A PRELIMINARY STUDY OF THE TWU READING TEST AS A MEASURE OF SYNTACTIC ABILITIES FOR DEAF CHILDREN

A THESIS

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We hereby recommend that the thesis prepared under our supervision by Bonnie Kaye Knowlan entitled "A Preliminary Study of the TWU Reading Test as a Measure of Syntactic Abilities for Deaf Children"

be accepted as fulfilling this part of the requirements for the Degree of Master of Arts.

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Chapter I

Introduction

Overview

Reading serves as a medium of communication and a tool of learning in society. It remains the chief means of exchanging ideas and experiences (McCullough and Tinker, 1968). For the hearing impaired child, learning to read is one of the most important, as well as one of the most difficult, tasks he will encounter in his education (Hart, 1963). Hart (1963) states that "the printed form represents the only medium of communication in which the deaf person meets intact language patterns in exactly the same form as anyone else" (p. 1). It is important that the hearing impaired child develop a high degree of skill in reading for "the written pattern is not only more permanent but it is more complete than the pattern that can be obtained either through lipreading or aided hearing or the combination of both" (Watson, 1969, p. 136).

"Reading is acquired by relating what the word looks like to what it sounds like" (Myklebust, 1964, p. 231). A hearing child learns to convert the printed symbols into oral counterparts for the words and meanings are usually available, but with the hearing impaired child this often is

not true. The hearing impaired child is at a disadvantage for "he cannot easily convert written symbols into oral symbols" (Hart, 1963, p. 1). His language grows slowly for he is struggling to identify written words that have no meaning to him in any form. The hearing impaired child must acquire meaning for the written word before conceptualization can occur, for "a word without meaning is not a word" (Myklebust, 1964, p. 232).

"Educated understanding and the most valued forms of competence are unattainable by one who cannot read well" (McCullough and Tinker, 1968, p. 3). Teachers of deaf children must discover the students' strengths and weaknesses in order to meet the needs of all their students. For years, educators of the deaf have assessed hearing impaired childrens' reading ability with instruments specifically designed for the normal hearing child. Thus, educators are faced with the problem of finding an instrument that is proficient in appraising a hearing impaired child's reading ability.

Need for the Study

Educators of the deaf realize that when auditory language is impeded, syntax development is restricted. Syntactic development is crucial in the acquisition of reading competence. Thus, in order to evaluate a hearing

impaired child's reading development, it is important for deaf educators to be able to measure the child's level of syntactic competence. Consequently, there is a need in the field of deaf education for an instrument which accurately measures syntactic development in hearing impaired children.

A hearing child's first exposure to inner and receptive language is auditory. However, "it is impossible for the deaf child first to have language which is auditory" (Myklebust, 1964, p. 234). Normally every child is born with the capacity to acquire language. Because of the importance of auditory language, however, a deaf child "is confronted with one of the most difficult problems of learning known" (Myklebust, 1964, p. 234). McNeil (1966) acknowledged that the deaf child is faced with the task of constructing a complex grammar on the basis of poor data. Without the experiences that the hearing child encounters, the deaf child is limited in his language development. For example, if the word "dog" is to have significance, the deaf child must first gain the experience of "dog." When auditory language is impeded and "cannot be established because of deafness, then acquisition of all of the succeeding language functions will be impeded" (Myklebust, 1964, p. 233).

The acquisition of syntax is crucial for the hearing

impaired child if he is to reach an adequate level of reading competence. Myklebust (1964) commented that reading acquisition will be impeded if a hearing impaired child's inner and receptive language are not equivalent to the inner and receptive language of a hearing child. Unfortunately, the deaf child grows up in a world devoid of meaningful sound. He is forced to learn language through experience other than the normal aural experience (Hart and Rosenstein, 1964). With the lack of basic auditory language, the deaf child has great difficulty in acquiring the rules which govern the structure of his native tongue" (Myklebust, 1964, p. 292). The task of learning a code without knowledge of what is to be learned is a hindrance to the deaf child (Streng, 1967). Betts (1957) suggests that reading is an evaluative process that requires reconstruction of the facts behind the symbols. Such reconstruction requires the reader to carry a sequence of ideas in mind, associate immediate experiences with a background of information, anticipate ideas and draw inferences (Streng, 1964). When reading is considered in such a frame of reference, the importance of language facility immediately becomes dominant" (Streng, 1964, p. 1). Thus, the process of reading is closely connected to the learning of language. Before a deaf child

can learn to read, he must have an understanding of the language (Hart, 1963).

There are unlimited sources of difficulty that must be dealt with in order to provide the child with an opportunity for normal language development. As teachers of the deaf are almost solely responsible for developing language in deaf children, an assessment of syntactic competence of deaf children would be of great value to teachers in their efforts to transmit information that will meet the special needs of deaf students. In order to adjust reading instruction to specific needs, evaluation of each student is necessary. Such appraisal should reveal a child's pattern of growth (McCullough and Tinker, 1968).

Statement of the Problem

Furth, in Thinking Without Language, states that reading achievement is one indication of the linguistic ability of a deaf child; low reading achievement signifies language problems and not just reading difficulties (Lane and Baker, 1974). Goda (1959) stated that a deaf child who reads at a lower level may be expected, in general, to lipread, write and speak at a lower level. Conversely, the student who excels in reading may be expected, in general, to be relatively superior in all language skills (Goda, 1959).

The Stanford Achievement Test (S.A.T.) is the most frequently used instrument to measure the reading ability of deaf students. Merenda (1972) states that the S.A.T. has been the most widely used test of its kind over the longest period of time. Revisions of this test have been used in schools since the first edition appeared in 1923. The S.A.T. for hearing impaired students is a "series of comprehensive achievement tests developed to provide measurement and assessment of learning at different levels of the educational process" (Madden, Gardner, Rudman, Karlsen, and Merwin, 1972, p. 3). The test is widely used for evaluative purposes and has been integrated into many schools for the purpose of assessing current academic status of deaf students. Merenda (1972) states that "the Stanford Achievement Tests could probably by now be aptly called the 'standard' achievement tests" p. 25). The format of the individual tests is attractive and very efficient (Merenda, 1972). It is agreed that the S.A.T. is certainly "the patriarch of the standardized achievement test" (Merenda, 1972, p. 25).

Although the S.A.T. continues to be the most widely used battery of evaluating reading ability, many educators feel that the results obtained with hearing impaired children are not satisfactory. Hart (1963) states that "the standardized test is a useful, but limited tool" (p. 8). She goes

on to say that "the testing situation . . . may in some cases alter or disturb the pupils usual approach" (Hart, 1963, p. 8). The opinion has been voiced by many educators of the deaf that the S.A.T. is frustrating for the deaf child and not truly indicative of his ability. Betts (1957) believes that standardized tests of reading achievement cause children to perform at their frustration reading levels. He states that "the frustration level is the lowest level of readability at which the pupil is unable to comprehend printed symbols to a reasonable degree" (Betts, 1957, p. 450). According to Betts (1957), several things can contribute directly to frustration. First, the pupil may have inadequate word recognition skills. Second, the pupil may have a meager background of experience, limiting his ability to reconstruct facts behind symbols (Betts, 1957). Third, a child may have the ability to recognize vocabulary, but he may be unable to extract meaning from sentences due to a lack of syntactic competence. All of these contributing factors are often evident in the hearing impaired child.

Another problem that often arises when giving standardized tests to deaf children is that of guessing. Myklebust (1964) warns that the validity of test scores may be questionable. Often the deaf child does not make his choice

on the basis of total meaning of a sentence or paragraph, but matches words to possible associations of other words in the sentence. This tactic can result in high scores (Myklebust, 1964). Unfortunately, "the only information most teachers of the deaf have concerning the reading skills of their students is a set of test scores, expressed in grade levels" (Jensen, 1967, p. 1836).

Purpose of the Study

In an effort to provide teachers of the deaf with a more meaningful assessment of their students reading ability and to eliminate many frustrations cause by the S.A.T., White (1975) has designed the TWU Reading Test of Syntactic Constructions. The TWU Reading Test is specifically designed for the hearing impaired child. It assesses a child's ability to recognize various structural patterns fundamental to reading. The TWU Reading Test provides for this assessment without offering clues for guessing. A syntactic reading score is obtained for each child. The TWU Reading Test is economically designed in that it makes reasonable demands in terms of the amount of time needed to administer so that the hearing impaired child is not fatigued.

The purpose of this study is twofold. First, preliminary data will be secured by studying test results of the TWU Reading Test. Second, since the Stanford Achievement

Test/Reading Subtest (S.A.T./R.S.) is the achievement test which is widely used for evaluative purposes, data will be used to determine the relationship between reading achievement scores derived from the S.A.T./R.S. and the syntactic reading scores derived from the TWU Reading Test. These scores will be obtained from 89 elementary age deaf students ranging in age from 6 years 6 months, to 14 years 0 months, currently enrolled in a public day school for the deaf.

Research Hypothesis

It is hypothesized that a positive linear relationship will be manifest through performance on the S.A.T./R.S. and the TWU Reading Test. It is also predicted that the relationship, though linear and positive, will not be high, thus suggesting that while the two tests may be assessing some skills in common, they also are assessing skills that are unique to each test.

Chapter II

Review of the Literature

Introduction

"Achievement," as defined by Webster (1961), is the act of being successful; "performance by a student . . . during a given period" (p. 16). The concept of this word has been evident throughout history. As early as biblical days, the use of measures to test achievement were recorded. One such example is cited in Judges 12:5-6:

> And the Gileadites took the passages of Jordan before the Ephraimites: and it was so, that when those Ephraimites which were escaped said, Let me go over; that the men of Gilead said unto him, Art thou an Ephraimite? If he said Nay; then said they unto him, say now Shibboleth; and he said Sibboleth; for he could not frame to pronounce it right. Then they took him, and slew him at the passages of Jordan; And there fell at that time of the Ephraimites forty and two thousand.

The format of tests has been altered considerably since biblical times. Educators have been concerned with "measuring and evaluating the progress of their students" (Mehrens and Lehmann, 1969, p. 4). The task of evaluating became increasingly difficult with the complexity of goals and the growth of student population. "As a result, standardized tests have permeated the educational establishments"

(Mehrens and Lehmann, 1969, p. 4). Standardized tests provided pertinent information for teachers in terms of measurement and evaluation.

While everyone working with the deaf recognizes that reading ability is crucial for the deaf child in his dealing with today's society, limited research has been conducted on the matter of perfecting an instrument proficient in assessing the deaf child's reading ability. The most widely used instrument throughout the past few decades to measure the reading ability of the deaf child has been the standardized reading test. However, "many educators have questioned its face validity when used with deaf children" (Myklebust, 1964, p. 234). Traditionally, reading scores from the standardized reading test have been given as an indication of the deaf child's reading ability. Fusfield (1955) found, however, that inflated estimates and strange contradictions of capabilities became evident. As a result, the field of deaf education is lacking in competent instruments that assess linguistic abilities of deaf children. Blanton, Farr and Tuinman (1974) concur that "there can be little doubt that current reading tests . . . are in need of improvement" (p. 12).

Studies of Reading Achievement

A number of researchers have noted a striking deficiency

in the ability of deaf children to develop a high level of reading achievement (Odom and Blanton, 1970). Furth (1966) stated that reading is the ceiling of linguistic competence for deaf children. He felt that linguistic incompetence should not be regarded as retardation in reading, but rather deficiency in verbal language. Reading ability for the deaf indicates to what degree the language of the culture has been mastered (Odom and Blanton, 1970). Therefore, a lack of competency in language would be a limiting factor on one's ability to read language. Odom and Blanton (1970) concluded that low reading achievement levels for the deaf should not be interpreted as retardation in reading, but "as an index of linguistic incompetence" (p. 47). A reading test measures the language competence or lack thereof in the deaf child (Odom and Blanton, 1970). Research in the past 50 years has been conducted to answer questions regarding reading retardation in the deaf child, but little reason for optimism has been provided from results obtained.

In 1921, (Dr. R.) Pitner and (J. C.) Reamer developed the first battery of tests to be used in a national survey that included 2,500 deaf children. The population was gathered from 15 state schools and 11 day schools. Pitner and Reamer reported an educational retardation of five years, or three and one-half grades, as an average for the

deaf population.

The Visual Language Tests were introduced by Brill in 1941. These tests were developed and standardized for the deaf. The tests were designed to test the language ability of the deaf child below the level of standardized tests such as the S.A.T./R.S. The Visual Language Test was highly reliable and valid. This was proved by obtaining S.A.T. reading scores for a group of four and five year olds after they had taken the Visual Language Test. A correlation of over .87 was obtained which proved close compatibility and constancy of the two tests (Brill, 1941). The Visual Language Test was considered by Brill (1941) to be a valid predictor of the deaf child's ability to learn language between the ages of seven and eleven. Brill (1941) concluded that if a child made an educational quotient of less than .80, it was unlikely that the child would become proficient in language. From the group studied, Brill (1941) predicted that a child scoring lower than .80 on the Visual Language Test had one chance in five of reaching the lowest quartile of the Stanford Reading Battery.

Brill, in 1942, conducted another study using the publication My Weekly Reader in testing deaf children's reading progress. His purpose in the study was to prove that a set of norms obtained for hearing children would not

be duplicated when administering the same test to deaf children. He hoped to prove to teachers of the deaf that a deaf child's score could not be interpreted the same as a hearing child because of the language handicap inherent in the deaf child. Brill (1942) administered the My Weekly Reader test to 33 deaf children that were in the fourth grade. Form D was given in October. In January, Form D was given again and Form B was given the following day. The results showed that even though all forms were similar as far as the hearing child was concerned, the forms were dissimilar for the deaf child. He discovered that when the deaf child was given the same form of the test in January that he had taken in October, the growth was only .25. However, when taking the second form on the following day, there was an indicated growth of .72. For the forms to be parallel, however, there should have been a correlation well over .90 instead of the .72. These same forms were parallel for the hearing population, but Brill's study showed they were not parallel for the deaf population. Brill (1942) concluded from his findings that "until tests are standardized upon deaf children, there will be no identical forms for the deaf" (p. 139).

Griffin (1956) conducted a study at the Rochester School for the Deaf to test reading performance of deaf

children. The test used was the Informal Reading Inventory by Betts. The Inventory consisted of two paragraphs and five to eight questions covering fact, thought, and vocabulary. The children were tested individually and questions were given orally. The results of the test indicated that an average four year retardation in reading of deaf children was evident when compared with the expected average of hearing children. The range of scores was greatly varied within the group. Griffin (1956) found significant relationship between the Informal Reading Inventory and the S.A.T. reading scores, although the Inventory scores were spread over a greater range.

Wrightstone, Aranow, and Muskowitz (1962, 1963), using the Metropolitan Achievement Tests, developed norms by studying 5,307 deaf children in 73 special schools for the deaf in the United States and Canada. They found that the average gain in reading from ages 10 to 16 was less than one year; approximately eight months. The average reading achievement of sixteen year olds was grade level 3.5. Eight percent of the sixteen year olds tested were below grade level 4.9 in reading.

As stated earlier in this chapter, Odom and Blanton (1970) felt that reading achievement tests measure "the language competence or lack thereof in the deaf" (p. 48).

They felt that it was not surprising that deaf do poorly on reading tests when the deaf have not mastered the basic structure of language. However, Odom and Blanton (1970) felt that the nature of sign language and the relation to spoken language had been overlooked. Therefore, they stated that "for many deaf students, an apparent difficulty on reading achievement tests may be an artifact of a propensity of testing them in the wrong language" (p. 48). The study of Odom and Blanton (1970) reported the performance of deaf students on a reading test when administered in English, sign language, and nonsense word order. A control group of hearing students was given the same tests. It was predicted that the deaf subjects would perform better on the tests when in word order of sign language than when in word order of English. The subjects for this study were 36 deaf students, with a mean age of 17.11 years and a mean reading achievement grade equivalent of 4.0. The 36 hearing students used as a control group in the study had a mean age of 10.5 years and a mean reading achievement of 6.15. The test used in this study was the Gates Basic Reading Test for grades five through eight. The stories in the test were rewritten into sign language form by interpreters as were the questions. The test was given on three types of reading material. One group received an English version, a second

group received the test written in sign language and a third group received a scrambled version of the test. The results indicated that the deaf understood the paragraphs better when they conformed to the word order of sign language. Both hearing and deaf students understood scrambled paragraphs least. Odom and Blanton (1970) concluded that reading achievement tests "are not measuring reading ability in the deaf but the deaf's competency in English" (p. 54).

In 1970, the Office of Demographic Studies at Gallaudet College administered the Stanford Achievement Test to the United States hearing impaired youth and child population. The battery level to be administered to each student was determined by a screening test. The population ranged in age from 6 years to 20 years. Seventy percent of those tested were given the primary batteries standardized for hearing children grades one through three. Reading scores of fifth grade or better were achieved by only 12 percent of the deaf population, including students at secondary school levels (Lane and Baker, 1974).

Lane and Baker (1974) of Central Institute for the Deaf (C.I.D.) felt there was a need to examine the reading program by measuring the rate of improvement and associated achievement levels in reading scores. The battery selected for testing at C.I.D. was the American School Achievement

Series. The 132 subjects used in the testing were C.I.D. students ranging from 10 years to 16 years. All of the students had attended C.I.D. for a period of from 5 to 13 years, with an average attendance of 10.1 years. The testing was carried out over a four year period. The results showed improvement in reading skills of 2.5 grades in four years, as measured by five consecutive tests. The mean grade level in reading at the end of the five tests for students with an average chronological age of 15 years was 5.8. The results of this longitudinal study were compared to the scores obtained from the Wrightstone (1963) administration. The C.I.D. group was 2.2 grades ahead of the Wrightstone sample at the conclusion of the C.I.D. study. The C.I.D. results also showed improvement from test to test, indicating a steady rise with no evidence of a plateau. Lane and Baker (1974) concluded that although the study showed steady improvement, the reading level was still discouraging. They felt, however, the study did emphasize "that better reading achievement is possible for deaf children, with continuous progress but at a slower rate" (Lane and Baker, 1974, p. 499). Despite norms established by the Wrightstone (1963) study, Lane and Baker (1974) felt that parents and teachers "must be aware that reading skills above the third grade level can be achieved

by deaf students"(p. 499).

Summary

Along with the inquiry as to the deaf child's deficiencies, assessment of the deaf's language abilities maintains an area of primary concern (Moores, 1970). By reviewing the literature, one can see the progress in the area of reading ability has been slow and unproductive. Traditionally, educators of the deaf have used the S.A.T./R.S. to assess deaf students' reading ability. However, due to the inflated estimates (Moores, 1967) and strange contradictions as found by Fusfield (1955), Odom and Blanton's (1970) statement that reading achievement tests "are not measuring reading ability in the deaf but the deaf's competency in English" (p. 54) and Myklebust's (1964) comment as to the fact that the traditional standardized reading test validity is questionable when used with deaf children, it has been hypothesized by some that the S.A.T. may not be providing a true analysis as to the deaf students' ability. The TWU Reading Test is a new reading assessing instrument which focusses on a student's ability to recognize various structural patterns fundamental to reading (White, 1975). Inasmuch as educators have limited means of adequately measuring ability of deaf students to recognize syntactic patterns, further research as to the effectiveness

of a new instrument is warranted.

Chapter III

Research Design

Introduction

In the previous chapter, a review of contemporary major contributions to the literature on assessing the reading ability of deaf students was discussed. The chapter described the general characteristics of studies conducted in reading achievement since 1920. The intent of this chapter is to provide specific information as to the design of this study. The purpose of this study is to secure preliminary data by comparing TWU Reading Test averages and S.A.T./R.S. averages and to determine the relationship between reading achievement scores derived from the S.A.T./R.S. and syntactic reading scores derived from the TWU Reading Test. It has been hypothesized that a positive linear relationship will be manifest through performance on the S.A.T./R.S. and the TWU Reading Test. It is also predicted that the relationship, though linear and positive, will not be high, thus suggesting that while the two tests may be assessing some skills in common, they are also assessing some skills that are unique to each test.

Population and Hearing Sample

For the purpose of this study, a group of 89 students

ranging in age from 6 years to 14 years and currently enrolled in a public day school for the deaf was tested. An intelligence quotient for each student was not available, but in the judgment of the teachers and administrators, the students represented a group of children with normal intellectual ability. Each of the students had recently completed the Stanford Achievement Battery Reading Subtest for Hearing Impaired Students. Due to the wide variety of students with varying degrees of hearing loss attending classes for the deaf, the subjects of this study had hearing losses ranging from 26 dB in their better ear to 120+ dB in their poorer ear. Nine students' audiograms showed no response (NR), so in order to determine a mean hearing loss for the testing population, a dB loss of 120 was assigned to each of these nine students. A mean of 86.26 dB was found with a standard deviation of 22.4. By using students with such a vast range of hearing losses, a more complete sample of all students enrolled in the school for the deaf was obtained. Representation of group data is provided in Figure 1.

Treatment

The TWU Reading Test of Syntactic Constructions (White, 1975) is used in this study. It is designed so that word clues are eliminated. Each item includes one picture with

four word strings accompanying it. The student is required to recognize the correct syntactic word string in order to identify the right answer. The test is designed so that if the student has the sight vocabulary for the words in the test and if he has the competence to recognize the correct syntactic order, he should perform well. However, "knowledge of vocabulary, without syntactic competence, should result in low scores" (White, 1975, p. 1). The TWU Reading Test is not a vocabulary test. It is, however, designed to discover whether or not the student recognizes basic sentence patterns. The sentence patterns that are tested in the TWU Reading Test are listed on the evaluation form (Appendix A).

The TWU Reading Test was administered to all 89 students. Each student was given one test booklet with 28 items in it. An item included one picture with four word strings accompanying it. The student was to pick one word string which he felt represented the action of the picture. Of the four word strings, only one was syntactically correct. The student was given a sheet of paper numbered 1 through 28 to record his responses. All responses were then gathered and transcribed onto TWU Reading Test evaluation forms. The number of correct answers were counted for each of the respective sentence patterns. As found on the evaluation form, the number possible is indicated immediately

to the right of the sentence patterns. To report an overall score, a total of correct responses was recorded as the student's TWU syntactic score. The syntactic score reflected the child's ability to recognize various structural patterns. A second score of all tests confirmed that each child's syntactic score was recorded correctly.

Once TWU scores were obtained, they were then plotted against the S.A.T./R.S. scores. Although the scatter plot did not reveal a strong linear relationship, no other trend existed either; hence, a Pearson product-moment correlation was computed to determine the degree to which a linear relationship existed. An item analysis of the TWU Reading Test was presented to determine which sentence patterns were the most difficult. The age and score of each student was also plotted to see if there was a linear relationship. The scatter plot revealed very little, if any, linearity; nevertheless, to add precision to that observation, a Spearman Rho correlation was computed. Finally, an analysis of a few individual students was conducted to determine if syntactic weaknesses with children could be identified by means of the TWU Reading Test of Syntactic Constructions.

Chapter IV

Results

The purpose of this study was to investigate the reading performance of deaf children. The nature of the study was twofold. Preliminary data was secured on the TWU Reading Test and the data was used to determine the relationship between reading achievement scores derived from the S.A.T. reading subtest and syntactic reading scores derived from the TWU Reading Test.

Following the procedures outlined in Chapter III, data was obtained from 89 elementary age students enrolled in a public day school for the deaf during the Spring semester of 1976. They ranged in age from 6 years old to 14 years old and they possessed hearing losses ranging from 26 dB in their better ear to 120+ dB in their poorer ear. (See Figure 1)

During the Spring semester, 47 of the 89 students were tested on the reading subtest of the Stanford Achievement Test for Hearing Impaired Students (Madden, et al., 1972). The remaining 42 students were not given the S.A.T. by the school system on recommendation from the diagnostician. However, all 89 students were given the TWU Reading Test of Syntactic Constructions (White, 1975).

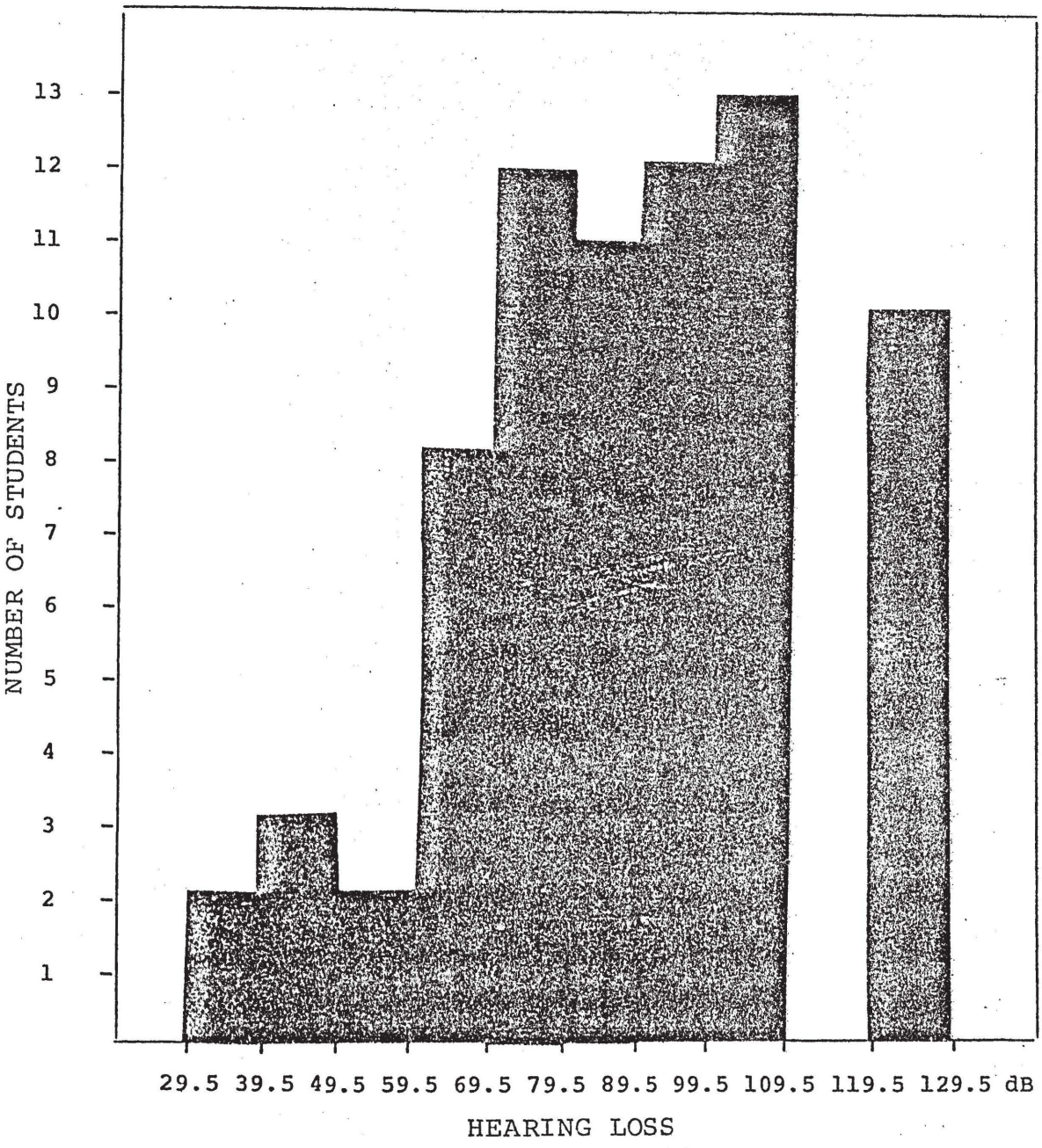

Figure 1. Distribution of subjects according to hearing loss.

It was hypothesized that a positive linear relationship will be manifest through performance on the S.A.T. reading subtest and the TWU Reading Test. To test this hypothesis, S.A.T. reading achievement scores and TWU Reading Test syntactic scores were obtained and plotted. Visual inspection of the scatter plot did not reveal a strong linear relationship; however, no other relationship existed either. To determine the relationship, a Pearson product-moment correlation was computed and ascertained to be .31. (Figure 2) A coefficient of determination, which is Rho^2, tells how much of the variation in one variable is attributable in the other variable. The coefficient of determination in this correlation is .09; hence, only .09 of the variability of the S.A.T./R.S. scores are predictable by knowledge of the TWU Reading Test syntactic scores. This correlation confirmed the implication that while the two tests may be assessing some skills in common, they are primarily assessing skills that are unique to each test.

It should be noted at this point that after all data was collected, 15 of the 89 students' tests were considered inadmissable for evaluative purposes. This decision was made on the basis of test performance. If the student was guessing, and this was made evident by repeating A, B, C, D, throughout items 1 through 28, the test was discarded from

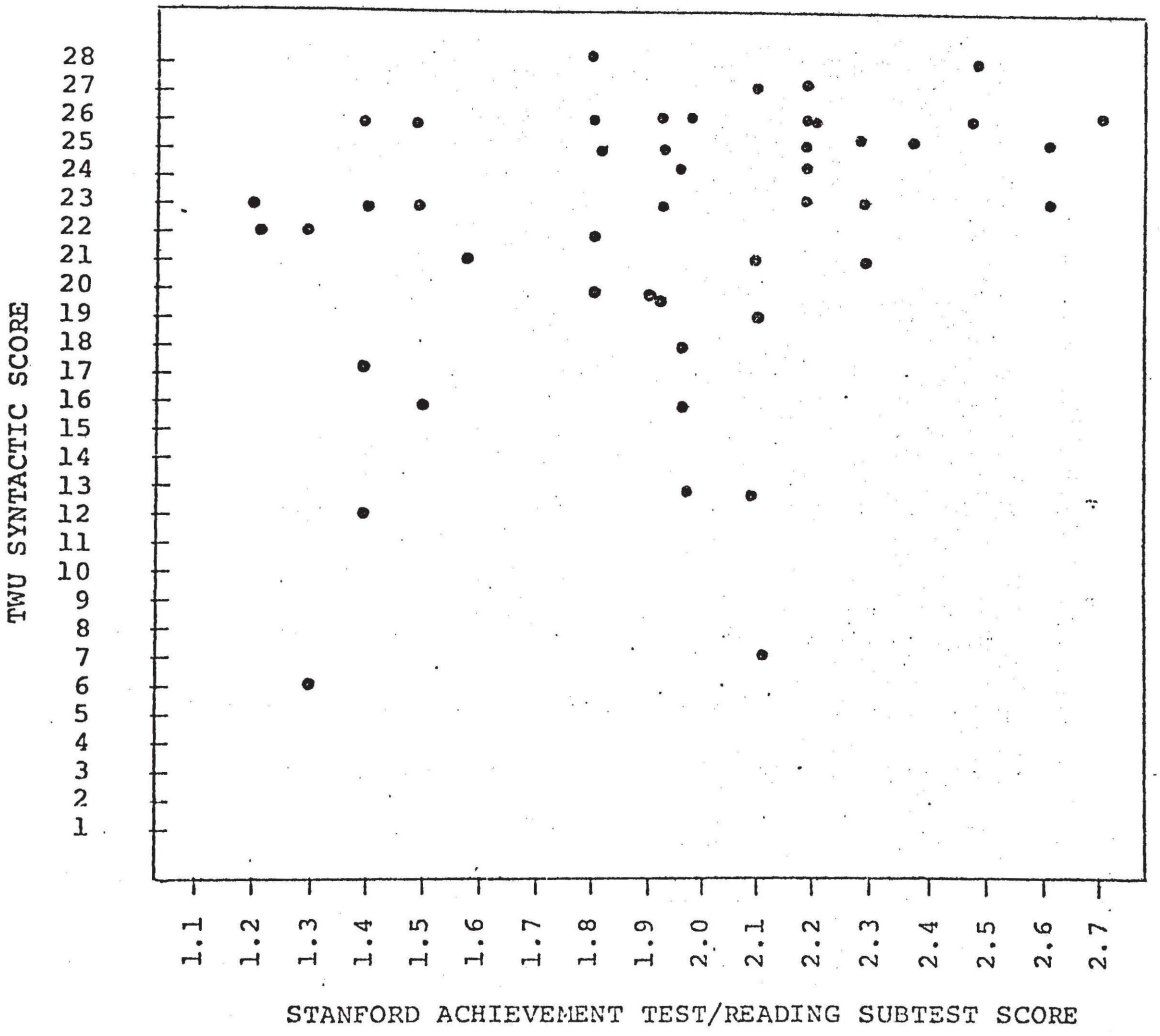

Figure 2. Scatterplot for deaf students readin achievement and syntactic scores.

this study. The removal of these 15 tests left a population of 74 admissable tests for evaluation. An item analysis of the TWU Reading Test was presented to determine which sentence patterns were the most difficult. Of the 11 sentence patterns tested, N + V + Infinitive proved the most difficult, with 51.1 percent of the students missing this series of items. The sentence pattern including articles before a singular or plural noun proved the second most difficult item with 43.25 percent of the students arriving at an erroneous answer. Figure 3 displays the sentence patterns graphed according to degree of difficulty, from most difficult to least difficult.

Mean age of the 74 students was also plotted to see if a linear relationship could be observed between age and score. The scatter plot revealed very little, if any, linearity; nonetheless, to add precision to that observation a Spearman Rho correlation was computed. The correlation was ascertained to be .27. A coefficient of determination, which is Rho^2, was computed to .07; hence, only .07 of the variability of the ages is predictable by knowledge of the syntactic score. There is a positive correlation between age and score, but it is small. The mean age for 74 students was found to be 135.97 months (11.3 years) with a standard deviation of 16.6 months. Table 1 provides data

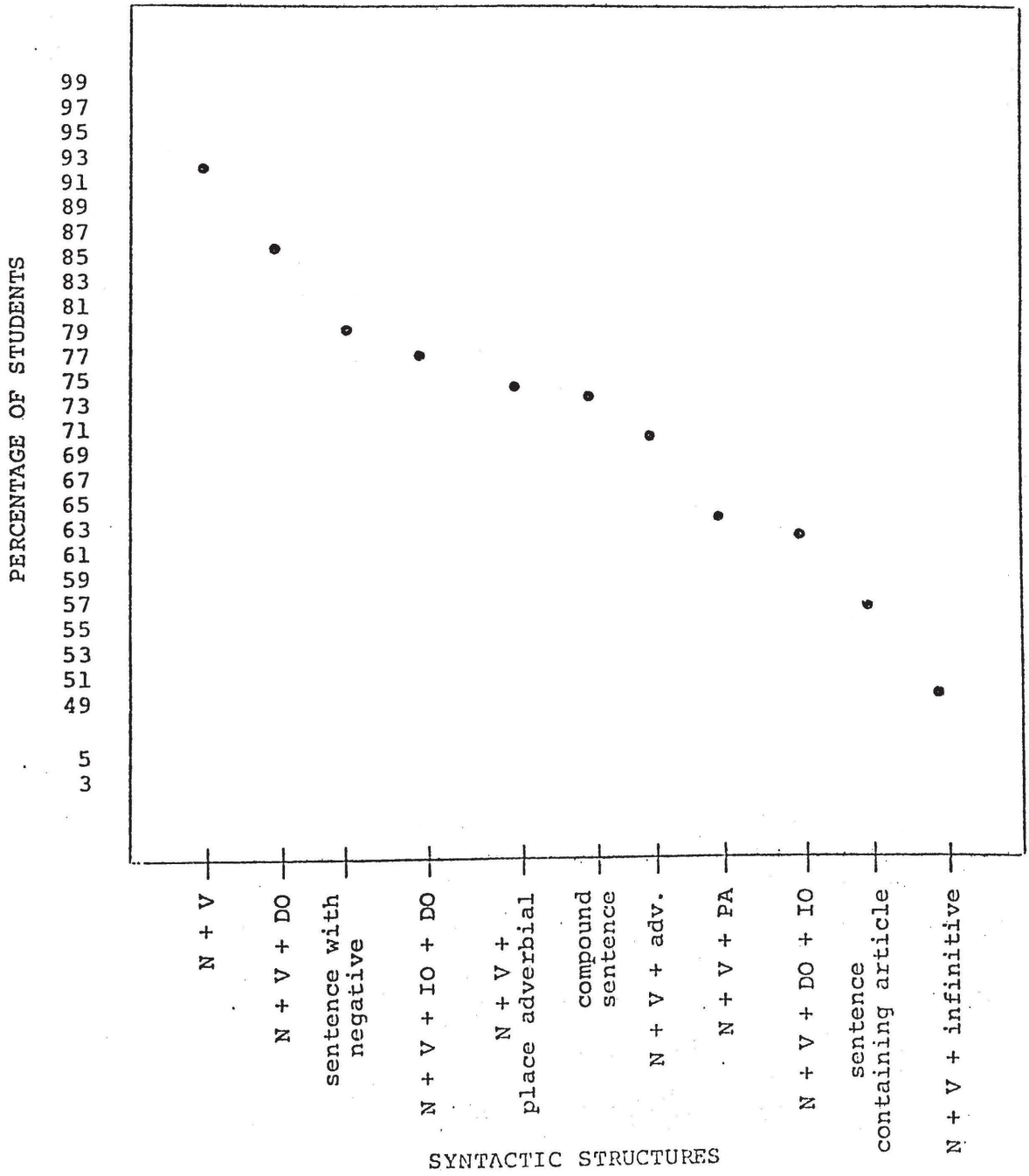

Figure 3. An item analysis of the percentage correct in each syntactic structure in the TWU Reading Test.

Table 1

Tentative Norms for
TWU Reading Test

Age	N	Mean Score	Standard Deviation
6.6 to 7.5	2	17.5	10.6
7.6 to 8.5	1	24.0	--
8.6 to 9.5	3	10.3	2.9
9.6 to 10.5	7	19.4	4.6
10.6 to 11.5	23	19.1	5.8
11.6 to 12.5	24	20.6	7.0
12.6 to 13.5	10	23.3	6.4
13.6 to 14.5	4	18.0	6.3

concerning age and mean TWU syntactic score.

In order to determine which variables are informative in predicting the TWU syntactic score, Table 2 was compiled. The Table takes into account age, dB loss, S.A.T./R.S. scores and their effect on the mean TWU syntactic score. The Table is compiled as a 3x3x3 matrix in order to display the effect that age, dB loss, and S.A.T./R.S. score has on the TWU syntactic score. It is predicted that a student in the older group with a high S.A.T./R.S. score and a low dB loss would perform better than a student of the same age with a higher dB loss and the same S.A.T./R.S. score. It is also predicted that the older student will perform better than the youngest student when considering dB loss and S.A.T./R.S. score. This trend of predictability is evident from the Table. However, an insufficient number of students leaves considerable gaps in the data. In order to include the remaining students, a matrix, found in Table 3, was used to compare age and dB loss. The Table uses the same division of dB loss and adds two additional age ranges to encompass all age groups. An upward trend is again evident when comparing data from the 74 students. Comparisons such as these are preliminary in nature and it must be remembered that a greater amount of data is necessary if trends are to be accurate in a predictive manner. Table 4 provides data

Mean TWU Reading Score According
to Hearing Loss, Age, and S.A.T./R.S. Score

Age/Hearing Loss	30-60 dB	61 - 90 dB	91 - 120+ dB
6.6 - 8.0		$\bar{x}$ = 24.5 n = 2	$\bar{x}$ = 10 n = 1
8.1 - 9.5	$\bar{x}$ = 12 n = 2		
9.6 - 11.0		$\bar{x}$ = 18.7 n = 6	$\bar{x}$ = 15.1 n = 11
11.1 - 12.5	$\bar{x}$ = 20.8 n = 6	$\bar{x}$ = 19.7 n = 17	$\bar{x}$ = 21.7 n = 15
12.6 - 14.0	$\bar{x}$ = 18.8 n = 4	$\bar{x}$ = 27.5 n = 2	$\bar{x}$ = 21.9 n = 8

Mean TWU Reading Score
According to Hearing Loss and Age

Age	S.A.T./R.S. Score	30-60 dB	61-90 dB	91-120+ dB
Age_1 9.6 - 11.0	1.1 - 1.6			$\bar{x}$ = 17.3 n = 3
	1.7 - 2.2		$\bar{x}$ = 17.7 n = 3	$\bar{x}$ = 20 n = 2
	2.3 - 2.8		$\bar{x}$ = 21 n = 1	$\bar{x}$ = 25 n = 1
Age_2 11.1 - 12.5	1.1 - 1.6	$\bar{x}$ = 11 n = 2	$\bar{x}$ = 22.5 n = 2	$\bar{x}$ = 23 n = 4
	1.7 - 2.2	$\bar{x}$ = 25.5 n = 2	$\bar{x}$ = 24.7 n = 3	$\bar{x}$ = 23.8 n = 8
	2.3 - 2.8	$\bar{x}$ = 26 n = 2	$\bar{x}$ = 24.5 n = 2	
Age_3 12.6 - 14.0	1.1 - 1.6			$\bar{x}$ = 26 n = 1
	1.7 - 2.2	$\bar{x}$ = 21.7 n = 3	$\bar{x}$ = 27 n = 1	$\bar{x}$ = 12.5 n = 2
	2.3 - 2.8		$\bar{x}$ = 28 n = 1	$\bar{x}$ = 24.3 n = 4

Table 4

A Frequency Distribution of
TWU Syntactic Scores

TWU Score (# correct)	Frequency	Cumulative	%	Cumulative %
28	3	74	4	100
27	3	71	4	96
26	11	68	15	92
25	7	57	9	77
24	3	50	4	68
23	8	47	11	64
22	5	39	7	53
21	3	34	4	46
20	4	31	5	42
19	2	27	3	36
18	1	25	1	34
17	1	24	1	32
16	3	23	4	32
15	0	20	0	27
14	2	20	3	27
13	3	18	4	24
12	4	15	5	20
11	2	11	3	15
10	2	9	3	12
9	1	7	1	9
8	2	6	3	8
7	3	4	4	5
6	1	1	1	1

as to the frequency of scores on the TWU Reading Test. The 74 students obtained syntactic scores from 6 to 28 with 28 possible on the test. Table 4 also provides the percentage of students making a certain score. The percentages ranged from 1 percent to 15 percent of the students.

Finally, analysis of a few individual students was conducted to determine if syntactic weaknesses within deaf children could be identified by items on the TWU Reading Test. Four examples were randomly picked from the 74 tests in order to conduct this student analysis. For purposes of discussion, the students will be referred to as Student A, B, C, and D.

Student A was 144 months old and obtained a score of 26 on the TWU Reading Test. In reviewing Student A's tests, it was found that all sentence patterns were identified correctly except the compound sentence joined by the conjunction "and." The correct word string for these two items is patterned as follows:

The boy is jumping and the girl is swinging.

However, Student A chose in both items the following word string pattern:

Boy is the jumping and girl is the swinging.

This may indicate that although most of his syntactic constructions seem to be internalized, Student A is still in

need of work on the compound sentence joined by the conjunction "and." The fact that Student A chose the same wrong pattern in both items may be indicative of a performance error. Student A may have had that pattern internalized and yet failed to draw upon it during this testing time. Another possibility may lead one to conclude that Student A does have a rule, but that he has internalized an incorrect linguistic rule for use of the compound sentence joined by the conjunction "and."

Student B was 116 months old and obtained a score of 25 on the TWU Reading Test. In reviewing Student B's test, it was found that, again, all sentence patterns were identified correctly except the N + V + Infinitive. Student B consistently picked the word string which had correct word order, but failed to include the "to" of the infinitive. For example, the correct word string for these items is patterned as follows:

The girls wants to get a drink.

In every item of this type, however, Student B chose the following pattern:

The girl wants get a drink.

Again, information is gained from this analysis by the indication that Student B is familiar with correct word ordering, but is unfamiliar with the use of the infinitive.

Student C was 168 months old and obtained a syntactic reading score of 23. He performed relatively well on all items except for the N + V + DO + IO sentence pattern and the sentence pattern using articles before singular and plural nouns. The N + V + DO + IO sentence pattern was one of the more difficult for all students, yet Student C presents an interesting note. He performed incorrectly on two of the three items, yet he correctly identified one string. This may indicate guessing on Student C's part. The correct sentence pattern was contained in the following word string format:

The man is giving a book to the girl.

Student C, however, chose the following word string pattern two out of three times:

The man is giving to the book a girl.

This may indicate that the child is confusing the objects of the sentence. The next pattern that Student C was asked to recognize was the N + V + IO + DO. Student C performed correctly on all three items testing this sentence pattern. In reviewing this, one may conclude that Student C simply made a performance error in the N + V + DO + IO sentence pattern. Knowledge of the use of objects is illustrated by Student C on his performance with the N + V + IO + DO sentence pattern. This type of performance error may

indicate the need for further assessment to determine Student C's status as far as object use in a sentence is concerned.

The sentence pattern containing articles before singular and plural nouns clearly involved a problem of connecting the right article with the proper noun case. Student C confused a plural article with a singular noun and vice versa in both test items. For example, he chose the following word string to describe two bicycles:

Here are two bikes.

He then chose the following word string to describe one shoe:

Here is some shoe.

This is a problem for most hearing impaired children and clearly needs attention.

Student D was 125 months old and made a syntactic score of 14. His performance on this test proved interesting in that on 6 of the 11 sentence patterns, he performed well. However, on the remaining five patterns, he missed every item. The items on which Student D scored correctly were split up. The first four patterns were at the beginning of the test and the other two patterns were at the end of the test. In reviewing Student D's errors, few patterns were found to be repetitive. For example, on the N + V + Place

Adverbial, the correct word string pattern was as follows:

The man is in the car.

However, in every situation, Student D chose the pattern:

The man the car in.

Use of a verb was avoided in every item, along with the misuse of the place adverbial. The student has the wrong pattern internalized for the use of the place adverbial. Further investigation may suggest that he has no linguistic rule for the N + V + Place Adverbial pattern.

In evaluating the remaining nine items that Student D missed, only one other pattern was repetitive. The sentence pattern for the N + V + Infinitive was patterned as follows:

The girl wants to get a drink.

However, as found with Student B, Student D picked the following pattern for the three items:

The girl wants get a drink.

The same assumptions that were drawn for Student B may be applicable here. It appears that Student D is aware of correct word order, but he is unfamiliar with correct use of the infinitive. Assessing the performance of Student D on the remaining six items indicates no pattern or incorrect linguistic rule. It appears that Student D was unfamiliar with the remaining sentence patterns. Thus, he probably guessed on the items in order to complete the test. A

reason for Student D's accurate performance at the beginning of the test and again at the end can only be based on the notion that he was unfamiliar with the items in the middle of the test. Further assessment may indicate that there were other problems involving environment or the time of testing.

These four analyses are a limited look at what the TWU Reading Test offers as an assessment instrument. When specific weaknesses can be spotted through the use of such a test, unlimited resources are opened to the educator for treatment of specific problems. It is worth noting that the four students that were picked for analysis seemed aware for the most part that a pattern was involved and yet they were unable to always decipher the correct sentence pattern.

Chapter V

Summary, Conclusions and Recommendations

This study was conducted to establish preliminary data on the TWU Reading Test of Syntactic Constructions and to determine whether or not a significant relationship existed between elementary age deaf students' reading achievement scores and syntactic reading scores.

Summary

A review of contemporary major contributions to the literature on assessing the reading ability of deaf students was made to begin this investigation. Eighty-nine elementary age students enrolled in a public day school for the deaf were then chosen as subjects for this study. The Stanford Achievement Reading Subtest for Hearing Impaired Students and the TWU Reading Test of Syntactic Constructions were both administered to this group and hand scored. The scores were then plotted. Although a strong linear relationship was not observed, no other trend existed either; hence, a Pearson product-moment correlation coefficient was computed. The computed correlation was found to be .31. An item analysis of the TWU Reading Test was presented. The item analysis revealed that certain sentence patterns were more difficult than others. The most difficult sentence pattern

was found to be the N + V + Infinitive, while the least difficult sentence pattern was found to be the N + V. The mean age of 135.97 months and standard deviation of 16.6 were computed for the 74 students. Age and reading scores were also plotted to see if a linear relationship could be observed between reading ability and age. Although the scatter plot revealed very little linearity, a Spearman Rho correlation was computed. The correlation was ascertained to be .27. Finally, an analysis of a few individual students was conducted to determine if syntactic weaknesses within deaf children could be identified by items on the TWU Reading Test.

Conclusions

Based on the results of this study, the following conclusions were drawn. There is a positive linear relationship between reading achievement scores obtained from the S.A.T./R.S. and the syntactic scores derived from the TWU Reading Test. This relationship, although positive, is not large enough to be meaningful; hence, to use either the TWU Reading Test to predict S.A.T./R.S. scores or vice versa would be without justification. The slight positiveness of this relationship may be indicative of the fact that certain skills are required of the student to perform on both tests. For example, the S.A.T. devotes one section of the reading

achievement test to vocabulary. Although the TWU Reading Test is not a vocabulary test, knowledge of sight vocabulary is needed for the student to perform. The item analysis conducted on the TWU Reading Test was presented to determine which of the 11 patterns being tested was the most difficult. The findings of this analysis indicated that 7 of the 11 sentence patterns were missed by 25 percent or more of the population. The spectrum of percentages ranged from 9.1 percent to 51.1 percent. These percentages, established from a diversified group of students displays, perhaps, a fair representation as to the performance of deaf students in similar environments on items such as those contained on the TWU Reading Test. Further statistics would need to be gathered to confirm such a statement.

There is a positive linear relationship between age and scores obtained on the TWU Reading Test. Again, however, this positive relationship is very low and not considered meaningful. As made apparent from such a relationship, the age of a deaf child plays a small role in his performance on the TWU Reading Test. Should such a test be given to hearing children, one would expect a high positive linear relationship between age and score. However, as seen in this study, the age of a deaf child and performance on this test are not related but to a small degree. As can be found

in Chapter IV, of the population tested, one 6 year old acquired a syntactic score of 25 while a 13 year old acquired a syntactic score of 7. This example of comparing age and score was but one of the many reflecting the low correlation between a child's age and his syntactic score.

Implications and Recommendations

The implications of this study suggest that the TWU Reading Test might be used as a reading assessment tool, but not in place of the S.A.T./R.S. If the primary objective is to test syntactic constructions in reading, it is suggested that the TWU Reading Test be administered since the S.A.T./R.S. does not provide meaningful assessment of a person's syntax. Given the fact that the S.A.T./R.S. tests vocabulary, word meaning and reading comprehension, there is no chance for the child to correctly order words. The areas which are tested proficiently on the S.A.T./R.S. are not necessarily indicative of syntactical competence. Assuming the educator is concerned with grade placement, use of the S.A.T./R.S. will yield a relative grade placement value which is not available from use of the TWU Reading Test; however, previous research has shown that even this is an inflated score (Moores, 1967).

An advantage of the TWU Reading Test can be found in the individual student analysis as offered in Chapter IV.

Specific weaknesses within syntax can be spotted by administration of this test. Whereas the S.A.T./R.S. may miss the problem of a child using an article incorrectly, the TWU Reading Test may discover such a weakness. Although the S.A.T./R.S. offers a grade placement for each child, there are no tangible means whereby the educator can pinpoint a specific weakness. By obtaining one overall grade placement score, he will only see that the student is lower in one area, vocabulary, than another area, word meaning. In this vein, however, the TWU Reading Test provides the educator with specifics. He is aware of some of the child's syntactic weaknesses, for they are before him; not intangible as the weaknesses assessed by the S.A.T./R.S. The TWU Reading Test is an instrument that may aid the classroom instructor and administrator in more aptly assessing students with syntactical problems.

An additional advantage of the TWU Reading Test is the ease with which it can be administered and scored. Unlike the reading subtest of the Stanford Achievement Test, the TWU Reading Test of Syntactical Constructions can be administered to an individual or a group within a time span of approximately 30 minutes. Scoring can be executed in less than five minutes.

Accurate information as to the deaf child's needs is

required if educators wish to provide the deaf child with the best education possible. On the basis of the relatively low correlation, along with other facts considered in this study, it is recommended that the TWU Reading Test of Syntactical Constructions be considered by educators of the deaf as another means of assessing reading ability along with the Stanford Achievement Test Reading Subtest for Hearing Impaired Students. It is recommended that the TWU Reading Test not be used over the S.A.T./R.S. for assessment of vocabulary word meaning, or reading comprehension, but rather that the TWU Reading Test be used in conjunction with the S.A.T. in order to test syntactic competence in reading. It may be that educators should consider giving the TWU Reading Test prior to giving the S.A.T./R.S. If a syntactic score between 20 and 26 were obtained on the TWU Reading Test, this may indicate that the student has internalized certain syntactic rules. Such performance on the TWU Reading Test may enable the student to render an improved grade level score on the S.A.T./R.S. if he has certain linguistic rules and is not forced to guess on reading ability items. At this point, it is recommended that the TWU Reading Test of Syntactical Constructions be considered as an alternative instrument in determining the deaf student's syntactic ability.

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Appendix

TWU READING TEST OF SYNTACTIC CONSTRUCTIONS

Individual Record Form

Name _____ Age _____ Birthdate _____

Sex _____ Race _____ School _____ Grade _____

Address _____ Telephone _____

Multihandicapped _____ Explain _____

dB Loss _____ Date _____

Comments _____

Test Administered As: group/individually TWU Reading Syntax Score ☐

Patterns	# Possible	# Correct	Prob. of 1 if child guessed	Prob. of 2 if child guessed	Prob. of 3 if child guessed	DECISION		
						Child Knows Structure	Child Does not Know Structure	Need More Information to Make Decision
N + V	3		.25	.06	.02			
N + V + DO	3		.25	.06	.02			
N + V + DO + IO	3		.25	.06	.02			
N + V + IO + DO	3		.25	.06	.02			
N + V + Place Adverb.	3		.25	.06	.02			
N + V + Infinitive	3		.25	.06	.02			
N + V + Pred. Adj.	2		.25	.06	X			
N + V + Adverb	2		.25	.06	X			
Sent. include Neg.	2		.25	.06	X			
Compound sent. joined by Conj. "and"	2		.25	.06	X			
Articles before sing. & plural nouns	2		.25	.06	X			