THE USE OF CUMULATIVE CLOZE PROCEDURE TO
INVESTIGATE CONTEXTUAL BUILD-UP IN
DEAF VERSUS HEARING READERS

by

Tom K. McKnight

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APPROVED:

______________________________
Richard T. Graham
Chairman

______________________________
Jerome A. Niles

______________________________
Robert M. Todd

______________________________
John K. Burton

______________________________
Elizabeth Steffey

October, 1984
Blacksburg, Virginia
DEDICATION

I dedicate this document to my best friend, to my confidant, to the love of my life, to my wife, Judy Ruth Couch McKnight. Further, I want to thank Dr. Richard T. Graham for his faith in me as a student. My upbringing in the mountains of Appalachia forbid one's teacher from becoming a friend; but, when someone shares of his knowledge, his humor, and his love for learning as Terry has shared with me, I easily exchange tradition for friendship.
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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedication</td>
<td>ii</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>iii</td>
</tr>
<tr>
<td>Table of Contents</td>
<td>iv</td>
</tr>
<tr>
<td>List of Tables</td>
<td>vii</td>
</tr>
<tr>
<td>List of Figures</td>
<td>viii</td>
</tr>
<tr>
<td><strong>Chapter</strong></td>
<td></td>
</tr>
<tr>
<td>I  INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Purpose of the Study</td>
<td>3</td>
</tr>
<tr>
<td>Rationale</td>
<td>3</td>
</tr>
<tr>
<td>Hypotheses</td>
<td>9</td>
</tr>
<tr>
<td>II REVIEW OF THE LITERATURE</td>
<td>11</td>
</tr>
<tr>
<td>Reading Achievement of the Deaf</td>
<td>11</td>
</tr>
<tr>
<td>Syntactic Skills</td>
<td>11</td>
</tr>
<tr>
<td>Reading Achievement</td>
<td>14</td>
</tr>
<tr>
<td>Deaf and Hearing Readers Compared by Reading Level</td>
<td>22</td>
</tr>
<tr>
<td>Oral Versus Manual Instruction</td>
<td>25</td>
</tr>
<tr>
<td>Good and Poor Readers</td>
<td>27</td>
</tr>
<tr>
<td>English as a Second Language for Deaf Readers</td>
<td>32</td>
</tr>
<tr>
<td>The Cloze and Cumulative Cloze Procedures</td>
<td>37</td>
</tr>
<tr>
<td>The Cloze Procedure</td>
<td>38</td>
</tr>
<tr>
<td>Criticisms of the Cloze Procedure</td>
<td>39</td>
</tr>
</tbody>
</table>
The Cumulative Cloze Procedure ..... 42

III METHODOLOGY ................. 46
          Participants ................ 47
          Rationale for the Participant
          Selection Strategy ............ 49
          Educational Setting for the
          Deaf Participants ............. 50
          Instrumentation ............... 50
          Data Collection ............... 52
          Analysis of Data ............... 54

IV RESULTS .......................... 57
          Ages of Participants .......... 57
          Reading Levels of Participants 57
          Hypothesis One ................. 61
          Hypothesis Two ................. 65
          Hypothesis Three ............... 67

V SUMMARY, CONCLUSIONS AND
       RECOMMENDATIONS ............. 81

References Notes ................... 86
References .......................... 87
Appendices

A  Summary of Grammatical Features of Children Using American Sign Language .......... 97
B  Cumulative Cloze Passages ............. 99
C  Goodman's Explanation of Grammatical and Semantic Acceptability ............. 102
D  Student Response Sheet .............. 105
E  Directions for Administering Cumulative Cloze Passages .............. 107

Vita ................................................. 109

Abstract
<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mean Ages of Deaf Versus Hearing Participants</td>
<td>58</td>
</tr>
<tr>
<td>2</td>
<td>Mean Reading Scores of Deaf Versus Hearing Participants</td>
<td>60</td>
</tr>
<tr>
<td>3</td>
<td>Analysis of Variance for the Data of Hypothesis One</td>
<td>62</td>
</tr>
<tr>
<td>4</td>
<td>Analysis of Variance for the Data of Hypothesis Two</td>
<td>68</td>
</tr>
<tr>
<td>5</td>
<td>Analysis of Variance for the Data of Hypothesis Three</td>
<td>70</td>
</tr>
<tr>
<td>6</td>
<td>Number of Deaf Versus Hearing Participants Abandoning and Returning to Correct Target Nouns</td>
<td>72</td>
</tr>
<tr>
<td>7</td>
<td>Number of Grammatically Acceptable Predictions Across Six Exposure Points (Cumulative for All Passages) for Deaf Versus Hearing Readers</td>
<td>74</td>
</tr>
<tr>
<td>8</td>
<td>Number of Semantically Acceptable Predictions Across Six Exposure Points (Cumulative for All Passages) for Deaf Versus Hearing Readers</td>
<td>76</td>
</tr>
<tr>
<td>9</td>
<td>Percentage of Grammatical Accuracy at Points of Maximum Gain Given Two Levels of Context</td>
<td>77</td>
</tr>
<tr>
<td>10</td>
<td>Percentage of Semantic Accuracy at Points of Maximum Gain Given Two Levels of Context</td>
<td>79</td>
</tr>
</tbody>
</table>
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Increase in the Number of Correct Responses Across Six Exposure Points for Hearing Versus Deaf Readers Across All Grade Levels</td>
<td>64</td>
</tr>
<tr>
<td>2</td>
<td>Total Number of Correct Responses at Points of Maximum Gain in Comprehension for Hearing Versus Deaf Readers Across All Grade Levels</td>
<td>65</td>
</tr>
</tbody>
</table>
CHAPTER I

The Use of Cumulative Cloze to Investigate Contextual Build-Up in Deaf and Hearing Readers

Traditional methods of comparing deaf and hearing readers have consistently detected significant differences in vocabulary, comprehension, and syntactic knowledge favoring hearing readers. In fact, investigations have revealed consistent comparisons of the reading abilities of 18-year-old deaf adults with the reading abilities of 9-and-10-year-old hearing children (Jensema & Trybus, 1978). However, Ewoldt (1978) has documented similarities in the performances of deaf and hearing readers, suggesting that for both groups reading is a single process. Through a research technique labeled miscue analysis, developed by Kenneth Goodman (1965, 1968), Ewoldt (1978) has recorded examples of deaf readers who chunk textual information, predict unfamiliar vocabulary, and use context clues in a manner similar to hearing readers. As evidence of the use of contextual information, for example, Ewoldt (1978) has noted that deaf readers often fingerspell an unfamiliar word throughout a reading passage and move to an established sign after constructing meaning from contextual information.
Cloze procedures offer a vehicle to explore hearing and deaf readers' interactions with missing vocabulary and contextual clues but have primarily been used to measure syntactic, rather than semantic, knowledge (Quigley, Power & Steinkamp, 1977). However, Moores (1970) and La Sasso (1980) have supported the reliability of the cloze format as a measure of deaf readers' semantic skills.

In addition to a concentration on syntactic skills, past cloze research in the area of reading has often involved cloze tasks limited to a sentence level (Gormley & McGill-Franzen, 1978). Hoffman (1980) has pointed out that, for the hearing reader, the "bilateral constraints" (p. 337) of sentence-level cloze exercises are usually limited to four-to-five words on either side of a random deletion. Hoffman (1980) has viewed these bilateral constraints as an "insensitivity" (p. 337) to any investigation of the role of context in an extended passage. Because of this failure to consider passage-level context, the bilateral constraints of sentence-level cloze tasks have been viewed as limiting to any accurate assessment of larger idea units as might be found in connected text of a paragraph or more in length (Hoffman, 1980).

Hoffman (1980) has proposed a modified cloze task, derived from a comprehension exercise from Goodman and Burke (1972), labeled "cumulative cloze" (p. 337) to study
contextual build-up in extended text. The modification is the deletion of the same noun from a paragraph of five or six sentences. This design presents a format to observe deaf and hearing readers' predictions as they read for the purpose of constructing meaning. With each opportunity to form a prediction, readers are given increasing amounts and varieties of context clues.

**Purpose of the Study**

The purpose of this study was to compare and to describe deaf versus hearing readers' sensitivity to contextual build-up by examining each group's successive approximations of deleted noun meanings as constructed in cumulative cloze tasks.

**Rationale**

Some measures of school tasks relating to reading are similar for younger deaf and hearing readers. Kyle (1980) found that children with partial hearing, profound deafness, and normal hearing differ little in their knowledge of letter identification, letter equivalence, and sight vocabulary at ages seven, eight, and nine. However, measures of comprehension favor hearing readers at all chronological levels. Evidence suggests that deaf as well as hearing readers can and do successfully manipulate the surface structures of language, but deaf readers sometimes
have more difficulty in going from print to meaning. Psycholinguistic theory on how the reading process works lends insight to difficulties deaf readers experience because of a lack of hearing ability compared to advantages hearing readers enjoy.

Rumelhart (1980) has described reading as a constructive, interactive process where readers assemble or work toward meaning. The three main conceptual aspects of the construction strategy have been labeled as the 1) prediction of meaning, 2) further sampling of available cues to test the predictions, and 3) confirmation or rejection of the initial predictions (Goodman, 1968). These phases of comprehension parallel Anderson's (1977) schema theory of 1) schema selection, 2) schema testing, and 3) schema maintenance. A comparison of the two models reveals that it is precisely the prediction state where Goodman's (1968) psycholinguistic model and Anderson's (1977) schema theory intersect.

Rumelhart (1980), elaborating on Anderson's theory, has defined a schema as "a data structure for representing the generic concepts stored in memory" (p. 34). He has further described schema as being networks of meaning assimilated into a structure in terms of their predictability, and he has suggested that the learner naturally accumulates a build-up of predictable events through unique prior
experiences. Predictability has been explained as frames of comparison and contrast against which new experiences are examined. Rumelhart (1980) has maintained that learners use this feedback to make sense of new events and ideas to make new experiences fit into established patterns. In terms of reading, he noted that comprehension is gained when enough schema are 1) activated through prediction and 2) logical in view of the range of alternatives.

Similarly, Goodman's (1968) psycholinguistic model of reading reiterates that to make initial predictions of meaning, readers first survey the available information from print. Predictions are then tested against further information revealed through extended context. Goodman's (1968) third step proposes that if the initial predictions are rejected, the search for meaning starts again. If initial predictions are confirmed and maintained, meaning is achieved. Logically then, if readers are denied the opportunity to examine extended text, the prediction process is hindered if not halted.

Adams (1980) discusses "bottom-up processing" (p. 12) where letter identification leads to word identification and word identification cues the most predictable syntactic and semantic structures. She elaborates that as the various levels of meaning are triggered, they move the comprehension process from general to specific understanding. "Top-down
processing" (p. 12) is described as a competition between activated schema at each level to cue, test, and satisfy schema networks of other levels. Prediction on the basis of contextual information is an example of top-down processing. The two processes are set forth as simultaneous, interacting complements of the larger process of meaning construction.

Readers' predictions are tentative until additional information allows them to be confirmed or rejected. Goodman (1968) has documented that readers often miscue and later correct their predictions. Elaborating on the constructive, interactive nature of the reading process, Spiro, Bruce, and Brewer (1980) describe its "dynamic nature" (p. 8). They propose the possibility that "as a consequence of some of the intermediate stages, the reader must back up and rehypothesize about the meaning of a text" (pp. 8-9).

Hoffman's (1980) modification of the cloze procedure, the cumulative cloze task, offers opportunities to observe how deaf and hearing readers hypothesize and rehypothesize during the construction of meaning. The cumulative cloze task, a series of six predictions of the same noun, the "target noun," in one paragraph, provides two channels to monitor the meaning construction process of reading. First, consecutive predictions offer an observer an opportunity to watch as readers direct the building of meaning as demanded
by syntactic constraints. Second, the cumulative cloze task provides a map of readers' prediction strategies as they process print within and among sentences in connected discourse during interaction with context clues.

Woods (1980) has noted that while readers are testing one possible avenue of meaning, the information from other possible meanings is not discarded but held until some prediction has been confirmed. He discussed different ways readers deal with multiple hypotheses when several alternatives are generated from initial contact with print. Woods (1980) has labeled one of the predicting, testing, confirming or rejection strategies as "backtracking": "Backtracking refers to the process of saving enough information before making a choice among alternatives ... so that, at a later time, the situation prior to the choice can be reconstructed and a different choice selected" (p. 60).

In terms of Goodman's (1968) psycholinguistic model of cues and miscues, the cumulative cloze task offers an opportunity to examine how deaf and hearing readers backtrack or recue during reading. The cumulative cloze task offers readers six chances to predict and to refine, to backtrack and to recue meaning through contextual clues. Smith (1975) has posited that readers use context to reduce the number of possible vocabulary choices while testing predictions.
Gormley and McGill-Franzen (1978) have suggested that deaf readers are able to "bypass" (p. 542) complicated syntax to gain comprehension when given context beyond a sentence level. They found that deaf readers are able to understand concepts and vocabulary in syntactic structures thought to be beyond their grasp when allowed to interact with context extending beyond isolated sentences.

Rather than focusing on syntactic abilities, this study explored the construction of semantic information. A cumulative cloze task characterized by simple syntax, concrete nouns, vocabulary within the realm of readers' experiences, predictable language patterns, and intrasentence and intersentence redundancy presented favorable reading conditions to both hearing and deaf readers. Under these reading conditions, it was predicted that there would be no significant differences in the number of correct predictions of correct target nouns by deaf and hearing readers at corresponding grade levels by the sixth, final exposure points in a series of cumulative cloze tasks.

In this study, the cumulative cloze task asked five deaf and five hearing readers at grade levels four, six, eight, ten, and twelve to predict meaning from passage-level contextual clues. Additionally, five deaf and five hearing readers at the same five grade levels were asked to predict meaning in sentence-level cloze tasks, selected from the
cumulative cloze passages. Because of the opportunity to examine extended context and the opportunity to rehypothesize in passage-level prose, it was predicted that both deaf and hearing readers would be able to construct meaning more easily in connected discourse than in isolated sentences. Additionally, it was predicted that for both deaf and hearing readers, the number of word types would decrease as readers continually narrowed their focus of meaning as they progressed through the series of six exposure points for the target noun in the cumulative cloze task.

It was predicted that younger deaf and hearing readers, defined in this study as fourth and sixth graders, would not perform as well as older deaf and hearing readers, defined as eighth, tenth, and twelfth graders, in their ability to focus on meaning. A difference in younger, second graders, and older, seventh graders, hearing readers' ability to use context clues, measured by an orally administered version of the cumulative cloze procedure, has been observed by Hoffman (1979, Note 1).

Hypothesis

1) There is no difference in the number of correct responses by deaf versus hearing readers at grades four, six, eight, ten, and twelve to target nouns
in cumulative cloze tasks constructed in passage-level versus sentence-level context.

2) There is no difference in the number of deaf versus hearing readers at grades four, six, eight, ten, and twelve correctly predicting the target noun by the final, sixth exposure point in a cumulative cloze task.

3) There is no difference in the number of word types produced by deaf versus hearing readers at grades four, six, eight, ten, and twelve in responses to passage-level versus sentence-level context.
CHAPTER II

Review of Literature

This review of literature is divided into four major areas: 1) reading achievement of the deaf, 2) perception of deaf readers as "poor" hearing readers, 3) English as a second language, and 4) the cloze and cumulative cloze procedures.

Reading Achievement of the Deaf

Reading achievement of the deaf is divided into three subsections: 1) syntactic skills, 2) general reading achievement, 3) deaf versus hearing readers compared by reading level, and 4) oral versus manual instruction.

Syntactic skills. Most of the research in the area of educational performance of deaf readers has centered on syntactic rather than semantic skills. The importance of these studies could not have been overlooked because they represent researchers' largest efforts in the field of education for the hearing impaired. For the reader of this document who may be unfamiliar with mature deaf readers' knowledge and understanding of the English language, a summary of the findings of general syntactic abilities of
deaf students, from the work of Quigley, Power, and Steinkamp (1977), is listed in Appendix A.

In a sequence of studies involving 450 readers, ages 10 to 19, using early versions and revisions of a "Test of Syntactic Abilities" (Quigley, Steinkamp, Power & Jones, 1978), Quigley and several prominent researchers in deaf education, have summarized the most complete survey, thus far, of deaf readers' syntactic skills. Research teams have included: Power and Quigley (1973); Quigley, Montanelli, and Wilbur (1976); Quigley, Power, and Steinkamp (1977); Quigley, Smith, and Wilbur (1974); Quigley, Wilbur, and Montanelli (1974, 1976); Steinkamp and Quigley (1977); Wilbur and Quigley (1975); Wilbur, Quigley, and Montanelli (1975); and Wilbur, Montanelli, and Quigley (1979);

Deaf children read sentences and repeated in sign language what they had read; they also completed Nth deletion cloze tasks and multiple-choice questions to measure comprehension. Examples of negation, question formation, determiners, pronominalization, relativization, and verb system responses were consistent across age levels. Negation was handled outside the sentence: "Beth make candy no." Passive sentence constructions were incorrectly interpreted most of the time: "The boy was pushed the girl." Incorrect inversion in some question formation structures became: "Who TV watched?" (Quigley, Power & Steinkamp, 1977, p. 80).
According to Trybus and Karchmer (1977) who also reviewed national data on syntactic abilities, only ten percent of the 20-year-old readers read above an eighth-grade level with the average reader at about 4.5 grade level. Also noted was the small amount of increase in proficiency at various grade levels throughout all linguistic categories. In most cases, deaf readers progressed less than .3 percent per year on the average compared to as much as an average of two years' improvement for many hearing children. The small percent of growth at each level was enough for Trybus and Karchmer (1977) to reject a popular notion of a plateau at approximately fourth-grade level. A plateau has been proposed by Clark, Rogers, and Booth (1982), Cooper and Rosenstein (1966), di Francesca (1972), Moores (1970), and Myklebust (1964).

The idea that deaf readers plateau at about fourth grade closely follows in importance to the finding by Quigley, et. al., of a subject-verb-object pattern imposition on most sentence structures. According to Quigley (1982), "the most general pattern found was the tendency to impose a subject-verb-object (S-V-O) pattern on sentences--to read English as a linear rather than a hierarchical structure--often leading to misinterpretations of sentences" (p. 99). Syntactic knowledge, however, is only one factor of overall reading achievement.
Reading Achievement. Clark, Rogers, and Booth (1982) pointed out that "during the first two years of school, hearing-impaired students perform slightly better in reading than they do in other subjects...." They attributed this finding to the "early attention given by teachers to vocabulary and basic word-recognition skills" (pp. 61-62). Testing at these primary levels has been limited to isolated word identification, sentence-level cloze tests, and basic matching of vocabulary to pictures. Teaching practices and primary testing materials as defined by the Virginia Schools for the Deaf Unified Reading Curriculum Guide (1982) changed from a "traditional focus of ... phonics" to a focus on "comprehension" (p. 7, Note 5). Changing from an environment of limited context, the new curriculum guide stated, "It is no longer the teacher's role to preteach vocabulary and reading skills in isolation" (p. 5).

Mykelbust (1964) examined vocabulary levels of hearing and deaf readers using the Columbia Vocabulary Test. He found that deaf readers' vocabularies achieved only limited growth after age 13. The difference was about six years; 15-year-old deaf readers' vocabularies were similar to those of 9-year-old hearing readers.

Furth (1966) reviewed the work of Wrightstone, Aronow, and Muskowitz (1963) who investigated the silent reading ability of deaf children from 10 1/2 to 16 1/2 years old.
The elementary level of the Metropolitan Achievement Test was administered to Canadian and American deaf readers. By age 16 1/2 only 12 percent of the deaf students reached a fourth-grade level. One finding was the small amount of growth realized from ages 12 to 16. The average increase was one-year's growth for the latter four-to-five years' schooling.

Gentile and di Francesca (1969) reported the results of a national survey conducted by the Office of Demographic Studies at Gallaudet College in Washington, D.C. The first test used the Stanford Achievement Test which had been normed with a hearing population. After two years of work, the Gallaudet staff deemed new test modifications appropriate for hearing-impaired children. In 1972, di Francesca reported the results of the modified Stanford Achievement Test (SAT-HI) for hearing-impaired students from five to 21 years old. The total number of participants was 19,037 with the following breakdown: 22 percent 6-10 years old, 58 percent 11-16 years old, and 19.6 percent 17-21 years old. A placement test was administered to all participants before taking the actual test. As a result, 70 percent of the participants took the Primary I or II battery designed for 1:1 to 3:0 grade levels. Only 4.3 percent were able to take the advanced battery designed for students in grades seven through nine. The grade-level retardation averaged about
two years for 13-year-old readers. Scores on paragraph meaning and vocabulary subtests decreased as hearing loss increased. Residual hearing appeared to positively affect the scores.

Babbini and Quigley (1970) reported the results of a five-year longitudinal study involving 163 deaf readers in six residential schools from 1963 to 1967. Consistently, readers were six years deficient when compared to grade-level expectations, and the familiar .3 grade-level growth pattern was also observed.

Silverman-Dresner and Guilfoyle (1972) investigated deaf readers' vocabulary knowledge through multiple-choice definition selection. The researchers machine scored 13,207 students' responses to 200 words each. Student ages were eight through 17 years. Several cautions were taken to insure simple, logical definitions. For example, each definition contained words either at or below the grade level of the stimulus word. They concluded that vocabulary knowledge increases with age. However, although some increase was found in older students' vocabulary knowledge, adult deaf readers' scores resembled younger hearing readers' scores.

A retarded grade-level competency has been established and generally has been accepted in the literature. According to Walter (1978), "it has been shown that at the
level of the 2,000 most frequently used words in printed English, a 14-year-old hearing-impaired student performs at only a 60% accuracy rate" (p. 982). Vocabulary knowledge, syntactic knowledge, and paragraph understanding were all found to be limited for deaf readers at all ages.

Hammermeister (1971) tested 60 adults who had been out of school from seven to thirteen years and found that while vocabulary increased somewhat, no significant growth occurred in comprehension ability. Vocabulary growth was measured for the English language; fluency in American Sign Language was not examined for growth.

Gormley (1981) proposed that reading scores are dependent on readers' familiarity with a topic. She found that retelling scores were significantly better with topics which were familiar to readers. These results were interpreted as support for a language-experience approach to reading for deaf children. A language-experience format, she proposed, seemed ideal to utilize readers' prior knowledge and experiences. A language-experience based approach, as viewed by Gormley, promised to familiarize readers with a general topic before specific facts and comprehension measures could penalize readers.

Although deficient in the areas of syntactic knowledge and reading comprehension skills, several studies have shown that for words understood and used by deaf children, at
various ages within the deaf school-age population, and when matched with hearing readers on reading ability, deaf children's spelling skills often equal or surpass hearing children's skills (Hoemann, Andrews, Florian, Hoemann & Jensema, 1976). Gibson, Surcliff, and Yonas (1970) have offered that the lack of sound is almost an advantage in learning the patterns of English orthography. Sound related miscues, according to Gibson et al., (1970), have been found to represent the largest type of spelling problems for hearing children.

Fischler (1983) found no difference in deaf and hearing college students' cloze responses given sentence-level contextual conditions. Two levels of contextual constraint were determined from cloze responses by hearing college students. Cloze items which produced little variation among word types in hearing readers' responses were labeled "highly constrained." Deaf readers' responses were similar at both levels of contextual constraint: for highly constrained and less constrained words, there was no difference in the types of responses. The results indicated that deaf and hearing readers use the same semantic and syntactic linguistic skills to construct meaning. Ahlfors (1979) used three teaching conditions stressing "definition," "context," and "prior experience" to study vocabulary acquisition in deaf sixth graders. The
definition group manipulated dictionary definitions of words; the context group studied and constructed written models of words in sentence-level context; and the prior experience group designed semantic trees using clues to target words. Twenty readers in each of these groups and a control group completed immediate and delayed multiple-choice definition tests, a cloze test, a memory recall test, and sentence-level vocabulary usage tests. Under these particular experimental and testing conditions, the definition and context groups achieved better scores than both the experience and control groups. These findings of context as a viable means of teaching vocabulary have also been supported by Gipe (1978-79) and Pany and Jenkins (1978).

Through miscue analysis, Ewoldt (1981) evaluated the performance of four deaf readers, ages 6, 12, 15, and 16. The deaf children were reading at grade levels one, four, six, and five, respectively. All had hearing parents; all were in a residential school for the deaf; the amount of oral training increased with age. All children used a form of Pidgin Sign English which is a combination of features from both ASL and Signed English.

One example from the 15-year-old reader typified the construction task of the cumulative cloze task. The example was cited as "evidence for the accumulation of meaning by deaf readers" (p. 74).
With deaf readers the development of a concept can often be seen more clearly. The appropriate choice of signs can give a better indication of comprehension than a correctly pronounced word.

Jane read the same story ... in which the word *typical* occurred 13 times. The first two times she signed *type*, meaning to use a typewriter; then she signed *office*, chaining from her first miscue.... She then signed *type* three more times, then fingerspelled *typical*, misspelling it, then fingerspelled it correctly the next five times it appeared. The last time she encountered the word, she signed *group*, a word which approximates the concept. (When one is typical, one is a member of a group.) (Ewaldt, 1981, p. 74)

Ewaldt (1981) documented other examples of meaning construction where "partially fingerspelled words ... were abandoned for the appropriate sign" (p. 84). The construction of meaning was more evident in deaf readers because of their options of fingerspelling and signing.
Ewoldt (1981) and Gormley and McGill-Franzen (1978) articulated how deaf readers "bypassed" syntax, which was presumed to be above their levels of understanding when measured in single-sentence cloze tasks, and went directly to meaning when reading passage-level text. McGill-Franzen and Gormley (1980) found that deaf readers were able to understand truncated-passive sentence constructions in the context of extended discourse but not in the context of single sentences. Full-passage conditions were seen as more meaningful for readers than were sentence-level conditions:

It was demonstrated that increasing the meaningfulness of the task facilities an understanding of complex syntax for deaf readers, enabling them to utilize their word knowledge and redundant textual information to disambiguate grammatical relations among words (p. 942).

Implications for educators and test makers from Ewoldt's (1981) miscue analysis included "providing deaf readers with more context than an isolated sentence or paragraph" to allow them "more opportunities to construct meaning regardless of difficult syntax or unfamiliar words" (p. 86).

Johnson, Toms-Bronowski, and Pittleman (1982) recommended a semantic mapping strategy for teaching deaf
readers new vocabulary similar to the structure of Hoffman's (1980) cumulative cloze structure: "A successful teaching strategy ... might be to begin with the topic of animals or birds and, using prior knowledge, 'build bridges' (links, networks) between the known; and the new (e.g., Canaries are birds; Canaries have color; Canaries are yellow)" (p. 15). Actually, the cumulative cloze design combines semantic mapping, prior experience, and contextual analysis activities. Sentence-level contextual information forms a structure for semantic mapping clues. A reader must keep building clues until enough information, schema, are activated to trigger a response. A correct match between a reader and the author is achieved only if the reader holds in memory the target word, accumulated through prior experience. Thus, the need for an investigation using the cumulative cloze procedure was in order to study contextual build-up in deaf and hearing readers.

**Deaf and hearing readers compared by reading level.** Deaf readers score significantly lower on reading tests when compared with hearing readers at similar grade levels. Deaf readers at high school levels perform similarly to hearing readers at elementary school levels. Moores (1970) matched sixteen-year-old deaf readers and nine-year-old hearing readers on overall reading ability, fourth-grade reading level, based on cloze tests of random Nth deletions. Deaf
readers scored significantly lower than hearing readers on passages at their reported grade levels and on passages above their grade levels. The sample was small, 37 readers in both groups. Moores (1970) concluded that deaf readers' standardized test scores were inflated measures of their actual abilities. He contributed the inflation to the answer format of the standardized test procedure; the answers were stated, and the readers could choose from the available choices. The cloze procedure was recommended over standardized test scores as a more sensitive measure of deaf readers' syntactic and semantic abilities. Moores (1970) and Walter (1978) demonstrated that deaf readers' skills in English are less proficient than hearing readers' skills when both groups are matched on reading level.

Odum, Blanton, and Nunnally (1967) studied form-class and degree-of-contextual-constraint effects on answers in cloze tasks with 156 deaf versus hearing readers. Deaf readers were twelfth graders, and hearing readers were fifth graders. Three statistical variations of the cloze format were used: deletions of every third, fourth, and fifth word. Hearing readers outscored deaf readers on all three levels of contextual constraint on the task of direct word replacement but not on form-class accuracy. Apparently, "greater contextual constraint aided the deaf in predicting the form class of a deleted syntactic word, but not in
predicting the word itself" (p. 822). Increased context failed to facilitate the correct prediction of the form class or the exact deleted word for hearing subjects. The results were interpreted by these particular researchers to mean that "different types of rules were being used by the deaf and hearing groups" (p. 826). A ceiling effect was also noted for deaf readers for correct form-class word completion.

Marshall (1970) compared the influence of various amounts of contextual constraint by contrasting readers' responses to sentence fragments, whole sentences, and an entire 809-word story. Hearing readers, approximately six years younger, outperformed deaf readers at all levels of contextual constraint. Deaf readers correctly filled in more form-class words than content words. The limited population of the form-class words was reasoned to be the cause of this finding. All readers demonstrated better cloze scores on the connected discourse level of constraint.

Cohen (1967) compared hearing and deaf readers' responses to cloze tests imposed on stories written by deaf and hearing children of matched reading abilities. The compositions were paraphrases of stories previously read by both groups. Hearing subjects found paraphrased stories written by deaf readers significantly less predictable than stories paraphrased by hearing readers. Deaf readers
experienced equal difficulty filling in cloze tasks designed by hearing and deaf readers/writers. The reading level of the participants was unclear from the article, but the results indicated that hearing readers had more difficulty with the reconstruction of the language of deaf writers.

Oral versus manual instruction. Further, a controversy between the proponents of manual and oral methods of instruction has raged since the early 1900's (Myklebust, 1964). Research by Meadow (1968) and Stevenson (1964) has demonstrated that children exposed to early manual communication, sign language, in addition to oral training, speech therapy concentrating on vowel and consonant sounds and English suprasegmentals, are higher achievers in reading than children limited only to oral training. The children exposed to early manual communication were almost always children whose parents were also hearing impaired. It was noted that speechreading skills of both groups were similar, only early sign language experience varied due to parentage and time of a diagnosis of deafness.

Meadow (1968) matched 56 pairs of orally-trained versus manually-trained children and concluded that the manual group was two years ahead of the oral group in reading, one year ahead in math, social adjustment, and written language assessments. Stevenson (1964) matched 134 pairs of manual and oral students. He concluded that 90 percent of the
manual group were better performers on reading tasks than were their orally-trained counterparts.

These results were supported by Stuckless and Birch (1966) who investigated 105 pairs of manually-trained versus orally-trained language users. Vernon and Koh (1970) matched 32 pairs of readers. Using the Stanford Achievement Test, the students exposed to early communication scored 1.39 years better in reading and 1.57 years better in vocabulary than did students limited to early oral training. On smaller scales, these general findings were supported in studies by Denton (1969), Hester (1964), and Quigley and Frisina (1961).

Although crucial to any study of deaf readers' performances, there was no consensus among researchers on the question of the benefits or detriments of oral versus manual training. Therefore, it was not sufficiently resolved in the literature to include an added variable of speech training to this study. In addition to the unresolved issue of oral versus manual training, educators of the deaf also disagree on a register of comparison for deaf readers' skills.

Essentially, educators and researchers who fail to consider and to respect the linguistic differences in English and American Sign Language have described deaf readers as "poor" hearing readers. Without reducing deaf
readers' skills to such a status, consistent comparisons warranted a review of pertinent literature on "good and poor" hearing readers.

**Good and Poor Readers Who Enjoy Normal Hearing Ability**

Good and poor hearing readers may attend to different features of semantic information. Tierney, Bridge, and Cera (1978-79) observed that fourth-grade readers were not able to restate as many propositions explicit in text as were good readers. Weaver (1979) has pointed out that "younger and/or less proficient listeners and readers" have more difficulty "with constructions that require readers to hold all or part of one constituent" of a proposition "in mind while processing another" (p. 36).

These constructions include:

1) sentences with a relative clause embedded within a main clause,
2) sentences with a nominalization in subject position,
3) sentences with a nominalization in subject noun,
4) sentences with modifiers coming after the subject noun,
5) sentences in which a verb-plus-article construction is interrupted by a lengthy noun phrase, and
6) sentences with a long indirect object phrase and short direct object phrase. (Weaver, 1979, pp. 36-37).

Weaver (1979) continued that "another difficulty is with constructions that are relatively inexplicit about specifying the underlying syntactic and/or semantic relationships"; for example: "1) sentences in which the performer of an action is not explicit, and 2) sentences which do not include an optional syntactic marker" (p. 38).

Cromer (1970) rejected a processing deficit theory of differences for good and poor readers having normal hearing but suggested that a difference may exist in the ways each group utilizes semantic and syntactic cues in normal reading situations. Guthrie and Tyler (1976) documented similarities in the use of syntactic information by older poor readers as compared to younger good readers.

Good readers matched for age with poor readers appear to be better predictors of semantic information (Goodman, 1965, 1968, 1969; and Wildman & Kling, 1978-79). Weber (1970) observed that poor readers' miscues were less acceptable semantically and syntactically in intrasentence context than were the miscues of good readers.

Weber (1968) observed first graders' miscues and found that almost 90 percent were grammatically acceptable in terms of prior context, and that approximately 60 percent
were acceptable in terms of following context. However, this study further compared good and poor readers and found that better readers corrected significantly more miscues, 80 percent, which were unacceptable with context occurring after miscues as opposed to poor readers' 42 percent correction rate for similar miscues.

Wanat (1976) proposed that the complexity of grammatical constructions affects the number of forward and regressive eye movements of skilled readers. Blea (1967) found that deaf readers at various reading levels make more eye regressions during reading of extended text than do hearing students of corresponding ages. Other than the number of regressions, the eye movement patterns were the same for deaf and hearing readers. However, the grammatical complexity of the reading material was not in this particular study.

Clay and Imlach (1971) found that good and poor readers, seven-year-olds, differed in the number of words read between pauses and the number of stresses per word in oral reading. While poor readers made 1.1 stresses per word and read 1.3 words between pauses, good readers operated at 4.7 words per stress and read seven words between pauses.

Hoffman (1979, Note 1) discussed the performance of 34 students including good and poor readers, in grades three through seven, on an oral cumulative cloze task. Reading
levels of the participants ranged from 2.1 to 7.2 grade levels. The Wide Range Achievement Test mean was 4.4 grade level. Students responded orally after hearing a recitation of a story while they read along silently. Recorders transcribed readers' answers. Each reader's scores for all cloze passages were totaled to form a total cumulative cloze score (TCC).

Although the TCC could not measure or display individual growth, it served as a comparison of readers' end scores. No significant differences were found in good and poor readers' TCC. However, one difference was observed between the prediction strategies of the two groups: poor readers more frequently abandoned correct responses after correctly predicting the target word. Poor readers appeared less able to maintain a word choice after correctly predicting the target word. Poor readers appeared less sure of their decisions after correctly predicting meaning. This was interpreted as poor readers being "disproportionately tuned into the immediate context" instead of making use of progressive development in extended text (p. 12).

Neville and Pugh (1976-77) also described poor readers' lack of utilization of following context in sentence-level cloze tasks. More proficient readers tended to group words in meaningful linguistic units instead of reading word-by-word. This finding indicated that poor readers concentrate
more on visual features of print than on more meaning-bearing features in the flow of language.

In summary, poor readers concentrate on smaller groups of words within a sentence than do good readers. This attention to shorter word groups indicates that poor readers differ from good readers in their organization of text into smaller meaningful units. In addition to poor readers' inappropriate articulatory phrasing patterns, displayed in an increased number of intrasentence junctures or pauses, poor readers also evidence a reduced tendency to use following context in word-identification decisions, and a reduced tendency to correctly predict syntactic and semantic information. Although poor readers tend not to adequately utilize as many syntactic and semantic clues as do good readers, vocabulary and comprehension decisions reflect the use of syntactic and semantic contextual information. These findings indicate a difference in processing strategies by good and poor readers, but the process appears to be the same for both groups.

Deaf readers, as documented in the first section of this literature review, exhibit some of the same processing differences as do poor hearing readers. In addition to this treatment of deaf readers as poor hearing readers, many educators consider American Sign Language a variant form of English. Research in the linguistics of ASL does not
support this position. Instead of treating ASL as a variant form of English, several studies have investigated the similarities in the strategies of deaf readers of English and second-language readers of English.

**English as a Second Language for Deaf Readers**

The literature tends to support the idea that English is a second language for deaf children of deaf parents. Although her sample of four readers was small, Ewoldt (1981) found that the greater the percentage of features of ASL used in reading and retelling strategies by deaf readers, the more they resembled bilingual speakers and readers.

Wilbur (1979) presented summaries of research which compared the performances of children born to deaf and hearing parents. Overwhelmingly, the conclusions indicated that deaf children of deaf parents are at an advantage in the areas of language acquisition, socialization, reading achievement, written language, and emotional development. Rarely was there a difference found in lipreading and speech skills. Wilbur (1979) offered a possible explanation for the achievement differences: "It is probable that much of this achievement depends directly on better parent-child relations, which in turn are a function of better communication channels" (p. 246). It was pointed out that positive parental interactions were supplemented by
extensive additional communication opportunities in the deaf community. Children born to hearing parents do not enjoy the benefits of early language with competent signers.

Gormley and McGill-Franzen (1980) supported the proposal that English is a second language for deaf children of deaf parents. They theorized that "because reading is based on language knowledge, children who are proficient language users, whether their language is Ameslan" (ASL) "or English, signed or oral, have an advantage over those who are not" (p. 453).

Wibur (1979) provided a sophisticated set of proposals as justification for the second-language status of English for deaf children of deaf parents:

1. ASL may be described in terms of discrete elements.
2. There exist constraints on the combinations and permutations of these elements. There exist violations of these constraints, and native signers can make metalinguistic judgments of grammaticality utilizing these constraints.
3. Elements in proximity interact with each other. In other words there are phonological modifications of signs in sequence.
4. There are derivational and inflectional morphological processes.
5. There is a deep structure, a surface structure, and a mapping from one to the other.

6. There exist linguistic universals such as noun, verb, and the expression of grammatical relations in the base.

7. An linguistic model claiming to provide a consistent description of language should be an appropriate framework in which to attempt an analysis. This framework should allow one to develop tests, arguments, and predictions. In other words, it provides the metalinguistic mechanisms with which to work.

8. Nonmeaningful variation exists either stylistically or sociolinguistically conditioned. Knowledge of the grammatical system as a whole will allow us to recognize points at which this nonmeaning-changing variation occurs. (pp. 155-56)

Wilbur's (1979) rationale agreed with the linguistic research of Charrow and Wilbur (1975) and Klima and Bellugi (1979).

Additional features of ASL which support Wilbur's position include: 1) there does not exist a one-to-one correspondence between ASL and English, 2) ASL and English do not share a common syntactic structure, and 3) sign users from other English speaking counties do not automatically comprehend American Sign Language.
Those educators who wholeheartedly adopted the premise that English is a second language to ASL have also faced the challenge of educating deaf children of hearing parents. It was found that deaf children of hearing parents are further divided into subgroups according to the quality and degree of deaf preschool experiences after they are diagnosed as deaf.

Charrow and Fletcher (1974) supported the idea that English is a second language for deaf children of deaf parents but realized that "it is less plausible that the deaf child of hearing parents learns English as a second language. Until he enters a school for the deaf, learns sign from his peers, and is taught English, a deaf child of hearing parents may have no native language in the sense of a code shared by many users" (p. 463). Reading for deaf children becomes a language-learning activity as well as a construction task.

Educators have been forced to attempt to accommodate a multiplicity of linguistic levels and competences of both English and ASL users. The attempt to merge ASL and English has led to various borrowings from English syntax and vocabulary. In fact, Moores (1978) suggested that a continuum exists along which lie various dialects of ASL, Pidgin forms of ASL and English, and, finally, signed English.
Ching (1976) argued that "when bilingualism is used in its broadest sense, it is considered without qualification as to the degree of difference between the two languages or systems known: it is immaterial whether the two systems are languages, dialects of the same language, or varieties of the same dialect" (p. 1) (underlining added). In this sense, bilingual equals bimodal.

Although some experts were critical of Ching's (1976) reasoning because of the implications for second-language teacher-training models and reading-instruction strategies, no consensus appeared to exist among leading researchers in the field of deaf education on the issue of bilingualism. Without denying the differences in English and ASL, the issue was partially resolved in Feitelson's (1979) request to researchers in bilingual education:

There seems urgent need for serious research work and sharing of information among educational experts directly active in bilingual and multilingual education in naturalistic settings, and a clear realization of the ways in which such situations differ from the teaching of a second language to students firmly entrenched in a unilingual environment. Such work, it is hoped, could also
provide new evidence about the role of reading in facilitating language development in the two, three, or more languages a child will be acquiring in a multilingual society, rather than make the fact of multilingualism a scapegoat for unsatisfactory performance in reading. (p. 4)

Obviously, there are problems with deaf readers' interaction with print. Since they have no written orthography for ASL, deaf readers must read in English in countries where English is the spoken language. Syntactic and semantic information in written English provides contextual clues to meaning. However, deaf readers have consistently performed at lower levels than hearing readers on tests of context usage. There are gaps in syntactic and semantic understanding, and there are vocabulary identification skills which are lacking in deaf readers' reading performance. One method of examining these features of comprehension is the cloze procedure.

The Cloze and Cumulative Cloze Procedures

The final division of the review of literature is divided into three subsections: 1) the traditional cloze procedure, 2) criticisms of the cloze procedure, and 3) the cumulative cloze procedure.
The cloze procedure. Taylor (1954) introduced the term "cloze procedure" to education as a measure of readability. He defined several uses of the procedure and elaborated on beginning cloze theory. Taylor (1954) originally experimented with the cloze procedure as a means to investigate the relationship of information theory and continuous prose. A standard in the field of cloze psychology, "An Evaluation of the Cloze Procedure as a Technique for Measuring Reading Comprehension" by Rankin (1958) established the cloze procedure as a measure of reading comprehension. Bormuth (1962) enlarged the possibilities for the use of the procedure for classroom use and documented its reliability as a measure of readability. His work became the basis for a multitude of studies in readability and comprehension during the 1960s and 1970s.

Since Taylor's (1954) introduction, the cloze procedure has been applied in educational research in four main areas: 1) as a measure of reading comprehension, 2) as a measure of readability, 3) as a measure of language growth, knowledge, and change, and 4) as a teaching strategy. For exceptionally thorough reviews of the literature on the cloze procedure, the reader is further referred to Bickley, Ellington, and Bickley (1970), Buros (1978), Potter (1968), and Rankin (1965).
Weaver (1965) and Tuinman (1972) stressed the insight that the cloze procedure could provide into language behavior and the thought process. However, Weaver (1965) was critical of a simplistic perceptual model of the procedure. Instead of viewing the cloze procedure as merely a filling in of blank spaces, he described the task as a search process which the reader fulfills to respond to such a hole or blank space in print.

La Sasso (1980) tested the "validity and reliability of the cloze procedure as a measure of readability for prelingually, profoundly deaf students" (p. 559). The cloze procedure failed to be a valid measure of readability when compared to the Fry (1968) and the Dale-Chall (1948) formulas. A format of Nth deletion constructions was used to compare the cloze procedure to the readability formulas. The reliability of the procedure was established for 14-to-18-year-old deaf readers although a particular formula was not endorsed. La Sasso (1980) encouraged educators of the deaf to consider the reading level of tests, texts, and teaching materials when deciding what is appropriate for deaf children.

Criticisms of the cloze procedure. Shanahan, Kamil, and Tobin (1982) investigated the sensitivity of the cloze procedure to intersentence redundancy. They compared readers' performances on scrambled-sentence passages and
sentences embedded in non-supportive text to readers' performances on traditional cloze measures of comprehension. The design examined three readability levels and two styles of writing, expository and narrative. Within these definitions of sentence boundaries and information construction tasks, the cloze test was not found to be a "good measure of intersentence comprehension" (p. 241). Reading level appeared not to affect performance, nor did a timed task significantly change the results.

Henk (1982) responded to the Shanahan, Kamil, and Tobin (1982) findings with three main points. First, he suggested that the changes in the original passages to force the new passages to conform to a fifth-word-deletion pattern altered the cohesion and readability of the original text's message. Second, the statistical deletion format was criticized as being "susceptible to trends and cyclical fluctuations which threaten the representatives of the sample" (p. 592). Third, Henk (1982) contended that the authors exhibited a "tendency to overgeneralize the results to populations and settings that were not represented in the study itself" (p. 594).

Shanahan et. al. (1982) stated: "It seems possible that the cloze procedure by its very design is biased against intersentence integration because later fill-ins would be dependent upon earlier correct completions if
integration is to have any affect" (p. 242). Henk (1982) disagreed.

Smith-Burke, Gingrich, and Eagleeye (1978) offered readers varying amounts of context (500 words, 250 words, and no prior context) in narrative and expository styles of writing. Function words and a pattern of every fifth-word-deletion strategy were studied. Under these circumstances and within this definition of contextual constraint, no significant differences were found for the effects of prior context. Smith-Burke et. al. proposed that the "cloze task may be interfering with the subject's ability to utilize the strong cuing systems of connected discourse, forcing the subject to attend to syntactic and semantic information at the sentence level" (p. 135). The statistical base for the deletion patterns was seen as one reason "cloze had been insensitive to the natural cuing systems in connected discourse" (p. 137). The authors called for a linguistic-based model of pattern deletion.

Although they accepted the general usefulness of cloze as an indirect measure of comprehension, Klein and Klein (1973) criticized the traditional cloze procedure because it "does not control for individual differences which may be unrelated to context use, such as difference in guessing style, vocabulary size, test anxiety," or "extraneous features of the material itself, such as word length" (p. 87).
To a degree, all of these criticisms were accepted as true for a random, Nth deletion cloze task—any statistical model. However, the cumulative cloze procedure, as defined in this study, was not based on a statistical model but on a psycholinguistic model which acknowledged the right, the opportunity, and the natural inclination of a reader to correct or restate an hypothesis or prediction. In fact, the cumulative cloze task was designed to do just that—to afford readers the opportunity, to actually force them to go back and examine incorrect, earlier predictions. The cumulative cloze task offers an alternative to a statistical model by choosing one linguistic element, nouns, and monitoring the word types or surface representations of the information interplay occurring at a deep structure, as readers construct meaning throughout a paragraph.

Cumulative cloze. Hoffman (1980) modified second-and-third-grade reading passages from Bormuth's (1969) cloze tests to form a cumulative cloze procedure. "The deleted item for each passage was limited to a noun appearing at least six times in separate sentences across the 100-word passage" (p. 1). He studied the performance of forty-one college undergraduates on five different passages at a fourth-grade reading level. "Group performance across the passages was analyzed in terms of the percentage of the subjects identifying the target words at each of the six exposure points" (p. 338).
Although Hoffman (1980) originally modified five passages only four were used in the actual analyses due to a lack of clarity in the number of possible answers which could have been semantically correct in one particular passage. It was found that the "performance on the remaining four passages indicated a direct relationship between the percentage of subjects identifying the correct item and each successive exposure of text sections: Exposure point 1(24%); 2(35%); 3(41%); 4(50%); 5(75%); and 6(79%)" (p. 339). The range of different word types decreased with each exposure point indicting that increased context "limited" and "refined" (p. 339) cloze choices.

The two sentences where the largest gains in comprehension occurred were labeled maximum gain (MG) and next largest gain (NLG) respectively. To determine if the results were greater than chance, two sets of cloze tests were composed of one sentence from each of the four usable stories.

Two groups of twenty-four subjects each of the same ages and backgrounds as the original subjects were given an A or B version of the cloze test composed of MG and NLG sentences. These tests compared readers' performances using sentence-level context with the responses of readers using passage-level context.
Hoffman (1980) found that full-passage conditions where readers had access to context clues from more than one sentence allowed readers greater accuracy in the percentage of correct noun completions and provided for a more limited number of word choices. Also, he observed that context beyond the immediate sentence level affected cloze accuracy and limited the number of overall choices.

Summary

Reading achievement for the deaf is four-to-six years behind hearing readers when matched on age. Growth is often limited to .3 year in terms of grade level assessment, and a plateau of fourth-grade level is frequently encountered when assessment is limited to standardized reading tests. When deaf and hearing readers are matched on reading level, deaf readers' syntactic skills and vocabulary knowledge are significantly lower than hearing readers' skills. Deaf readers exhibit many of the same characteristics that "poor" or less-able hearing readers exhibit. Deaf readers also exhibit characteristics similar to students for whom English is a second language. The traditional cloze procedure utilizing a statistically-based strategy of random Nth deletions is inappropriate to observe how readers build meaning at the intersentence level. However, a modified format, the cumulative cloze procedure, offers an
alternative to a statistical deletion pattern. The cumulative cloze procedure offers a means to observe how readers construct meaning of one particular language element given increasing amounts of contextual information. The procedure provides a map of readers' predictions of one particular noun as they interact with contextual clues. The cumulative cloze procedure offers an opportunity to observe readers as they formulate, test, and refine predictions of meaning in passage-level text of a paragraph or more.
CHAPTER III

Methodology

The purpose of this study was to examine developing versus mature, deaf versus hearing readers' successive approximations of meaning on a cumulative cloze task. More specifically, this study compared and contrasted deaf versus hearing readers' predictions of meaning in a series of cumulative cloze tasks at every-other-year intervals from fourth to twelfth grades. Cloze responses were examined in terms of 1) deaf versus hearing readers' comprehension on sentence-level and passage-level contextual situations, 2) the number of readers correctly predicting the target noun by the sixth, final exposure point across all passages, 3) the number of different words types at each of the six prediction points across all passages, and 4) the points of largest gain in comprehension.

Recent research suggested that deaf readers' vocabulary and reading comprehension skills, as measured by Nth deletion cloze tasks, are four-to-six years behind the skills of hearing readers of the same ages (Trybus & Karchmer, 1977). Other research suggested that given simple, predictable grammar structures, familiar vocabulary,
and an opportunity to correct miscues, deaf readers' prediction strategies more closely approximate hearing readers' strategies (McGill-Franzen & Gormley, 1980). To more thoroughly investigate these hypotheses, deaf and hearing readers completed five cumulative cloze tasks, building meaning from sentence-level and passage-level context clues (see Appendix B for a complete listing of the different passages).

Participants

The sample consisted of 100 participants: ten hearing and ten deaf readers at each of the fourth-sixth-, eighth-, tenth-, and twelfth-grade levels. The hearing students came from a rural setting in southwestern Virginia. Hearing readers were randomly selected from a pool of average students defined as students not more than two years below or above their grade levels in overall performance. Another criterion was the rejection of any hearing student with mild hearing-loss functioning in a mainstreamed situation.

The hearing-impaired participants came from a state-supported residential school for the deaf. All deaf students met a criterion of prelingual, profound deafness. That is, they were deaf at birth or became deaf before the onset of speech usually at one-to-two years of age. Further, each hearing loss was a minimum of 80 dB in the
better ear. This, according to Ewoldt (1981), insured the absence of hearing within the speech frequencies, "500, 1,000, and 2,000 cycles" (p. 65).

All participants were administered the reading subtest of the Stanford Achievement Test. Hearing readers received the regular reading subtest, but deaf readers received a special edition modified for hearing-impaired students. The modifications to accommodate hearing-impaired readers were field tested and completed by the Office of Demographic Studies at Gallaudet College in Washington, D.C., in 1973.

The Stanford Achievement Test for the Hearing-Impaired reported a reliability coefficient of .83. According to Ziezula (1982), the authors have "assume(d) that content validity will not vary between tests ... because test items of the SAT-HI and SAT are exactly the same ..." (p. 14).

Researchers found that the modifications increased the reliability of the test with hearing-impaired students, but nationally, their scores remained, at minimum, 25 percent below the scores of hearing readers at comparable grade levels (Jensema & Trybus, 1978). Complete test-correlation data were not available, but the modified Stanford Achievement Test is the most widely used test with hearing-impaired readers in the United States (La Sasso, 1978).
Rationale for the Participant-Selection Strategy

A wide range of grades was chosen for hearing and deaf readers for three reasons. First, the wide range provided a format to observe both deaf and hearing readers at both developing and mature levels. Second, the broad range was included in an attempt to broaden the population of deaf readers who were reading at or above the grade level of the cumulative cloze passages, fourth-grade level. Trybus and Karchmer (1977) found that half of the students at age 20 (or any younger age) read at less than a mid-fourth-grade level, that is, below or barely at a newspaper literacy level. By way of a comparison, the average hearing child reaches a grade equivalent of 8.2 before age 14" (p. 64). Third, performance data on this particular cumulative cloze task were scanty for hearing readers, and data were nonexistent for deaf readers at any age or grade level.

All deaf participants in this study were children of hearing parents. The Office of Demographic Studies at Gallaudet College in Washington, D.C., reported that the vast majority of the deaf population in the United States is made up of children with hearing parents. Deaf readers' scores from this group promised greater applicability for any results because these participants were most representative of the larger deaf population. In keeping with the demographic characteristics of the educational
setting for most deaf children in the United States, a residential school was chosen over mainstreamed public school situations.

Educational Setting of the Deaf Participants

Only deaf children whose total educational experience had been spent at the target residential school participated in this study. The language of instruction at the target school was found to be a mixture of Signed English and American Sign Language. Both hearing teachers and deaf teachers at the school used a combination of voiced, signed, fingerspelled, and written language presentation. In addition, the majority of children received speech training to enhance the use of voice with their signed communication. However, the informal language of the participants was described by their teachers as more closely resembling American Sign Language than Signed English. The instructional setting fit the description of a total communication environment where any available method of communication is encouraged.

Instrumentation

The six cumulative cloze tasks patterned Hoffman's (1980) design with each passage consisting of six sentences. The deleted, target word was the same noun throughout an entire passage. The information structure for each passage
introduced clues progressing from general to specific. (See Appendix D for Student Answer Sheet).

The readability of the six passages is 3.5 to 4.0 grade level according to the formulae of Fry (1978) and Raygor (1979). These formulae are calculated by counting the number of syllables, sentences, and six-letter words in a passage, but neither formula addresses the grammatical aspects of the paragraphs. Among all passages, in most sentences, the syntax is simple: the grammar avoids complex structures and instead provides active, declarative statements.

When matched with standardized reading scores, reading level of the cumulative cloze passages, 3.5 - 4.0, represented an independent level for hearing readers in grades six, eight, ten, and twelve; an instructional level for most hearing fourth graders and a few deaf readers in grades ten and twelve; and a frustration level for all other deaf readers. The subject matter of the passages centered around commonly used, concrete nouns within the vocabulary of all readers. Teachers of both deaf and hearing children confirmed that the subjects of the cloze passages - sample) milk, 1) money, 2) popcorn, 3) donuts, 4) water, and 5) lion - were known and understood by all readers.
Data Collection

Data were collected in April, 1983, for hearing and for deaf readers. First, a sample exercise was administered to acquaint each group of readers with the cumulative cloze procedure. Next, within each grade level, students completed five cumulative cloze paragraphs. As each group of students at each grade level completed all five cloze tests, the passages were immediately graded to determine which sentences reflected the instances of maximum gain in comprehension.

For example, when hearing fourth graders read passage one, four students predicted the correct target noun, milk, by the fourth sentence:

**Passage One**

1. Where does ______ come from?
   it, it, that, gold, candy
2. Some people buy _____ at a grocery store.
   some, some, eggs, grocerys, it
3. Most ______ is white.
   is, paper, shirts, paper, shirt
4. I love to eat cookies with ______.
   milk, milk, milk, mouth, milk

Sentence four became the MG sentence, the earliest place where a majority of the five students achieved a maximum gain in comprehension.
Next, a subtest, different at each grade level, was composed of the maximum gain (MG) sentences from all five passages. This subtest was administered to a group of five new readers of the same grade level. The five new readers who completed sentence-level cloze tests never saw the original passages.

A special edition screening test for hearing-impaired children was administered to all deaf readers by instructors from the participating school. The screening test allowed a reading ability range to be determined before administering the actual reading battery. This determination of a range prevented deaf children from being assigned tests too advanced to measure their actual reading performances.

The screening tests were scored, and the appropriate reading batteries were completed three weeks earlier than the cumulative cloze tests. According to Jensema (1975), over 50 percent of all deaf readers in past national samples were assigned to the Primary Level Test after such a screening.

All instructions to deaf participants for the cumulative cloze tasks were spoken by the test administrator and interpreted into American Sign Language by an interpreter. The interpreter relayed all questions to the examiner and helped clarify illegibly-written answers following each testing session. (See Appendix E for a summary of participants' instructions).
Analysis of Data

To test two levels of contextual conditions, passage level and sentence level; with two categories of readers, deaf and hearing; at five different grade levels, grades four, six, eight, ten, and twelve; required a 2 X 2 X 5 factorial design with repeated measures on the third factor. A three-way analysis of variance was used to test for possible main effects and interactions of hypothesis one: there is no difference in the number of correct responses by hearing versus deaf readers to target nouns in cloze tasks constructed in passage-level and in sentence-level context. The dependent variable was the combined number of correct cloze responses in all five cumulative cloze passages.

Seven subhypotheses resulting from the three-way ANOVA used to test hypothesis one were: main effects for the independent variables of 1) hearing ability, 2) grade level, and 3) contextual constraint; three first-order interaction effects for 1) hearing ability by grade level, 2) hearing ability by contextual constraint, and 3) grade level by contextual constraint; and one second-order interaction effect, hearing ability by grade level by contextual constraint. A post hoc multiple comparison test, Tukey, was used when appropriate for this group of subhypotheses and for all additional hypotheses in this study where significant F-ratios were found at the .05 level.
A two-way ANOVA in a 2 x 5 design with repeated measures in this second factor was used to test hypothesis two: there is no difference in the number of deaf versus hearing readers, at grades four, six, eight, ten, and twelve, predicting the target noun by the final, sixth exposure point in a cumulative cloze task providing passage-level contextual conditions. Three subhypotheses for hypothesis two were: main effects for the independent variables of 1) hearing ability and 2) grade level; and a first-order interaction effect, hearing ability by grade level. The dependent variable was the combined number of correct cloze responses in all five cumulative cloze passages.

A three-way ANOVA in a 2 x 5 x 2 design with repeated measures on the second factor was used to investigate hypothesis three: there is no difference in the number of word types produced by deaf versus hearing readers, at grades four, six, eight, ten, and twelve, given sentence-level versus passage-level contextual conditions. An ANOVA was performed for readers' correct responses on the combined totals of the five experimental passages for the number of word types, the dependent variable, at the points of maximum gain. Seven subhypotheses resulting from the three-way ANOVA used to test hypothesis three were: main effects for independent variables of 1) hearing ability, 2) grade level,
and 3) level of contextual constraint; three first-order interaction effects for 1) hearing ability by grade level, 2) hearing ability by contextual constraint, and 3) grade level by contextual constraint; and one second-order interaction effect, hearing ability by grade level by contextual constraint.

The number of readers abandoning and subsequently returning to their original, correct noun choices across all passages was noted. Grammatically and semantically acceptable responses and spelling errors were noted but were not included as main hypotheses because they were not the central issues in this particular cumulative cloze task.

The differences in the syntax of ASL and English prompted a review of deaf readers' unacceptable answers. Because of the differences in syntax, deaf readers' predictions were given partial credit in the category of grammatical acceptability if the construction was correct in ASL but not in English. The basis for marking grammatical and semantic acceptability, other than the partial credit difference for ASL structures, was taken directly from the Reading Miscue Inventory by Goodman and Burke (1972). (See Appendix C for a complete explanation of the coding system of semantically and grammatically correct, partial, and unacceptable answers).
CHAPTER IV

Results

The purpose of this study is to compare and to describe deaf versus hearing readers' sensitivity to contextual build-up by examining each group's successive approximations of deleted noun meanings as constructed in cumulative cloze tasks.

**Ages of participants.** Throughout the five grade levels, deaf participants ranged from 1.5 to 2.46 years (mean differences) older than hearing participants.

----------------------------------------------

**INSERT TABLE 1 HERE**

----------------------------------------------

This finding is consistent with national statistics describing deaf participants' ages in studies conducted by di Francesca (1969) and Trybus and Karchmer (1977), through the Office of Demographic Studies at Gallaudet College in Washington, D.C.

**Reading levels of participants.** Eighty-six percent of the deaf participants, 42 readers, completed the Primary
Table 1

Mean Ages of Deaf Versus Hearing Participants

<table>
<thead>
<tr>
<th>Grade Levels</th>
<th>Mean Ages Deaf</th>
<th>Mean Ages Hearing</th>
<th>Difference in Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>11.04</td>
<td>9.29</td>
<td>1.75</td>
</tr>
<tr>
<td>6</td>
<td>12.86</td>
<td>11.36</td>
<td>1.50</td>
</tr>
<tr>
<td>8</td>
<td>15.86</td>
<td>13.40</td>
<td>2.46</td>
</tr>
<tr>
<td>10</td>
<td>17.87</td>
<td>15.95</td>
<td>1.92</td>
</tr>
<tr>
<td>12</td>
<td>19.72</td>
<td>17.78</td>
<td>1.94</td>
</tr>
</tbody>
</table>
Level Battery of the SAT-HI. Twelve percent, three tenth graders and four twelfth graders, completed the Intermediate Battery, and two percent, one tenth grader, completed the Advanced Battery. These findings also parallel the test-assignment patterns found in national survey data by Babbini and Quigley (1970) and Gentile and di Francesca (1969).

Hearing readers' SAT reading scores are higher in reading comprehension than are deaf readers' scores at all five grade levels. The smallest mean difference between deaf and hearing readers is .88 years at the fourth-grade level. The largest difference, 5.99, appears at the tenth-grade level.

Low reading scores such as the 1.84 grade level score for deaf eighth graders are not atypical. These findings, using standardized reading materials, closely pattern results found by Babbini and Quigley (1970), Gentile and di Francesca (1969), Jensema and Trybus (1978), Muskowitz (1963), and Walter (1978).
Table 2
Mean Reading Scores of Deaf Versus Hearing Participants

<table>
<thead>
<tr>
<th>Grade Levels</th>
<th>Mean Scores Deaf Readers</th>
<th>Mean Scores Hearing Readers</th>
<th>Difference in Means</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2.20</td>
<td>3.08</td>
<td>.88</td>
</tr>
<tr>
<td>6</td>
<td>2.21</td>
<td>6.46</td>
<td>4.25</td>
</tr>
<tr>
<td>8</td>
<td>1.84</td>
<td>7.08</td>
<td>5.24</td>
</tr>
<tr>
<td>10</td>
<td>4.49</td>
<td>10.48</td>
<td>5.99</td>
</tr>
<tr>
<td>12</td>
<td>4.51</td>
<td>9.78</td>
<td>5.27</td>
</tr>
</tbody>
</table>
Hypothesis One

Hypothesis one states: There is no difference in the number of correct responses by deaf versus hearing readers at grades four, six, eight, ten, and twelve to target nouns in cumulative cloze tasks constructed in passage-level versus sentence-level context. A three-way ANOVA used to test the relationship of the dependent variable, the number of correct cloze responses at the points of maximum gain in comprehension, detected differences, significant at the .05 level, for the three independent variables of 1) hearing ability, 2) contextual level, and 3) grade levels. No interaction is present between first order effects for 1) hearing ability by grade level, 2) hearing ability by contextual constraint, and 3) grade level by contextual constraint. No interaction is present among the second-order effect of hearing ability by grade level by contextual constraint.

Both deaf and hearing readers display significantly more correct target nouns in passage-level context than in sentence-level context. Cumulative cloze test, context
Table 3
Analysis of Variance for the Data of Hypothesis One

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sums of Squares</th>
<th>Degrees of Freedom</th>
<th>Variance Estimate</th>
<th>F-ratios</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rows (Level of Context)</td>
<td>49</td>
<td>1</td>
<td>49</td>
<td>34.50</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>Columns (Grade Levels)</td>
<td>35.14</td>
<td>4</td>
<td>8.78</td>
<td>6.18</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>Layers (Deaf vs. Hearing)</td>
<td>27.04</td>
<td>1</td>
<td>27.04</td>
<td>19.04</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>R X C</td>
<td>1.5</td>
<td>4</td>
<td>.375</td>
<td>.264</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>R X L</td>
<td>2.56</td>
<td>1</td>
<td>2.56</td>
<td>1.802</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>C X L</td>
<td>7.05</td>
<td>4</td>
<td>1.76</td>
<td>1.239</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>R X C X L</td>
<td>8.14</td>
<td>4</td>
<td>2.035</td>
<td>1.43</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>Within Cells</td>
<td>113.6</td>
<td>80</td>
<td>1.42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>244.04</td>
<td>99</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
limited to the sentence level does not allow readers to correctly focus on target nouns as often as when they have access to extended text.

There is no difference in the number of correct responses between deaf versus hearing readers at the eighth-, tenth-, and twelfth-grade levels. However, hearing readers at the fourth- and sixth-grade levels list more correct responses than do deaf readers at the fourth- and sixth-grade levels.

The overall increase in the number of correct predictions at each of the six exposure points, at most grade levels, demonstrates that deaf and hearing readers construct meaning using contextual information. As the amount of contextual information increases, the number of correct responses to target nouns increases. Figure 1 displays the increase in the number of correct predictions of target nouns across all five passages.

In three instances, deaf readers in the passage-level group have no correct predictions of target nouns at any of the six prediction points. None of the deaf participants in
INCREASE (CUMULATIVE FOR ALL PASSAGES) IN THE NUMBER OF CORRECT RESPONSES

Number of Correct Responses

22 21 20 19 18 17 16 15 14 13 ... 12 ... 11 ... 10 9 ... 8 ... 7 ... 6 ... 5 ... 4 ... 3 ... 2 ... 1 ... 0

Exposure Points

GRADE 4 GRADE 6 GRADE 8 GRADE 10 GRADE 12
deaf... hearing....
grade four have any correct predictions of the target noun water in passage five. None of the deaf sixth graders have any correct predictions of the target noun donuts in passage three or the target noun lion in passage six. Figure two lists the number of correct predictions of target nouns in sentence-level context and in passage-level context.

Hypothesis Two

Hypothesis two states: there is no difference in the number of deaf versus hearing readers at grades four, six, eight, ten, and twelve correctly predicting the target noun by the final, sixth exposure point in a cumulative cloze task. A two-way ANOVA analyzing the number of correct responses at the sixth, final exposure point presents differences, significant at the .05 level, for the two independent variables of hearing ability and grade level. The measure of interaction between hearing ability and grade level is not significant.
TOTAL NUMBER OF CORRECT RESPONSES AT POINTS OF MAXIMUM GAIN ACROSS ALL PASSAGES

Number of Correct Responses

<table>
<thead>
<tr>
<th>Number of Correct Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
</tr>
<tr>
<td>29</td>
</tr>
<tr>
<td>28</td>
</tr>
<tr>
<td>27</td>
</tr>
<tr>
<td>26</td>
</tr>
<tr>
<td>25</td>
</tr>
<tr>
<td>24</td>
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<tr>
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<tr>
<td>22</td>
</tr>
<tr>
<td>21</td>
</tr>
<tr>
<td>20</td>
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<tr>
<td>19</td>
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<tr>
<td>17</td>
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<tr>
<td>16</td>
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<tr>
<td>15</td>
</tr>
<tr>
<td>14</td>
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<td>13</td>
</tr>
<tr>
<td>12</td>
</tr>
<tr>
<td>11</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>9</td>
</tr>
<tr>
<td>8</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>0</td>
</tr>
</tbody>
</table>

GRADE 4 DEAF  HEARING  GRADE 6 DEAF  HEARING  GRADE 8 DEAF  HEARING  GRADE 10 DEAF  HEARING  GRADE 12 DEAF  HEARING

Passage Level Context  Sentence Level Context

Figure 2
The number of correct scores by students at the fourth- and sixth-grade levels does not equal the number of correct scores by students at the eighth-, tenth-, and twelfth-grade levels. Among readers at the eighth-, tenth-, and twelfth-grade levels, there is no difference in the number of deaf versus hearing readers correctly predicting target nouns in cumulative cloze tasks by the sixth, final exposure points across five different passages.

Hypothesis Three

Hypothesis three states: there is no difference in the number of word types produced by deaf versus hearing readers at grades four, six, eight, ten, and twelve, given sentence-level versus passage-level context. A three-way ANOVA used to test the dependent relationship of the number of word types at the points of maximum gain in comprehension presents differences, significant at the .05 level, for the independent variable of the level of context and for the first-order interaction effect of grade level by hearing ability. The results of this ANOVA present no significant
Table 4

Analysis of Variance for Data of Hypothesis Two

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>Degrees of Freedom</th>
<th>Variance Estimate</th>
<th>F-ratios</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rows</strong> (hearing ability)</td>
<td>32</td>
<td>1</td>
<td>32</td>
<td>15.686</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td><strong>Columns</strong> (grade levels)</td>
<td>28.92</td>
<td>4</td>
<td>7.23</td>
<td>3.544</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>Interaction</td>
<td>14.2</td>
<td>4</td>
<td>3.55</td>
<td>1.740</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>Within Cells</td>
<td>81.6</td>
<td>40</td>
<td>2.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>156.72</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
differences for the independent variables of 1) grade level, and 2) hearing ability and no significant differences for the interactions of 1) level of context by grade level, and 2) level of context by hearing ability.

---

**INSERT TABLE 5 HERE**

---

Hearing and deaf readers are able to refine their predictions as evidenced by the reduced number of word types when predicting meaning while reading passage-level text. The number of word types is significantly higher in responses by readers who only had access to sentence-level contextual clues. Both deaf and hearing readers focus their responses more when reading passage-level text. In addition to the major findings of this study, several supplemental findings emerged.

**Additional Findings**

Supplemental findings which emerged from the data concern 1) the abandonment of correct responses by deaf readers, and 2) a comparison of the semantic and grammatical acceptability of deaf versus hearing participants' responses.
### Table 5

Analysis of Variance for the Data of Hypothesis Three

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sums of Squares</th>
<th>Degrees of Freedom</th>
<th>Variance Estimate</th>
<th>F-ratios</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rows (Levels of Context)</td>
<td>21.16</td>
<td>1</td>
<td>21.16</td>
<td>11.658</td>
<td>p &lt; .01</td>
</tr>
<tr>
<td>Columns (Grade Levels)</td>
<td>10.7</td>
<td>4</td>
<td>2.675</td>
<td>1.473</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>Layers (Deaf vs. Hearing)</td>
<td>1.44</td>
<td>1</td>
<td>1.44</td>
<td>.793</td>
<td>p &lt; .05</td>
</tr>
<tr>
<td>R X C</td>
<td>2.34</td>
<td>4</td>
<td>.585</td>
<td>.322</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>R X L</td>
<td>.36</td>
<td>1</td>
<td>.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C X L</td>
<td>22.26</td>
<td>4</td>
<td>5.565</td>
<td>.198</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>R X C X L</td>
<td>2.54</td>
<td>4</td>
<td>.635</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Cells</td>
<td>145.2</td>
<td>80</td>
<td>1.815</td>
<td>3.066</td>
<td>p &gt; .05</td>
</tr>
<tr>
<td>Total</td>
<td>206</td>
<td>99</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
First, a difference appears between deaf and hearing readers' ability to maintain an idea choice after correctly predicting target nouns. Deaf readers at the fourth-, eighth-, tenth-, and twelfth-grade levels display a tendency to abandon correct word choices more often than do hearing readers at corresponding grade levels. Additionally, deaf readers at the fourth-, sixth-, eighth-, and tenth-grade levels do not return to correct answers as often as do hearing readers who also abandoned correct responses at times.

Hoffman (1979, Note 4) documents this same observation for "poor" hearing readers in grades three through seven on an oral cumulative cloze test. He interprets this inability to maintain correct word choices as poor readers being "disproportionately tuned into the immediate context" instead of making use of progressive development in extended text (Hoffman, 1979, Note 4, p. 12).

Hearing readers in grades eight, ten, and twelve appear to abandon and restate target nouns more often than do hearing readers in grades four and six. Deaf readers in
Table 6

Number of Deaf Versus Hearing Participants
Abandoning and Returning to Correct Target Nouns

<table>
<thead>
<tr>
<th>Grade Levels</th>
<th>Hearing Abandoning</th>
<th>Hearing Returning</th>
<th>Deaf Abandoning</th>
<th>Deaf Returning</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>2</td>
<td>0</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>3</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>7</td>
<td>5</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>Totals</td>
<td>20</td>
<td>12</td>
<td>28</td>
<td>9</td>
</tr>
</tbody>
</table>
grades ten and twelve appear to abandon correct predictions more often than do deaf readers in grades six and eight. Deaf twelfth graders returned to abandoned word choices more often than did deaf readers at any other grade level.

The second additional finding is that syntactic and semantic acceptability of cloze responses increase as the level of contextual information increases. The semantic and syntactic acceptability of both deaf and hearing readers' cloze responses increase both within and across all grade levels. This finding supports the findings of Hoffman's (1980) data from cumulative cloze research with hearing readers.

At all five grade levels, among both hearing and deaf readers, the percentage of semantically correct responses increases with each exposure point for the target nouns. Again, the most visible increase is seen in deaf participants' responses across grade levels. However, hearing readers' grammatical and semantic acceptability levels appeared and remained at higher levels of correctness than did deaf readers' response acceptability.
Table 7
Number of Grammatically Acceptable Predictions Across Six Exposure Points, Across All Five Passages

<table>
<thead>
<tr>
<th>Number of Exposures</th>
<th>Grade 4</th>
<th>Grade 6</th>
<th>Grade 8</th>
<th>Grade 10</th>
<th>Grade 12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Y</td>
<td>P</td>
<td>N</td>
<td>Y</td>
<td>P</td>
</tr>
<tr>
<td>HEARING</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>5</td>
<td>0</td>
<td>18</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>4</td>
<td>0</td>
<td>21</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>19</td>
<td>3</td>
<td>3</td>
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<td>4</td>
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<td>6</td>
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<tr>
<td>DEAF</td>
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<td></td>
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<tr>
<td>1</td>
<td>4</td>
<td>12</td>
<td>9</td>
<td>11</td>
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<tr>
<td>2</td>
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<td>3</td>
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<td>11</td>
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<tr>
<td>4</td>
<td>14</td>
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<tr>
<td>5</td>
<td>11</td>
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<tr>
<td>6</td>
<td>8</td>
<td>7</td>
<td>10</td>
<td>18</td>
<td>6</td>
</tr>
</tbody>
</table>
At the points of maximum gain in comprehension, across all passages, the percentage of grammatically acceptable predictions is greater for responses by deaf participants reading passage-level text at the sixth-, eighth-, and twelfth-grade levels. For hearing participants, the percentage of grammatically acceptable responses is greater given passage-level text at the fourth- and sixth-grade levels. There is no difference in the percentage of grammatically correct responses by hearing readers in passage-level versus sentence-level text at the eighth-, tenth-, and twelfth-grade levels.

Deaf participants display more semantically acceptable responses in passage-level text at all five grade levels. Hearing participants record more semantically correct responses in passage-level text at all grade levels except
### Table 8
Number of Semantically Acceptable Predictions Across Six Exposure Points, Across All Five Passages

<table>
<thead>
<tr>
<th>Number of Exposures</th>
<th>Grade 4</th>
<th>Grade 6</th>
<th>Grade 8</th>
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<th>Grade 12</th>
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<td>Y</td>
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<td>Y</td>
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Table 9

Percentage of Grammatical Acceptability at Points of Maximum Gain Given Two Levels of Context

<table>
<thead>
<tr>
<th>Level of Context</th>
<th>Grade 4</th>
<th>Grade 6</th>
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<th>Grade 10</th>
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<tr>
<td>H E A R I N G</td>
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<td></td>
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<td></td>
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<tr>
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<td>Isolation</td>
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<td>.72</td>
<td>.28</td>
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<tr>
<td>D E A F</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passage</td>
<td>.55</td>
<td>.30</td>
<td>.15</td>
<td>.80</td>
<td>.13</td>
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<tr>
<td>Isolation</td>
<td>.70</td>
<td>.10</td>
<td>.20</td>
<td>.53</td>
<td>.33</td>
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</table>
grade eight where the number of semantically acceptable responses is equal for both contextual conditions.

In summary of these additional findings, 1) deaf readers tend to abandon correct word choices more and return to abandon choices less often than do hearing readers, 2) deaf as well as hearing participants' responses are generally more grammatically and semantically acceptable when reading passage-level text versus sentences in isolation.

Summary of all Results

A summary of all of the findings indicate that both deaf and hearing readers are more accurate in their prediction of meaning given passage-level versus sentence-level contextual constraints. On this particular cumulative cloze task, deaf readers at grades eight, ten, and twelve performed similarly to hearing readers at grade eight, ten and twelve; however, deaf readers at grades four and six performed significantly lower than their hearing counterparts. Hearing readers at all grade levels and deaf readers at the eighth-, tenth-, and twelfth-grade levels
Table 10

Percentage of Semantic Acceptability at Points of Maximum Gain Given Two Levels of Context

<table>
<thead>
<tr>
<th>Level of Context</th>
<th>Grade 4</th>
<th>Grade 6</th>
<th>Grade 8</th>
<th>Grade 10</th>
<th>Grade 12</th>
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<td>Y</td>
<td>P</td>
<td>N</td>
<td>Y</td>
<td>P</td>
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<tr>
<td>HEARING</td>
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<td></td>
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<td></td>
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<td>.36</td>
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<td>Isolation</td>
<td>.56</td>
<td>.20</td>
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<td>.32</td>
<td>.32</td>
</tr>
<tr>
<td>DEAF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passage</td>
<td>.24</td>
<td>.36</td>
<td>.40</td>
<td>.40</td>
<td>.20</td>
</tr>
<tr>
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<td>.45</td>
<td>.0</td>
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<td>.66</td>
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</table>


increased in cumulative cloze accuracy as the number of exposure points in passage-level text increased. By the sixth, final exposure points in passage-level text, no significant differences were found in deaf versus hearing readers' predictions of target nouns.

Deaf readers abandoned correct choices after correctly predicting target nouns more often than did hearing readers. Additionally, deaf readers returned to abandoned correct choices less often than did hearing readers. Both semantic and grammatical acceptability of cumulative cloze responses improved for deaf as well as for hearing readers as the amount of available contextual information increased in passage-level text. MG sentences, proved to be more semantically and grammatically acceptable under passage-level versus sentence-level contextual conditions.

The results of this study indicate that under favorable reading conditions, given passage-level contextual constraints, both deaf and hearing readers construct meaning in similar ways. The patterns of miscues and responses at the points of maximum gain and at the sixth, final exposure points are similar for both hearing and deaf readers at mature levels, eight-, tenth-, and twelfth-grades.
Chapter five contains three sections: first, the findings of the study are summarized; second, the conclusions are presented; and finally, the recommendations are set forth.

Findings

The first major finding is that between deaf versus hearing readers at eighth-, tenth-, and twelfth-grade levels, there is no significant difference in the number of correct cloze responses at the points of maximum gain in comprehension. The results support Wilbur's (1982) finding that deaf readers appear to catch up in certain semantic skills by seventh-grade. Further, these findings support Gormley and McGill-Franzen's (1978) findings that deaf readers' semantic skills increase when the testing format includes extended text. Significant differences favoring hearing readers do exist in the scores of deaf versus hearing fourth-grade and sixth-grade readers.

The second major finding is that deaf as well as hearing readers at most grade levels tend to complete more
correct responses given passage-level versus sentence-level contextual constraints. These results support Moore's (1970) findings that deaf readers and hearing readers demonstrate better cloze accuracy on connected discourse versus isolated sentences. Further, these findings, support Hoffman's (1980) findings that increased context positively affects the accuracy of hearing readers' cloze ability.

The third major finding is that by the sixth, final exposure point in the combined cumulative cloze task there is no significant difference between deaf versus hearing readers' correct number of responses at the eighth-, tenth-, and twelfth-grade levels. However, significant differences favoring hearing readers do exist at the fourth- and sixth-grade levels.

The fourth major finding is that the number of word types tends to be lower in passage-level text at every grade level in both groups of readers, with the exception of sixth-grade deaf readers where the number of word types is the same in both contextual settings. This finding supports Hoffman's (1980) cumulative cloze research with hearing readers.

Conclusions

The first conclusion is that deaf readers at eighth-, tenth-, and twelfth-grade levels are as sensitive to the
accumulating influence and direction of context as are hearing readers at corresponding grade levels. This conclusion is in opposition to researchers' conclusions of a six-year performance deficit when the instrumentation is limited to random Nth deletion cloze patterns or sentence-level contextual constraints.

In this study, there is a discrepancy in eighth-, tenth-, and twelfth-grade deaf participants' standardized reading scores and their cumulative cloze scores. Most deaf participants were reading material above their expected comprehension levels as measured by the Stanford Achievement Test. However, on this particular cumulative cloze exercise, deaf readers at grades eight, ten, and twelve performed similarly to hearing readers at grades eight, ten, and twelve, respectively.

The second conclusion is that by the sixth, final exposure point in this particular cumulative cloze task, deaf readers at grades eight, ten, and twelve perform similarly to hearing readers at grades eight, ten and twelve, respectively. This conclusion supports the conclusions of Gormley and McGill-Franzen (1978) who found that given extended, passage-level text, deaf readers understand passive grammatical structures thought to be beyond their understanding. Wilbur (1982) noted that experience with the redundancy of orthography and with the
flow of language aids older deaf readers' use of context to appropriately search for meaning. Deaf participants at the fourth- and sixth-grade levels scored significantly lower than their hearing counterparts at the sixth, final exposure points.

A third conclusion from the findings is that extended context limits or helps to focus meaning as demonstrated by a reduced number of word types by both hearing and deaf readers in passage-level versus sentence-level text. As Hoffman (1980) concluded with hearing readers, increased context also helps deaf readers refine cloze choices.

Finally, since deaf readers perform similarly to hearing readers under favorable reading conditions, the reading process appears to be the same for both groups of readers.

Recommendations

First, the cumulative cloze procedure ought to be used as an additional tool in constructing the total reading profile for deaf and hearing readers' semantic and syntactic skills in grades four through twelve.

Second, testing formats for deaf as well as for hearing readers need to include passage-level text of a paragraph or more to offer readers the opportunity to hypothesize, backtrack, and rehypothesize; to cue, miscue, and recue meaning.
Recommendations for Further Research

First, research using the cumulative cloze procedure needs to be conducted with isolated segments of the total deaf population including: 1) readers who are both deaf and blind, and 2) readers who are orally trained through speech therapy versus readers who are manually trained through the use of sign language.

Second, research is needed among the various subgroups of the deaf population over an extended period of time and involving more grade levels than time permitted in this study.

Third, the written cumulative cloze procedure, adapted by Hoffman (1979, Note 1) as an oral cloze procedure for hearing readers, could be further researched and developed for purposes of investigating signed cloze procedures for deaf readers. This modification of a signed cumulative cloze procedure also could be extended to the previously mentioned isolated segments of the total deaf population.
Reference Notes


References


87


APPENDIX A

Summary of Grammatical Features of Children Using ASL
Summary of Grammatical Features of Children Using ASL

Some distinct syntactic structures in the language of deaf students.

<table>
<thead>
<tr>
<th>Structural environment in which structure occurs</th>
<th>Description of structure</th>
<th>Example sentences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verb system</td>
<td>Very deletion</td>
<td>The cat under the table.</td>
</tr>
<tr>
<td></td>
<td>be or have deletion</td>
<td>John sick. The girl a ball.</td>
</tr>
<tr>
<td></td>
<td>be-have confusion</td>
<td>Jim have sick.</td>
</tr>
<tr>
<td></td>
<td>Incorrect pairing of auxiliary with verb markers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>by deletion (passive voice)</td>
<td>Tom has pushing the wagon.</td>
</tr>
<tr>
<td>Negation</td>
<td>Negative outside the sentence</td>
<td>Beth make candy no.</td>
</tr>
<tr>
<td>Conjunction</td>
<td>Marking only first verb</td>
<td>Beth threw the ball and Joan catch it.</td>
</tr>
<tr>
<td></td>
<td>Conjunction deletion</td>
<td>Joe bought ate the apple.</td>
</tr>
<tr>
<td>Complementation</td>
<td>Extra for</td>
<td>For to play baseball is fun.</td>
</tr>
<tr>
<td></td>
<td>Extra to in Puts-ing complement</td>
<td>John goes to fishing.</td>
</tr>
<tr>
<td></td>
<td>Infinitive in place of gerund</td>
<td>John goes to fish.</td>
</tr>
<tr>
<td></td>
<td>Incorrectly inflected infinitive</td>
<td>Bill liked to played ball.</td>
</tr>
<tr>
<td></td>
<td>Unmarked infinitive without to</td>
<td>Jim wanted go.</td>
</tr>
<tr>
<td>Relativization</td>
<td>NP's where whose is required</td>
<td>I helped the boy's mother was sick.</td>
</tr>
<tr>
<td></td>
<td>Copying of referent</td>
<td>John saw the boy who the boy kicked the ball.</td>
</tr>
<tr>
<td>Question formation</td>
<td>Coping</td>
<td>Who a boy gave you a ball?</td>
</tr>
<tr>
<td></td>
<td>Failure to apply subject-auxiliary inversion</td>
<td>Who the baby did love?</td>
</tr>
<tr>
<td></td>
<td>Incorrect inversion</td>
<td>Who TV watched?</td>
</tr>
<tr>
<td>Question formation. Negation</td>
<td>Overgeneralization of construction rule.</td>
<td>I amn't tired. Bill will'n go.</td>
</tr>
<tr>
<td>Question formation. Conjunction</td>
<td>Object-object deletion</td>
<td>Jonn chased the girl and he scared. (John chased the girl. He scared the girl.)</td>
</tr>
<tr>
<td>Object-subject deletion</td>
<td>Object-subject deletion</td>
<td>The dog chased the girl had on a red dress. (The dog chased the girl. The girl had on a red dress.)</td>
</tr>
<tr>
<td>All types of sentences</td>
<td>Forced subject-verb-object pattern</td>
<td>The boy pushed the girl. (The boy was pushed by the girl.)</td>
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</table>

APPENDIX 3

Cumulative Cloze Passages
Cumulative Cloze Passages

Sample passage:

Where does ___________ come from? Some people buy ___________ at a grocery store. Most ___________ is white. I love to eat cookies with ___________. Most ___________ comes from cows. Some ___________ comes from goats.

Passage one:

Banks keep lots of ___________. A ___________ has a picture of George Washington on one side. A ___________ is shiny and round. A ___________ is made of silver and copper. Five nickels make one ___________. Four ___________ make one dollar.

Passage two:

Not all gardeners grow ___________. Most ___________ is white or yellow. You must shuck ___________ before it is cooked. ___________ jumps around while it is cooking. A bag of ___________ costs about fifty cents. I love to eat hot ___________ when I watch a movie.
Passage three:

Some shops sell only ____________. ____________ come in all shapes and sizes. Some cooks bake ____________, and some cooks fry them. My mother's recipe makes about three dozen ____________. I love to eat jelly ____________. My friend loves to eat ____________ holes.

Passage four:

___________ is important to everyone. Not all ____________ tastes alike. My little brother likes to play in ____________. Cool ____________ is nice to drink on a hot day. Some ____________ has bubbles in it. ____________ from the ocean tastes like salt.

Passage five:

Almost every zoo has a _____________. A baby ____________ is called a cub. A ____________ looks like a big cat. A ____________ is called the king of the jungle. A ____________ likes to eat raw meat. The hair on a ____________ is called mane.
APPENDIX C

Goomdan's Explanation of
Grammatical and Semantic Acceptability
GRAMMATICAL AND SEMANTIC ACCEPTABILITY

GRAMMATICAL ACCEPTABILITY. Does the miscue occur in a structure which is grammatically acceptable?

Y-The miscue occurs in a sentence which is grammatically acceptable and is acceptable in relation to prior and subsequent sentences in the text.

P-The miscue occurs in a sentence which is grammatically acceptable but is not acceptable in relation to prior and subsequent sentences in the text. Or the miscue is grammatically acceptable only with the sentence portion that comes before it or after it.

N-The miscue occurs in a sentence that is not grammatically acceptable.

SEMANTIC ACCEPTABILITY. Does the miscue occur in a structure which is semantically acceptable?

Y-The miscue occurs in a sentence which is semantically acceptable and is acceptable in relation to prior and subsequent sentences in the text.

P-The miscue occurs in a sentence which is semantically acceptable but is not acceptable in relation to prior and subsequent sentences in the text. Or the miscue is semantically acceptable only with the sentence portion
that comes before or after it.

N-The miscue occurs in a sentence that is not semantically acceptable. (Goodman and Burke, 1972, pg. 63)
APPENDIX D

Student Response Sheet
<table>
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<table>
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<td>5. ____________</td>
</tr>
<tr>
<td>6. ____________</td>
<td>6. ____________</td>
</tr>
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</table>
APPENDIX F

Directions for Administering Cumulative Cloze Passages
Directions for group one: Passage-Level Context Group

My name is Tom McKnight. I want to work with you today on some reading activities. First, I want to show you a story and let you guess what it is about. I will give you one clue at a time. Each sentence has a word left out. Put in a word that you think will make sense. I want you to keep guessing until you feel like you know what the story is about. When you finish all of the sentences, I will tell you what the story is about. You might want to change your mind on each guess. That is fine. Let's do a practice story together. (After the practice story is completed) Let's talk about the story.

Directions for group two: Sentence-Level Context Group

My name is Tom McKnight. I want to work with you today on a few reading activities. I want to give you some sentences with some missing words. I want you to put in a word that makes sense. The sentences do not go together to make a story. The sentences are not related to each other. Fill in each blank with a word that will make sense in each sentence.
The two page vita has been removed from the scanned document. Page 1 of 2
The two page vita has been removed from the scanned document. Page 2 of 2
THE USE OF CUMULATIVE CLOZE PROCEDURE TO INVESTIGATE CONTEXTUAL BUILD-UP IN DEAF VERSUS HEARING READERS

by

Tom K. McKnight

Chairman: Richard T. Graham

Curriculum and Instruction

(ABSTRACT)

The purpose of this study was to compare and to describe deaf versus hearing readers' sensitivity to contextual build-up by examining each group's successive approximations of deleted noun meanings as constructed in cumulative cloze tasks.

The methodology of this study, a 2 X 5 X 2 factorial design, focused on successive predictions of deleted noun meanings in five cumulative cloze tasks completed by five deaf and five hearing readers at fourth-, sixth-, eighth-, tenth-, and twelfth-grade levels. Both for deaf and hearing readers, sentences within the five individual cumulative cloze passages where the greatest gain in comprehension occurred (MG sentences) comprised an alternative cloze test for five other readers at all five grade levels.
The results indicate that both deaf readers and hearing readers predict meaning more accurately given passage-level versus sentence-level contextual constraints. On this particular cumulative cloze task, deaf readers at grades eight, ten, and twelve performed similarly to hearing readers at grades eight, ten, and twelve respectively. However, deaf readers in grades four and six performed significantly lower than their hearing counterparts. Hearing readers at all five grade levels and deaf readers at the eighth-, tenth-, and twelfth-grade levels increased in cumulative cloze accuracy as the number of exposure point in passage-level text increased. By the sixth, final exposure points in passage-level text, no significant differences were found in deaf versus hearing readers' predictions of target nouns at grade levels eight, ten, and twelve.

Deaf readers tended to abandon correct choices after predicting target nouns more often than did hearing readers. Additionally, deaf readers returned to abandoned correct choices less often than did hearing readers. Both semantic and grammatical acceptability of cumulative cloze responses improved for deaf as well as for hearing readers as the amount of available contextual information increased in passage-level text. MG sentences, proved to be more semantically and grammatically acceptable under passage-level versus sentence-level contextual conditions.
The results of this study indicate that given passage-level contextual constraints, deaf as well as hearing readers construct meaning similarly.