VALIDITY AND RELIABILITY OF THE CLOZE PROCEDURE AS A MEASURE OF READABILITY AND COMPREHENSION FOR PRELINGUALLY, PROFOUNDLY DEAF STUDENTS

THESIS

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ABSTRACT

The purpose of this study was to determine the validity and reliability of the cloze procedure as a measure of passage readability and the comprehension of prelingually, profoundly deaf students. Also under investigation was the use of the Fry (1968) and Dale-Chall (1948) readability formulas to determine if the cloze scores reflect relative passage difficulty for deaf students.

Subjects for the study consisted of 18 prelingually, profoundly deaf students between the ages of 14-18 years and 27 hearing students between the ages of 9-10 years. The deaf subjects had attained scores of 4.0-7.6 on the Stanford Achievement Test, Intermediate I, Form B, Reading Comprehension subtest and the hearing subjects attained above average reading scores on the Iowa Test of Basic Skills.

Cloze tests were constructed for each of the four reading passages consisting approximately of 250 words each. The Fry readability formula was used to compute the reading difficulty of the 3rd-grade passage. The

Dale-Chall readability formula was used to compute the reading difficulty of the two 5th-grade and one 7th-grade passages. Both the deaf and hearing populations took all four passages.

Statistical procedures used to analyze the data included the Pearson Product-Moment Coefficient of Correlation and the Kuder-Richardson Formula 20 for internal consistency.

Within the limitations of this study, the following conclusions can be drawn:

1. The findings of this study suggest that, due to a lack of reliability, the cloze procedure is not a valid measure of readability and comprehension.

2. The findings failed to show that the cloze tests are measuring the same thing as the Stanford Achievement Test or the Iowa Test of Basic Skills.

3. The findings revealed that the deaf students found the two fifth-grade passages easiest, the seventh-grade passage next easiest, with the third-grade passage the most difficult.

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Chapter I

Statement of the Problem

Purpose

The purpose of this study was to determine the validity and reliability of the cloze procedure as a measure of passage readability and the comprehension of prelingually, profoundly deaf students. Also under investigation was the use of the Fry (1968) and Dale-Chall (1948) readability formulas to determine if cloze scores reflect relative passage difficulty for deaf students.

Need for the Study

Students' ability to comprehend what is read has been an area of concentrated study for approximately the last 30 years. Comprehension is the result of the listener's (receiver's) ability to reconstruct the semantic representations of objects, events, or state of affairs which are being read. Research indicates that deaf students are more likely to be retarded in their reading skills than hearing students (Cooper, 1967; Quigley, Power, and Steinkamp, 1977). While both hearing and deaf students are immersed in sound daily, the deaf students do not have a monitoring system to pick up sound. Hearing students have an advantage over deaf students in learning language (reading and writing) because of their daily exposure to oral language.

Reading is a medium which, if properly used, brings together information and background experience. If an element of new information does not relate to a student's past experience it may be more difficult for the reader to effectively make use of the medium. For a deaf student, not only may a concept be unfamiliar, but the way the concept is communicated may prove to be an added handicap. Therefore, both elements of reading comprehension--new information and background experience--might present difficulties.

The basal reader, used in 73.5% of the nation's hearing impaired reading programs (LaSasso, 1978), is designed to be used by students who have mastered many of the elements of the English language (Robbins and Hatcher, 1981). Herein lies the problem for deaf students--their first language is sign language, not standard English. By the time formal reading education begins, deaf students have not mastered standard English (Odum, Blanton, and Nunnally, 1967; Rompf, 1970). In Cooper's 1967 study it was noted that hearing children are exposed daily to a constant stream of speech uttered by parents, peers, TV, and themselves. In contrast, deaf children have little or no exposure to hearing the speech of others or themselves. Upon entering schools where the subject content is transmitted through standard English, deaf students have virturally little comprehension of the language. Deaf students are not only required to learn the same subject

content as their hearing counterparts, they must also master standard English (Cohen, 1967). Upon entering school, the teaching of English, in addition to all content areas, becomes the responsibility of the classroom teacher.

Teachers of the deaf must carefully choose reading materials for classroom use by considering the readability of materials and the comprehension level of the student. Traditionally one of two procedures for selecting materials has been used. The first traditional procedure utilizes a two-step approach which involves determining the student's reading ability and the readability of the text (Dale-Chall, 1948; Fry, 1968). The student's current reading grade level is matched with printed material at a corresponding grade level. The currently used methods to measure reading ability for hearing impaired students are altered standard achievement tests, informal reading inventories, and diagnostic tests accompanying basal readers (LaSasso, 1979). The cloze procedure is the second traditional technique used in selecting reading materials. By uniformly deleting every fifth word rather than specific ones (nouns, verbs, et cetera), a measure of word and sentence comprehension is achieved (Taylor, 1953). Children are judged as comprehending the passage when they receive cloze test scores between 44-57 percent (Bormuth, 1968). Bormuth's study also revealed that close tests are highly valid measures of passage difficulty.

LaSasso's 1978 study revealed that most teachers of hearing impaired students use either subjective judgment or informal criteria to select materials. Although the field is rich with readability formulas, teachers of the hearing impaired are either unaware of such formulas or wary of them due to lack of valid or reliable studies involving deaf subjects.

A need exists in deaf education for more acceptable measures in the field of reading. The cloze procedure may prove to be such a measure since it does allow an analysis of the deaf student's understanding of English semantics (Odum, Blanton, and Nunnally, 1967) and the results are quantifiable. By examining the cloze procedure more closely, its validity and reliability as a measure of passage readability for and the comprehension ability of deaf students can be investigated.

Questions

1. Is the cloze procedure a valid readability measure for deaf students?
2. Is the cloze procedure a reliable readability measure for deaf students?
3. Is the cloze procedure a valid measure of comprehension for deaf students?
4. Is the cloze procedure a reliable measure of comprehension for deaf students?

Definitions of Terms

Cloze Procedure - A method of intercepting a transmitter (writer or speaker), mutilating its language pattern by deleting parts, and so administering it to receivers (readers or listeners) so that their attempts to make the patterns whole again potentially yield a considerable number of cloze units (Taylor, 1953).

Readability - In the broadest sense, readability is the sum total of all those elements within a given piece of printed material that affects the success which a group of readers has with it. The success is the extent to which they understand it, read it at optimum speed, and find it interesting.

Prelingually Deaf - Deafness occurring before language acquisition.

Profoundly Deaf - Hearing loss in the better ear is greater than 85 decibels (ISO) for the speech frequencies of 500-2,000 Hz.

Limitations of the Study

This study included 18 deaf students from a school for the deaf and 22 hearing students from a public school, both of which are located in northwestern New York State. Results may have varied with a larger testing population.

Summary

At the present time, teachers of deaf students do not have an effective method to match up deaf students and printed material. As research continues to investigate effective teaching and testing materials for deaf students, the cloze procedure is being

considered very carefully. This study investigated the cloze procedure as a valid and reliable measure of passage readability and the abilities of deaf students' comprehension.

Chapter II

Review of the Literature

Purpose

The purpose of this study was to determine the validity and reliability of the cloze procedure as a measure of passage readability and the comprehension abilities of prelingually, profoundly deaf students. Also under investigation was the Fry (1968) and Dale-Chall (1948) readability formulas to determine if the cloze scores reflect relative passage difficulty for deaf students.

Language and Reading

While it is true that deaf and hearing students need to progress through the same developmental stages of syntactic structure, deaf students develop at a retarded rate (Quigley, Power, and Steinkamp, 1977). If the stages of language development are the same for deaf and hearing students, then why do deaf students learn at a different rate? Part of the answer lies in the fact that children learn by reinforcement. In discussing language development, Bockmiller (1981) points to the fact that from birth, both normal hearing children and deaf children are exposed to a hearing world and its language. These children babble and coo at approximately the same age. However, deaf children, unlike

hearing children, do not have a monitoring system to receive feedback. As a result they discontinue babbling after eight to nine months. The hearing children, receiving reinforcement, continue at a "normal" rate of development.

Standard English, its syntax, semantics, and phonological encoding, relies heavily on sound to be experienced and learned. Hearing children learn language rules by selecting freely from the multitude of English language forms which are encountered daily. However, deaf children must rely largely on the presentation of carefully selected examples from which rules can be derived (Cohen, S., 1967). Cooper's (1967) study supports Cohen's findings by showing that deaf children lack knowledge of morphological rules necessary for reading comprehension. Knowledge of the language rules of standard English is important in order to communicate with other people. By the time hearing children enter school they have acquired two essential elements needed to learn how to read: word- and sentence-level skills as well as knowledge of linguistic conventions specifically associated with continuous discourse (Bryans, 1979). By comparison, deaf students are "penalized" when they do not know the standard structure of English. This creates problems in receiving messages from hearing individuals and creating messages that can be correctly received by the hearing (Cohen, S., 1967).

Cooper (1967) noted this difference between deaf and hearing children's knowledge of language: hearing children are exposed to a constant stream of speech uttered by parents, peers, TV, and themselves. In contrast, deaf children have little or no exposure to hearing the speech of others or themselves. He concludes that deaf children enter school with virtually no comprehension of language. Odum, Blanton, and Nunnally (1967) dispute this theory by suggesting that the deaf do comprehend language--sign language. It is not until formal education is begun that the English language is presented.

Those who have little or no contact with the deaf community are unaware that for the majority of deaf students sign language is their first language. Deaf students' apparent weakness in English stems from its being a second language that they never mastered (Odum, Blanton, and Nunnally, 1967). These children must not only learn the same curriculum as their hearing peers (Cohen, S., 1967), but they must also master the entire language system through which their education is transmitted (Bockmiller, 1981).

It is of vital importance to the deaf student that he/she master those skills needed to receive information from the written page (Johnson, 1976). Teachers use whatever they have at their

disposal to teach deaf students how to decipher the written page. At present, the Language Experience Approach (LEA) is one method on which many teachers rely.

As a result of Gormley and Geoffrion's (1971) and Gormley's (1981) work with deaf children and the LEA, she believes that the LEA is a valid approach in teaching reading. Use of the LEA, experience stories with familiar events and language structure, should facilitate the search for meaning by deaf children. There is a lack of appropriate reading materials for deaf students. Thus, the largest source of reading materials for the deaf are materials which have been constructed from their own language (sign language) and experiences (Bockmiller, 1981).

American Sign Language (ASL) is itself a language. It has its own syntax and semantic system, idioms, and experiential approaches (Gormley and Geoffrion, 1971). However, deaf students living in a society that depends on a standard language different from their own must become bilingual. In Gormley's 1971 study, results indicate that a deaf student's bilingual fluency comes through to help the child think and correspond in both languages. Because sign language uses a different syntax from the syntax of written and oral standard English, deaf students must be able to understand and use both when reading (Gormley and Frazen, 1978). Because reading requires the receiver to understand the sender, a common grammar is necessary. Bockmiller (1981) says reading needs

two things for success: the first is that the sender and receiver share a common grammar; the second is that of background experience.

Once a common grammar and prior experience are established, materials for reading are required. LaSasso's 1978 national survey indicated that 73.5% of the hearing-impaired programs surveyed use basal readers as either primary or supplementary materials. In Hasenstab and McKenzie's (1978) national survey of hearing impaired reading programs, basal readers were found to be weak in the following areas: uncontrolled vocabulary, inappropriate language development, phonetic emphasis, and insufficient repetition of vocabulary, and/or skills. Hasenstab and McKenzie concluded that teachers need to carefully modify selected reading materials to meet student needs.

Basal reader materials are designed to meet the needs of students who have already mastered much of the vocabulary and structure of language by the time they enter school (Cohen, S., 1967; Conley, 1976). Based on the accumulated evidence, deaf students have difficulty with syntactic rules (Quigley, Power, and Steinkamp, 1977; Robbins and Hatcher, 1981); semantics (Gormley and Franzen, 1978); idioms and figurative elements (Conley, 1976); vocabulary (Gilliland, 1972; Quigley, et al., 1977; Quinn, 1980); and grammatical structure (Cohen, S., 1967; Conley, 1976; Wilbur, 1977). A contributing factor to deaf students' reading difficulty

is that they are not able to rely on verbal coding. This means they must rely on relatively inefficient visual coding in reading and in memory (Quinn, 1980). Quinn's research found that lipreading helps deaf children with phonological rules.

Comprehension

Just exactly how the reader comprehends is unclear. LaSasso (1980) cites Simons (1971) when making a distinction between process and products of comprehension. The process cannot be examined; however, the product or reader's behavior after reading can be seen. A reader's comprehension can be measured by his/her behavior exhibited after he/she has read. Semantics performs an important role in reading. As Stauffer (1979) says, "If there is a royal road to reading it must be a semantic road, because to read is to comprehend" (p. 21). Most communication situations require the listener to construct semantic representations of objects, relations between objects, events, state of affairs, and the like (Barclay, 1973). In contrast to Stauffer and Barclay, Robbins and Hatcher (1981) state that word recognition and word comprehension training do not affect the subject's comprehension of sentences. They recommend knowledge of syntax as important when teaching hearing-impaired students to read. While discussions concerning semantics and syntax cause disagreement among researchers, other aspects of comprehension produce agreement.

Taylor (1956) stated that if something is readable it is comprehensible. He concluded that learning depends on comprehension and retention of new information. LaSasso (1980) cites several experts (Bransford and Franks, 1971; Goodman, 1975; Smith, 1978) who have adopted the view that because of the limitations of the visual processing system and memory the reader reduces the amount of visual information needed to comprehend the text by using non-visual information in the form of previous experience and knowledge about what will be found in the text.

LaSasso (1980) cites Hittleman's (1978) three types of non-visual information that the reader brings to the printed page: procedures for regulating physical aspects of reading; a language repertoire containing all rules and cues of written language; and meanings and concepts previously acquired. From this point of view more is involved in the comprehension process for deaf readers than for hearing readers.

As previously mentioned, deaf students do not begin learning standard English (its rules and cues of written language) until they begin formal education. Many skills which hearing readers naturally acquire (e.g., meanings and concepts) as they mature, must be taught to deaf readers. For example, reading between the lines and making inferences (creative comprehension) is difficult

for deaf readers who comprehend better at the literal comprehension level (Balow, Fulton, and Peploe, 1971). Performing better at the literal level may be a reflection of the tendency toward "concreteness" (Balow, et al., 1971). The literal comprehension level requires skill at locating, extracting and assimilating factual information from the reading. Creative comprehension requires students to interpret the feeling, the mood, and literary qualities of the passage. At this time more research is needed which actually demonstrates that deaf students have a more difficult time with creative comprehension than literal comprehension.

The process by which comprehension takes place is unclear. By viewing student reactions (product) to what is read, a measure of individual comprehension can be attained. Often, after reading an assignment the student is required to answer questions concerning the material. In examining the answers to these questions the student's comprehension can be evaluated. LaSasso's study (1979) on WH question and statement formats points out that, "It is not always clear, when students fail to answer a comprehension question if they do not comprehend the written material or if (some other variable) they do not comprehend the question" (p. 834). It would appear then, that to effectively judge deaf students' comprehension of written material, and not the question format, more research is needed for the creation of appropriate testing and evaluation materials for hearing-impaired students.

Cloze Procedure

The term "cloze" comes from the Gestalt concept of "closure," the tendency to complete a structured whole by filling in a missing gap (Kazmierski, 1973). In 1953, Taylor devised a cloze procedure which involved mutilating a written passage by systematically deleting certain words and substituting a ten-space line. This procedure could be used for either testing or practice exercises. In 1956, Taylor shared what he saw as new developments of the cloze procedure. What he originally thought of as a new way of determining readability could also be used with auditory and visual communication. Language, other than English, could be studied using the cloze procedure. The indexing of individual differences in comprehension, intelligence and knowledge were also possible. Taylor (1956) concluded, "If readability means understandable then the scores that measure readability should measure comprehension too" (p. 44).

Since 1953, when Taylor first introduced the cloze procedure, researchers and teachers have modified the cloze to meet various needs. Hoffman's (1980) study used the cumulative cloze. Instead of deleting every nth word, he removed the same target word every time it appeared in the passage. In its place the same nonsense word was substituted each time. Some researchers delete a specified form class (noun, verb, adjective). Sampson, Valmont, and

Van Allen (1982) found the need to delete every 10th word instead of every 5th word when working with 3rd graders. Kazmierski (1973) stresses the difference between the cloze procedure and fill-in-the-blank as follows:

> A cloze passage might look like an ordinary "fill-in-the-blank" exercise. However, as the fill-in-the-blank is traditionally used, the sentences containing blanks are unconnected and chosen or generated because they contain specific constructions the teacher wishes to emphasize. The cloze technique differs in that the passage is a connected reading sample (p. 14).

Regardless of format, the cloze procedure is gaining recognition as a useful procedure for teachers of the hearing-impaired.

The cloze procedure is a useful tool but its usefulness is still being debated. Sampson, Valmont, and Van Allen (1982) studied cloze as an instructional tool. After the students completed the cloze practice exercise, they engaged in a discussion about their responses. The researchers concluded that the entire gestalt of the cloze practice exercises accompanied by teacher guided discussions did produce reliable and sizable comprehension gains. As Kazmierski's (1973) study indicates, the cloze can be potentially useful in many areas. It can be used as a tool to teach what is defined as grammar, syntax, composition, reading comprehension, and content. Jongsma (1971) found just the opposite to be true: research evidence does not suggest that the cloze

procedure is an effective teaching technique. At best it is no better or no worse than conventional methods of teaching reading.

Drury, in her 1981 study, concluded that the cloze may be sensitive to syntactic variables and thus not be an accurate measure of comprehension. Investigators of the cloze procedure see advantages and disadvantages to the procedure such as: simple and economical test construction; can be used with any passage; does not confound the passage difficulty measurements with the difficulty of the language and other characteristics peculiar to the test questions themselves; succeeds in some studies and not in others; and can be easily refined to produce desired results. Kazmierski (1973) also points out that, by adding choices, the cloze procedure would seem to act as a means of focusing attention or transforming a nominal stimulus into an effective stimulus.

Readability

Defining Readability

In the past 20 years researchers have worked to develop some basic underlying truths concerning readability, namely how to define it and how to make something readable. Readability is a confusing term which has no standard meaning (Chall, 1958; Dale and Chall, 1949). Cohen and Wiener (1976) refer to readability as the reading ability needed by the reader to grasp or understand a given selection. Gilliland (1972) views readability as primarily

concerned with matching reader with text. He concurs with Cohen and Wiener (1976) that readability is concerned with the interest or ease with which a book can be read. In his research, Gilliland (1972) cites McLaughlin (1968) who defines readability as "the degree to which a given class of people find certain reading matter compelling and, necessarily, comprehensible." McLaughlin emphasizes that a definition of readability must be based on the characteristics of the reader because people only read that which they understand. Dale and Chall (1948) define readability as,

> the sum total of all those elements within a given piece of printed material that affects the success which a group of readers have with it. The success is the extent to which they understand it, read it at optimum speed, and find it interesting. (p. 23)

This definition emphasizes three aspects of the reading process: comprehension, fluency, and motivation. Regardless of the reader's auditory ability--comprehension, fluency, and motivation interact to affect readability (Gilliland, 1972).

To comprehend, one must understand the words and phrases used, and be able to relate the ideas to past experiences. Fluency is the extent to which a person can read a given text at optimum speed. It is this second aspect of reading which deals with the relationship between the linguistic skill of the reader and the syntactic complexity of the text. Motivation, the last

aspect of the Dale-Chall definition, is supported by interest. If the subject matter is of interest to the reader then motivation to read is present.

According to Chall (1958) and Cohen and Wiener (1976), motivation and interest do not depend entirely on subject matter. Chall sees mechanical factors such as size, style of type, length of the book, clarity and color of illustrations as bearing weight on what is and is not read. Cohen and Wiener (1976) add that the reader's biases, background, and attitude all influence what is deemed "readable."

The Cloze Procedure and Readability

Many researchers (Bormuth, 1968; Sampson, Valmont and Van Allen, 1982; and Taylor 1956) view readability and comprehension as closely related. In the classroom, teachers of the hearing-impaired must assume responsibility for the selection of reading materials. The earliest procedure for determining readability involved individual teachers estimating both the reading level and text level, then matching the two (Chall, 1958; Cohen and Wiener, 1976). In LaSasso's 1978 national survey, fewer than 20% of the hearing-impaired programs used any kind of informal readabilty procedure. LaSasso suggests that most teachers, when selecting materials, either use subjective judgment or informal criteria. She speculates that either teachers of deaf students are

unfamiliar with formal readability procedures or they are wary of them due to lack of valid or reliable studies involving deaf children. LaSasso (1978) mentions three procedures for matching readers to materials. The first is teacher judgment. Here the teacher employs subjective judgment in attempting to find suitable materials for students. Teachers use what they know about their students' needs to match students with materials. Second is a two-step approach which involves both the measuring of text difficulty and the student's reading ability. Text difficulty is determined by readability formulas (Dale-Chall, 1948; Fry, 1968). The student's current reading grade level is matched with written material at a corresponding grade level. For hearing-impaired students, the currently used methods to measure reading ability are standard achievement tests especially adapted for the deaf, informal reading inventories, and diagnostic tests accompanying basal readers (LaSasso, 1979). The cloze procedure is the third method used in selecting materials. Taylor's (1953) format is used with deletions of every 5th word. By deleting every 5th word rather than specific ones (nouns, verbs, and adjectives) a measure of word and sentence comprehension is achieved. Researcher Feeley (1975) requires correct exact word answers. Feeley reasons that scoring can become cumbersome when deciding which synonym is acceptable. Children are judged as comprehending the passage when

they receive cloze test scores between 44-57 percent (Bormuth, 1968). Bormuth's study also revealed that cloze tests seem to be highly valid measures of passage difficulty.

Reading specialists, teachers, librarians, and publishers have been dissatisfied with inadequate predictions of difficulty (Cohen and Wiener, 1976). Reasearchers continue to devise methods by which easy and hard materials are distinguished and reliable measures are found. Greenwald (1981), in developing and using cloze materials to teach reading, suggests that individual performance is determined by the reader's knowledge of the given language code, familiarity with the subject of the passage, the reader's ability to utilize relevant semantic and syntactic cues, passage length, and exercise format used. Therefore, for the student's progress to be accurately measured, the teacher must be aware of the material available. Unlike Greenwald's teaching approach, Bormuth (1968) sees cloze "tests" as highly valid measures of passage difficulty. Sampson, Valmont and Van Allen's (1982) study looks at the cloze as a commonly used method of estimating the readability of materials used for classroom instuction and to measure reading comprehension. Teachers must assume responsibility for the improvement of student success in a particular content area by becoming sensitized to the principles of

reading instruction (Dolgin, 1975). The individual teacher makes those decisions which will most affect the student in the classroom.

LaSasso (1980) views researchers of readability as focusing on variables within the text (versus variables within the reader) to account for the difficulty readers of varying reading ability will have with the text. Three kinds of studies achieved these three goals: surveys of experts' and readers' opinions, experimental studies of one factor, and quantitative associational studies (Chall, 1958). While all three kinds of studies are valuable, it is the quantitative associational studies from which the readability formulas emerged. Dolgin's research (1975) indicates that readability formulas through statistical methods provide an estimate of the relative difficulty of materials.

Currently teachers can choose from many readability formulas. Lorge (1959), Dale-Chall (1949), Botel (1962), Fry (1968) and others have devised formulas to judge readability. For the purpose of this study, only the Dale-Chall and Fry formulas will be examined.

When the Dale-Chall readability formula was tested, a positive correlation was found between the formula and teachers' judgment of difficulty of secondary-school geography textbooks

(Chall, 1958). The range of difficulty found by the Dale-Chall is from 4th to 9th-12th grade. The Dale-Chall is validated by teachers' and librarians' judgments of material difficulty and by correlations with other formulas. This formula correlates highly with Flesch (1948), Spache (1953), and Fry (1968) formulas.

The Fry Readability Graph is a revision of Fry's earlier readability formula. The revised graph only requires two printed pages in comparison to Dale-Chall's 18. The score obtained by using the readabilty graph is within a grade level of the score obtained by using the Dale-Chall formula (Fry, 1968). Validity is a problem when grade levels do not stand still and teacher judgment is the best indicator of material readability. Fry (1968) suggests two ways out of this dilemma. First, use relative ranking which involves using one formula to determine if it ranks a group of books the same as another formula. Second, reading difficulty of the books can be obtained by looking at the mean comprehension scores of a class which has successfully read the book.

In conclusion, readability has for some time been of great interest to teachers, librarians, and researchers. Lacking in a standard meaning, many professionals have offered their definition of "readability." Dale and Chall have, however, contributed the most precise definition by incorporating comprehension, fluency,

and reader motivation. Professionals are continually searching for accurate measures of readability through the use of teacher judgment, the cloze procedure, and a variety of formulas. It appears thus far that readability formulas provide the greatest opportunity for a consistent form of measure. Now what is needed is for teachers to use the formulas to help prove their usefulness and need for further research and development.

Summary

The literature describes various aspects of language differences between hearing and deaf students. First, while both hearing and deaf students progress through the same developmental stages of syntactic structure, deaf students develop at a retarded rate. Second, language produced by hearing children is more similar to English than language produced by deaf children. Finally, the quantity of language output is greater for hearing children than deaf children.

Researchers concur that while the process of comprehension cannot be seen, the products (behavior) can be examined for possible new insights. Found in comprehension and readability research is the investigation of semantics and syntax and their relationship to deaf children's reading. As the literature indicates, learning depends on the comprehension of written material; and written material must be readable to be comprehended.

The cloze procedure has been under investigation since it first appeared in 1954. Teachers, librarians, and other professionals concerned with text readability have adapted the cloze to help meet the professional's need for testing tools which determine text readability and student comprehension. As Taylor (1956) concludes, "If readability means understandable then scores that measure readability should measure comprehension too" (p. 44).

Readability is a confusing term which has no standard meaning. Dale-Chall's (1948) definition is the most comprehensive because it includes three aspects of the reading process: comprehension, fluency, and motivation. Other researchers believe that mechanical fact, and/or reader bias, background, and attitudes all influence what is deemed "readable."

The literature is abundant with studies concerning comprehension, readability, and the cloze procedure. However, research material concerning hearing students' reading ability surpasses research which involves hearing-impaired students and reading. A need exists for more research which involves methods of helping deaf students with comprehension and readability.

Chapter III

The Research Design

The purpose of this study was to determine the validity and reliability of the cloze procedure as a measure of passage readability and the comprehension abilities of prelingually, profoundly deaf students. Also under investigation was the use of the Fry (1968) and Dale-Chall (1948) readability formulas to determine if the cloze scores reflect relative passage difficulty for deaf students.

Methodology

This study was based on an earlier study conducted by LaSasso (1980).

Subjects

The subjects consisted of 18 prelingually, profoundly deaf students who attended an urban school for the deaf in northwestern New York State. The deaf students ranged from 14-18 years of age and had attained scores of 4.0-7.6 on the Stanford Achievement Test, Intermediate I, Form B, Reading Comprehension subtest. The hearing subjects were chosen from a group of 27 fourth graders. Five students were illiminated due to absenteeism or not having previously taken the Iowa Test of Basic Skills. The hearing subjects, ranging between 9-10 years of age, attained scores of above average reading ability on the Iowa Test of Basic Skills. Stu-

dents differed in socioeconomic background and intelligence. In addition, members of the deaf population differed as to degree of hearing loss, cause of deafness, age deafness began and academic placement (see Table 1).

Table 1

Individual Score Data

Hearing Subjects			Deaf Subjects		
	Cloze score (raw score)	ITBS (raw score)		Cloze score (raw score)	SAT (raw score)
A	27	29	A	3	29
B	37	44	B	11	19
C	27	32	C	5	29
D	28	38	D	10	21
E	22	40	E	8	33
F	27	41	F	16	34
G	28	39	G	18	39
H	29	40	H	14	31
I	26	39	I	9	34
J	32	48	J	12	31
K	22	42	K	20	28
L	24	38	L	6	30
M	22	38	M	16	34
N	29	34	N	1	38
O	22	42	O	20	37
P	32	44	P	9	18
Q	22	43	Q	9	26
R	26	34	R	9	23
S	28	36			
T	29	40			
U	28	35			
V	36	48			

Reading scores from the Intermediate I, Form B, Reading Comprehension subtest of the Stanford Achievement Test (September 1982) and the Iowa Test of Basic Skills (May 1982) were used to give an indication of the general reading ability of all participating subjects. It was not possible to find a comparison population who also used the Stanford Achievement Test. Therefore, it became necessary to use the achievement test already in use.

Four passages, approximately 250 words each, were randomly chosen by the investigator based on content, style, length and readability. One passage, at the third-grade level, was taken from a social studies textbook. Two passages, at the fifth-grade level, were taken from a literature textbook. The last passage, at the seventh-grade level, was taken from an American history textbook. It was determined that to accurately cover all appropriate reading levels a sampling of below grade level (3rd-grade), at grade level (late 4th-early 5th-grade), above grade level (late 5th-grade), and frustration level (7th-grade) was necessary.

Passage difficulty was calculated by the Fry (1968) and Dale-Chall (1948) readability formulas, which are most frequently used with deaf children (LaSasso, 1978). Each passage was modeled after Taylor's cloze test (1953). The first and last lines of each passage were left intact. The deletion of every fifth word began with the second sentence of each passage. In place of the deleted word, a typed, ten-space line was inserted.

Procedure

All students completed the cloze tests at each of the third-, fifth-, and seventh-grade levels of difficulty. At the beginning of each testing period, the classroom teacher read the directions to the students as they followed along on their test copy. Due to time and school schedules, the testing for both hearing and deaf testing populations was divided up into two 45 minute periods.

During the first 45 minute period, both deaf and hearing students were instructed on how to complete a cloze passage. At that time, the third-grade and the first of the fifth-grade passages were administered. On the following day, the second 45 minute testing period was conducted in the same manner. The instructions were given along with the second fifth-grade and the seventh-grade passages. The passages were scheduled over a two day period in order to eliminate test fatigue.

Analysis of Data

Statistical procedures used to analyze the data included the Kuder-Richardson Formula 20 test of internal consistency and an analysis of variance.

Summary

Four randomly chosen text book passages were used to test readabilty and passage comprehension of both the deaf and hearing populations. The sample consisted of 18 deaf students and 22 hearing students both enrolled in schools in northwestern New York State. Students differed in socioeconomic background and intelligence. In addition, members of the deaf population differed as to degree of hearing loss, cause of deafness, age deafness began and academic placement. The Kuder-Richardson Formula 20 was used to analyze the internal consistency.

Chapter IV

Analysis of Data

Statement of the Problem

The purpose of this study was to determine the validity and reliability of the cloze procedure as a measure of passage readability and comprehension abilities of prelingually, profoundly deaf students. Also under investigation was the use of the Fry (1968) and Dale-Chall (1948) readability formulas to determine if cloze scores reflect relative passage difficulty for deaf students.

Findings and Interpretations

Research Question 1

Is the cloze procedure a valid readability measure for deaf students?

The Pearson Product-Moment Coefficient of Correlation was used to measure the concurrent validity. The correlation between the Stanford Achievement Test and the cloze procedure is 0.90, while between the Iowa Test of Basic Skills and the cloze procedure the correlation is 0.98. Such high correlation would normally indicate a good concurrent validity; however, in this instance the lack of reliability indicates otherwise.

Salvia and Ysseldyke (1981), in explaining the relationship between validity and reliability, state that the reliability of

the test limits its potential validity. Validity cannot stand by itself, it needs reliability. Of what value is a test if it does not measure what it should consistently? Salvia and Ysseldyke sum up validity and reliability thus,

> Finally, the validity of a particular test can never exceed the reliability of that test. Unreliable tests measure error; valid tests measure the traits they are designed to measure. (p. 110)

Research Question 2

Is the cloze procedure a reliable readability measure for deaf students?

In examining this question, the reliability of the raw scores for the passages was determined by assessing internal consistency using the Kuder-Richardson Formula 20. The Kuder-Richardson Formula allowed the estimation of reliability from a single administration of the cloze procedure. The Kuder-Richardson Formula is actually the mean of all possible split-half correlations. Internal consistency coefficients of 0.80 or above indicate good internal consistency. Salvia and Ysseldyke (1981) state that:

> If a test score is used to make a decision for one student, a much higher standard of reliability is demanded. When important educational decisions, such as tracking and placement in a special class, are to be made for a student, the minimum standard should be 0.90. When the decision being made is a screening decision, such as a recommendation that a child receive further assessment, there is still need for high reliability. For screening devices, we recommend a 0.80 standard. (p. 98)

The results are recorded in Table 2.

Table 2 indicates that for both testing populations the cloze procedure is not a good screening device for either deaf or hearing subjects because the internal consistency is below 0.80. The exception to this is seen in the deaf population with the mean scores of passage 2 (.82) and passage 3 (.82). The results reported in Table 2 indicate that the cloze procedure measures produce different levels of internal consistency for the deaf and hearing subjects.

Table 2

Kuder-Richardson 20 estimates of Internal Consistency for all four cloze passages

	Hearing Subjects	Deaf Subjects
Passage 1 (grade 3)	.51	.58
Passage 2 (grade 5)	.72	.82
Passage 3 (grade 5)	.40	.82
Passage 4 (grade 7)	.33	.72
All four passages (mean)	.50	.74

Research Question 3

Is the cloze procedure a valid measure of comprehension for deaf students?

The Pearson Product-Moment Coefficient of Correlation was used in establishing the correlation between the cloze test scores

and the standard comprehension test. In both cases the correlation is high: deaf (0.90), and hearing (0.98). Such high correlation would normally indicate a good concurrent validity; however, in this instance the lack of reliability indicates otherwise.

Research Question 4

Is the cloze procedure a reliable measure of comprehension for deaf students?

The results of the Kuder-Richardson 20 (Table 2) indicate that the cloze procedure is not a reliable measure of comprehension.

The Fry and Dale-Chall Readability Formulas

The Fry (1968) and Dale-Chall (1949) readability formulas were investigated to determine if cloze scores reflect relative passage difficulty for deaf students. The Pearson-Product Moment Coefficient of Correlation was used in correlating both the Fry and Dale-Chall results with the mean cloze scores. The correlation between the Fry and Dale-Chall formulas and the mean cloze scores of the hearing subjects was 0.87. The correlation between the Fry and Dale-Chall formulas and the mean cloze scores of the deaf subjects was 0.85. From these results a high correlation for both deaf and hearing subjects appears to have been achieved. However, since the cloze tests were not found to be reliable, any results indicating validity must be questioned.

Summary

The purpose of this study was to examine the cloze procedure as a measure of passage readability and of student comprehension for a given passage. Initially the results indicate that the cloze procedure is a valid measure of both student comprehension and passage readability.

The analysis of data does not show the cloze procedure as a reliable indicator of student readability and comprehension. As a result, the data supporting validity must be questioned.

Validity needs reliability. A test is of little value if it does not test what it is supposed to test consistently.

Chapter V

Conclusions and Implications

The purpose of this study was to determine the validity and reliability of the cloze procedure as a measure of passage readability and comprehension abilities of prelingually, profoundly deaf students. Also under investigation was the use of the Fry (1968) and Dale-Chall (1948) readability formulas to determine if cloze scores reflect relative passage difficulty for deaf students.

Conclusions

Within the limitations of this study, the following conclusions can be drawn:

The findings of this study support the conclusion that the cloze procedure is a valid, yet unreliable measure of readability and comprehension. As demonstrated in Table 2, mean scores for third-, fifth-, and seventh-grade passages indicate that the deaf students found the two fifth-grade passages easiest, the seventh-grade passage the next easiest, with the third-grade passage the most difficult. Since all levels of students (4.0-7.6) were calculated together, it can be speculated that different scores would be obtained if only the high scores were analyzed.

There may be several reasons for the above results. The first is that the cloze procedure may not predict relative passage difficulty for deaf students. Second, while the cloze procedure may fail to predict passage difficulty, the Fry and Dale-Chall formulas are successful measuring devices. Third, the Fry and Dale-Chall formulas may not predict relative passage difficulty for deaf students. A formula which uses linguistic variables other than sentence length, unfamiliar words, and number of syllables to predict readability may prove more accurate in predicting passage difficulty. A fourth possibility is that the Stanford Achievement Test scores incorrectly estimate deaf students' reading levels. Perhaps another standardized test would provide different results.

Study Limitations

This study was limited by a small sample of 18 deaf students and 22 hearing students. The actual testing of both samples took place during second semester. In replicating this study, it is suggested that a larger population (encompassing several classes) be tested during the first semester.

A larger testing population would also help eliminate logistic problems caused by incomplete testing due to absenteeism or ineligibility due to not having taken the standardized test. This researcher estimates that the cloze testing was given too close to

the time designated for end-of-the-year testing. Also, part of the testing was given by a substitute teacher and this may have been an unexpected variable.

Implications for Further Research

The findings from this study suggest the need for further research in the following areas:

1. The use of cloze scores as a measure of passage difficulty and student comprehension needs further examination before it can be recommended as a measure of comprehension and readability. It would be advantageous to select a larger testing population from oral and total communication programs.

2. Further research should use a variety of reading materials and different age groups.

3. The relationship between the traditional cloze passage (omitting every 5th word) and an altered form such as the maze needs to be investigated. Perhaps a multiple choice variety of cloze provides a more reliable evaluation of both passage difficulty and student comprehension.

4. Correlations between the standard tests and the cloze passages were high, resulting in a valid measure. However, since the cloze proved unreliable, more research is needed in the areas

of reliability and validity of the cloze. Here, also, a variety of reading materials should be used.

5. A content analysis should be performed on the passages used to see if there is anything in the language used that caused the passages to be difficult.

6. The Dale-Chall, Fry, or any other readability formula needs to be further researched to determine if these formulas can be used as predictors of readability for deaf students.

Recommendations for Classroom Instruction

1. Until further research can affirm the validity and reliability of the cloze procedure, it should be used cautiously as a method to match students with appropriate reading materials.

2. The Fry and Dale-Chall readability formulas are questionable measures of readability for deaf students. These formulas should also be used cautiously until further research determines their validity.

3. The comprehension scores on the Stanford Achievement Test and cloze test should be carefully examined when drawing conclusions about comprehension or lack of comprehension until further research is concluded.

4. One method which may prove helpful is using an altered form of the cloze; for example, the maze. The student would still be expected to fill in the blank but could choose from several written choices for the answer.

5. Perhaps the cloze could be used as an exercise in conjunction with class discussion. In this way it is used as either a group exercise or a diagnostic tool.

Summary

The purpose of this study was to determine if the cloze procedure is a valid and reliable measure of both passage readability and comprehension abilities for prelingually, profoundly deaf students. The Fry and Dale-Chall readability formulas were also under investigation to determine if cloze scores reflect relative passage difficulty for deaf students.

The study's findings concluded that while being valid, the cloze procedure is not reliable. When a measuring device proves unreliable, it is viewed as a poor measuring tool.

At the present time, many teachers use the cloze procedure as one of many classroom techniques. By altering the traditional cloze format and offering a list of words from which to choose the answer, the instructor could perhaps use the cloze in a more effective manner.

More research is needed in both the areas of the cloze procedure and readability formulas. There is also a need for more research in the area of deaf education and appropriate teaching materials.

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APPENDIX

CLOZE TEST DIRECTIONS

On the next page is a sample of a new kind of test. Each of these tests is made by copying a few paragraphs from a book. Every fifth word was left out of the paragraphs, and blank spaces were put where the words were taken out.

Your job will be to guess what word was left out of each space and to write that word in that space.

It will help you in taking the test to remember these things:

1. Write only one word in each blank.
2. Try to fill every blank. Don't be afraid to guess.
3. You may skip hard blanks and come back to them when you finish.
4. Wrong spelling will not count against you if we can tell what you meant.
5. Most of the blanks can be answered with ordinary words, but a few will be numbers like.....2,328 or 1982
   contractions like.....can't or won't
   abbreviations.....Mr. or U.S.A.

On the next page is a sample of one of these tests. Fill in each blank with the word you think was taken out. When you are finished you may recheck your work to make sure that all the blanks are filled in, then wait for directions from your teacher. You may begin.

Passage 1 (grade 3)

In the beginning, there was neither light nor dark, places nor things, up nor down. There was nothing. This _____ was called Chaos; in _____ it was simply the _____ of either things or _____. Even in Chaos, however, _____ the possibilities of order, _____ these possibilities were like _____ from which, in time, _____ all things grew.

The first _____ to grow out of _____ was Night, spreading its _____ of darkness like a _____ bird. Next to emerge _____ Erebus, the bottomless place _____ Death lives. Then Night _____ a silver egg, out _____ which hatched Eros, or _____. The beginning of Love _____ also the beginning of _____ life, and joy.

Mother _____, or Gaia, and Father _____, called Uranus, then came _____ this universe of light _____ dark, and life and _____. Rain fell from Heaven _____ lakes, oceans, and rivers _____ made, and green plants _____ to spring out of _____ Earth.

Uranus and Gaia _____ quite a large number _____ children. Their first three _____ were ugly monsters; each _____ fifty heads and a _____ hands. Uranus was so _____ with them that he _____ shut them up inside _____ earth. The Cyclopes were _____ next three children of _____ and Uranus. Each Cyclops _____ one enormous, glassy eye _____ the middle of his _____. Although they were cleverer _____ the three monsters and _____ even skilled at making _____ from metal, Uranus shut _____ away, too. He thought they were ugly and perhaps even dangerous.

Kitzhaber, A. R.; Malarkey, S.; Bratton, N.; Cagle, A.; deLespinasse, D. Literature I. Holt, Rinehart and Winston, Inc., New York, New York, 1968, 157.

Passage 2 (grade 5)

At daybreak Billy Buck emerged from the bunkhouse and stood for a moment on the porch looking up at the sky. He was a broad, _____ little man with a _____ mustache, with square hands, _____ and muscled on the _____. His eyes were a _____ watery grey and the _____ which protruded from under _____ Stetson hat was spiky _____ weathered. Billy was still _____ his shirt into his _____ jeans as he stood _____ the porch. He unbuckled _____ belt and tightened it _____. The belt showed, by _____ worn shiny places opposite _____ hole, the gradual increase _____ Billy's middle over a _____ of years. When he _____ seen to the weather, _____ cleared each nostril by _____ its mate closed with _____ forefinger and blowing fiercely. _____ he walked down to _____ barn, rubbing his hands _____. He curried and brushed _____ saddle horses in the _____, talking quietly to them _____ the time; and he _____ hardly finished when the _____ triangle started ringing at _____ ranch house. Billy stuck _____ brush and currycomb together _____ laid them on the _____, and went up to _____. His action had been _____ deliberate and yet so _____ of time that he _____ to the house while _____ Tiflin was still ringing _____ triangle. She nodded her _____ head to him and _____ into the kitchen. Billy Buck sat down on the steps, because he was a cow-hand, and it wouldn't be fitting that he should go first into the dining-room.

Passage 3 (grade 5)

The desert nomads' way of life is like no other in the world. Nomads have no government _____ we know it. They _____ no schools, no churches, _____ policemen. Yet their way _____ life is very well _____ and regular.

The Bedouins _____ nomads found in parts _____ North Africa and the _____ East. Bedouins keep flocks _____ sheep and goats and _____ of camels. Their herds _____ Bedouin people with food _____ a means of travel.

_____ between oases and water _____, Bedouins follow set routes _____ their herds and flocks. _____ they stop at farm _____. They are very dependent _____ oases for water and _____ town dwellers for grain, _____, fruits, and sugar. In _____ for these goods, Bedouins _____ meat, wool, and camel _____.

A person alone in _____ desert could not survive _____. As a result, each _____ knows how important the _____ is. He is first _____ to his family, then _____ his clan, then to _____ tribe. These groups are _____ for training the young _____ looking after each person's _____.

Bedouin men are camel _____ and warriors. Women attend _____ the flocks, to housework, _____ to children. Children enjoy _____ freedom until they are _____ seven. Then boys begin _____ learn the roles of _____, and girls begin to learn _____ roles of women.

Related _____ form clans which are _____ by nobles. Several clans _____ make up a tribe. A tribe is led by a sheik who rules with the aid of a council of elders.

Clark, J., and Associates. People and Culture, Noble and Noble, Publishers, Inc., New York, N.Y., 1974, 88-89.

Passage 4 (grade 7)

The significance of immigration in American history is at once apparent and difficult to define. At each stage of _____ development from the colonial _____ to the present the _____ had left his impress _____ American life; hardly an _____ of the total culture _____ remained untouched by his _____. Yet it must never _____ forgotten that immigrants were _____ integral part of an _____ whole. Nothing they did _____ America had any meaning _____ in the larger context _____ the life of the _____. For this reason the _____ impact upon American society _____ culture cannot be isolated, _____, and labeled as though _____were a chemical element. _____ that can be done _____ a summary of this _____ is to suggest in _____ terms the scope and _____ of the "contribution" of _____ in various fields.

The _____ obvious consequences of immigration _____ been demographic and economic. _____ continuous flow of great _____ of immigrants into the _____ States has been, in _____ first place, an important _____ in the steady increase _____ her population.

The realization _____ America's vast economic potential _____ likewise been due in _____ measure to the efforts _____ immigrants. They supplied much _____ the labor and technical _____ needed to tap the _____ resources of a virgin _____. This was most obviously true during the colonial period, when not only the pace of economic expansion but the very survival of the colonies was largely dependent upon a constant supply of new blood, whether in the shape of free immigrants, indentured sevants, or Negro slaves.