LANGUAGE UNDERSTANDING OF DEAF STUDENTS UNDER THREE AUDITORY-VISUAL STIMULUS CONDITIONS

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KLOPPING, Henry Walter Edward, 1941-
LANGUAGE UNDERSTANDING OF DEAF STUDENTS
UNDER THREE AUDITORY-VISUAL STIMULUS
CONDITIONS.

The University of Arizona, Ed.D., 1971
Education, special

University Microfilms, A XEROX Company, Ann Arbor, Michigan

LANGUAGE UNDERSTANDING OF DEAF STUDENTS UNDER THREE AUDITORY-VISUAL STIMULUS CONDITIONS

by

Henry Walter Edward Klopping

A Dissertation Submitted to the Faculty of the

DEPARTMENT OF SPECIAL EDUCATION

In Partial Fulfillment of the Requirements
For the Degree of

DOCTOR OF EDUCATION

In the Graduate College

THE UNIVERSITY OF ARIZONA

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THE UNIVERSITY OF ARIZONA

GRADUATE COLLEGE

I hereby recommend that this dissertation prepared under my direction by Henry Walter Edward Klopping

entitled Language Understanding of Deaf Students Under Three Auditory-Visual Stimulus Conditions

be accepted as fulfilling the dissertation requirement of the degree of Doctor of Education

George Leshin — 6/8/71

Dissertation Director — Date

After inspection of the final copy of the dissertation, the following members of the Final Examination Committee concur in its approval and recommend its acceptance:*

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*This approval and acceptance is contingent on the candidate's adequate performance and defense of this dissertation at the final oral examination. The inclusion of this sheet bound into the library copy of the dissertation is evidence of satisfactory performance at the final examination.

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SIGNED: Henry H. E. Klopping

ACKNOWLEDGMENTS

To Dr. George J. Leshin, my dissertation adviser, I wish to extend my sincere gratitude for his guidance and encouragement throughout my doctoral studies. Appreciation is also expressed to Dr. Francis E. Lord, Dr. Frederick J. Smokoski, Dr. Walter L. Olson, Dr. Henry E. Butler, and Dr. Waldo K. Anderson.

Special appreciation is given to June E. Newkirk whose assistance in preparing the materials and tests for use in the study was invaluable. Thanks are given to Delores E. Erlandson, Marilyn L. Raybould, and Clemontine Y. Randall for their assistance in critiquing the materials and tests. Special thanks are given to Dr. Sarah D. Hervey for statistical consultation.

The cooperation of the Arizona State School for the Deaf and the Blind was a major contribution to this study. Special appreciation is extended to the many deaf children who made the study possible.

To my parents, Albert and Nina Klopping, I wish to offer my sincere thanks for their encouragement and interest throughout the years.

Finally, to my wife, Sandra Lee, I wish to express my sincere love and thanks for her encouragement and support throughout my doctoral studies.

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ABSTRACT

Statement of the Problem

The purpose of this study was to determine the level of comprehension of language of profoundly deaf students in a state residential school for the deaf under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

Procedure

Thirty deaf students enrolled at the Arizona State School for the Deaf and the Blind, a state residential school, were selected for this study. Eligible subjects met the study criteria.

Materials and instruments were devised and administered that measured the ability of this group of subjects to understand language under the various methods of communication. A comparison of test performances of the subjects under the various methods of communication was made utilizing a proportional, three-way analysis of variance and a t-test. Post hoc analysis was made utilizing the Tukey HSD test.

Results

The results of this study indicated that in general this group of subjects understood language better through the use of total communication than through the use of speechreading with voice and the Rochester method.

Specifically, the results indicated:

(1) Of the three methods of communication, total communication was superior to the Rochester method and speechreading with voice beyond the .01 level of significance. In addition, the Rochester method was superior to speechreading with voice beyond the .01 level of significance. Total communication resulted in 76.35 per cent comprehension of language; the Rochester method resulted in 55.50 per cent comprehension of language; and speechreading with voice resulted in 35.15 per cent comprehension of language.

(2) There were no significant differences in the ability of residential and day-residential students to understand language under the various methods of communication.

(3) There were no significant differences in the ability of students with average and above average intelligence to understand language under the various methods of communication.

(4) There were no significant differences in the ability of male and female students to understand language under the various methods of communication.

A significant fact revealed by the study was that almost one-third of the subjects did not understand language at an adequate level under any of the methods of communication.

Importance of the Results

The importance of the results for the group of subjects involved in the study and for the field of education of the deaf are as follows:

(1) Since subject matter at the secondary level involves a great amount of interchange between students and teachers, the findings for this group of students indicate that their teachers should use total communication in order to achieve the highest level of comprehension of language. It might be expected that improved academic achievement would follow the result of improved ability to understand in the classroom.

(2) Although the results of this study cannot be generalized, the results have provided the field of education of the deaf with objective evidence regarding the ability of one specific group of deaf adolescents to understand language under the various methods of communication. Education of the deaf has lacked objective research indicating the effectiveness of particular communication methodologies. The current study is the first of its type known to this investigator to have been undertaken regarding the ability of deaf students to understand factual information under the various methods of communication tested.

(3) The results of this study should serve as an impetus and a reference point for others wishing to investigate objectively the ability of deaf students to comprehend language under the various methods of communication. This study is only a beginning in an attempt to find answers to the much broader question

regarding selection of methods of communication most appropriate to meet the needs of individual deaf children.

CHAPTER I

INTRODUCTION

Effective communication between teacher and student is an essential requisite for educational attainment of deaf students. Its absence or inadequacy is a major problem when onset of profound deafness takes place at the age of two or three before language development. With the auditory channel severely impaired, profoundly deaf children receive information through other sensory channels. Communication with profoundly deaf children is achieved primarily through the visual channel by speechreading or manual communication.

For more than one hundred years, teachers of the deaf in the United States have been using a variety of methods to communicate with students. The various methods employed include speechreading, the Rochester method, and total communication. The use of the various methods of communication has become a controversial issue which has plagued the field of education of the deaf. The controversy has become known as the "Hundred Years War" (Brill, 1967). Specifically the controversy is concerned with the method of communication which should be used in the classroom.

Surprisingly, the often bitter controversy which has centered on the use of the various methods of communication in instructing deaf children has produced very little research. While there is considerable literature debating the merits of the various communication methods, there is a dearth of data on the educational results produced by the use of the methods (Quigley, 1969). Much of the literature on the use of the various methods of communication consists of descriptive articles which are predicated on the emotional and subjective opinion of the author, rather than an objective analysis of the controversy. Levine (in Getz, 1953, p. xx) comments that ". . . the method rather than the pupil . . ." has taken the spotlight in the education of the deaf. Myklebust (1964, p. 240) states, "Many claims and counterclaims have been made regarding the effectiveness of a particular methodology. Only through objective study can such claims be evaluated."

Teachers of the deaf have been using various methods of communication without knowing the extent of comprehension by the child. It is apparent that the various methods are being practiced without objective research indicating their effectiveness. It therefore is necessary to conduct research which will relate the comprehension of language by profoundly deaf students to the various methods of communication used by teachers.

Statement of the Problem

The purpose of this study is to determine the level of comprehension of language of profoundly deaf students in a state residential school for the deaf under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication. In specific terms, the research objectives are:

(1) To determine which condition results in the highest level of comprehension of language and to provide a ranking of these conditions.

(2) To determine if there are differences between male and female deaf students in ability to understand under the various stimulus conditions.

(3) To determine if there are differences between students in residence and day-residential students to understand under the various stimulus conditions.

(4) To determine if intelligence makes a difference in the deaf students' ability to understand under the various stimulus conditions.

Importance of the Problem

While the debate over which method of communication should be used in educating deaf children continues, the academic achievement of deaf students continues to lag behind that of their hearing peers. Boatner (1965) conducted an extensive survey of the educational achievement of the deaf in the United States. His study included ninety-three per cent of deaf students sixteen years or older in the United States. The results showed that only five per cent of the students achieved at the tenth grade level or better; sixty per cent were at grade level 5.3 or below; and an additional thirty per cent were functionally illiterate. Vernon (1969) pointed out that studies such as Boatner's on the academic achievement of deaf children usually yield spuriously favorable results since they are based on standardized educational achievement tests which fail to fully diagnose the language retardation of deaf students. He also pointed out that many students who were dropped for academic failure from the schools surveyed were not included in the sample. He concluded that the educational retardation of the deaf is even more serious than Boatner's study indicated. It is evident that there is a substantial gap between the educational achievement of deaf students and hearing students when their secondary education ends.

Courses at the secondary level in a school for the deaf are content oriented. The usual academic course of study includes language (English), reading, social studies, science, and arithmetic. Since there is a substantial amount of information to be conveyed and discussed in these content oriented courses, there is a need to determine which method of communication results in the highest level of comprehension. Such a determination would encourage the use of a particular method of communication with the expectation that improved academic achievement would be the result of improved ability to understand in the classroom.

Hypotheses

The four major hypotheses to be tested in this study are stated in the null form as follows:

(1) Profoundly deaf students in a state residential school will show no significant differences in ability to understand language under three auditory-visual stimulus conditions:

speechreading with voice, the Rochester method, and total communication.

1.1 There is no significant difference between speechreading with voice and the Rochester method.

1.2 There is no significant difference between speechreading with voice and total communication.

1.3 There is no significant difference between total communication and the Rochester method.

(2) Profoundly deaf students in residence and day-residential students will show no significant differences in ability to understand language under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

2.1 There is no significant difference between speechreading with voice and the Rochester method when comparing students in residence with day-residential students.

2.2 There is no significant difference between speechreading with voice and total communication when comparing students in residence with day-residential students.

2.3 There is no significant difference between total communication and the Rochester method when comparing students in residence with day-residential students.

(3) Profoundly deaf students of average and above average intelligence will show no significant differences in ability to understand language under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

3.1 There is no significant difference between speechreading with voice and the Rochester method when comparing students of average intelligence with students of above average intelligence.

3.2 There is no significant difference between speechreading with voice and total communication when comparing students of average intelligence with students of above average intelligence.

3.3 There is no significant difference between total communication and the Rochester method when comparing students of average intelligence with students of above average intelligence.

(4) Profoundly deaf male and female students will show no significant differences in ability to understand language under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

4.1 There is no significant difference between speechreading with voice and the Rochester method when comparing profoundly deaf male and female students.

4.2 There is no significant difference between speechreading with voice and total communication when comparing profoundly deaf male and female students.

4.3 There is no significant difference between total communication and the Rochester method when comparing profoundly deaf male and female students.

Assumptions

This study was based on the following assumptions: (1) an accurate assessment of the language understanding of profoundly deaf students could be obtained from the stories and tests devised for use, (2) the subjects used in the study would be motivated to respond to the testing in a manner that accurately reflects their ability to understand language, and (3) the subjects have no undetected physical or psychological problems that would interfere with their ability to successfully complete the study.

Definitions

Fingerspelling: Fingerspelling is a means of communication based upon the formation of the letters of the alphabet by designated positions of the fingers and hands. Such letters comprise the manual alphabet. Words are spelled out in this alphabet and sentences formed in correct English (Higgins, 1942).

Sign Language (Signs): The language of signs is a non-verbal method of communication. Words and ideas are graphically expressed through various established gestures, conventional positions, and movements of the body, particularly of the arms and hands, and facial expressions (Long, 1949).

Speechreading: Commonly known as lipreading, speechreading is the comprehension of spoken language through visual observation of the fleeting movements of the lips, mouth, and tongue as they form the words and sentences of the speaker (Macnutt, 1955).

Rochester Method: The use of fingerspelling and speech simultaneously (Quigley, 1969).

Total Communication: Total communication is a means of communication based upon the simultaneous use of speech, sign language, and fingerspelling.

Manual Communication: Communication based upon the use of the sign language and fingerspelling.

Profoundly Deaf: Those children with hearing losses greater than seventy-five decibels in the better ear, and who lost their hearing by the age of three.

Students in Residence: Students who live at a state residential school during the school year, returning home during vacations and occasionally on weekends.

Day-Residential Students: Students who attend classes at a residential school, but return home after school every day.

Average Intelligence: An I.Q. score between 90 and 110 on the performance scales of the Wechsler Intelligence Scale for Children or the Wechsler Adult Intelligence Scale.

Above Average Intelligence: An I.Q. score between 111 and 130 on the performance scales of the Wechsler Intelligence Scale for Children or the Wechsler Adult Intelligence Scale.

Oral-Manual Controversy: A controversy between oralists and manualists regarding methods of communication. The oralists believe that deaf children should be taught utilizing speech, speechreading, and reading. The manualists believe that deaf children should be taught utilizing speech, speechreading, fingerspelling, sign language, and reading.

CHAPTER II

REVIEW OF THE LITERATURE

This chapter presents a review of the literature and is divided into five sections. Section one presents a history of methods of communication. Section two describes the oral-manual controversy. Section three presents the literature on speechreading relating to the role of speechreading in the understanding of language by deaf children. Section four reviews the literature on manual communication. The final section summarizes the only study found that compared methods of communication.

History of Methods of Communication

The first recorded description of a method of communication appeared in the sixteenth century (Bender, 1960). Ponce de Leon is credited with having created the art of teaching those deaf from birth. Since the written works of de Leon were destroyed by fire, it has been necessary to rely on early historians for clues to the methods he employed. Although there is some controversy as to the method of communication he employed, Bender (1960) states that lipreading probably was utilized. De Leon was successful in teaching several young deaf Spanish noblemen not only to read and write, but also to speak.

Another important figure in the history of the deaf was Juan Martin Pablo Bonet who recorded his ideas on the education of the deaf in a book called Reduction de las Letras y Arte para Ensenar a Hablar Los Mudos (Simplification of Sounds and the Art of Teaching the Dumb to Speak).

> Part II described Bonet's philosophy as to methods of teaching the deaf to speak. He advocated first, the teaching of a one-handed alphabet, using pictures illustrating the position of the hand for each letter in association with the printed symbol of the letter, both capital and ordinary forms, written above it. He also insisted that everyone living in a house with a deaf-mute should be forced to learn this manual alphabet.
>
> After the letters were learned in this visual fashion, the pupil was then taught to sound each letter vocally, beginning with the vowels. . . . Then the pupil was taught syllables, . . . and after that words (Bender, 1960, p. 44).

Bonet did not advocate the teaching of lipreading since he believed that lipreading could not be taught. Bonet stated, ". . . to enable the deaf-mute to understand by the lips alone, . . . cannot be performed by teaching, but only by great attention on their part; and it is to this that their skill is attributed and not to the skill of the master (quoted in Bender, 1960, p. 45)." The fingerspelling method originated by Bonet was the basis for other fingerspelling methods developed later.

In 1692, a Dutchman, John Konrad Amman, published his book, The Speaking Deaf. He described the methods he employed, including the teaching of speech. His method was based largely on the theory that the deaf could be taught to imitate sounds by means of lipreading and watching their own speech movements in a mirror (DeLand, 1968). Eighteenth century educators of the deaf relied to a great extent on Amman's methods. Much of what Amman wrote about the nature of voice and breath control, his description of the organs of speech, and the methods he used for developing speech and speechreading skill currently are being utilized by educators of the deaf.

The eighteenth century produced a number of individuals who contributed to the development of methods of communication and a philosophy of education of the deaf. The first of the more notable and influential of these was the Frenchman, Abbé Charles Michel de l'Épée (1712-1789), who has been called the Apostle of the Deaf (DeLand, 1968). De l'Épée was the first to establish a class for the deaf where more than one or two children could be taught at a time. He also established the first private school for the deaf, and was the first to teach poor deaf children. De l'Épée developed a method for teaching the deaf which included a system of manual signs incorporating Bonet's manual alphabet. He wrote a dictionary and grammar of signs, refining and organizing them until they became an adequate means of language communication (Bender, 1960). Although de l'Épée also developed a method for teaching speech involving the manipulation of the tongue, he eventually eliminated the teaching of speech and speechreading because of the individual attention and time they required.

De l'Épée's contemporary, Samuel Heinicke (1729-1790), founded the first public school for the deaf in Germany. Heinicke is known as the father of the German method of teaching the deaf (Bender, 1960). Heinicke's methods were strictly oral and were kept secret until long after his death (DeLand, 1968). To help the deaf remember the sounds they were taught to speak, he made use of the sense of taste. "He gave his pupils substances to taste that seemed to him related to the sounds. For the vowel A, he used pure water; for E, wormwood; for I, vinegar; for O, sweet water; for U, olive oil (Bender, 1960, p. 104)." Heinicke was opposed to the use of mirrors, manipulation of the tongue, breathing exercises, or fingerspelling in teaching the deaf (Bender, 1960, p. 105), thus setting himself apart from his contemporaries. He maintained that the deaf could learn if they kept their eyes firmly fixed on the lips. He was the first to advocate that the deaf learn a whole word before proceeding to learn its parts.

At the time Heinicke was developing his system for educating the deaf in Germany and de l'Épée was doing the same in France, Thomas Braidwood was working with deaf children in Scotland. Knowing nothing of previous manual methods of teaching the deaf, Braidwood developed an oral method of instruction which was successfully used in educating many deaf children. Braidwood kept his methods secret, revealing them only to members of his own family who assisted him in his school.

In the early nineteenth century, Thomas Hopkins Gallaudet in the United States had become interested in the education of the deaf. Gallaudet's studies had led him to be interested in the possibilities of both the oral method, as taught by Braidwood, and in the manual approach, as it was taught by the followers of de l'Épée. He hoped to be able to work out his own method as a result of studying both, and he traveled to Europe to study the two methods. Braidwood had strong feelings of animosity toward the manual method. In addition, he guarded his own methodological secrets closely. Gallaudet spent several months negotiating with Braidwood for permission to learn his methods, but Braidwood refused to disclose his oral methods of teaching the deaf. When Abbé Rock Ambrose Sicard (the most prominent of de l'Épée's followers) visited London during a lecture tour, Gallaudet met him and was invited to visit his school in Paris to study the manual method of teaching the deaf. It was this manual method of instruction that Gallaudet brought back to the United States; thus, the first formal method of teaching the deaf in the United States was manual (DeLand, 1968). In 1817, Gallaudet assisted in establishing the American Asylum for the Education and Instruction of the Deaf and Dumb in Hartford, Connecticut. Fifty years passed before the oral method of instruction was used in the United States. In 1867, the Clarke School for the Deaf was established in Northampton, Massachusetts. The establishment of the Clarke School marked the beginning of oral education for the deaf in the United States.

At about the same time that the Clarke School was being established, education of the deaf in Europe became almost exclusively oral (Bender, 1960). The oral movement in the United States began to grow as day schools and classes were established.

In 1880, the First International Congress of Teachers of the Deaf was held in Milan, Italy. Educators of the deaf from all countries, which then had such schools, were in attendance. Among the resolutions passed were the following:

> I. The Congress--Considering the incontestable superiority of speech over signs in restoring the deaf-mute to society, and in giving him a more perfect knowledge of language,

> Declares--That the oral method ought to be preferred to that of signs for the education and instruction of the deaf and dumb.
>
> II. The Congress--Considering that the simultaneous use of speech and signs has the disadvantage of injuring speech, lipreading and precision of ideas, Declares--That the Pure Oral Method ought to be preferred (Bender, 1960, pp. 164-165).

"The oral method was adopted as the preferred method in all countries except the United States (Bender, 1960, p. 167)." "In the United States, also, instruction in oralism began to spread more and more rapidly, growing by its own success, side by side with the existing manual methods (Bender, 1960, p. 168)."

By the turn of the twentieth century a number of residential schools that formerly followed a strict manual approach ". . . adopted what they called the combined method, which was intended to make use of the best in both approaches to teaching the deaf (Bender, 1960, p. 160)." This combined approach was used in most state supported resitial schools, while private residential schools, public day schools, and public day classes followed the pure oral method. During the early twentieth century, state supported residential schools began widespread use of the oral method of instruction with deaf children in the lower grades, retaining the combined approach for use with students in the intermediate and upper grades.

In recent years there has been a renewed effort by some educators and professionals working with the deaf to return to using manual communication with very young deaf children (Hester, 1963; Birch and Stuckless, 1966; Quigley, 1969; Vernon and Koh, 1970). The momentum in the early 1970's appears to be with those advocating a total approach in teaching deaf children.

The Oral-Manual Controversy

Although the communication controversy in education of the deaf has been referred to as the "Hundred Years War," differences of opinion have existed for almost two hundred years. According to Bender (1960) the debate between the "oralists" and the "manualists" began in the mid-eighteenth century with the Abbé Charles Michel de l'Épée and Samuel Heinicke. While de l'Épée emphasized manual communication, Heinicke emphasized the oral approach to teaching the deaf. The two men entered into a lengthy correspondence arguing the relative merits of their respective methods. Eventually, de l'Épée asked the Zurich Academy, a group of impartial scholars, to judge the relative merits of the oral and manual methods of instruction. De l'Épée provided all of the correspondence that he and Heinicke had written. The Zurich Academy studied the letters and requested more information from both men. Heinicke refused to give them additional information without financial compensation. Finally, in 1783, the Zurich Academy wrote to de l'Épée.

> They stated that they thought de l'Épée's method was good, because they had seen its results adequately demonstrated. They felt that neither man could claim a method which was "natural," nor exclusively beneficial for teaching the deaf. Of Heinicke's method, they had been able to learn so little that they could not pass judgment. They were inclined to be doubtful of some of his claims, especially after the testimony of the Abbé Stork, who had seen and was not impressed. They stated, in their judgment, de l'Épée had answered his adversary sufficiently and the controversy could be dropped (Bender, 1960, pp. 106-107).

The debate, however, has continued undiminished to this time, and has retained its bitter, all-or-nothing quality.

The controversy concerning which method of communication should be used in the United States had its beginning when those supporting education through the oral method attempted to obtain public financial support to establish an oral school for the deaf. The American Asylum for the Education and Instruction of the Deaf and the Dumb under Thomas Hopkins Gallaudet had abandoned the use of speech and fought to keep any oral school from being established. Gallaudet and others were successful for a number of years in blocking any appropriation of public funds for use in establishing an oral school (DiCarlo, 1964). A real animosity developed between the "oralists" and the "manualists" over this situation, and it carried over into all professional concerns, especially those involved with which method of communication should be used.

The Position of the Oralists

The position of the "oralist" is summed up by DiCarlo (1964, p. 114) when he states that ". . . the oralist perseveres in his singleness of purpose and faith that deaf children can learn oral communication." The oralists believe that the use of manual communication interferes with the acquisition of speech. The credo of the oralists maintains:

(1) Deaf children should be taught lipreading and speech from the beginning.

(2) Deaf children must be in an exclusively oral environment.

(3) Systematic signing must be eliminated during the critical period of speech and language development (DiCarlo, 1964, p. 115).

Because of the comparative ease with which manual communication is learned by the deaf, it is believed that the deaf child will not be motivated to attempt speech if he has access to an easier means of communication. "The evidence is unequivocal that signs may be learned with greater ease and less time than speech. But the evidence is also impressive that speech seldom develops if signs come first (DiCarlo, 1964, p. 115)." The oralists also believe that the deaf child must learn to live in a hearing world and that speech and speechreading are the necessary tools he must have to achieve that accomplishment.

The Position of the Manualists

Brill (1967), in commenting on those who support the use of manual communication, suggests that a better label for the method would be the combined system of communication since speech and speechreading are taught as well as manual communication. He states:

> The philosophical position of the person who supports the combined method is frequently summed up in the phrase, "Fitting the method to the child, rather than the child to the method." The supporter of the combined system takes the position that it is most important to produce a well educated, well adjusted deaf person and not try to produce a pale imitation of a hearing person. While the supporter of the combined method believes in the importance of speech, he is not a purist in this regard and takes the pragmatic approach that the amount of intelligible speech that many deaf children are able to learn is very limited and that more time should be devoted to teaching language in its other forms and teaching content material rather than a purely oral means of communication. He also takes the position that the law of individual differences applies to a person's ability to learn speech and to learn lipreading just as it applies to anything else. Thus, all deaf people are not able to learn speech or learn lipreading equally

> well, and in fact, many are not able to learn it at all. Therefore, the means of communication used in teaching these deaf children should be fitted to their abilities rather than requiring the deaf person to utilize one particular method of communication regardless of whether he has any ability along this line or not (1967, p. 368).

Brill's statement summarizes the belief of those who support manual communication.

There is some question as to whether or not the oral-manual controversy will ever be settled. DiCarlo (1964, p. 113) states, "This bitter and extended debate is no nearer solution today than it was 100 years ago. Nor does compromise appear imminent, because compromise favors the survival of the manual method." Brill (1967, p. 368) states:

> In most areas of great controversy a solution is reached by some agreement upon a middle ground. This has not been the solution in this controversy because the point of view of the pure oralist is that pure oralism cannot exist where any manual communication is allowed. Therefore, there is no compromise or middle ground.

Speechreading

A review of the literature on speechreading reveals the difficulty experienced by deaf children when attempting to speechread. The proportion of speech sounds visible on the lips of a speaker varies between one-third (Pauls, 1964), and one-half (Fusfeld, 1958). The factors involved in speechreading and the relative efficiency of speechreading as reported in the literature are summarized below.

Factors in Speechreading

Much of the literature on speechreading is concerned with the attempt to determine the variables that enhance or inhibit the learning of speechreading by deaf children (Sharp, 1970). Factors which have been studied include: (1) chronological age, (2) length of speechreading training, (3) intelligence, (4) rate of speech, and (5) visual synthesis. Following is a review of literature relative to these specific factors.

(1) Chronological Age: Utley (1946) developed a test of speechreading ability which was standardized on 761 deaf and hard of hearing students between the chronological ages of eight and twenty-one. The students came from day schools, day classes, and residential schools. She correlated speechreading test scores with chronological age and obtained a correlation coefficient of .38, which suggests little relationship between speechreading proficiency and chronological age.

Reid (1947) constructed a filmed speechreading test which she administered to sixty-two girls at the Lexington School for the Deaf and thirty-seven girls at the Wisconsin School for the Deaf. The girls ranged in age from ten to twenty-two years. Test scores were correlated with the student's chronological ages and yielded a correlation coefficient of .18, indicating little relationship between chronological age and speechreading proficiency.

(2) Length of Speechreading Training: Heider and Heider (1940) constructed speechreading tests which they gave to a group of deaf children between the ages of seven and nineteen. On the basis of speechreading test scores, twenty-nine good speechreaders and twenty-eight poor speechreaders were selected. The average length of training

for the good speechreaders was 4.77 years, while the average length of training for the poor speechreaders was 4.95 years. The average score of the good speechreaders was 30.8, while the average score of the poor speechreaders was 22.8. The results indicate there is little relationship between length of training and speechreading ability. Heider and Heider concluded that after a certain amount of training there is little improvement in speechreading ability.

(3) Intelligence: In Reid's (1947) study, which has already been cited, there was very little correlation (.06) between the intelligence quotients of the ninety-nine deaf subjects and the scores on Reid's speechreading test.

Quigley and Frisina (1961) found little relationship between speechreading and intelligence. They administered the Chicago Non-Verbal Examination to 120 deaf students from residential schools and 120 deaf students from day schools. They obtained a correlation coefficient of .16 between those scores and speechreading as measured by the Utley Film Test (Form A).

(4) Rate of Speech: Byers and Lieberman (1959) investigated rate of speech in relation to speechreading proficiency. Forty-eight students from the Kentucky School for the Deaf who had at least two years of formal speechreading training were divided into four groups consisting of six good speechreaders and six poor speechreaders. Speechreading was assessed by the Utley Lipreading Test. Each group was given a sentence speechreading test adapted from the Utley test. Group one viewed the sentences at 120 words per minute, group two

viewed the sentences at eighty words per minute, group three viewed the sentences at sixty words per minute, and group four viewed the sentences at forty words per minute. The results showed no significant differences among the four groups either in number of words correct or in quantity of words produced for either the good or poor speechreaders.

(5) Visual Synthesis: Simmons (1959) correlated speechreading ability as assessed by the Utley Test, the Mason Test and a speechreading interview, with scores obtained by twenty-four hard of hearing adults on the Gestalt Picture Completion Test, Mutilated Word Test and the Fragmentary Sentence Test. She found that synthetic ability as measured by the Fragmentary Test Scores correlated significantly (.44) with the Mason Test and (.40) with the Utley Test. The speechreading interview did not relate synthetic ability to speechreading.

Sharp (1970) administered eight tests of visual closure, movement closure, and short term visual memory to eighteen good speechreaders and nineteen poor speechreaders with the chronological ages of seven, eight and nine. The subjects were profoundly deaf and were being educated in two state residential schools. The results of her study indicated that in general good speechreaders are superior to poor speechreaders in visual closure, movement closure and short term visual memory.

Relative Efficiency of Speechreading.

Although most of the literature on speechreading does not discuss the efficiency of speechreading, several studies have addressed this question.

Day, Fusfeld, and Pinter (1928) tested 400 students in a number of schools and classes for the deaf. Four tests of ten sentences each were constructed. The sentences were from five to eleven words in length, and the total number of words in each test ranged from seventy-two to eighty-one. Only the students in the three most advanced classes of the schools were tested. Two tests were given to each student, the survey field examiner reading one set of sentences and the teachers of the children being tested reading the other set. The mean scores on the test ranged from 18.6 for thirty-one students in a residential school, as tested by the examiner, to 83.7 for nine day school students, as tested by their teacher. The total score possible was one hundred. For all students the mean score for the teacher-given set was 51.7, and for the set given by the survey examiner it was 40.0. Day, Fusfeld, and Pinter attributed the difference between the day and residential schools to the fact that the day schools included more children with more hearing and more cases of late onset of deafness.

Johnson (1948) tested the speechreading proficiency of 253 students at the Illinois School for the Deaf. Seventy-seven students were classified as manual and had been taught by means of fingerspelling, signs, and speechreading; ninety-six students were classified as oral and had been taught by speechreading; eighty students were classified as acoustic and had been taught by speechreading and the use of their residual hearing. A test consisting of ten sentences was constructed and given to the students. The sentences were from six to eight words in length with a total of seventy-two words. All students were allowed to use amplification. The mean score for the manual students was ten, with a range of zero to sixty-seven. Fifty-five of the manual students had scores in the zero to nine step interval. The mean score of the oral group was thirty-eight. Three students in the oral group had scores above ninety, and seven students scored between eighty and eighty-nine. The mean score for the acoustic group was ninety-two, with twenty-nine students scoring a perfect one hundred. Only seven acoustic students scored below seventy. The differences between the acoustic students and the manual and oral students were significant in favor of the acoustic students. There also was a significant difference between the oral and manual students in favor of the oral students.

Manual Communication

A review of the literature on manual communication reveals that many of the studies conducted involving manual communication also include speech and speechreading. The following studies document this fact.

Quigley and Frisina (1961) compared the achievement of sixteen non-residential deaf children of deaf parents (manual group) with sixteen non-residential deaf children of hearing parents (oral group). They found that the deaf children of deaf parents had speech scores inferior to deaf children of hearing parents. On the other hand, the children of deaf parents were significantly superior in vocabulary and speechreading and also were superior in educational achievement, although not at a significant level. Quigley and Frisina interpreted the findings as showing that the exposure of deaf children of deaf parents to manual communication at an early age resulted in superior language development.

Hester (1963) reported results from an experiment with fingerspelling at the New Mexico School for the Deaf. He compared a group of deaf children who had completed five years of school using fingerspelling with a previous group of students who had not used fingerspelling in the first five years of school. He found that the children using fingerspelling had a better command of language and could read better than the other group when compared on the Stanford Achievement Test. They also had better written language. Hester also gave a speechreading test to twenty-two children age ten, eleven and twelve who had been taught by the Rochester method and to twenty children, age fourteen, fifteen and sixteen who did not have fingerspelling used with them until they were eleven or twelve years old. Results of the speechreading test showed that the younger children who had been exposed to the Rochester method for the first five years of school were superior in speechreading skill to the older children who had not had this exposure.

Stevenson (1964) compared 134 deaf children of deaf parents with 134 deaf children of hearing parents with respect to the use of very early manual communication. The deaf children of deaf parents were exposed to manual communication from infancy, while the deaf children of hearing parents were not. He found that ninety per cent of the deaf children of deaf parents achieved higher scores on the Stanford Achievement Test than deaf children of hearing parents. Thirty-eight per cent of the deaf children of deaf parents were admitted to college, while only nine per cent of the deaf children of hearing parents were admitted. Stevenson concluded that early manual communication was the significant factor in these results.

Birch and Stuckless (1966) carried out a study of the influence of early manual communication on the linguistic development of deaf children. A group of deaf children of deaf parents was matched with a group of deaf children of hearing parents. The children were matched on the variables of "sex, chronological age, mental ability, hearing characteristics, integrity of the central nervous system, age admitted to school, educational attributes of the school, and socio-economic level of parents (p. 457)." The students were tested on speech, reading, speechreading, written language, and psychosocial adjustment. Birch and Stuckless concluded from their findings:

(1) There were no differences in speech. Early manual communication appears to have no influence on the intelligibility of the deaf students' speech.

(2) The early manual group was better in speechreading (P = .05). Early manual communication facilitates the acquisition of speechreading skills in deaf children.

(3) The early manual group was better in reading (P = .01). Early manual communication facilitates the acquisition of language in deaf students as manifest through comprehension in reading.

(4) The early manual group was better in writing ($P = .01$). Early manual communication facilitates the acquisition of language in deaf students as manifest through written language.

(5) The early manual group was possibly better in psychosocial adjustment ($P = .06$). Early manual communication has no negative influence on the psychosocial development of deaf children and it may have a positive effect (pp. 499-502).

Meadow (1967) studied the effect of early manual communication and family climate on the deaf child's psychological and educational development. She matched fifty-six deaf children of deaf parents with fifty-six deaf children of hearing parents on a number of variables. She found that the group of deaf children of deaf parents and early exposure to manual communication had better development of self concept and better psychosocial development than did the group of deaf children with hearing parents. The group of children of deaf parents also had significantly higher academic achievement and reading achievement, and were superior in written language, fingerspelling, and the use of the sign language. The two groups were rated equal on speechreading and speech ability.

Quigley (1969) investigated the effects of the Rochester method on the development of language and communication in deaf children. The experiment involved utilization of the Rochester method with sixteen selected deaf children in a residential school and the Oral method with sixteen matched deaf children in a similar residential school. All of the children had hearing parents. The classroom and out-of-classroom environment of both groups was controlled with respect to communication procedures for a period of four years.

> Each school had a self-contained preschool unit which permitted the entering children to be segregated from the main student population during the four years of the experimental study; and both schools were willing to participate in the project and to permit the investigator control of all factors in the school and dormitory programs relevant to the project (Quigley, 1969, p. 81).

At the end of the fourth year, the groups were compared on speechreading, the reading of fingerspelling, written language, and educational achievement, including reading. The results of the study showed that the group instructed by the Rochester method was significantly superior in reading, writing ability, fingerspelling, speechreading, and general academic achievement. Quigley drew the following implications from the findings of his study:

> (1) The use of fingerspelling in combination with speech as practiced in the Rochester method can lead to improved achievement in deaf students, particularly on those variables where meaningful language is involved.
>
> (2) When good oral techniques are used in conjunction with fingerspelling, there need be no detrimental effects to the acquisition of oral skills.
>
> (3) Fingerspelling is likely to produce greater benefits when used with younger rather than with older children. It was used successfully with children as young as three and a half years of age.
>
> (4) Fingerspelling is a useful tool for instructing deaf children but is not a panacea (pp. 94-95).

Vernon and Koh (1970) matched thirty-two children who had received early manual training with thirty-two children who had early oral training and compared them on educational achievement, communication skills, and psychosocial adjustment. The children who had early manual instruction scored significantly higher on the Stanford

Achievement Test than did the early oral trained group. On communication skills, the children who had early manual instruction had significantly better written language, but there were no differences between the two groups in speechreading and speech intelligibility. On psychosocial adjustment the results favored the manual group, but in no instance did the difference reach statistical significance.

In a number of studies (Hester, 1963; Stevenson, 1964; Meadow, 1967, Quigley, 1969, Vernon and Koh, 1970), it should be pointed out, the children in both day and residential groups attended classes in the residential setting.

Comparison of Methods of Communication

A review of the literature on the ability of deaf children to understand language by means of the various methods of communication revealed only one pertinent project related to the problem researched in this study. Johnson's (1948) study, cited earlier, evaluated 253 students in the six most advanced grades at the Illinois School for the Deaf, which had distinct and separate Acoustic, Oral, and Manual Departments for instruction. Johnson devised five tests which consisted of ten simple sentences ranging from four to ten words in length. She then tested the language understanding of the students on "speech-hearing, lipreading, hearing plus lipreading, fingerspelling, and signs plus fingerspelling (p. 283)." The students wrote down the exact words in the sentences as given by Johnson. The sentences were repeated three times using the method of communication that was being tested. Table I summarizes the results obtained under the various methods of communication.

TABLE I

Mean Scores On Understanding Language Utilizing Various Methods of Communication on Johnson's Study

Department	Speech-Hearing	Lip Reading	Hearing Plus Lip Reading	Finger-Spelling	Signs & Finger-spelling
Manual	0	9	10	76	59
Oral	1	33	38	75	60
Acoustic	63	66	92	73	62
Total Group	23	29	47	74	60

> When the pupils in this school for the deaf are communicated with as a group . . . fingerspelling with a mean of 74 per cent . . . affords a fairly acceptable method. The other media of communication tested cannot be considered acceptable for the group as a whole, the scores ranging from 60 for signs down to 23 for speech-hearing.
>
> When considered as separate groups, the Manual and Oral children still understand fingerspelling best and make their only mean score above 70 per cent on this test. . . .
>
> The Acoustic children understand best through a combination of Hearing and Lip Reading. Their average of 92 on this test indicates a very satisfactory and reliable method of communication (Johnson, 1948, p. 300).

After matching groups of children from each of the three departments on a number of variables and comparing them on the test results of the various methods of communication, Johnson included the following among her conclusions:

(1) Speech-hearing ability is the most important and basic method of communication for pupils in a school for the deaf. Experience and proficiency in hearing speech are associated with significantly greater achievement in all forms of communication. Progressively greater deficiency in speech-hearing ability and experience are associated with increasing retardation of academic and communication levels (p. 306).

(2) Although fingerspelling as judged by the test scores can be considered only fairly accurate as a method of communication, it is, for this group as a whole and for the separate Manual and Oral groups, the most satisfactory of any of the methods of communication tested (p. 308).

(3) The language of signs combined with fingerspelling as judged by the test scores appears to be a rather unsatisfactory method of communication for this group of subjects. Furthermore, it appears that the more severe the deafness and the earlier its onset, the less efficient is the language of signs of the deaf as a method of communication (p. 309).

(4) Inasmuch as the ability of the Manual pupils to understand fingerspelled language is so superior to their ability to understand language through a combination of signs and fingerspelling, it would seem advisable to replace the combination of signs and fingerspelling with fingerspelling alone as the classroom method of communication for this group with the expectation that improved academic achievement would be the result of improved ability to understand in the classroom (p. 309).

Summary

The purpose of this chapter was to present a review of the literature relating to the historical background on methods of communication and to understanding of language by deaf children. The history of methods of communication was presented in the first section. Section two described the oral-manual controversy. Section three presented the literature on speechreading relating to the role of speechreading in the understanding of language by deaf children. Section four reviewed the literature on manual communication. Section five summarized the only study found that compared methods of communication.

CHAPTER III

PROCEDURE

The design of this study involved a comparison of the ability of thirty profoundly deaf students between the chronological ages of thirteen and twenty (Appendix A) to understand language under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

Subjects

Subjects participating in this investigation were enrolled at the Arizona State School for the Deaf and the Blind, Tucson, Arizona, a state residential school.

The students were selected as study subjects if they met the following criteria:

(1) an IQ of ninety or above on the Performance Scale of the Wechsler Adult Intelligence Scale or the Wechsler Intelligence Scale for Children;

(2) a hearing loss of seventy-five decibels or more in the better ear based on an average of the pure tone thresholds at the frequencies of 500 cycles per second, 1,000 cycles per second, and 2,000 cycles per second;

(3) a reading score of 4.0 to 5.5 in Paragraph Meaning on the Stanford Achievement Test, Form X;

(4) at least two years' attendance at a state residential school for the deaf;

(5) oral training during, at least, the first four years in school;

(6) onset of hearing loss by age of three; and

(7) confirmation by the student's reading teacher that the student displayed no visual problems that interfered with adequate functioning in the classroom.

The permanent records of the subjects at the Arizona State School for the Deaf and the Blind were reviewed to obtain the information needed in selecting the subjects. Eleven of the thirty subjects had transferred to the school, and information concerning their previous schooling was obtained from transfer records. All of the necessary information was obtained, except for the IQ scores of eight students which the investigator obtained by administering the appropriate Wechsler test.

Of the forty-nine students who had reading scores of 4.0 to 5.5 in Paragraph Meaning on the Stanford Achievement Test, thirty-three met all of the established criteria. Sixteen girls and fourteen boys were selected for the study. Twelve students were day-residential and eighteen students were residential.

Materials and Measuring Instruments

In order to determine the level of language comprehension by the subjects with the various means of communication being tested, it was necessary to devise materials that could be used in the study. It was essential to ensure that all vocabulary was within the comprehension of the subjects. Four different nonfiction stories (Appendix B) were adapted to meet the needs of the study. Source of the nonfiction stories was the Reading Laboratory IIa (Parker, 1958). Adaptations included deleting idiomatic language, changing some of the vocabulary, and shortening some of the sentences in the stories. A panel of three trained educators of the deaf who teach reading judged the adapted stories with regard to familiarity of the vocabulary to the subjects and to appropriateness of the adaptations mentioned above. Recommendations of the panel for story revisions were accepted, and the stories were modified accordingly. Reading level of the stories adapted for use in the study ranged from grade levels 3.19 to 3.60 (Appendix B) as determined by the Spache Readability Formula (Spache, 1953).

It was necessary to devise the tests that would be used in measuring the level of language comprehension by the subjects. A paper and pencil test was devised (Appendix C) following the design of Strang (1942). The test consisted of three sections. Part I consisted of a free-response question requiring the subjects to describe the content of the story. Parts II and III consisted of multiple choice objective-type questions. The tests were developed by the investigator with the assistance of an experienced educator of the deaf who has taught reading for more than twenty years. The panel of three trained educators of the deaf also judged the test questions and the panel's recommendations for changes were implemented. A method of scoring the tests was developed (see Question and Answer Sheets in Appendix C and the Free-Response Rating Scale in Appendix D) following the design of

Strang (1951). A maximum of twenty points was possible on each test, ten points for Part I and ten points for Parts II and III.

Prior to the testing of the subjects used in this study, the nonfiction stories and the tests developed to measure understanding were given to a group of deaf students not included in this study to eliminate any problems that might have arisen in the mechanics of test administration. On the basis of the results of the pilot study, it was not necessary to make changes in the materials or in the testing procedure that is described in the following section.

Method of Administration

The thirty subjects were randomly assigned to six groups with a total of five subjects in each group. The six groups permitted the investigator to alter the order in which the methods of communication used in presenting the stories could be randomized. Table II indicates the order of presentation of the various methods of communication to the six groups.

TABLE II

Order of Presentation of the Various Methods of Communication

Group	Order of Presentation 1st	2nd	3rd
1	A	B	C
2	B	C	A
3	C	A	B
4	C	B	A
5	B	A	C
6	A	C	B

A = Speechreading with voice; B = Rochester method; C = total communication.

Pairs of stories and methods of communication were coupled together as they were drawn at random from separate containers. As indicated in Appendix B, Story II was aligned with speechreading with voice, Story III was aligned with the Rochester method, and Story IV was aligned with total communication. Story I was selected as the practice story since its readability level was considerably higher than the other three stories.

The testing room was located in a building at the Arizona State School for the Deaf and the Blind. The amount of outside light entering the room was kept constant. There was 110 foot-candle power of light in the testing room at all times as measured by a General Electric Light Meter. The subjects sat at tables located six feet from the investigator. The subjects were permitted to use amplification if they had their hearing aids with them.

The same instructions (Appendix E) were given to the six groups of subjects. Prior to the actual testing, the subjects were given the opportunity to practice the procedure followed throughout the testing. Story I in Appendix B was used for the practice in which the subjects became familiar with what was expected of them.

The procedure for administering the stories and tests was the same for all methods of communication. The stories were narrated by the investigator who was skilled in the methods of communication. First, the investigator narrated the story utilizing a particular method of communication. Immediately upon completion of the first presentation of the story, the subjects were given Part I of the test.

After the subjects had completed Part I and the test papers were collected, the story was offered for the second time. Parts II and III of the test then were administered. Testing time for each group of subjects was slightly less than two and a half hours. Testing of all subjects was completed within a three-day period.

Method of Analysis

The tests were scored independently by the investigator and an experienced educator of the deaf. In the few instances where there were differences in scores between the investigator and the experienced educator of the deaf, a careful mutual review of the tests was made and a final score was given.

Although the subjects were not randomly selected from a population, parametric statistics were used in analyzing the data because there are no nonparametric techniques available for analyzing such a complex design (Siegel, 1956) which involve the use of a proportional, three-way analysis of variance with two factors fixed and one factor repeated (Glass and Stanley, 1970). The nonrandomness of sample selection limits the generalization of the findings, but is not a violation of the analysis of variance statistical assumptions since the subjects were randomly assigned to groups and there were an equal number of subjects in each treatment group.

The proportional, three-way analysis of variance was utilized to test hypotheses one, two, and three. Post hoc analysis was performed utilizing the Tukey HSD (honestly significant differences) test (Kirk, 1969, p. 88). In order to determine if there were any differences based on sex, hypothesis four, a pooled variance t-test (Popham, 1967, p. 145) was utilized to analyze the data.

CHAPTER IV

RESULTS OF THE STUDY

The purpose of this chapter is to present the findings with respect to the methods of communication tested in this study: speechreading with voice, the Rochester method, and total communication. Using the criteria presented in the preceding chapter, thirty profoundly deaf students between the chronological ages of thirteen and twenty were selected from the population at the Arizona State School for the Deaf and the Blind. Materials and instruments were devised and administered to test the following hypotheses:

(1) Profoundly deaf students in a state residential school will show no significant differences in ability to understand language under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

1.1 There is no significant difference between speechreading with voice and the Rochester method.

1.2 There is no significant difference between speechreading with voice and total communication.

1.3 There is no significant difference between total communication and the Rochester method.

2) Profoundly deaf students in residence and day-residential students will show no significant differences in ability to understand language under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

   2.1 There is no significant difference between speechreading with voice and the Rochester method when comparing students in residence with day-residential students.

   2.2 There is no significant difference between speechreading with voice and total communication when comparing students in residence with day-residential students.

   2.3 There is no significant difference between total communication and the Rochester method when comparing students in residence with day-residential students.

3) Profoundly deaf students of average and above average intelligence will show no significant differences in ability to understand language under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

   3.1 There is no significant difference between speechreading with voice and the Rochester method when comparing students of average intelligence with students of above average intelligence.

3.2 There is no significant difference between speechreading with voice and total communication when comparing students of average intelligence with students of above average intelligence.

3.3 There is no significant difference between total communication and the Rochester method when comparing students of average intelligence with students of above average intelligence.

4) Profoundly deaf male and female students will show no significant differences in ability to understand language under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

4.1 There is no significant difference between speechreading with voice and the Rochester method when comparing profoundly deaf male and female students.

4.2 There is no significant difference between speechreading with voice and total communication when comparing profoundly deaf male and female students.

4.3 There is no significant difference between total communication and the Rochester method when comparing profoundly deaf male and female students.

A proportional, three-way analysis of variance was utilized to test hypotheses one, two, and three. Table III presents a summary

TABLE III

Summary of Analysis of Variance of Speechreading with Voice, the Rochester Method, and Total Communication

Source of Variation	df	Sum of Squares	Mean Squares	F
Intelligence	1	.451	.451	.017
Residence	1	.820	.820	.031
Intelligence x Residence	1	4.810	4.810	.183
Error (between)	26	682.950	26.270	
Methods of Communication	2	976.090	488.050	82.440*
Intelligence x Methods of Communication	2	12.350	6.180	1.044
Residence x Methods of Communication	2	13.910	6.960	1.176
Intelligence x Residence x Methods of Communication	2	11.210	5.600	.946
Error (within)	52	307.770	5.920	
Total	89	2010.460		

*Significant beyond the .001 level.

analysis of the data pertaining to the three hypotheses. Further analysis and discussion of the findings will be made in a separate section concerning each of the hypotheses. A Pooled Variance t Model was utilized to test hypothesis four.

Analysis of Methods of Communication

The first hypothesis to be tested was that profoundly deaf students in a state residential school will show no significant differences in ability to understand language under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

Using a proportional, three-way analysis of variance as shown in Table III, an F-ratio of 82.44 was found, which demonstrated that there were significant differences in the subjects' ability to understand language under the various methods of communication. The differences were significant beyond the .001 level. Hypothesis one was rejected, leading to the conclusion that there were significant differences in the ability of profoundly deaf students at the Arizona State School for the Deaf and the Blind to understand language under the various methods of communication.

In order to determine which methods of communication were significantly different, the Tukey HSD test (Table IV) was applied to the data, and it was determined that scores for the Rochester method and total communication method were significantly higher than speechreading with voice. The significance was beyond the .01 level. In addition, it was found that the score for the total communication method was significantly higher than for the Rochester method. The significance was beyond the .01 level.

TABLE IV

Differences Among Means on Methods of Communication

Methods of Communication	Speechreading with Voice	Rochester Method	Total Communication
Speechreading with voice	-	4.07*	8.07*
Rochester method		-	4.17*
Total communication			-

*Significant beyond the .01 level; HSD = 1.94 is necessary for rejection at .01.

Table V summarizes the pertinent information concerning the various methods of communication.

TABLE V

Summary of the Means, Standard Deviations, and Ranges of the Various Methods of Communication

Methods of Communication	Mean	Standard Deviation	Range
Speechreading with voice	7.03	3.67	1 - 14
Rochester method	11.10	3.27	2 - 16
Total communication	15.27	3.45	8 - 20

Speechreading with Voice

The results of the tests regarding the speechreading with voice method of communication indicated that for this group of students speechreading with voice is an inadequate method of communication. The mean of 7.03 for this group was the lowest of the three methods of communication. For the subjects as a group, speechreading with voice resulted in 35.15 per cent comprehension of language. Although nine students had scores indicating fifty per cent or more in comprehension, the great bulk of the scores fell at the twenty to thirty per cent level of comprehension of language. The ranges of scores, shown in Table V, revealed that there was a great variance in the ability of the subjects to understand speechreading with voice.

Two of the students scoring lowest with this method of communication were Indian girls. They did not attempt to answer Part I of the test and answered only a few of the questions on Parts II and III of the test. This kind of response is not abnormal for Indian students at the Arizona State School for the Deaf and the Blind, who characteristically refuse to guess answers to questions if they fail to understand or do not know the answer. One of the two Indian girls performed in the same fashion with the Rochester method, while both attempted to answer all parts of the test when total communication was utilized.

None of the subjects was required to use amplification since it was decided not to impose artificial conditions on the subjects who did not ordinarily use amplification in the classroom. Nine subjects used amplification throughout the testing. Their speechreading with voice scores indicated mixed results. Four of the students using amplification scored above fifty per cent comprehension of language, while the remaining five subjects using amplification scored thirty per cent or lower in comprehension of language.

Rochester Method

The results of the tests regarding the Rochester method of communication, as shown in Table V, revealed that the Rochester method did not result in a high percentage of comprehension of language. The mean of 11.10 for this group of students resulted in 55.10 per cent comprehension of language. Only five subjects scored seventy-five per cent or higher in comprehension of language, and fourteen subjects scored fifty-five to seventy per cent in comprehension of language. The ranges of scores showed wide differences in the ability of individual subjects to understand language under the Rochester method.

The subjects who scored lowest with this method of communication also scored lowest with speechreading with voice. As mentioned previously, the Indian girls did not score high. In this instance the lowest score with the Rochester method was attained by one of the Indian girls who had scored second lowest with the speechreading with voice test.

Total Communication

The results of the tests regarding total communication indicated that for this group of students total communication was the most adequate of the three methods utilized for understanding language.

The mean of 15.27 resulted in 76.35 per cent comprehension of language. Two-thirds of the subjects scored seventy-five per cent or more on the test. The only perfect score on any method of communication was obtained utilizing total communication. It was achieved by a student who scored highest with speechreading with voice and third highest with the Rochester method. Five subjects had ninety-five per cent comprehension; four subjects had ninety per cent comprehension; three subjects had eighty-five per cent comprehension; and four subjects had eighty per cent comprehension. Only two subjects scored below fifty per cent comprehension of language. Although the ranges of scores were as great as with the other methods of communication, a greater proportion of the scores were significantly high.

A majority of the subjects scoring lowest with total communication also scored lowest in the other means of communication. Factors other than method of communication could be hampering the ability to understand language.

Discussion of Methods of Communication

From the results presented above, it was possible to rank the various methods of communication. Total communication, with 76.35 per cent comprehension of language, was most effective; the Rochester method, with 55.10 per cent comprehension of language, ranked second in effectiveness; and speechreading with voice, with 35.15 per cent comprehension of language, was least effective.

Seventy per cent comprehension of language under the various methods of communication was considered by this investigator to be the minimal level of adequacy. Total communication was the only method of communication which could be considered adequate for educational purposes for this group of subjects. It must be pointed out, however, that for almost one-third of the subjects, no method of communication resulted in a satisfactory level of comprehension. The nine subjects who scored lowest with total communication also scored lowest on the other two methods of communication. Although the scores of the nine subjects under total communication were higher than for the other methods of communication, none of the methods of communication was adequate for educational purposes for the nine subjects, since the highest amount of language comprehended with total communication was less than seventy per cent. Since the nine subjects were average and above average in intelligence, were both day-residential and residential students, and were of both sexes, these factors can be eliminated as possible causes of the inadequate understanding of language.

In looking at individual subjects with the various methods of communication being utilized, four subjects scored lower with the Rochester method than with speechreading with voice. When total communication was used with the four subjects, they scored at least seven points higher than with speechreading with voice. Only one subject scored lower with total communication than with the Rochester method, and no subjects scored lower with total communication than with speechreading with voice.

The findings of the difference between the subjects' ability to understand language with the Rochester method and total communication were contradictory to the findings of Johnson (1948). In her study, Johnson concluded that the Rochester method resulted in superior ability to understand language, and she recommended that sign language plus fingerspelling be abandoned in favor of the Rochester method. The results of this study for this group of students suggest that total communication should be utilized.

It is evident from this study that individual differences in ability to understand language with the various methods of communication must be taken into consideration. For this group of subjects, however, total communication was the most satisfactory means of communication.

Analysis of the Effect of Residence

The hypothesis to be tested was that profoundly deaf students in residence and day-residential students will show no significant differences in ability to understand language under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

There were no significant differences in the ability of the subjects to understand language under the various methods of communication when based on residence. An F-ratio of .031, shown in Table III, indicated that there were no significant differences between day-residential and residential students. Hypothesis two and the accompanying sub-hypotheses were not rejected.

Table VI summarizes the pertinent information regarding the effect of residence on the understanding of language under the various

TABLE VI

Summary of the Means, Standard Deviations, and Ranges: Residence

Method of Communication	Day-Residential			Residential		
	Mean	Standard Deviation	Range	Mean	Standard Deviation	Range
Speechreading with Voice	7.25	3.67	4 - 13	6.89	3.77	1 - 14
Rochester Method	11.75	3.22	8 - 16	10.67	3.25	2 - 15
Total Communication	15.00	3.76	8 - 19	15.44	3.33	8 - 20

methods of communication. Although there were no significant differences between the day-residential and residential students, there were mean differences in favor of the day-residential students with speechreading with voice and the Rochester method. The residential students had a higher mean with total communication.

Analysis of the Effect of Intelligence

The hypothesis to be tested was that profoundly deaf students of average and above average intelligence will show no significant differences in ability to understand language under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

There were no significant differences in the ability of the subjects to understand language under the various methods of communication when based on average and above average intelligence. An F-ratio of .017, shown in Table III, indicated that there were no significant differences between subjects of average and above average intelligence. Hypothesis three and its accompanying sub-hypotheses were not rejected.

Table VII summarizes the pertinent information regarding the effect of average and above average intelligence on the understanding of language under the various methods of communication. The subjects with above average intelligence had higher mean scores with speechreading with voice and total communication. The subjects with average intelligence had a higher mean score with the Rochester method. None of the mean differences, however, was significant.

TABLE VII

Summary of the Means, Standard Deviations, and Ranges: Intelligence

Method of Communication	Above Average Intelligence			Average Intelligence		
	Mean	Standard Deviation	Range	Mean	Standard Deviation	Range
Speechreading with Voice	7.27	3.86	3 - 14	6.80	3.59	1 - 13
Rochester Method	10.67	4.06	2 - 16	11.52	2.28	8 - 15
Total Communication	15.53	3.91	8 - 20	15.00	3.05	8 - 19

Analysis of the Effect of Sex

The hypothesis to be tested was that profoundly deaf male and female students will show no significant differences in ability to understand language under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

In order to determine if there were differences in the ability of the students to understand language under the various methods of communication based on sex, it was necessary to analyze the data using the t-test statistic. Table VIII summarizes the data using the Pooled Variance t Model.

TABLE VIII

Comparison of Methods of Communication Based on Sex

Method of Communication	df	Mean Scores Female	Mean Scores Male	t-ratio
Speechreading with Voice	28	6.75	7.28	.39
Rochester Method	28	10.62	11.64	.85
Total Communication	28	14.87	15.71	.66

In order to be significant at the .05 level of significance, the t-ratio for the three methods of communication would have to reach 2.048. None of the t-ratios reached this level. Hypothesis four and its accompanying sub-hypotheses were not rejected. There were no significant differences in the ability of the subjects to understand language under the three methods of communication when sex was the factor considered.

Table IX summarizes the pertinent information regarding the effect of sex on the understanding of language under the various methods of communication. Although there were no significant differences between male and female students, there were mean differences in favor of the male students in all methods of communication. These differences in mean scores between the male and female students are partially explained by the fact that several females made extremely low scores which affected the mean scores for the entire group of females.

Analysis of Interaction Effects

Table III revealed that there were no interaction effects that reached significance. In order to be significant at the .05 level, the F-ratio had to reach 4.26 for residence interacting with intelligence. For methods of communication interacting with residence, methods of communication interacting with intelligence, and methods of communication interacting with both residence and intelligence, the F-ratio would have to reach 3.20. None of the F-ratios reached the

TABLE IX

Summary of the Means, Standard Deviations, and Ranges: Sex

Method of Communication	Female			Male		
	Mean	Standard Deviation	Range	Mean	Standard Deviation	Range
Speechreading with Voice	6.75	3.97	1 - 13	7.28	3.43	4 - 14
Rochester Method	10.62	3.52	2 - 15	11.64	3.00	6 - 16
Total Communication	14.87	3.50	9 - 19	15.71	3.47	8 - 20

necessary level, leading to the conclusion that there were no interaction effects with the variables of residence, intelligence, and method of communication.

Summary

The purpose of this chapter was to present the findings with respect to the methods of communication being tested in this study: speechreading with voice, the Rochester method, and total communication. Hypothesis one and its accompanying sub-hypotheses were rejected, leading to the conclusion that for this group of students there were significant differences in the ability of the students to understand language under the various methods of communication. The scores for total communication and the Rochester method were significantly higher than for speechreading with voice, and the scores for total communication were significantly higher than for the Rochester method. Hypotheses two, three, and four with their accompanying sub-hypotheses were not rejected, leading to the conclusion that for this group of students, residential status, intelligence, and sex do not influence ability to understand language under the various methods of communication.

CHAPTER V

SUMMARY

Statement of the Problem

The purpose of this study was to determine the level of comprehension of language of profoundly deaf students in a state residential school for the deaf under three auditory-visual stimulus conditions: speechreading with voice, the Rochester method, and total communication.

Procedure

Thirty deaf students enrolled at the Arizona State School for the Deaf and the Blind, a state residential school, were selected for this study. Eligible subjects met the following criteria: (1) an IQ of ninety or above on the Performance Scale of the Wechsler Adult Intelligence Scale or the Wechsler Intelligence Scale for Children; (2) a hearing loss of seventy-five decibels or more in the better ear, based on an average of the pure tone thresholds at the frequencies of 500 cycles per second, 1,000 cycles per second, and 2,000 cycles per second; (3) a reading score of 4.0 to 5.5 in Paragraph Meaning on the Stanford Achievement Test, Form X; (4) at least two years of attendance at a state residential school for the deaf; (5) oral training during, at least, the first four years in school; (6) onset of hearing loss by age of three; and (7) confirmation by the student's reading teacher that the student displayed no visual problems that interfered with adequate academic functioning in the classroom.

Materials and instruments were devised and administered that measured the ability of this group of subjects to understand language under the various methods of communication. Scoring of the tests was completed by the investigator and a trained and experienced educator of the deaf.

A comparison of the test performances of the subjects under the various methods of communication was made utilizing a proportional, three-way analysis of variance with two factors fixed and one factor repeated. Post hoc analysis was made utilizing the Tukey HSD test. Hypotheses one, two, and three were tested utilizing the three-way analysis of variance and the Tukey HSD test. Hypothesis four was tested through the use of a t-test.

Results

The results of this study indicated that in general this group of subjects understood language better through the use of total communication than through the use of speechreading with voice and the Rochester method.

Specifically, the results indicated:

(1) Of the three methods of communication, total communication was superior to the Rochester method and speechreading with voice beyond the .01 level of significance. In addition, the Rochester method was superior to speechreading with voice beyond the .01 level of significance. Total communication

resulted in 76.35 per cent comprehension of language; the Rochester method resulted in 55.50 per cent comprehension of language; and speechreading with voice resulted in 35.15 per cent comprehension of language.

(2) There were no significant differences in the ability of residential and day-residential students to understand language under the various methods of communication.

(3) There were no significant differences in the ability of students with average and above average intelligence to understand language under the various methods of communication.

(4) There were no significant differences in the ability of male and female students to understand language under the various methods of communication.

Discussion of Results

It was obvious from the results of the study that for this group of students attending the Arizona State School for the Deaf and the Blind, a state residential school, total communication was the most satisfactory method of communication for the understanding of language. Although there was a significant difference between the Rochester method and speechreading with voice, neither method of communication can be considered adequate for educational purposes for this group of students.

A significant fact revealed by the study was that almost one-third of the subjects did not understand language at an adequate level under any of the methods of communication. It is necessary to determine the causes that are interfering with the understanding of language for such a substantial proportion of the subjects, regardless of the method of communication being utilized.

All students in this study attended classes at a residential school, although two-fifths of the students resided at home. The mean differences in ability to understand language under the various methods of communication between day-residential and residential subjects were not significant.

The intelligence of the subjects did not influence the results of the study. Average and above average subjects did not display significant differences in ability to understand language under the various methods of communication. Mean differences between the average and above average subjects were not significant.

The results of the study showed that the sex of the subjects did not influence ability to understand language under the various methods of communication. Although the male subjects had higher mean scores on the three methods of communication, the means were not significantly different from those achieved by the female subjects.

The results of this study cannot be generalized to all deaf children, but specifically are limited to the group of deaf students participating in this study.

Importance of the Results

The importance of the results for the group of subjects involved in the study and for the field of education of the deaf are as follows:

(1) Since subject matter at the secondary level involves a great amount of interchange between students and teachers, the findings for this group of students indicate that their teachers should use total communication in order to achieve the highest level of comprehension of information presented and discussed in the classroom. It might be expected that improved academic achievement would follow the result of improved ability to understand in the classroom.

(2) Although the results of this study cannot be generalized, the results have provided the field of education of the deaf with objective evidence regarding the ability of one specific group of deaf adolescents to understand language under the various methods of communication. Education of the deaf has lacked objective research indicating the effectiveness of particular communication methodologies (Myklebust, 1964; Quigley, 1969). The current study is the first of its type known to this investigator to have been undertaken regarding the ability of deaf students to understand factual information under the various methods of communication tested.

(3) The results of this study should serve as an impetus and a reference point for others wishing to investigate objectively

the ability of deaf students to comprehend language under the various methods of communication. This study is only a beginning in an attempt to find answers to the much broader question regarding selection of methods of communication most appropriate to meet the needs of individual deaf children.

Recommendations for Future Research

It is recommended that this study be replicated with:

(1) profoundly deaf students in other state residential schools for the deaf in the United States;

(2) profoundly deaf students in educational programs in the public schools;

(3) profoundly deaf students attending school in oral education programs;

(4) profoundly deaf students who have attended educational programs utilizing the Rochester method with young deaf children; and

(5) students who have hearing losses less than seventy-five decibels in the better ear.

It is also recommended that studies be undertaken:

(1) with profoundly deaf children who read above and below the 4.0 to 5.5 grade level in order to determine if reading level affects the ability of profoundly deaf students to understand language under the various methods of communication tested in this study;

(2) involving other methods of communication not researched in this study. Such methods would include speechreading without voice, fingerspelling without voice, and a combination of signs and fingerspelling without voice; and

(3) to attempt to identify the reasons for the lack of understanding of language by students in this study who did not understand language at an adequate level under any of the methods of communication tested.

APPENDIX A

BREAKDOWN ON AGES OF SUBJECTS

Age	Male	Female	Total
13		1	1
14		1	1
15	1		1
16	4	2	6
17	3	6	9
18	1	2	3
19	3	3	6
20	2	1	3
	14	16	30

APPENDIX B

TESTING STORIES

STORY I

Practice Story

Readbility Level: 3.6

Almost four thousand snakes are sold at the end of a snake hunt in Oklahoma every year. Almost one thousand trained snake hunters take part in the hunt. The hunt lasts for three days.

Last year only one of the hunters was bitten. A sixteen year old boy was bitten on the finger by a snake. He now has the right to become a member of the "Order of the White Fang." This is a group of people who have been bitten by snakes but were not hurt badly.

Some snakes are bought by zoos. Some are bought for their skins. Others are used for canned food. The rest are bought by people who make medicine.

STORY II

Speechreading Story

Readability Level: 3.199

Grasshoppers are fun to catch, but they can make trouble, too. They may do millions of dollars worth of damage. Sometimes great groups of grasshoppers fly together. They stop on a farm and eat and eat. Then they fly on to another farm. They can destroy crops in a very short time.

In late fall, scientists count grasshoppers. They can make a good guess as to how many grasshoppers there will be the next summer. Then farmers can plan a way to fight the grasshoppers.

Farmers fight grasshoppers by spraying their land. Airplanes are used to spray the places where grasshoppers eggs are laid. Poisoned food is spread out for the grasshoppers to eat. The farmers try to kill the grasshoppers before they come to eat up the crops.

STORY III

Rochester Method Story

Readability Level: 3.309

The giant ground sloth lived in South America 10,000 to 100,000 years ago. Ice covered the earth. The sloth was a big animal that walked on all four feet. When it ate leaves from trees, its heavy tail helped it to sit up straight. Sitting, the sloth was twelve to sixteen feet tall. It must have looked like a big kangaroo. It had no teeth, and had two claws on each front foot and one claw on each back foot.

The sloth was a slow, clumsy animal. During the time when ice covered the earth, North and South America became connected by a narrow piece of land. Then the mean, quick-moving animals of the north, such as the tiger, came into the sloth's land. Soon there were no more giant ground sloths.

STORY IV

Total Communication Story

Readability Level: 3.199

The Planet Venus is often called the earth's twin. It is about the same size and weight. Its pull of gravity is about the same. Because it is closer to the sun, it is warmer.

Although Venus is the planet closest to the earth, scientists have found it hard to study. Thick clouds are all around it. In the past it was thought that these were rain clouds. Today astronomers agree that they are thick clouds of dust, and that Venus often has great dust storms. It is believed that Venus has little or no oxygen. So there can be no plant life there. The ground is probably rocky and sandy. Someday we shall learn more about what Venus really looks like.

APPENDIX C

ANSWER SHEETS

Story I

I. What was the story about?

II. A good name for the story is

____ A. Snakes Are Used for Medicine
_X_ B. Snake Hunt
____ C. Snakes Are Poisonous
____ D. Safety From Snakes

III. 1. The snake hunt is held

____ A. for boys who are sixteen years old
_X_ B. in Oklahoma
____ C. in Alabama
____ D. by the Order of the White Fang

2. The number of snakes sold was about
____ A. 400
____ B. 1000
____ C. 2000
_X_ D. 4000

3. The snake hunters were
_X_ A. trained to hunt snakes
____ B. not trained to hunt snakes
____ C. all schoolboys
____ D. people who had been bitten once

4. The snake hunt lasts
____ A. one day
____ B. one week
_X_ C. three days
____ D. four days

5. One of the snake hunters was bitten on the
____ A. foot
____ B. leg
____ C. face
_X_ D. finger

6. Snakes are
____ A. bought only for food
____ B. never wanter
_X_ C. useful in many ways
____ D. useless

7. The snake hunt is held
_X_ A. one time a year
____ B. two times a year
____ C. many times during the year
____ D. once every two years

8. If snakes bite you, you will
____ A. always be hurt badly
____ B. never be hurt badly
_X_ C. sometimes be hurt badly
____ D. never die

9. Snakes are used for
_X_ A. nedicine and food
____ B. medicine and cloth
____ C. food and cloth
____ D. none of the above

Story II

I. What was the story about?

II. A good name for the story is

- ____ A. Grasshoppers Are Always Fun
- _X_ B. Grasshoppers Can Make Trouble
- ____ C. How to Help Grasshoppers
- ____ D. How to Kill Grasshoppers

III. 1. Grasshoppers

- ____ A. always eat farm crops
- ____ B. are always harmful
- _X_ C. sometimes eat farm crops
- ____ D. never eat farm crops

2. Grasshoppers destroy crops by
   ____ A. laying eggs on them
   _X_ B. eating them
   ____ C. landing on farms
   ____ D. shooting them

3. Grasshoppers destroy crops
   ____ A. slowly
   _X_ B. quickly
   ____ C. never
   ____ D. only at night time

4. Grasshoppers are counted
   ____ A. in the spring
   ____ B. in the summer
   _X_ C. in the fall
   ____ D. in the winter

5. Grasshoppers are counted by
   ____ A. farmers
   ____ B. airplanes
   ____ C. children
   _X_ D. scientists

6. Grasshoppers are fought by
   _X_ A. farmers
   ____ B. scientists
   ____ C. children
   ____ D. grasshoppers

7. Airplanes are used for
   ____ A. frightening the grasshoppers away
   ____ B. blowing the grasshoppers away
   _X_ C. spraying the places where grasshoppers' eggs are laid
   ____ D. killing farmers

8. The farmers hope to kill the grasshoppers
   _X_ A. before they eat up the crops
   ____ B. after they have eaten up the crops
   ____ C. in the air
   ____ D. with guns

9. Grasshoppers are killed by
   ____ A. other insects
   ____ B. spraying poison in the air
   ____ C. putting them in cages
   _X_ D. giving them poisoned food

Story III

I. What was the story about?

II. A good name for the story is

____ A. The Tiger of North America
____ B. South American Animals
__X__ C. The Giant Ground Sloth
____ D. Giant Ground Sloth's Make Good Pets

III. 1. The Giant Sloth lived in

____ A. Europe
__X__ B. South America
____ C. North America
____ D. India

2. The sloth walked
____ A. standing up
____ B. on its heavy tail
__X__ C. on all four feet
____ D. on its back feet

3. When sitting up, the sloth looks like
____ A. a tiger
__X__ B. a kangaroo
____ C. a rabbit
____ D. a dog

4. The sloth has two claws on
__X__ A. each front foot
____ B. each back foot
____ C. all four feet
____ D. all its fingers

5. The sloth ate
____ A. other animals
____ B. trees
__X__ C. leaves
____ D. insects

6. The sloth has
____ A. 50 teeth
__X__ B. no teeth
____ C. 150 teeth
____ D. 300 teeth

7. The Giant Sloth was
____ A. too strong for a tiger
____ B. too fast for men to cath
____ C. very mean and dangerous
__X__ D. killed by the tiger

8. The sloth
____ A. walked on land and swam in the ocean
____ B. swam in water
__X__ C. walked on land
____ D. jumped like a kangaroo

9. Today there are
__X__ A. no sloths
____ B. a few sloths
____ C. thousands of sloths
____ D. some baby sloths

Story IV

I. What was the story about?

II. A good name for the story is
____ A. Planets of the Universe
____ B. The Desert on Planet Venus
____ C. Planet Venus Looks Like Earth
__X__ D. The Planet Venus

III. 1. The planet Venus is like the earth in
____ A. temperature
____ B. plant life
__X__ C. size
____ D. water

2. The planet Venus is
   ____ A. closer to the moon
   ____ B. farther away from the sun than the earth
   _X_ C. warmer than the earth
   ____ D. heavier than the earth

3. Scientists find Venus hard to study because
   ____ A. it is so far away
   ____ B. it is too close to the sun
   ____ C. it is too far away from the sun
   _X_ D. thick clouds are all around it

4. It is thought that Venus has
   ____ A. many rainstorms
   ____ B. many snowstorms
   _X_ C. many dust storms
   ____ D. no storms at all

5. If Venus has no oxygen, there probably is no
   _X_ A. plant life
   ____ B. dust
   ____ C. sun
   ____ D. rocks

6. Who studies Venus:
   ____ A. Telescopes
   ____ B. Pilots
   ____ C. Astronauts
   _X_ D. Astronomers

7. The ground on Venus is
   ____ A. soft dirt
   _X_ B. sandy and rocky
   ____ C. hard dirt
   ____ D. swampy and hilly

8. Planet Venus is
   ____ A. the farthest planet from the earth
   ____ B. the largest planet in the Universe
   _X_ C. the closest planet to the earth
   ____ D. the hottest planet in the Universe

9. The planet Venus is
   ____ A. exactly the same color as earth
   _X_ B. called the earth's twin
   ____ C. easy to study with the telescope
   ____ D. covered by rain clouds

APPENDIX D

FREE-RESPONSE RATING SCALE

Points awarded each free response answer based on the following criteria:

0. No response.
1. Totally inadequate--gives no ideas of content.
2. A few scattered ideas, some accurately stated.
3. A few scattered ideas, all correctly stated.
4. Less than half the main ideas and several incorrectly stated details. (From 4 on there should be no serious inaccuracy).
5. About half of the main ideas and a few supporting details.
6. More than half the main ideas with supporting details.
7. Three-fourths or more of the main ideas with the most important supporting details.
8. Three-fourths or more of the main ideas with most of the supporting details.
9. Three-fourths or more of the main idea with all the important supporting details.
10. The complete content of the story very well expressed in the subject's own words.

APPENDIX E

INSTRUCTIONS

(1) If you wear glasses in the classroom, please put them on. For those of you wearing hearing aids, please check them to see if they are working properly.

(2) You have been selected to take some tests to show how deaf students understand language. The tests are part of my study at The University of Arizona. I will write a book like this (show a dissertation) about what I learn from the tests I give you.

(3) It is very important that you pay attention and that you try very hard during all of the tests. O.K.?

(4) The test is about your ability to understand me when I tell you a story. I will tell you three different stories. One story I will speak. One story I will fingerspell and speak, and one story I will sign, fingerspell, and speak. After each story that I tell you, you will answer some questions about the stories. Understand?

(5) Now I will explain how you will take the test. First, I will tell you a story. Then, I will give you the first question to answer, and you will write down all that you remember about the story. It is not important that your language is perfect. The important thing is that you write down all that you can remember about the story. Understand?

I will tell you the story for a second time. Then, you will answer some multiple choice questions about the story. (Put an example of a multiple choice question on the board). You must read each question carefully. Read all of the answers. Circle the correct answer. Understand?

(6) Now you will practice a story so that you know what to do during the tests. You may ask me questions during the practice test, but not during the real test. Understand?

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