To the Graduate Council:

I am submitting herewith a thesis written by Macon Mattern Krause entitled "Communication, Academic, and Social Skills of Selected Hearing-Impaired Children Trained in the Verbo-tonal Program at the University of Tennessee and Mainstreamed into the Public Schools." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Speech Pathology.

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We have read this thesis and
recommend its acceptance:

Accepted for the Council:

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COMMUNICATION, ACADEMIC, AND SOCIAL SKILLS OF SELECTED HEARING-IMPAIRED CHILDREN TRAINED IN THE VERBO-TONAL PROGRAM AT THE UNIVERSITY OF TENNESSEE AND MAINSTREAMED INTO THE PUBLIC SCHOOLS

A Thesis

Presented for the

Master of Arts

Degree

The University of Tennessee, Knoxville

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June 1978

1358373

ACKNOWLEDGMENTS

The writer expresses her appreciation to Dr. Carl Asp, Professor, Audiology and Speech Pathology, for support and guidance in the preparation of this study. Appreciation is also expressed to Dr. Harold Peterson, Professor, Audiology and Speech Pathology, and Mrs. Clare Maisel, Associate Professor, Audiology and Speech Pathology, for their interest and helpful suggestions.

Sincere gratitude is expressed to the principals, teachers, and parents of the children who served as subjects for this study, and to the children, themselves, though all of these must remain anonymous.

ABSTRACT

The communication, academic, and social skills of eleven hearing-impaired children were evaluated. These children had received training in the University of Tennessee Verbo-tonal Program prior to being mainstreamed into public schools.

The six female and five male subjects ranged in age from six years, six months to fourteen years, zero months. The three-frequency pure-tone average ranged from 53 to 108 dB HTL (ANSI, 1969) in the better ear. Grade levels ranged from kindergarten to sixth grade. Mainstreamed programs varied from self-contained, special classrooms to regular, open-space classrooms.

To test the communication, academic, and social skills of the children, the Templin-Darley Test of Articulation, the receptive and expressive subtests of the Northwestern Syntax Screening Test, a word intelligibility test utilizing the Dolch word list, the Metropolitan Achievement Test, and the Vineland Social Maturity Scale were used.

A clinician-made 1-5 rating scale was employed by teachers, parents, and the tester to rate the skills. Additional information was obtained from the school and clinical files. Correlation coefficients were computed for comparison among the test scores and ratings.

Articulation and language tests results revealed severely delayed speech and language skills for the group. Ratings of the quality of spoken language of the children indicated low average abilities. Ratings of the quantity of spoken language of the children indicated

average amounts of verbalizations. Correlation coefficients suggested positive trends among the articulation test scores, word intelligibility scores, and receptive language scores. Expressive language test scores were positively related to the quality and quantity of spoken language.

On the achievement tests, the mean percentile ranks for both total reading and total math indicated that as a group the tested children had low average academic skills compared to normal-hearing children of the same grade level. The ratings by the classroom teachers of academic skill and the grade point averages (GPAs) suggested average and above-average skills in both reading and mathematics. Correlation coefficients suggested positive trends between the total reading and total math scores, between the total reading scores and the children's performances in reading, between total math scores and GPAs in reading, and between GPAs and academic ratings by the teachers.

Trends were observed that suggested a positive relationship between articulation test scores and the total reading scores, positive relationships between the quality of spoken language and both the total reading and the total math scores, and negative relationships between the total math scores and both receptive language test scores and articulation test scores.

Ratings of social maturity suggested that average and above-average social skills were exhibited in the schools and in the homes. The social quotient was negatively related to articulation test scores, word intelligibility scores, and quality of spoken language. However, the quotient positively related to total math scores.

All eleven children were successful in their mainstreamed programs. Because of the small sample size, conclusions were not generalized beyond the tested population.

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CHAPTER I

INTRODUCTION

Problem

A recent federal law (Public Law 94-142, The Education for All Handicapped Children Act) guarantees a free appropriate public education to all handicapped children. In this Act, hearing-impaired persons between the ages of three and twenty-one years are classified as handicapped children. The Act encourages the mainstreaming of hearing-impaired children in regular public school classrooms (Kidd, 1977).

Public education programs are now legally responsible for teaching a communication code that will equip a hearing-impaired child to function within the hearing society. Some training programs emphasize the development of manual forms of communication (e.g., fingerspelling and sign language). This form of communication is less conducive to mainstreaming since most normal-hearing people do not use manual communication. Other programs emphasize the development of oral communication skills so that hearing-impaired children can communicate with their normal-hearing peers (Valhos, 1977).

Purpose

The University of Tennessee Verbo-tonal Program emphasizes the development of good speaking and listening skills. The training follows the same developmental sequence that is observed in normal-hearing

children. This program assumes that the development of good speaking and listening skills facilitates success in the mainstream hearing society, and an ultimate goal of the program is the mainstreaming of its hearing-impaired students into the hearing society (Asp, 1975, 1976).

Eleven hearing-impaired children who were trained in the University of Tennessee Verbo-tonal Program and subsequently mainstreamed into public schools were the subjects of the present study. The mainstream situations ranged from self-contained, special classrooms to regular, open-space classrooms. The communication, academic, and social skills of these children were evaluated. The test scores and ratings were compared to performances of normal-hearing populations. The following null hypotheses were tested.

Null Hypotheses

There is no significant correlation among the subtest scores and ratings in the following three categories of (A) communication skills, (B) academic skills, and (C) social skills for eleven hearing-impaired children who were trained at the University of Tennessee Verbo-tonal Program and mainstreamed into public schools:

A. Communication skills
    1. Articulation proficiency of phonemes in single words
    2. Single word intelligibility
    3. Expressive language
    4. Receptive language
    5. Quality of spoken language
    6. Quantity of spoken language

B. Academic skills

1. Achievement test scores in reading
2. Cumulative grade points in reading
3. Ratings in reading skills
4. Achievement test scores in mathematics
5. Cumulative grade points in mathematics
6. Ratings in mathematical skills

C. Social skills

1. Social age
2. Social quotient.

Definition of Terms

Mainstreaming. The practice of integrating physically and mentally handicapped children into regular classrooms. (Time, 1976)

Individualized education program. A written statement for each handicapped child designed to meet the unique needs of that child (Abeson & Zettel, 1977).

Least restrictive environment. "Handicapped children should be placed where they obtain the best education at the least distance away from mainstream society" (Molloy, 1975, p. 7).

Support program. A specialist provides a continuum of services including consultation with public school staff, evaluation, individualized therapy, parent interaction, and curriculum assessment and modification. (Yater, 1973)

CHAPTER II

REVIEW OF THE LITERATURE

Mainstreaming

Whether handicapped children are better educated when placed in a regular or a special educational facility is a question which has been considered for many years. A review of the literature on this question, or even on that portion of the literature which advocates the regular classroom, is beyond the scope of the present study. Since the Ninety-Fourth Congress has said that education must be structured in the most appropriate environment possible for each child, and since the present study is concerned with hearing-impaired children, the literature reviewed here is limited to studies about the relative worth of various methods of mainstreaming hearing-impaired children into the regular classroom. Although the term "mainstreaming" does not appear in the law (Hayes & Higgins, 1978), the ultimate least restrictive environment would be the regular classroom.

According to Public Law 92-142, The Education for all Handicapped Children Act of 1975, an education which facilitates the mainstreaming of hearing-impaired children into the hearing society is the responsibility of the local public school system. Since the programs which provide the best preparation for positive academic experiences are fitted to the individual child, it is mandatory that all educational opportunities for hearing-impaired children provide such programs.

When available public facilities are not adaptable to the individual child, state and local education agencies are required to secure the necessary services at their own expense (Kidd, 1977). By October 1, 1977, an individualized education program had to be structured for every eligible handicapped child in compliance with the 1975 Act (Hayes & Higgins, 1978).

The Mandatory Education of the Handicapped Act (Tennessee Law No. 839) specifically dictated that the mandatory education of handicapped children between the ages of four (age three for the deaf population) and twenty-one years was the financial responsibility of local school systems in Tennessee. Services provided were to be sufficient to meet the needs and to maximize the capabilities of the handicapped child. The environment was to be altered to meet the child's needs, and the child's rights to a public education were to be honored (Rules, Regulations, Policies and Guidelines, 1975).

The objectives of mainstreaming involve a series of steps beginning with placing each child at a level which best fulfills his individual needs and which is as close as possible to a regular classroom environment. The student progresses through new programs as his scholastic and social needs mature. To facilitate the individualization of the learning experiences, several levels of integration, or mainstreaming, have been developed, with educational settings ranging from residential, total care units to total integration into the regular public school classroom with or without support programs (Deno, 1971).

Enrolling the handicapped child in the public schools as soon as he can adapt to the environment is advisable for three reasons. It

has been shown: (1) that handicapped children will achieve more academically and socially in integrated classrooms; (2) that "normal" classrooms will better equip them to cope with the "real" world as adults; and (3) that association with them makes normal children more understanding of handicaps (Time, 1976). Northcott (1973) has identified four positive characteristics of mainstreamed, hearing-impaired children which support such programs:

1. Active utilization of residual hearing and full-time hearing aid usage, if prescribed;
2. Demonstrated social, academic, cognitive, and communicative (auditory and oral) skills within the normal range of behaviors of hearing classmates at a particular grade level;
3. Intelligible speech and the ability to comprehend and exchange ideas with others through spoken, written, and read language; and
4. Increased confidence and independence in giving self-direction to the task at hand. (p. 4)

The choice of school placement determine which communication skills a student will master. A teaching method, i.e., oral, manual, or total communication, must be chosen. Some habilitation programs more than others would be expected to accelerate a student's progress into the mainstream, that is, the hearing society. An emphasis upon signing may perpetuate the self-concept of being a deaf person living within the deaf community. Better developed oral-aural skills may encourage the communicative independence necessary for successful public school experiences (Valhos, 1977).

These two different assumptions about teaching methods have been the subject of several studies. Vernon and Koh (1971) reported that children who had an oral environment but no preschool experiences were equal in academic achievement and oral skills to those children who had

been in preschools which stressed oral skills. Phillips (1963) reported that seven-year-old deaf children who had preschool experiences were more skilled academically and socially than those who did not have preschool experiences; at age nine these differences were not observed. In other studies, children who learned manual communication from infancy (Stuckless & Birch, 1966) and children who used fingerspelling (Quigley, 1969) were reported to be better readers than children sho did not use a manual system. These conclusions questioned the superiority of oral programs over manual programs as a preferred avenue to academic successes, especially when such an emphasis deprived the preschool child of an effective communication code.

In contrast, a study by Guberina (1976) described hearing-impaired children who were equal to their normal-hearing peers in all areas of academic achievement. These hearing-impaired children were trained at the Verbo-tonal Center in Zugreb, Yugoslavia, and then mainstreamed into the Zugreb Public School System. The training emphasized the development of speaking and listening skills, and did not include any training in manual communication (see Appendix A). When hearing-impaired children function at the same level as normal-hearing children, this is the ultimate achievement in mainstreaming.

Moores, Weiss, and Goodwin (1974) studied schools that used either the Rochester method, total communication, or an oral/aural approach. There was no significant difference in the academic abilities of the students in these schools. All of these schools emphasized reading skills more than computational skills. The schools that stressed an

academic approach in the primary grades seemed to have greater success in preparing their students for academic achievement.

Although there are definite advantages to mainstreaming, some adverse situations may develop. For example, classroom teachers may lack special education training, supportive personnel may be inadequate in number and/or skills (Fellendorf, 1975), school districts may misuse state and federal funds slighting the handicapped populations (Time, 1976), or ambitions of school staff and families may force handicapped children to struggle in environments which they are not equipped to handle (Thompson, 1977).

The remainder of this review of the literature is divided into the following: (1) studies concerned with communication skills, (2) studies concerned with academic abilities, and (3) studies concerned with social skills.

Communication Skills

The premise that the aurally handicapped population is delayed in linguistic skills is supported in studies by Goda (1959), Myklebust (1960), Simmons (1962), Fisher (1972), Quigley (1977), and Furth (1973). Lack of auditory stimulation during initial verbal development and breakdown in the feedback cycle during speech due to lack of audition affect linguistic acquisition. Breakdown in language development is centered in the auditory channel. Language must be perceived either aurally or visually before it can be internalized by the observer, and it must be internalized receptively before it may be expressed through spoken, written, and read modes (Myklebust, 1960).

That linguistic skills of the aurally handicapped are delayed is supported by Fisher (1972), who reported a mean verbal quotient of 74 (Wechsler, 1949) for hearing-impaired children. A verbal quotient of 74 is a borderline score between mentally defective (I.Q. between 70 and 80) and dull normal (I.Q. between 80 and 90). Wechsler designated a quotient of 70 to differentiate educable mentally retarded children (EMR). Brown and Mecham (1961) reported no correlation between this verbal I.Q. and language skill. Fifty percent of Fisher's (1972) subjects had defective speech that was unintelligible. For hearing losses greater than 50 decibels, Johnson (1962) concluded that unintelligible speech of the deaf was due mostly to misarticulation rather than problems in fluency and syntax.

The syntax of the hearing-impaired population differs from that used by the hearing population. Quigley (1977) found that hearing-impaired children acquire language skills at a reduced rate and used some syntactic structures which were different from those of the hearing population. Among seven-year-old students there was a failure to use passive, negative, and interrogative transformations. The omissions of these transformations placed these children behind their age group (Moores, Weiss, Goodman, 1974) enough to prompt Myklebust (1964) to equate the language skill of an average seventeen-year-old deaf child with the language skill of a seven-year-old hearing child. Among hearing-impaired children, Myklebust (1964) reported that the better speakers wrote longer sentences than the less competent speakers. Aurally handicapped students used the same number of words in both

written and oral samples. Simmons (1962) observed that their sentences were shorter than those of the hearing population.

Several studies have dealt with specific morphological errors made by the hearing-impaired population. Kennerly (1965) noted that the aurally handicapped did not apply morphological principles to new situations as well as did hearing children. Wilbur (1977) examined how well the aurally handicapped used redundant pronouns in single and consecutive sentences. Rules governing the use of pronouns are not fixed. Therefore, learning a rule, e.g., use a pronoun to refer to a previously used noun phrase ($S \rightarrow NP + VP$, $NP \rightarrow pro$), would not aid the student in this task. Wilbur (1977) concluded that when to use a pronoun was more confusing to hearing-impaired children than which pronoun to use. The hearing-impaired children experienced less difficulty with single sentences than with two or more consecutive sentences. A linguistic deficiency was proposed to explain these findings. The hearing-impaired subjects did not distinguish between old and new information in a series of sentences, i.e., redundant information. The greater problem with pronouns in paragraphs suggested an emphasis in schools for the hearing-impaired upon construction of correct, single sentences rather than on logical sequences of sentences in paragraphs.

In a 1971 survey basing its conclusions about linguistic skills upon analysis of errors on achievement tests taken by hearing-impaired children, hearing-impaired children did worse on all parts of speech than did the hearing students (Studies in Achievement Testing, 1971). Aurally handicapped children had trouble especially with adjectives and adverbs.

Wolf (1973) discussed whether concepts can exist without language. Even though prelingual deaf children may possess some concepts, these concepts may not be defined by the same criteria nor be grouped in the same categories as those of the hearing population. Furth (1973) and Stuchless and Birth (1966) theorized that hearing-impaired children handled concrete concepts adequately, but that they were less able to manipulate problems requiring propositional thinking. Abstract reasoning used in propositional thinking seems to be acquired through verbal interaction rather than through the concrete realities of daily experiences. Therefore, hearing-impaired children are at a disadvantage compared to normal-hearing children when learning necessitates oral communication.

In conclusion, the hearing-impaired population tended to be delayed linguistically, i.e., experienced difficulty with phonology, morphology, and syntax. The lexicon of the hearing-impaired child may equal that of a hearing child. The aurally handicapped child's difficulty with abstract concepts may result from his problems with a communication system which he cannot hear but which he is forced to use in a hearing society. Therefore, hearing-impaired children are handicapped in their communication skills when their skills are compared to those of a normal-hearing population.

Academic Skills

Reading Skills

Reading ability is commonly used to measure the educational benefits of mainstreamed experiences (Fisher, 1974; Katz, 1974) even though for the hearing-impaired population retarded reading skills have been reported (Johnson, 1962; Furth, 1966; Fisher, 1972; and Redgate, 1973). The academic success of mainstreamed children depends upon reading skills. Without the skill to read, attempts to mainstream the impaired child in the hearing classroom are fruitless, according to Giangreco and Giangreco (1970).

As age increases, deaf children become more retarded in reading skills (Pugh, 1946; Myklebust, 1960) which may be due to linguistic factors. The reading materials often use linguistic structures, i.e., transformations and lexical items, beyond the competence of the aurally-handicapped student (Quigley, 1977).

Difficulty with written material also affects how well these children perform on achievement tests. Hearing-impaired children consistently score lower than normal-hearing children on reading subtests. Therefore, different interpretations are required for the low scores for hearing-impaired children and the same low scores for normal-hearing children. Furth (1966) adjusted the normal curve to fit the pattern in the lower achievement test scores of the hearing-impaired population. For a 16.5-year-old child who has been profoundly deaf from birth, the ability to read at fifth grade level or better is an unusual skill, according to Furth. A reading grade level of 4.9 is the suggested cutoff

point between pupils having a functionally useful reading ability and those who know some English but could not be considered literate. Using this criterion, only 1% of the eleven-year-old and 12% of the sixteen-year-old children would be literate (Furth, 1966). Rutledge (1965) reported that reading grade levels ranged from 3.8 to 5.6 with a mean of 4.4 for twenty-one-year-old subjects, and ranged from 1.7 to 5.4 with a mean at 2.9 for fourteen-year-old subjects. Word reading and vocabulary scores were generally lower than paragraph meaning scores. Johnson (1962) reported that 66% of his tested population was delayed one to seven years in reading knowledge. Forty percent of these children exhibited a serious delay of two years or more.

Mathematical Skills

The hearing-impaired population was shown to have difficulty with abstract figural reasoning, in a study by Farrant (1964). On tests of academic skills, scores for mathematical ability were higher than for reading skills. For hearing losses between 30 and 70 dB, 56.5% of the children were delayed one to six years and 25.5% of these children were seriously delayed two or more years (Johnson, 1962). A survey (Studies in Achievement Testing survey, 1971) concluded that hearing-impaired children did better than hearing children on the arithmetic computation subtest, but did much worse than hearing subjects on the arithmetic concepts and application subtests. The percentage of correct answers decreased as the length of the test item increased.

Linguistic skill of the hearing-impaired child may be inadequate for facilitating the acquisition of mathematical skills (Furth, 1973).

The hearing-impaired student may have difficulty with mathematics because it requires an understanding of past, present, and future (Wolf, 1973) and of linguistically confusing questions such as "Which one has more/less?" and "Do we both have the same?" Because of the linguistic handicap, as a group the hearing-impaired are delayed one to two years according to Furth (1973), and up to 10 years according to Oléron and Herron (1961) on tests of mathematical knowledge.

Achievement Testing

Achievement tests suitable for testing the reading and mathematical skills of the hearing-impaired population are being developed. Curriculums used in programs for the hearing-impaired were not considered in the development nor in the standardization procedures of achievement tests on the market today. The same criteria used to recommend achievement testing for the hearing population should be used in developing tests for the hearing-impaired population. The criteria are that test results be comparable (1) between children taking the same test battery, and (2) between the test batteries. A different test battery is used for each grade level (Studies in Achievement Testing, 1971).

The purpose of the 1971 survey was to determine the suitability of achievement testing for the aurally handicapped population. Item analysis of test results on intermediate and advanced forms of the Stanford Achievement Test disclosed which subtest best distinguished between low- and high-ability handicapped students. The aurally handicapped children did worse on the paragraph meaning subtest (similar

to the reading subtest on the Metropolitan Achievement Test) than on any other subtest. The range of scores was small on this subtest, which reduces the sensitivity of the test scores. Although the scores on the paragraph meaning subtest were generally depressed, on the intermediate test battery, the hearing-impaired group did better than the hearing group on the questions on the completion test found in the paragraph meaning subtest. On this same subtest on the Advanced test battery, the hearing-impaired group did substantially worse than did the hearing. These results indicate overall poor comprehension of written material in paragraph form (Studies in Achievement Testing, 1971).

Giangreco and Giangreco (1970) reported that achievement tests are fairly close predictors of reading skills of hearing-impaired children during the first three years of schooling because they measure what is actually being taught to the child. After the third grade, the reading programs progress rapidly, which makes keeping pace with the normal-hearing children a difficult task for the deaf child. The achievement test emphasized this difference because the hearing-impaired child is compared to the hearing child of approximately the same age and grade level.

As a group, the aurally handicapped did better than the hearing population on the Arithmetic Application subtest, this subtest being one of three tests of mathematical ability on the Stanford Achievement Test. This subtest is sensitive for detecting differences within the tested hearing-impaired population between students with low- and high-level abilities. The items on the Arithmetic Application subtest (similar to the problem-solving subtest on the Metropolitan Achievement

Test) were also sensitive for discriminating between low- and high-level abilities in mathematics, although the overall test scores were lower than scores on the computation subtest (Studies in Achievement Testing, 1971).

Evaluation of the subtests on the Stanford Achievement Test revealed that the mathematical subtests were good tools for discriminating between low and high level ability groups within the hearing-impaired population.

Relationships between Communcation Abilities and Academic Skills

Fisher (1972) selected language development and communication skills, rather than reading skills, as measurable skills for assessing the success of programs provided for the hearing-impaired. Katz (1974) emphasized that good language skills are prerequisites for hearing-impaired children who are to be mainstreamed. Mastery of academic material is dependent upon an understanding of vocabulary and concepts. The lower achievement scores of hearing-impaired children during the formative years may be due to language handicaps. Thompson (1956) reported a close correlation between speech and language facility and the speed with which children learned to read. Myklebust (1960) reported that both good and poor oral speakers were retarded in reading. Those with better spoken language abilities scored approximately twice as high on tests of reading skill as did those who were rated poor in speech proficiency. Therefore, educational programs should provide the best learning opportunities possible for learning communication skills.

A frequently used method of assessing language skills is the administration of standardized reading tests. Furth (1966) considered this an invalid measurement because the authors of these tests assume by the linguistic structures they use in the tests that the test taker has a knowledge of language. Hearing-impaired children lack such a competence. A low reading score may be a result of linguistic incompetence rather than of a reading deficiency.

Social Skills

Many hearing-impaired children and adolescents are socially immature. This social delay may be caused by an auditory handicap (Myklebust, 1960; Newhause, 1969; Altshuler, 1972), by retarded linguistic skill (Bodmer & Johns, 1977), or by attendance at residential schools (Baker, 1953).

Hearing-impaired children scored lower on the Vineland Social Maturity Scale than did hearing children, due to the auditory handicap (Schlesinger & Meadowsn, 1972). Myklebust (1960) indicated that age of onset, the degree of hearing loss, and the sex of the child are significant variables in the emotional adjustment of hearing-impaired persons.

An impaired auditory system affects the hearing-impaired child's interactions with his environment. Lack of auditory contact between the infant and the mother alters the normal development of emotional bonds (Altshuler, 1972). The parent may have difficulty accepting the child and/or his handicap. Poor attitudes toward the hearing-impaired child affect the child's emotional adjustments and are not likely to

change as the child matures. As the child grows, parental attitudes toward the handicap affect the emotional adjustment and are likely to improve (Nauhause, 1969).

Unable to accept the child and/or his handicap, the parents may overprotect him or use inconsistent discipline, thereby obscuring codes of rightness and wrongness for the child. The hearing-impaired child may develop a weak inner code for appropriate behavior (Mindel & Vernon, 1971). In later life, these adolescents may feel dependent, inadequate in their judgmental abilities, and confused by an artificial code of behavior which is not their own (Levine, 1956). These same personality characteristics of the hearing-impaired adolescent are theorized to be due to a linguistic handicap by Bodmer and Johns (1977).

Baker (1953) studied how home and school environments interact to affect social maturity and independence. Day-school students seem to benefit from their homes. Hearing-impaired parents more than hearing parents grant their hearing-impaired children more personal independence. Thus, it seems that the lack of social maturity is not due solely to the auditory handicap.

The instability of an inner structure for appropriate behavior is most evident when aurally-handicapped students enter the school setting. The child may discover an assortment of personalities with which he is unfamiliar, or he may become self-conscious because his physical handicaps distinguish him from his classmates. Even though he may be placed with younger children, his academic and/or social skills may be inferior to those of his classmates. The maturity of the

hearing-impaired student affects how he will adapt to the educational environment (Boder & Johns, 1977).

Psychological services are often available to normal-hearing children experiencing difficulty adjusting to their home or school environment. Psychologists often do not feel that they are as adequately trained or as well equipped with methods and testing materials to meet the needs of hearing-impaired children in the school environment as they are to meet the needs of hearing children (Bodmer & Johns, 1977).

Verbal communication is an important factor in psychological testing. Because the tests are not designed for the hearing-impaired population, interpretation of test results is difficult. Often there is a lack of motivation and attention on the child's part in addition to the auditory deficit. These obstacles make psychological testing inappropriate and inaccurate for the hearing-impaired population (Birch & Birch, 1951).

Hearing-impaired children are often socially delayed during childhood and adolescence. This paper mentioned three explanations for the social deficit—the hearing impairment, the linguistic deficit, or the type of educational environment in which the hearing-impaired children live.

This review of literature has dealt with hearing-impaired children in the education process. The discussion included a review of the relative worths of several methods of early intervention through aural habilitation.

The communication skills, academic abilities, and social maturity of hearing-impaired children were compared to the skills of normal-hearing

children. Discussions of delayed attainment rather than descriptions of characteristic behaviors of hearing-impaired children were presented. The relative successes of a mainstreaming venture are measured by gains made by the individual child in competition with himself, and also by the child's achievement in communication, academic, and social skills relative to the skills of his hearing classmates.

The common denominators which would explain deficits in the three skill areas under study were not conclusively identified in the literature. This review had documented that hearing-impaired children are delayed in communication skills, academic abilities, and social maturity compared to their normal-hearing peers.

CHAPTER III

METHODS AND PROCEDURES

Subjects

This study evaluated eleven hearing-impaired children who were trained in the University of Tennessee Verbo-tonal Program and mainstreamed into public schools.

The criteria for subject selection included: (a) the consent of the parents; (b) the cooperation of the school systems; (c) residence within a 50-mile radius of Knoxville; and (d) participation in the University of Tennessee Verbo-tonal Program. Table 1 provides specific information on each subject. There were six females and five males. No gross facial deviations were observed among the children. The number of years spent by each child in the Verbo-tonal Program ranged from two years to six years. An intelligence quotient for each child was obtained by a Verbo-tonal staff member using the Leiter International Performance Scale, a nonverbal Binet scale (Arthur, 1952). The Leiter was used instead of other tests of intelligence such as the Hiskey or Wechsler because the Leiter was found to more closely predict academic achievement in the hearing-impaired population (Birch & Birch, 1951). Eight children had intelligence quotients greater than 90, but two had quotients less than 90. This information was obtained from clinical files on the children. Because an intelligence quotient was not reported in the file of S_2, this information was not recorded in Table 1.

Table 1

Information Identifying the Eleven Hearing-Impaired Children

Subject	Sex	Age (yr-mo)	Grade Level	I.Q.	Hearing Loss Three Frequency Average Better Ear (dB)	Age When Hearing Loss Was Diagnosed (yr-mo)	Etiology	Relatives With Hearing Loss	Additional Physical Handicaps
S_1	M	6-6	K (K)*	140	62	3-6	heredity	both parents	none
S_2	F	12-5	6 (6)	unknown	53	5-8	unknown	none	unknown
S_3	M	9-7	2 (3)	83	56	5-0	unknown	none	possibly minimal brain damage
S_4	F	7-9	1 (2)	140+	65	1-6	unknown	none	none
S_5	F	8-4	2 (2)	126+	78	5-8	unknown	none	unknown
S_6	F	11-7	2 (5)	90	87	3-6	congenital rubella	none	hyperactive congenital cataract heart murmer
S_7	F	9-7	2 (3)	113	80	2-6	unknown	none	none
S_8	M	12-6	4 (6)	82	80	1-10	congenital rubella	none	perceptual motor retardation
S_9	M	10-5	2 (4)	115+	85	6-9	heredity	older brother	none
S_{10}	M	14-0	6 (8)	115	93	5-8	unknown	none	none
S_{11}	F	11-7	4 (5)	126+	108	3-4	unknown	none	none
$\bar{X}$		10-5		113	77	4-1			
Median		10-5		115	80	4-6			
s		2-0		21.58	16.08	2-0			
Range		(14-0)-(6-6)		140-82	108-53	(6-9)-(1-10)			

*Bracketed grade levels were the grade levels appropriate to each subject's chronological age.

The ages ranged from six years, six months to fourteen years, zero months. The grade levels ranged from kindergarten to the sixth grade. As a group, the children were approximately 1.3 grade levels behind their normal-hearing peers (see Table 1). Six children were in self-contained classrooms; five children were in open classrooms. Table 2 describes the programs and supportive special education services in the public schools.

The three-frequency pure-tone average ranged from 53 to 108 dB HTL (ANSI, 1969) in the better ear (see Table 3). The mean hearing loss was 77 dB. The speech-reception threshold ranged from 42 to 85 dB for the better ear. The speech discrimination scores ranged from 52% to 94% in the better ear. Three of the eleven children could not be evaluated with the speech discrimination test. Additional information on the etiology and so forth is shown on Table 1.

Tests and Procedures

Communication, academic, and social skills were assessed in the following way. The area of communication skills included the testing of articulation skill, word intelligibility, and expressive and receptive language abilities, and the rating of the quantity and quality of spontaneous language usage. The area of academic achievements evaluated reading and mathematics skills using achievement test results, grade point averages, and teachers' estimations of academic skill. The area of social maturity included rating behaviors in the classroom and in the home and a social age from the Vineland Social Maturity Scale.

Table 2

Description of the Educational Program for Each Subject in the Public School

Subject	No. Years in Verbo-tonal Program*	Grade Level	No. Years in Public School	Type of Classroom	Description of Program	Description of Special Services
S_1	2	K	1	Self-contained**	Regular program with additional supportive services	Speech and aural habilitation
S_2	2	6	6	Open***	Regular program with speech and language teacher	Speech and language therapy
S_3	2	2	2	Open	Regular program with additional supportive services	Speech and aural habilitation
S_4	3	1	1	Self-contained	Regular program with speech and language teacher	Speech and language therapy
S_5	2	2	1	Open	Regular program with additional supportive services	Speech and language therapy and resource program
S_6	5	2	3	Self-contained	Regular program	None provided at public school
S_7	4	2	3	Self-contained	Regular program	None provided at public school
S_8	6	4	2	Self-contained	Special program for the hearing-impaired	Aural therapist as teacher in classroom
S_9	3	2	1	Self-contained	Special program for the hearing-impaired	Aural therapist as teacher in classroom
S_{10}	6	6	2	Open	Regular program with additional supportive services	Speech and aural habilitation
S_{11}	5	4	3	Open	Regular program with additional supportive services	Speech and language therapy and resource program

*To the nearest year.

**A self-contained classroom refers to a class taught by one regular teacher. The class is confined to one classroom for the majority of the day. Some students may also participate in special programs with a resource teacher and/or speech and aural habilitation clinicians.

***An open classroom refers to several classes being taught by a team of teachers in an open space which may be partitioned by dividers to provide some separation between learning groups. Children may also participate in special programs.

Table 3

Audiometric Information for Each of the Eleven Subjects

	Pure Tone Averages							
	Three Frequency Average (dB HTL)		Two Frequency Average (dB HTL)		Speech Reception Threshold		P-B Test CID W-22 (%/dB Level HTL)	
Subject	left	right	left	right	left	right	left	right
S_1	62	65	52	52	42	42	64%/82	84%/82
S_2	53	56	55	55	58	56	94%/98	88%/86
S_3	65	56	57	50	55	50	84%/85 MCL	96%/85
S_4	70	65	70	62	75	60	CNT**	74%/90
S_5	78	78	62	62	50	45	48%/90	52%/90
S_6	87	105	95	107	85	CNT	88%/100	CNT**
S_7	81	80	70	67	80	70	28%/90	52%/90
S_8	80	103	83	90	74	CNT	60%/95 MCL	DNT**
S_9	89	85	85	82	85*	85*	CNT**	CNT**
S_{10}	93	93	92	85	80	70	CNT**	CNT**
S_{11}	108	108	107	107	CNT	CNT	CNT**	CNT**
$\bar{X}$	78.72	81.27	75.27	74.45	68.40	59.75	67	74
Median	80	80	70	67	74,5	58	64	79
s	15.64	19.28	18.29	20.91	15.69	14.58		
Range	53-108	56-108	52-107	50-107	85-42	85-42	28-94	52-96
n =	11	11	11	11	10	8	7	6

Scale: ___ = the better ear.

* = Speech Awareness Level.

MCL = Most comfortable loudness level.

CNT = Could not test.

DNT = Did not test.

** = These scores were not available to compute group means.

The following tests and procedures were used to obtain the above mentioned information.

Communication Skills

A battery of three tests and a clinician-made rating scale were administered individually in one test session to each child. These included:

1. Articulation. The ability to articulate phonemes in single words was measured using the 141 test items of the Templin-Darley Test of Articulation.

2. Word intelligibility. Twenty test words were randomly chosen from the Dolch word list (with attention to selections of varied phonetic combinations) (see Appendix B). Each word was printed on a flash card. For the practice session, the child read each word aloud. The tester said the word if there was a problem.

For the testing session, the test cards were presented in random order with 10 seconds between each presentation. The child's spoken words (responses) were recorded (e.g., "ran" "fly") on a tape recorder (Sony, model TC 800).

The tape recordings of the eleven children were randomly presented to a panel of three experienced graduate students in speech pathology who were native to East Tennessee. Each member of the panel independently wrote the word that was heard. If the word was unintelligible, the panel members transcribed it phonetically. The child's responses were considered correct if two of the three judges wrote the same word as the

test card indicated. The word intelligibility score was the percentage correct of the twenty test items for each child.

3. Expressive and receptive language. Expressive and receptive language skills were measured using the Northwestern Syntax Screening Test. The testing procedures as described in the test manual were followed during administration of both portions of the test. Extra explanations of directions and additional trials prior to the testing were allowed to insure the child's full understanding of the directions. The test score of each child was recorded as a raw score. Then the raw score was converted to a z score using the mean and standard deviation of normal-hearing children of the same age (test norm).

4. Ratings of quality and quantity of spoken language. A clinician-made five-point rating scale was used to evaluate the quality and quantity of spoken language in the following way: (1) very poor or never; (2) poor, needs encouragement and/or extra help; (3) average performance for his/her grade level; (4) better, or more than would be expected from an average student; and (5) superior skill or excessive amounts. For all the ratings, the evaluators were instructed to use the value 3 as the average performance of a normal-hearing child.

The quality and quantity of each child's spontaneous language usage were rated by two teachers of each child, by a parent of each child, and by the tester. The teachers rated the communication skills that each child used in the classroom (see Appendix C, Questions 10-17). Communication skills in the reading and mathematics classes were analyzed separately because of the subject matter. Appropriate verbal responses

to mathematical questions may require one or two words. More often, questions in reading require responses in sentence form.

The communication skills in the home of each child were rated by his parent (see Appendix D, Questions 1, 4, 5). Note that "aggressiveness" in Question 1 referred to an amount of verbal participation and to the degree to which the child controlled the conversations in which he was involved.

The tester also rated each child on how the child would be expected to communicate in an unfamiliar situation (see Appendix C, Questions 7, 8, 13, 14, 16, 17).

The performance of each hearing-impaired child on the tests of communication were interpreted using the age norms of the tests appropriate for the chronological age of the child. Ratings by parents compared each hearing-impaired child to normal-hearing children of the same chronological age. The teachers' ratings compared communication skills of the hearing-impaired child to the skills of a normal-hearing child at the same grade level. Both ratings employed a five-point scale defining 3 as the rating for average performances of a normal-hearing child of the same chronological age and/or grade level.

The different referents, i.e., chronological age and similar grade level, may have influenced the correlations among tested and rated communication skills. All the children were mainstreamed into classrooms either common for or below their chronological age. The decisions upon grade placement were made by personnel from both the Verbo-tonal Program and the public school, and the parents.

For all the children, the means of the tests used to interpret the test scores were appropriate for the age levels of the grade in which the hearing-impaired child was mainstreamed. Therefore, the tested and rated communication skills should correlate regardless of age or grade level.

Academic Achievement

Three measurements of academic achievement were obtained in the areas of reading and mathematics: These included: (1) achievement test results; (2) grade point averages; and (3) ratings by teachers of mathematical and reading skill within the grade level.

The tests and ratings of academic achievement compared the hearing-impaired children with normal-hearing children. The normal-hearing children were on the same grade level as the hearing-impaired children but were often younger in chronological age. This was because nine of the hearing-impaired children were mainstreamed into classrooms below the grade level which was usual for a normal-hearing child of the same chronological age (see Table 1, p. 22).

1. Achievement test results. The Metropolitan Achievement Test or the Stanford Achievement Test had been administered to the subjects by the classroom teachers during the 1976-77 school year. These test results (national percentile and grade level skill) were obtained from the child's records with parent permission. Because an achievement test had not been administered in all schools, the Metropolitan Achievement Test was administered to six children by the tester using the test procedure of the school system. The tester scored these six tests. The

test results were scored in the following areas: word knowledge, reading, total reading, mathematical computation, mathematical concepts, mathematical problem solving and total mathematics. Only the grade level scores for total reading and total mathematics, both total scores being composite scores, were used for comparing academic skills to communication and social skills.

2. Grade point average. The cumulative grade point averages of each child in reading and mathematics for the 1976-77 school year were obtained from the child's records. These letter grades were converted to numbers (A = 5, B = 4, C = 3, D = 2, F = 1) for the statistical analysis. Since some schools do not use the letter grading system, teachers in these schools used the five-point scale to assign a grade for each child.

3. Rating of academic skill. Two teachers graded each child's performance in reading and mathematics (see Appendix C, Question 2) as compared with other children at the same grade level in the school.

Social Skills

Social age and quotient were assessed using the Vineland Social Maturity Scale. The Vineland Social Maturity Test is the only standardized developmental scale presently marketed (Watson, 1967). The social quotients were the only measurements of social skill used in the statistical analyses. The social level of each child in the school was rated by the classroom teacher. Social behavior in the home environment was rated by the parents.

1. Social age. The Vineland Social Maturity Scale was used to measure the social age and compute a social quotient for each child. The tester interviewed the child's mother according to the procedure recommended in the test manual. The social age indicates the age level at which the child is functioning. The quotient compares social skills of the child to those of his peers.

2. School environment. A question was designed to assess the general social skill in the classroom (see Appendix C, Question 5) using the five-point rating scale described earlier. Each classroom teacher was interviewed one time by the tester during visits to the public schools.

3. Home environment. A questionnaire (see Appendix D) was designed to evaluate (a) changes in verbal and social behaviors in the home environment (Questions 2, 3), and (b) parental attitudes towards mainstreaming (Questions 6-11). Parental attitudes towards mainstreaming were believed to affect the reactions of the children toward their public school experiences. Therefore, the atmosphere in the home towards mainstreaming was important insofar as it affected the children's adaptability to their new school environments. Parents rated their child using the five-point scale.

CHAPTER IV

RESULTS

Reliability

For the articulation test, the responses of three children were tape recorded during the test session, and rescored later by the tester. The agreement/disagreement comparison between the first and second judgments of the tester was 91%.

For the Northwestern Syntax Screening Test, three children were retested less than one week after the initial testing. These test-retest scores are listed on Table 4. The differences ranged from 0 to 2.

For the word intelligibility test, the panel re-scored the responses of one child a second time. A comparison of these scores indicated 80% agreement.

It appeared that the test-retest and intra-judge reliability were within the expected limits.

For the comparisons among communication, academic, and social skills, the Pearson Product-Moment Correlation and the Spearman Rank-Order Correlation (Bruning & Kintz, 1968) were used to compute correlation coefficients. An alpha level of .05 was the criterion for significance.

Table 4

Test-Retest Results for the Receptive and Expressive Subtests of the Northwestern Syntax Screening Test

	Receptive Subtest			Expressive Subtest		
Subject	Test	Retest	Difference	Test	Retest	Difference
S_1	28	28	0	24	24	0
S_6	24	25	1	16	18	2
S_{10}	18	19	1	25	25	0

Communication Skills

Table 5 shows the percentage correct and the z scores for articulation, word intelligibility, receptive language, and expressive language tests for the hearing-impaired children. The z score represented the number of standard deviations that each child's test score was from the test mean score appropriate for the child's chronological age.

For the Templin-Darley Test of Articulation, the individual z scores ranged from -0.9 to -10.7, with the mean z scores at -4.4. One subject, S_1 (z score = -0.9) scored within one standard deviation of the test mean. Four children (S_1, S_6, S_7, and S_{11}) did better on this test than on any other test of communication skills.

On the receptive subtest of the Northwestern Syntax Screening Test, the individual z scores ranged from -1.0 to -10.8. The mean z score was -5.1. Subject 2 was the only child to score within one standard deviation of the test mean. Three children (S_2, S_8, and S_9) did better on this test than on any other test of communication skills.

On the expressive subtest of the Northwestern Syntax Screening Test, the individual z scores ranged from -1.7 to -13.5, with a mean z score of -6.39. No subject scored within one standard deviation of the mean on this subtest. Four children (S_3, S_4, S_5, and S_{10}) did better on this test than on any other test of communication skills.

The word intelligibility scores ranged from 10% to 95%, with a mean value of 75.9%.

Table 5

Test Results on the Language Tests and Ratings of the Quality and Quantity of Spoken Language

Subject	Test Scores: Articulation %	Articulation Z	Word Intelligibility %	Language: Receptive %	Receptive Z	Expressive %	Expressive Z	Ratings (X/5): Quality T r	Quality T m	Quality P	Quality Te	Quality $\bar{X}$	Quantity T r	Quantity T m	Quantity P	Quantity Te	Quantity $\bar{X}$
S_1	64	- 0.95	75	70	- 1.20	60	- 1.72	3	3	3	4	3.25	3	3	5	3	3.50
S_2	85	- 1.49	95	90	- 1.09*	80	- 3.23	2	2	2	4	2.50	5	5	3	3	4.00
S_3	74	- 4.46	85	80	- 3.26	80	- 3.23	3	2	5	4	3.50	3	2	5	5	3.75
S_4	80	- 2.64	85	68	- 5.97	83	- 2.59	4	4	4	3	3.75	4	5	4	3	4.00
S_5	69	- 3.72	75	83	- 2.71	85	- 1.94	3	3	3	4	3.25	3	3	4	3	3.25
S_6	71	- 3.43	80	60	- 7.60	40	-13.57	2	2	3	3	2.50	2	2	3	3	2.50
S_7	74	- 3.04	90	68	- 5.97	75	- 4.53	2	3	3	4	3.00	2	3	3	3	2.75
S_8	63	- 6.54	80	75	- 4.34	50	-10.98	1	1	2	1	1.25	4	4	3	2	3.25
S_9	65	- 6.26	80	75	- 4.34	58	- 9.05	3	3	2	2	2.50	2	2	4	2	2.50
S_{10}	42	-10.70	10	45	-10.86	63	- 7.76	3	3	2	2	2.50	4	5	4	3	4.00
S_{11}	60	- 4.88	80	53	- 9.23	48	-11.64	2	2	2	2	2.00	1	1	2	1	1.25
$\bar{X}$	67.90	- 4.4	75.90	69.70	- 5.1	65.60	- 6.39	2.6	2.6	3.1	3.0	2.70	3.1	3.3	3.6	3.4	3.20
Median	69.00		80.00	70.00		63.00		3	3	3	3	2.50	3	3	4	3	3.30
s	11.42		0.23	13.19		15.76		.843	.843	3.1	1.09	0.70	1.2	1.41	0.9	0.8	0.90
R	43.00		61.00	45.00		45.00		3	3	3	3	2.50	4	4	3	4	2.80

*This score would be rounded to the nearest whole integer for clinical purposes. Therefore, the score is within one standard deviation of the test mean for her age group.

NOTE: The Templin-Darley Test of Articulation, the Expressive and Receptive subtests of the Northwestern Syntax Screening Test are recorded as percentage correct and as Z scores. Quality and Quantity were rated on a five-point scale: 1 = very poor/never; 2 = poor/needs encouragement and/or extra help; 3 = average performance for his grade level; 4 = better/more than is expected of an average student; 5 = superior/excessive amounts.

KEY : T = Teacher r = Reading

P = Parent m - Mathematics

Te = Tester

For the communication skills, the mean of ratings by teachers, parents, and the tester on the 1-5 scale ranged from 1.25 to 3.75 for the quality of spoken language and from 1.25 to 4.00 for the quantity (see Table 5). The mean rating for quantity ($\overline{X}$ = 3.2) was slightly higher than the quality of spoken language ($\overline{X}$ = 2.7). The mean ratings by the tester tended to be higher than the mean ratings by the two teachers. The parents tended to rate their children higher than did the teachers or the tester.

Appendix E shows the parents' ratings of their children's conversational language before and after mainstreaming. The children showed more improvement in increase in sentence length than in any other rated category. Aggressiveness during conversational speech was rated higher than the other features of conversational speech both before and after mainstreaming. Although the effects of maturation upon improved communication skills were not known, the comparison of the children to normal-hearing children of the same age (a rating of 3 on the 1-5 scale) for both the before and after mainstreaming ratings should have removed some of the ambiguity.

Table 6 shows the correlation coefficients for the null hypotheses listed under communication, academic, and social skills outlined in Chapter I. There were significant correlation coefficients between the following: (1) articulation test scores and word intelligibility scores ($r = 0.86$), and (2) receptive language test scores and (a) articulation test scores ($r = 0.71$), and (b) word intelligibility scores. Expressive language test scores correlated positively with ratings of the quality and quantity of spoken language.

Table 6

Correlation Coefficients Among Test Scores and Ratings of Communication, Academic, and Social Skills

		Communication Skills						Academic Skills				Social Skills
		Tests				Ratings						
		Articulation	Word Intelligibility	Expressive Language	Receptive Language	Quality	Quantity	Total Reading	Total Mathematics	GPA Reading	GPA Mathematics	Vineland
Communication Skills: Tests	Articulation											
	Word Intelligibility	0.86**										
	Expressive Language	0.48	0.16									
	Receptive Language	0.71*	0.66*	0.54								
Communication Skills: Rating	Quality	0.38	0.11	0.69*	0.19							
	Quantity	-0.13	-0.23	0.61*	0.34	0.40						
	Total Reading	0.52	0.48	0.37	0.29	0.65*	0.12					
Academic Skills	GPA Reading	0.13	0.23	-0.34	-0.24	0.25	-0.32	0.60*	0.58			
	Rating Reading	-0.12	0.03	-0.12	-0.10	0.23	-0.19	0.61*		0.69*		-0.28
	Total Math	0.24	0.13	0.38	0.14	0.64*	0.17	0.82**				
	GPA Math	-0.14	-0.03	-0.37	-0.33	-0.26	-0.07	0.29	0.33	0.51		
	Rating Math	-0.51	-0.37	-0.32	-0.51	-0.06	-0.29		0.42		0.80**	0.09
Social Skills	Vineland	-0.51	-0.61*	-0.16	-0.30	-0.53	-0.01	0.08	0.84**	-0.41	0.01	

*Significant at .05 level.

**Significant at .01 level.

Academic Skills

Table 7 shows the percentile scores from the achievement tests, grade point averages (GPA), and the teachers' ratings of academic skill for each child in reading and mathematics. The means and medians for the achievement test in both reading and mathematics do not agree with the means and the medians for the GPA and teachers' ratings. The mean achievement score suggested a low average performance in reading and mathematics; however, the mean GPA and the mean rating were between average (3 = C) and above average (4 = B) in academic skill. These three measurements compared hearing-impaired children to normal-hearing children at the same grade level.

The test scores and GPAs did not agree for Subjects 8, 10, and 11. The test scores indicated poor abilities or below-average abilities in both reading and mathematics (Durost, 1977). The GPAs for the same children suggest average to superior academic abilities. Why these discrepancies occurred was not known. Perhaps the children did not perform at their maximum potentials on the achievement tests, or the teachers may have overestimated the children's academic abilities.

Table 8 shows each child's scores on subtests of the achievement test. Test scores are converted to a grade level equivalent and a percentile rank for each subtest. The grade level and percentile rank shown in the total reading score are the sum of the word knowledge score and the reading score. Likewise, the total math score is the sum of the scores obtained in the computational subtest plus the concept subtest plus the problem-solving subtest.

Table 7

Achievement Test Results, Grade Point Averages, and Rating of Academic Skills in Reading and Mathematics

	Reading			Mathematics		
Subjects	Test Scores (percentile)	GPA (X/5)	Rating (X/5)	Test Scores (percentile)	GPA (X/5)	Rating (X/5)
S_1	64	5	4	80	5	4
S_2	8	3	2	16	3.5	2
S_3	28	3	3	5	2	2
S_4	96	5	4	93	5	4
S_5	52	3	3	78	3	3
S_6	28	5	3	20	4	3
S_7	56	4	4	38	4.5	4
S_8	1.5	3	*	4	5	*
S_9	50	5	5	64	4	*
S_{10}	0	3	3	12	4	4
S_{11}	6	4	3	10	4	4
$\bar{X}$	35.41	3.90	3.40	38.18	4.00	3.33
Median	28.00	4.00	3.00	20.00	4.00	4.00
s		0.90	0.84		0.92	0.86
R	0-96	3-5	2-5	4-93	2-5	2-4

*This child was in a special program for the hearing-impaired. He was the only child in his reading and/or mathematics group(s) making rating impossible.

NOTE: The grade point averages were converted to a five-point scale, A = 5, B = 4, C = 3, D = 2, F = 1. The ratings were based on a five-point scale: 1 = very poor; 2 = poor; 3 = average performance for his grade level/ 4 = better than average; 5 = superior and compared the hearing-impaired child to an average grade level performance of a normal hearing child.

Table 8

Grade Level Performances and Percentile Ranking on the Metropolitan Achievement Test
Taken by the Eleven Subjects in the Spring of 1977

	Reading						Mathematics							
	Word Knowledge		Reading		Total Reading		Computation		Concepts		Problem Solving		Mathematics	
Subjects	Grade	Percentile	Grade	Percentile	Grade	Percentile	Grade	Percentile	Grade	Percentile	Grade	Percentile	Grade	Percentile
S_1	-	-	-	-	-	64	-	-	-	-	-	-	-	80
S_2	4.7	17	2.8	2	3.9	8	.7	24	4.8	18	4.1	10	4.9	16
S_3	2.4	26	2.3	32	2.3	28	2.2	18	1.7	7	1.5	3	1.7	5
S_4	3.0	90	3.0	94	3.1	96	-	-	-	-	-	-	3.1	93
S_5	1.5	50	3.1	60	2.9	52	3.2	64	5.0	94	3.3	64	3.7	78
S_6	2.3	20	2.3	32	2.3	28	3.0	62	1.6	4	2.3	22	2.3	20
S_7	2.8	56	2.8	60	2.8	56	2.9	58	2.5	28	2.7	38	2.5	38
S_8	2.5	5	1.4	0	2.0	1.5	3.7	14	2.8	4	2.5	2	3.0	4
S_9	3.4	58	2.8	38	3.1	50	3.8	82	3.2	58	3.3	62	3.3	64
S_{10}	2.8	2	2.0	0	2.3	0	5.9	28	4.8	18	3.0	2	4.7	12
S_{11}	2.9	10	2.0	2	2.4	6	4.0	20	3.3	14	2.6	4	3.3	10
$\bar{X}$	2.83		2.45		2.71		3.82		3.30		2.81		3.25	
s	0.83		0.54		0.56		1.24		1.31		0.73		0.99	
R	1.5-4.7		1.4-3.1		2.0-3.9		2.2-5.9		1.6-5.0		1.5-4.1		1.7-4.9	

- = These scores were not reported since the test form did not test these areas.

When the percentile scores of the children were divided into ability levels (Durost, 1977), the scores were distributed as follows: Among the total reading subtest scores, one child scored at the superior ability level (95th percentile rank and above), six children scored at the average ability level (22.5 to 76 percentile ranks), two children scored at the below average ability level (3 to 22 percentile ranks), and two children scored at the poor ability level (0 to 2 percentile ranks). Seven of the hearing-impaired children's total reading scores fell within the average or better ability levels according to these groupings.

For total math scores, three children achieved at the above average ability levels (76.5 to 94 percentile ranks), two children scored at average ability levels and six children scored at the below average ability level. Five children of the hearing-impaired children had total math scores indicative of average or above average ability levels.

Correlation coefficients between test scores, GPAs, and teachers' ratings of academic skill in reading and mathematics are shown on Table 6 (p. 37). The total reading and total math scores were significantly correlated ($r = 0.82$). Significant correlations were also found among reading skills between the total reading score and the ratings of reading skills ($r = 0.61$). The total reading scores and the GPA in reading were significantly correlated ($r = 0.60$). Teachers' ratings correlated significantly with GPAs in both reading skills ($r = 0.69$) and mathematical skills ($r = 0.80$).

As an additional test, chronological ages of the children were correlated with the total reading score (rho = -0.89) and total math scores (rho = -0.74).

Communication Skills and Academic Skills

Correlations between communication skills and academic skills are shown on Table 6 (p. 37). Quality of spoken language significantly correlated with the total reading scores (r = 0.65) and total math scores (r - 0.64). Trends were noted between articulation test scores and total reading scores and also between the teachers' ratings in mathematical skills and (1) articulation test scores and (2) receptive language scores.

Social Skills

Table 9 shows (1) the results of each child on the Vineland Social Maturity Scale recorded as social ages and social quotients, (2) ratings by teachers, and (3) ratings by the parents of their child's social maturity before and after mainstreaming into the public school. The mean social quotient indicated average social skills although the quotients of five subjects exceed 100 points, which is the Vineland score for average chronological age performance. These results suggested that most of the children displayed average behaviors compared to the behavior of their peers of equal chronological age. The ratings by parents indicate average social skills relative to normal-hearing children of the same chronological age. These ratings suggested improved social abilities during the mainstreaming experiences. The ratings

Table 9

Social Ages and Social Quotients from the Vineland Social Maturity Scale and Ratings of Social Maturity in the Classroom and in the Home Before and After Mainstreaming

Subject	Vineland Social Maturity Scale		School Environment (X/5)	Home Environment (X/5)												
			Teacher Evaluation	Parent Evaluation												
	Social Age	Social Quotient	Maturity	Maturity		Sharing		Responsibility		Self Reliance		Self Image		$\bar{X}$	$\bar{X}$
				B	A	B	A	B	A	B	A	B	A	B	A
S_1	8.0	123	2	3	3	1	2	3	3	3	4	3	3	2.6	3.0
S_2	11.7	94	3	1	3	3	4	2	3	2	3	2	3	2.0	3.2
S_3	7.9	82	3	1	2	1	2	1	2	3	3	3	3	3.2	2.4
S_4	9.2	118	5	3	3	3	3	3	3	3	3	5	5	3.4	3.4
S_5	11.2	140	3	2	3	3	3	4	4	4	4	3	3	3.2	3.4
S_6	10.2	88	4	2	2	2	3	3	4	4	5	3	3	2.8	3.4
S_7	9.8	102	3	3	3	2	2	4	4	3	3	3	3	3.0	3.0
S_8	11.0	88	5	1	4	1	4	2	3	2	3	2	3	2.0	3.4
S_9	11.2	108	4	4	4	-	-	-	-	-	-	-	-		
S_{10}	13.8	99	5	3	3	3	3	3	3	3	3	4	4	3.2	3.2
S_{11}	10.8	93	3	2	3	2	3	1	2	2	3	3	3	2.0	2.8
$\bar{X}$	10.4	103.18	3.63	2.3	2.4	2.1	2.9	2.6	3.1	2.9	3.4	3.1	3.6	2.7	3.12
Median	10.8	99.00	3	2	3	2	3	1	2	2	3	3	3		
s	.5	17.63	1.02	1.0	0.7	0.9	0.7	1.1	0.7	0.7	0.7	0.9	0.4	0.55	0.32
R	5.9	58.00	3	3	2	2	2	3	2	2	2	3	2	1.4	1.0

B = Before mainstreaming.

A = After mainstreaming.

- = Information not obtained.

by teachers suggested that the children had average social skills compared to those of their normal-hearing classmates.

Table 6 (p. 37) shows the correlation coefficients among social quotients and the communication scores and academic scores. The social quotient significantly correlated with (1) word intelligibility scores ($r = -0.61$) and (2) total math scores ($r = 0.84$). Although they were not significant, the negative correlation coefficients were above 0.50 for the social quotient and (1) articulation test scores and (2) quality of spoken language.

CHAPTER V

DISCUSSION

Communication Skills

The high significant correlation between articulation test scores and word intelligibility scores was expected. Misarticulations obscure the intelligibility of single words lacking contextual clues.

The correlation between receptive language test scores and articulation test scores is easily explained if perception of speech sounds in contextual situations, i.e., receptive language, is seen to parallel the production of the same speech sounds. On this assumption, receptive language skills improve as articulatory skills improve. The receptive language test scores also correlated significantly with word intelligibility scores. Again, as receptive language skills improve, production of single words should improve.

How well the children perceived the single phonemes or single words in the receptive language test is not known. However, seven pairs of test items on the receptive subtest of the Northwestern Syntax Screeming Test are differentiated by the presence or absence of a sibilant phoneme. Sibilants are high-frequency phonemes that are high in pitch perception. This requires the hearing-impaired children to perceive high-pitched sibilants. Therefore, high scores on the receptive language test suggest well developed perceptual skills.

The relationship between receptive and expressive language test scores was not statistically significant; however, the correlation coefficient was high ($r = 0.54$). This trend is substantial enough to support the interdependence between perception and production. Since test items on the receptive and expressive subtests are parallel in structure, the responses on one subtest should resemble the responses on the other subtest.

Expressive language test scores were higher for higher ratings of the quality of spoken language, the significant correlation coefficient being $r = 0.69$. The rating of the quality appeared to be related to the expressive language test score.

Expressive language test scores improved as the quantity of verbalizations increased. As expressive language skill improved, confidence in verbal ability increased; so there was probably a greater inclination to talk. However, the quality of spoken language did not correlate significantly with quantity ($r = 0.40$). This lack of relationship is difficult to explain since the definition of the rating in quality of spoken language is similar to the expressive language measurement.

Academic Skills

Scores on the achievement tests in this study are similar to scores reported in the Studies in Achievement Testing (1971). The mean total math score for the group ($\overline{X} = 3.25$) was higher than the mean total reading score ($\overline{X} = 2.71$). The mean computation subtest score ($\overline{X} = 3.82$)

was the highest subtest score, and the mean reading subtest score was the lowest subtest score ($\bar{X}$ = 2.45) (see Table 8, p. 40).

The grade levels of the children ranged six years. Therefore the percentile ranks were more suitable for statistical comparisons with other test measurements than were the grade level scores. The mean percentile for reading was 35.41, and it was 38.18 for mathematics. Both means were within one negative standard deviation of the achievement test mean since one negative standard deviation equals the sixteenth percentile rank. These mean scores indicated low average abilities in reading and mathematics. Depressed academic achievement test scores were expected (Myklebust, 1960; Furth, 1966; Rutledge, 1965).

The teachers' ratings of their students' academic skills and GPAs are more sensitive to performances within the classrooms. These scores significantly correlated in both reading and mathematics. Total reading scores correlated significantly with the ratings and GPAs; total math scores did not. The high rating and GPAs indicate average and above-average academic skills for the mainstreamed hearing-impaired children relative to their classmates. This suggests that the educational programs chosen for each child are appropriate for meeting their educational needs. The eleven children are maintaining good academic standing. Only two subjects, S_5 and S_{11}, were enrolled in resource programs during the 1976-77 school year. Improvements were needed in several of the individual education programs. More special education services which would facilitate acquisition of improved communication and academic skills were needed in some of the school systems.

Most of the children were enrolled in language and speech therapy and/or aural habilitation classes. Whether these programs had the strengthening of academic concepts as therapy goals was not known.

Teacher education courses about teaching methods for the hearing-impaired student would have benefited most of the classroom teachers. The classroom teacher in addition to being a good teacher, should understand the implications of a hearing impairment, its psychological, sociological, linguistic, and communication aspects (Maisel, 1976). However, within the existing educational programs in the public schools, the eleven children appear to have undergone positive learning experiences.

A high correlation between achievement test scores in reading and math suggests that the same children did well on both tests. A lack of significant correlation coefficients between communication skills and academic skills fails to explain why. Studies by Furth (1973), Myklebust (1960), and Pugh (1946) support a positive correlation between language skills and achievement test scores. In this study, only quality of spoken language correlated significantly with the two achievement test scores.

The Leiter International Scores (I.Q.) (see Table 1, p. 22) were supposed to be a good predictor of academic success for the hearing-impaired population (Birch & Birch, 1951). However, in the present study, these scores did not correlate significantly with the total reading scores (rho = 0.46) or the total math scores (rho = 0.24).

The social age score obtained from the Vineland Social Maturity Scale correlated significantly with only the total math scores (r = 0.84).

Lack of correlation of social age with both achievement test scores suggests that social age does not explain the high correlation between the two achievement test scores.

Correlations between communication skills, social skills, intelligence quotients, and the two academic achievement test scores do not explain the high correlation coefficient between the two achievement test scores. Perhaps the correlation is due to a test-taking ability. However, this explanation cannot be justified within the framework and information of the present study.

Both total reading and total math scores negatively correlated with chronological age. Significant negative correlations between chronological age and achievement test scores were reported by Pugh (1946), Furth (1966), and Thompson (1977). These negative correlations were attributed to (1) the supportive services being inadequate to counteract the cumulative effects of a hearing impairment upon acquisition of knowledge, or (2) the children's linguistic ability ill equipping them to learn new concepts and vocabulary as rapidly as their classmates do.

Communication Skills and Academic Skills

Correlations between communication skills and academic skills are shown on Table 5 (p. 35). Quality of spoken language significantly correlated with the total reading score ($r = 0.65$) and total math scores ($r = 0.64$). The measurement of the quality of spoken language is a composite rating of articulation, morphology, and syntax used by the child during spontaneous speech. The children who rated higher on their

quality of spoken language scored higher on the achievement tests than children who rated lower on quality.

Such a relationship between a language handicap and achievement in reading is observed in the low correlation between articulation test scores and total reading scores ($r = 0.52$). Ten of the eleven children scored below one standard deviation of the articulation test mean (see Table 5, p. 35), but seven of the eleven children scored at or above the 22.5 percentile (the cutoff percentile ranks between average and below-average skills) for their total reading score (see Table 7, p. 39).

Low correlations existed between the teachers' ratings of mathematical skill and articulation test scores ($r = -0.51$) and receptive language scores ($r = -0.51$). These correlations suggested an opposite trend between language skills and academic achievements in mathematics. Ten of the eleven children scored below one standard deviation of the mean on the articulation test. Ten of the eleven children scored below one standard deviation of the mean on the receptive language test; however, seven of the eleven children were rated as average or above average in mathematical skill. This trend suggested that the language handicap of the hearing-impaired children was not adversely affecting their academic achievement in mathematics in the regular classroom.

These three low correlations suggested a trend that language handicaps were more detrimental to the acquisition of reading skills than to the acquisition of mathematical skills.

Social Skills

Although two children, S_5 and S_1, had high social quotients (140 and 123), the average social quotient of the hearing-impaired children obtained from the Vineland Social Maturity Scale indicated social skills appropriate for their chronological ages. The means of the ratings of social skills by teachers and parents revealed average social skills.

A social quotient was based on the child's chronological age. Most of the children were mainstreamed into classrooms where their classmates were younger in age. The average social maturity of the older, hearing-impaired children might have proved disadvantageous to the mainstreaming procedure. The physical differences of the older, mainstreamed child coupled with the child's desire to participate in social activities with peers of the same chronological age as himself, could cause the child to be uncomfortable in his classroom environment. However, greater social maturity in the mainstreamed, handicapped child could facilitate the speed of his adaptation to the regular classroom by counter-acting weaknesses in communication and academic skills. More time is available for academic lessons when the teacher's and child's attentions are not directed towards developing appropriate social behaviors for the classroom. Such a rationale appeared to be working in the education programs for Subject 6 and Subject 8. These children were reported as having difficulty accepting their classroom placements with younger children. Subject 6 was rated as having above-average (4 on the 1-5 scale) social skills, and Subject 8 was rated as having superior

(5 on the 1-5 scale) social skills relative to their classmates. Offsetting these advanced social skills were weak communication and academic skills which suggested placement in lower grade levels.

Conversely, the program for a child with superior academic skills may allow time for improved social skills. For example, Subject 1 and Subject 5 were strong academic students prior to their being mainstreamed into regular classrooms. Facilitating their adaptation to the normal classroom through improved communication and social skills was a higher priority than teaching academic concepts for the classroom teacher of these children at the beginning of the school year. The superior academic abilities of these handicapped children compared to their normal-hearing classmates were used to the children's advantage by facilitating mainstreaming.

The negative correlation between the social quotients and word intelligibility suggests that as the child matures, less attention is devoted to articulatory skills. This premise is supported by trends suggested by the insignificant correlations between the social quotient and (1) articulation test scores and (2) the quality of spoken language. Perhaps the deterioration of expressive language skills is due to a shift in priorities for the older hearing-impaired child. For example, older children tend to be less receptive to being singled out for special treatment than are younger children. Therefore, even when language, speech and aural therapy is provided in the public school, the older child may accomplish less in therapy than the younger child. As another example, the older child may be given more responsibility for evaluating and caring for the hearing aid. As a result, the child may not be

sensitive to changes in the performance of the aid which may affect the speech discrimination (Watson, 1967). A decrease in speech discrimination may affect the quality of language.

The significant correlation between total math scores and the social quotient indicated that the more socially mature child performs better on mathematical achievement tests.

CHAPTER VI

SUMMARY AND CONCLUSIONS

This study evaluated eleven hearing-impaired children who were trained in the University of Tennessee Verbo-tonal Program and mainstreamed into public schools. Three areas were evaluated: (1) communication skills, (2) academic abilities, and (3) social maturity.

A successful mainstreaming program would ideally promote the following developments: (1) improved receptive and expressive language skills, (2) grade level academic achievement, and (3) normalized social skills.

Communication Skills

Scores of the hearing-impaired children on the receptive and expressive language tests and on the articulation test indicated severe deficits in language and articulation skills. The children were also rated by their teachers and parents and by the tester. These ratings suggested that the oral communication skills of the children were better than the results of the language and articulation tests would indicate. The following trends among test scores and ratings were observed.

1. Articulation, word intelligibility, and receptive language tests were positively related. For example, high scores on one of these tests were related to high scores on the other tests.

2. Expressive language test scores were positively related to the rated quality and quantity of spoken language scores.

Academic Skills

Achievement test scores indicated low-average to superior abilities, i.e., at or above the 22.5 percentile, for seven of the children on the total reading scores and for five children on the total math score. The ratings of academic skills (3 and 4 on the 1-5 scale) and the grade point averages for nine of the children suggested average abilities or better. Ratings for two of the children were low (1 and 2 on the 1-5 scale). Although the achievement test scores for some of the children indicated low-average and below-average abilities for their grade level compared to national norms, these children were successful in their individual classrooms. The mainstreaming programs for these hearing-impaired children were considered successful as long as the children maintained good academic standing among their classmates. From these results, most of the children appeared to be in individual education programs which provided them with positive academic experiences. For reading and mathematics, the following relationships between test scores and academic ratings and GPAs were observed.

1. The total reading and the total math scores were positively related.

2. The total math scores and the grade point averages in reading were positively related.

3. The total reading scores and the child's performance in reading as rated by a teacher were positively related.

4. The grade point averages and academic ratings by the teachers were positively related.

Communication Skills and Academic Skills

The correlations between communication skills and academic skills were highest when ratings of the quality of spoken language were compared to academic test scores. Correlations between measurements of language skills and total reading scores were positive. Correlations between measurements of language skills and ratings in mathematics were negative. The following relationships between communication skills and academic abilities were reported.

1. The quality of spoken language was positively related to scores on total reading and total math on achievement tests.

2. The total reading scores were positively related to the articulation test scores.

3. Rated mathematical skill was negatively related to the articulation and receptive language test scores.

Social Skills

Scores on the Vineland Social Maturity Scale agreed with other ratings of social skills by the parents and with ratings made by the classroom teachers. Ratings by both parents and teachers suggested an improvement in social skills during the children's mainstreaming experiences. It appeared that social maturity facilitated the learning of mathematical skills but had an opposite affect upon communication skills. The following relationships were reported.

1. The rated mathematical skills were positively related to the social quotient scores.

2. Articulation test, word intelligibility, and expressive language test scores were negatively related to social quotient scores.

These several measurements of communication, academic, and social skills suggested the following conclusions about the success of the individual education programs which were designed for these hearing-impaired children in the public schools.

The communication skills of the children were poor relative to those of normal-hearing children of the same chronological age. However, success within the classroom did not appear to be dependent upon these communication skills.

Although their academic performances on standardized tests of reading and mathematics were average or below-average compared to national norms, within their own schools, the children were successfully mainstreamed insofar as academic achievement.

The children seemed to profit socially from their experiences in the public school environments. Their social skills were rated as average to high. Therefore, the mainstreaming experiences contributed to the development of social patterns appropriate for the grade levels of the hearing-impaired children.

Limitations of the Study

The number of subjects in the study was small (n = 11).

The subjects were not matched to control the number of independent variables (e.g., age, grade level, number of years in the Verbo-tonal Program, number of years in public schools, and degree of hearing loss).

The types of mainstream programs in which the children were enrolled were not matched to control effects of different teaching methods and learning environments.

The 20 words used in the word intelligibility test were not phonetically balanced.

The five-point rating scale was not as sensitive to levels of ability as a seven-point scale might have been.

Topics for Future Studies

Studies which need to be done:

A study similar to the present one using a longitudinal technique and a larger population.

A comparison of mainstreamed verbo-tonal students to mainstreamed students from the Tennessee State School for the Deaf in academic and social skills.

A comparison of communication, academic, and social skills of hearing-impaired students in open and in self-contained classrooms.

A survey of the type and amount of professional training in the education of aurally handicapped children which regular and special education teachers in the public schools have had.

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APPENDIXES

APPENDIX A

A DESCRIPTION OF THE VERBO-TONAL PROCEDURES

In general the Verbo-tonal therapy was divided into four areas: (1) body movements and implementation, (2) musical stimulation, (3) reading readiness and reading, and (4) individual work. Body movements involved the use of body tension and movement to teach the correct tension for articulation. The implementation procedure was used as soon as a child could articulate the word. Words were taught in a language atmosphere termed "situational teaching." Implementation procedures may also be observed in the tapes mentioned.

Musical (rhythmical) stimulations were used to teach the correct timing and rhythm of the syllables and words necessary for normal speech production, and to increase the auditory memory span of the children. In this procedure the children and the teacher would clap, tap, or make similar rhythmical movements together as they spoke in unison and practiced the nursery rhymes developed for this purpose.

Reading readiness activities, e.g., color matching, lotto games for concept formation, cutting and pasting, and number readiness were part of the total therapy program as was reading. During these activities, a multisensory approach was used with special emphasis on auditory input whenever it was appropriate. Visual clues were available, but formal lipreading was not taught.

For the Verbo-tonal Method, individual work should be used in conjunction with group therapy. In individual work the child is taken from the group situation and receives individual attention for any problem which is hindering his progress within the group. Emphasis may be upon body movements and speech production, rhythmical stimulations, or associations and concept development. Auditory perception is developed in both an aided and unaided situation.

Ideally, each child should receive individual work (stimulation) daily because it is an essential part of the Verbo-tonal method. However, it was not possible to provide individual work until the last four months of the third fiscal year. For this four month period, three of the older children received one hour per week as part of their regular 15-hour schedule. The other seventeen children did not receive formal individual training work.

Unaided stimulation was provided for each child within the classroom immediately after a group session. The teacher removed the child's earphones and spoke familiar words to the unaided ear. The distance was

increased if the child perceived and produced the words. Visual clues were not available (Asp, 1973).

APPENDIX B

TWENTY WORDS USED TO EVALUATE WORD INTELLIGIBILITY*

AWAY	GET	JUMP	STOP
BLUE	HAD	OVER	TEN
DOWN	HER	PUT	THAT
FIND	INTO	RAN	WHAT
FLY	ITS	SEE	WILL

*These words were taken from the Dolch Word List.

APPENDIX C

FORM USED IN INTERVIEW WITH CLASSROOM TEACHERS

1: very poor or never
2: poor, needs encouragement and/or extra help
3: average performance for his/her grade level
4: better, or more than would be expected from an average student
5: superior skill or excessive amounts

1. cumulative GPA

2. rating of child's academic skill 1 2 3 4 5

3. general maturity of class (F, D, C, B, A)
   1 2 3 4 5

4. general conduct of class 1 2 3 4 5
   of child 1 2 3 4 5

5. amount of communication between child and peers

6. Does she/he rely mainly upon verbal, gestural, both communication?

7. Do unfamiliar adults understand her/him?

8. Does she/he understand strangers?

9. How often does she/he initiate conversations (a) with adults, (b) during class discussions?

10. Doe she/he follow discussions well? 1 2 3 4 5

11. How well does he contribute (quality)? 1 2 3 4 5

12. How often does he contribute? 1 2 3 4 5

13. How clearly does she/he express himself? 1 2 3 4 5

14. What is his frustration level when met with new tasks? 1 2 3 4 5

15. How has he progressed academically compared to classmates? 1 2 3 4 5

16. Rate overall quantity of communication. 1 2 3 4 5

17. Rate overall quality of communication. 1 2 3 4 5

18. How much experience have you had teaching the deaf?

19. How much education in preparation for teaching deaf/hard-hearing?

20. Was mainstreaming a good idea for _____?

21. What is your general opinion about mainstreaming?

APPENDIX D

FORM USED IN THE INTERVIEW WITH PARENTS OF HEARING-IMPAIRED CHILDREN

1: very poor or never
2: poor, needs encouragement and/or extra help
3: average performance for his/her grade level
4: better, or more than would be expected from an average student
5: superior skill or excessive amounts

1. Have you noticed a difference in how she/he talks in your home since mainstreaming:

	BEFORE	AFTER
aggressiveness	1 2 3 4 5	1 2 3 4 5
amount of talking	1 2 3 4 5	1 2 3 4 5
content	1 2 3 4 5	1 2 3 4 5
pronunciation	1 2 3 4 5	1 2 3 4 5
length of sentences	1 2 3 4 5	1 2 3 4 5

2. Have you noticed a difference in social interaction in the home since mainstreaming?

	BEFORE	AFTER
maturity	1 2 3 4 5	1 2 3 4 5
sharing	1 2 3 4 5	1 2 3 4 5
responsibility for self	1 2 3 4 5	1 2 3 4 5
self-reliance	1 2 3 4 5	1 2 3 4 5
self-attitude	1 2 3 4 5	1 2 3 4 5

3. Have you noticed a difference in relationship between:
child and father
mother
siblings?

4. How would you rate the amount of talking your child does in the home compared to other children? 1 2 3 4 5

5. How would you rate how well he expresses himself? 1 2 3 4 5

6. Were you in favor of mainstreaming?

7. What did you know about the school in which he was to be placed?

8. Who pushed the hardest for his being mainstreamed?

9. Who was negative about mainstreaming?

10. Has he received enough additional support at the public school to insure his/her success academically?

11. Did the whole family support his being mainstreamed?

APPENDIX E

PARENTS' RATINGS OF CONVERSATIONAL LANGUAGE OF THEIR CHILDREN BEFORE AND AFTER MAINSTREAMING

Table 10

Ratings by Parents of the Conversational Language of Their Children Before and After Mainstreaming in the Public Schools

Subject	Aggression			Content			Articulation			Length of Sentence			Means	
	B	A	Difference	B	A	Difference	B	A	Difference	B	A	Difference	B	A
S_1	4	4	0	3	4	1	2	3	1	2	3	1	2.75	3.50
S_2	1	4	3	2	3	1	2	3	1	2	3	1	1.75	3.25
S_3	4	4	0	1	2.5	1.5	2	3	1	1	2.5	1.5	2.00	3.00
S_4	3	3	0	3	3	0	2	3	1	2	3.5	1.5	2.50	3.13
S_5	4	3	-1	3	3	0	2	4	2	2	3	1	2.75	3.25
S_6	3	4	1	3	3	0	3	4	1	2	5	3	2.75	4.00
S_7	2	2	0	2	3	1	2	3	1	2	2	0	2.00	2.50
S_8	2.5	3.5	1	3	3	0	3	3	0	2	3	1	2.63	3.13
S_9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
S_{10}	3	4	1	3	3	0	2	3	1	2.5	3.5	1	2.63	3.38
S_{11}	1	2.5	1.5	1	2	1	1.5	2	0.5	1	2	1	1.13	2.63
$\bar{X}$	2.8	3.4	0.7	2.4	3.0	0.6	2.2	3.1	1.0	1.9	3.0	1.2	2.29	3.18
Median	3	3.8	0.5	3.0	3.0	0.5	2.0	3.0	1.0	2.0	3.0	1.0	2.50	3.10
s	1.1	0.7	1.1	0.8	0.5	0.6	0.5	0.6	0.5	0.4	0.9	0.8		
R	1-4	0.7-4	1-3	103	2-4	0-1.5	1.5-3	2-4	0-2	1-2.5	2-5	0-3	1.13-2.75	2.5-4

- = Information not obtained.

B = Before mainstreaming.

A = After mainstreaming.

VITA

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