy-three.

The results of student themselves being the recipient of interactions showed a forty-nine percent increase. All other categories did not reflect a significant difference in pre and post data. Individually Lou, Steve, Andy, and Dave increased being the recipient of other's interaction, while Mike's and Chad's scores reflect a significant decrease in being the recipient of interactions.

Table Number Two - Recipients

Name	Pre Intervention				Helper	Total	Name	Post Intervention				Helper	Total
	Student	Adult	Peer					Student	Adult	Peer			
Ted	1	5	6		1	13	Ted	4	6		3	13	
Lou		2	21			23	Lou	6	3	10	2	21	
Mike	4	2	8			14	Mike	2		8		10	
John	4	1	7	4		16	John	5	2	11		18	
Steve	2	2	12	2		17	Steve	5	1	16		22	
Andy	4	1	7			16	Andy	8	5	10	2	25	
Chad	3	2	9			14	Chad	4	2	11	2	19	
Dave	2	3	6	1		12	Dave	9	4	1		14	
Total	20	17	76	8		121	Total	39	21	73	9	142	

Table number three reflects the breakdown of data according to the types of interaction. Types of interaction were divided into four categories; signed, spoken, nonverbal, and signed and voiced interactions. The total number of interactions increased from one hundred twenty-one in pre intervention to one hundred forty-two in post intervention. Signed interactions decreased significantly in post data collection, while spoken interactions increased. The scores changed from twenty-three to ten interactions. Spoken interactions showed a significant increase rising from seventy-nine in pre intervention to one hundred seventeen in post intervention. Nonverbal interactions decreased from twelve in pre intervention to eight in post intervention while signed and voiced interactions remained the same at seven.

The data for one student, Ted, accounted for the marked differences in signed interaction with his scores ranging from twelve signed interactions in pre intervention to no signed interactions in post intervention data. In contrast, Ted's spoken responses increased from none to thirteen in pre and post intervention data collection. The spoken responses for all other subjects except for Mike and David increased dramatically.

Table Number Three - type of interaction

Name	Pre Intervention					Name	Post Intervention				
	Sign	Spoken	Non-Verbal	Sign & Voice	Total		Sign	Spoken	Non-Verbal	Sign & Voice	Total
Ted	12		1		13	Ted		13			13
Lou	1	18	2	2	23	Lou		21			21
Mike		9	4	1	14	Mike		6	2	2	10
John		14	1	1	16	John		17	1		18
Steve	2	13		2	17	Steve	3	18		1	22
Andy		11	1		12	Andy		23	2		25
Chad		13	1		14	Chad		19			19
Dave	8		3	1	12	Dave	7		3	4	14
Total	23	79	12	7	121	Total	10	117	8	7	142

Nonverbal responses decreased from pre and post intervention data collection. Individually these results can be attributed to the interactions of Lou and Mike. Signed and voiced responses remained the same, the only noticeable differences being the increase in this type of interaction with Dave. His scores increased from one in pre intervention to four in post intervention.

Table Number Four - Response

Name	Pre Intervention			Name	Post Intervention		
	Yes	No	Total		Yes	No	Total
Ted	13		13	Ted	12	1	13
Lou	18	5	23	Lou	21		21
Mike	9	5	14	Mike	9	1	10
John	15	1	16	John	17	1	18
Steve	16	1	17	Steve	21	1	22
Andy	11	1	12	Andy	25		25
Chad	12	2	14	Chad	19		19
Dave	10	2	14	Dave	14	0	14
Total	104	17	121	Total	138	4	142

Finally, table number four reflects the pre and post data according to whether a response was received to interactions. The total number of responses increased from one hundred twenty-one in pre intervention to one hundred forty-two in post intervention. Yes responses increased from one hundred four in pre intervention to one hundred thirty-eight in post intervention, while the number of no responses decreased from seventeen in pre intervention to four in post intervention.

The scores reflect an increase of thirty-four percent in yes responses to interaction and a decrease of sixty-five percent in no response being given. These results can be attributed to the data of two subjects, Lou and Mike. Both of these subjects decreased their numbers of no responses dramatically.

CHAPTER V

DISCUSSION AND CONCLUSION

This study was developed to determine if the use of sign language with mildly mentally retarded students would increase interaction and communication among their peers. The results indicate that the interactions of the observed student remained the same, while interactions precipitated by adults, peers, and student helpers all increased. Initially it appears that the use of sign language was ineffective, but further study of the results show that interactions and communication both had increased overall.

The student's interaction with each other showed an increase from pre and post intervention data collection. Initiations by adults and student helpers increased as initiators, but in addition, the recipients of interactions being the student himself or a peer showed a significant increase. This can be explained by the fact that adults were interacting with the child himself, but the students were also interacting more with each other. Adults were talking to students but students were communicating with each other.

The use of sign language to communicate did not increase after interaction. Actually the opposite proved to be true. From pre to post data collections, the use of sign language to communicate decreased. In contrast, the number of verbal interactions did increase from seventy-nine in pre intervention to one hundred and seventeen in post intervention. Perhaps this can be explained by the students being more comfortable with spoken language. In addition to sign, the children receive both individual and integrated speech and language intervention three times a week. This undoubtedly could contribute to their being more comfortable speaking to their peers.

The results of this study coincide with previous research in the area of the use of sign language to increase interaction and communication. The research of Gibbs and Carswell (1991) and Theresa Kouri (1989) agree that using sign can be an effective method of increasing communication among children whose speech is developing. The students who were more nonverbal were given another means of communication. As they became more comfortable with spoken language, their interactions changed to voiced communication.

An additional benefit to the use of sign was observed throughout this study. The students increased their vocabulary, appeared to recognize letters of the alphabet and numerals more readily due to the added stimulus of sign. During recent testing for progress reporting, seven of the eight children in the study had mastered recognition of all letters of the alphabet. Although this cannot be proven to be a direct result of the use of sign language because we had no group with which to compare, it does coincide with the results of Penner and Williams (1982). They concluded from their research that sign stimulus added to the verbal appears to increase verbal learning.

The use of sign in the classroom appears to have benefits which would merit its use as an additional mode of instruction. The Individualized Education Plans of many special education students state that a multi-sensory or multi-modal method of instruction should be used. Sign language could be used as an additional visual cue to enhance auditory and visual instruction. Many children's books and videos are available to aid the inclusion of sign language in the curriculum.

Although the positive results of this study are encouraging to the use of sign language to increase communication, there are additional factors which could have accounted for the results. Anita, Kreimeyer, and Eldredge (1993) concluded after studying interaction among deaf and hearing peers that familiarity appears to be a factor that positively influences peer interaction. As the children progress through the year and

become more comfortable with each other, it would be a logical conclusion that they would be more apt to interact.

A serious limitation to this study is the small number of the children in the group. In order to truly see whether sign language was a significant factor, it would be necessary to have larger numbers of subjects divided into groups, a group which uses sign language and a group which does not. Results then could be compared.

Another limitation is the forced setting of the study. Children were observed and data was collected during free play time. Children of this age often engage in parallel play and often do not feel the need to communicate to be part of the group. In addition, the nature of the students made it necessary for adults to interact with the subjects. The interpreter for the deaf child often interacted with students to correct sign or aid communication and a behaviorally disordered student made it necessary for adult intervention at times.

The children were also exposed to a limited and specific sign vocabulary. It was noted that children used sign more readily during more structured times of the day: for example; snack, circle, and instructional group time. During these times adults are using sign to communicate with the deaf child and the children are instructed with sign and voice. Responses are made in sign and voice by the children. If this study were to be repeated, the collection of data could be done additionally during structured times. The results could then be compared.

In summary, this study shows that using sign language to increase communication among mildly mentally retarded students had positive results. Overall initiations of interaction increased as well as positive responses to interactions. Conversely, the use of sign to communicate decreased after intervention. Children did interact more after sign language intervention.

While the sign used in this study was limited, it should be viewed as a basis upon which a more complex use of sign can be built. Future research should examine a broader use of sign with a larger number of students.

References

- Anita, S.D., Kreimeyer, K.H., & Eldredge, N. (1994). Promoting Social Interaction Between Young Children with Hearing Impairments and Their Peers. Exceptional Children, 60, (3), 262-275.
- Barrera, R.D., Lobato-Barrera, D., & Sulzer-Azaroff, B. (1980). A Simultaneous Treatment Comparison of Three Expressive Language Training Programs with a Mute Autistic Child. Journal of Autism and Developmental Disorders, 10, (1), 21-37.
- Barrett, R.P., & Sisson, L.A. (1987). Use of the Alternating Treatments Design as a Strategy for Empirically Determining Language Training Approaches with Mentally Retarded Children. Research in Developmental Disabilities, 8, 401-412.
- Bryen, D.N., Goldman, A.S., & Quinlisk-Gill, S. (1988). Sign Language with Students with Severe/Profound Mental Retardation: How Effective is it? Education and Training in Mental Retardation, June, 129-137.
- Bryen, D.N., & Joyce, D.G., (1986). Sign Language and the Severely Handicapped. The Journal of Special Education, 20, (2), 183-194.
- Clarke, S., Remington, B., & Light, P. (1986). The Role of Referential Speech in Sign Learning By Mentally Retarded Children: A Comparison of Total Communication and Sign-Along Training. Journal of Applied Behavior Analysis, 19 (3), 231-239.
- Custer, J.D. (1980). Improving Social Acceptance by Training Handicapped Students to Tutor their Nonhandicapped Peers. (Report No. EC142750). Provo, UT: Brigham Young University, David O. McKay Institute of Education. (ERIC Document Reproduction Service No. ED 217 665).
- Gibbs, E.D., & Carswell, L.E. (1991). Using Total Communication with Young Children with Down Syndrome: A Literature Review and Case Study. Early Education and Development, 2 (3), 306-320.

- Haring, N.G., McCormick, L. & Haring, T. G. (Eds.). (1994). Exceptional Children and Youth. Ohio: Merrill.
- Kouri, T., (1989). How Manual Sign Acquisition Relates to the Development of Spoken Language: A Case Study. Language, Speech, and Hearing Services in Schools, 20, 50-62.
- Penner, K.A., & Williams, W.N. (1982). Comparison of Sign Versus Symbol Training in Retarded Adults. Perceptual and Motor Skills, 55, 395-401.
- Sensenig, L.D., Mazeika, E.J., & Topf, B. (1989). Sign Language Facilitation of Reading with Students Classified as Trainable Mentally Handicapped. Education and Training of the Mentally Retarded, June, 121-125.
- Sommer, K.S., Whitman, T.L., & Keogh, D.A. (1988). Teaching Severely Retarded Persons to Sign Interactively Through the Use of a Behavioral Script. Research in Developmental Disabilities, 9, 291-304.
- Vandall, D.L., Anderson, L.D., Ehrhardt, G., & Wilson, K.S. (1982). Integrating Hearing and Deaf Preschoolers: An Attempt to Enhance Hearing Children's Interactions with Deaf Peers. Child Development, 53, 1354-1364.
- Weller, E.M., & Mahoney, G.J. (1983). A Comparison of Oral and Total Communication Modalities on the Language Training of Young Mentally Handicapped Children. Education and Training of the Mentally Retarded, April, 103-110.

Appendix

ALPHABETICAL LIST OF SIGN LANGUAGE VOCABULARY

airplane	mean
ball	mother
bicycle	nice
brother	paint
build	parents
car	play
clean	put
cook	read
doll	sad
door	scared
draw	see
drink	silly
drive	sister
eat	snack
father	surprise
game	table
give	thirsty
grandfather	tired
happy	train
help	truck
house	walk
hurt	wash
jump	watch
mad	window
make	write