THE RELATIONSHIP BETWEEN PREDICTIVE READING

AND PREDICTIVE SPELLING STRATEGIES

USING CLOZE TESTS   /

THESIS

Submitted to the Graduate Committee of the

Department of Curriculum and Instruction

Faculty of Education

State University College at Brockport

in Partial Fulfillment of the

Requirements for the Degree of

Master of Science in Education

by

Sharon Baade Darnieder

State University College at Brockport

Brockport, New York

August, 1984

SUBMITTED BY:

Sharon Baade Darrieder

APPROVED BY:

Frances Moroney 8/84
Thesis Advisor   Date

Irene T. Begy 8/84
Second Faculty Reader   Date

Robert B. Ribble 8/84
Chair, Graduate   Date
Policies Committee

Abstract

The purpose of this research was to determine if there was a relationship between predictive strategies used in reading and predictive strategies used in spelling and to see if both could be measured using cloze tests. A secondary purpose was to see if there was a relationship between a spelling score on a standardized test and a score on a spelling cloze test; a relationship between a reading comprehension score on a standardized test and a score on a reading cloze test; a relationship between a standardized spelling test score and a score on a spelling word selection test; a relationship between a standardized reading comprehension test score and a standardized spelling test score; and a relationship between a spelling cloze score and a spelling word selection test score.

The reading cloze test, spelling cloze test and the spelling word selection test were examiner-designed. The reading cloze test, consisting of forty-nine scored blanks, and the spelling cloze test, consisting of eighteen nonsense words with one or two letter blanks per word, sought to determine if a subject used predictive strategies. The spelling word selection test consisted of twenty-five groups of three pseudo words and one nonsense word. The standardized spelling and reading comprehension test scores were taken from the Stanford Achievement Test.

All tests were administered to a total of eighty-nine students: fifty-five regular sixth graders, fourteen gifted sixth graders and eleven gifted fifth graders who were in the same reading class, and nine learning disabled students who were not doing sixth grade work but were

of sixth grade age. Class placement of subjects was determined by the school district.

The reading cloze test was scored using synonyms as correct answers. The spelling cloze test was constructed using spelling rules and patterns but some answers which did not conform to these were also accepted if the nonsense word could be pronounced and if it looked like a real word. In each group in the spelling word selection test the nonsense word was the only correct answer. All test data (examiner-designed and standardized) were analyzed using raw scores. Results showed a significant linear correlation between all relationships studied.

An informal analysis using averages was used on the time and the score from the examiner-designed tests. The examiner kept track of the time each test was begun and subjects recorded the time each test was completed. Class lists were used to break down the regular sixth graders into reading groups. The gifted fifth and sixth graders and the learning disabled class were already separate reading groups. The informal data analysis showed that on the average, the high reading group of regular sixth graders and the gifted fifth and sixth graders scored higher on all three tests. The medium reading group of regular sixth graders did not do as well and the low reading group of regular sixth graders and the learning disabled class scored even lower. The time factor appeared to have little impact on scores since often the poor readers took as much time as the better ones but still did not do as well.

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Chapter I

Statement of the Problem

Purpose

The primary purpose of this study was to determine the relationship between predictive strategies used in reading and predictive strategies used in spelling and to see if both could be measured using cloze tests. A secondary purpose was to see if there was a relationship between a spelling score on a standardized test and a score on a spelling cloze test; a relationship between a reading comprehension score on a standardized test and a score on a reading cloze test; a relationship between a standardized spelling test score and a score on a spelling word selection test; a relationship between a standardized reading comprehension test score and a standardized spelling test score; and a relationship between a spelling cloze score and a spelling word selection test score.

These were the questions posed for research purposes:

1. Is there a relationship between predictive strategies for reading and spelling? Do the same students who use predictive reading strategies also use predictive spelling strategies?

2. Do the students who score high on reading and spelling cloze tests and on a spelling word selection test also score high on standardized reading comprehension and spelling tests? Do the students who score low on standardized reading comprehension and spelling tests also score low on reading and spelling cloze tests and on a spelling word selection test?

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3. Cloze has been shown to accurately measure reading comprehension (which depends on prediction). Is it possible for a spelling cloze to reliably measure predictive spelling strategies?

Need for the Study

Spelling has been a part of most daily classroom schedules, however there are still many students who spell poorly or cannot spell at all. Educators have been concerned for a long time over why superior students could be inferior spellers (Gould, 1976). Absolute non-readers cannot spell, but there are reasonably able readers who spell very poorly (Frith, 1980). Correlations have been established showing that few persons who are excellent readers are poor spellers and few, if any, poor readers are good spellers (Horn, 1962).

The English spelling system is usually thought of as highly irregular and difficult to master. Many have advocated a spelling reform to aid both spelling and reading while others have chosen to teach reading using a simpler system, such as the initial teaching alphabet (i.t.a.). Spelling has been called irregular because there is often very little one-to-one correspondence between sounds and letters (Brengelman, 1970). However, this is only a surface view.

Recent computerized and linguistic analyses conducted by Hanna, Hanna, Hodges and Rudorf (1966), Venezky (1967) and N. Chomsky (1970), have shown that there are more regular patterns beneath the surface of phoneme-grapheme correspondence. In fact, the relation of conventional English orthography to the sound structure of language is closer than is commonly assumed.

N. Chomsky and Halle (1968) state that the conventional spelling of words relates more closely to the underlying abstract level than to the

surface phonetic form and is therefore a near optimal system for representing a spoken language. Their research has highlighted the meaning-bearing function of the orthography.

Young children do not begin to spell with a conscious understanding of these sophisticated linguistic findings. They use the most obvious aspect--the relationship between sounds and letters (Zutell, 1978). Children are proficient at sounding out words and their spellings often seem strange. This is not because the spellings are random or an indication of poor auditory perception or discrimination, but because adults, who are very knowledgeable about spelling, ignore some very real similarities in sounds (Read, 1971).

Children do not learn oral language simply through imitation (Zutell, 1978). Nor is spelling just a memory task (Frith, 1980). Children construct their own rule systems which they test and revise depending on both the feedback they get from their environment and their own developmental patterns.

This is done for both oral language and spelling. Children proceed in this developmental process by first, learning individual isolated examples, second, by developing a gradual awareness of the rule system, and last, by the formation of a hypothesis shown by incorrect use (such as overgeneralization). They finish their development by internalizing the rule system and correct usage and spelling of the words. Research (Beers, 1975; Beers, Beers & Grant, 1977; Beers & Henderson, 1977; Zutell, 1979) in young children's spelling errors provides evidence of this rule construction-hypothesis testing process in their writing.

The use a reader must make of prior knowledge relevant to the material being read is also showing up in many analyses of reading (Goodman, 1967, 1968; Hochberg, 1970; Kolers, 1970; Smith, 1971, 1973).

Much of the recent research in spelling suggests a link with psycholinguistics and studies in this area have contributed substantially to the knowledge about how children learn English orthography (Zutell, 1978). Spelling, like reading, involves the interplay between language and structure and the linguistic knowledge which the learner brings with him (Marino, 1980).

Goodman (1967) calls reading a psycholinguistic guessing game and says that it involves the interplay between thought and language. He notes that efficient reading "does not result from precise perception and identification of all elements, but from skill in selecting the fewest, most productive cues necessary to produce guesses which are right the first time" (p. 127).

Smith (1975) says reading is impossible without prediction. He defines prediction as "the prior elimination of unlikely alternatives" (p. 306) and notes that it is only through reading that children learn to read. Therefore development and the use of prediction skills must be a continual process with children and should be thought of as an important part of learning to read.

Smith (1975) also points out that it is not necessary for prediction to be taught and that anyone who can comprehend spoken language practices prediction.

Through studies, researchers have found that hypothesizing, or prediction, plays an important role in the reading process (Goodman, 1967; Rumelhart, 1976; Smith, 1978).

There have been many studies completed on hypothesis behavior. According to Ingalls and Dickerson (1969) hypothesis theories help to describe behavior on concept-identification tasks. The models used by many researchers in this area view problem solution as the result of testing in a trial-and-error fashion various predictions or hypotheses.

An efficient reader samples just enough of the text to confirm or discard his predictions or hypotheses about what is to be read (Gould, 1976). Minimal visual cues are used and the reader supplies as much as possible from prior knowledge which allows very skilled readers to read rapidly and accurately (Gould, 1976). This would be impossible if the reader processed letter-by-letter or word-by-word (Kolers, 1970).

Using prediction opens the reader to errors but Smith (1975) says that readers who read without ever making errors are not reading efficiently. Mistakes must be made to confirm hypotheses. However, an effort must be made to distinguish prediction from reckless guessing. This is not as hard to do as it seems since a child who randomly guesses has no meaning or sense in his guesses.

Like the reader, the speller also has a need for predictive strategies. Efficient spelling reflects an awareness of the structure and pattern of language (Marino, 1980). The reader and the speller differ, however, in what is used as the basis for predictions (Gould, 1976). It appears that good spellers would use prediction strategies which reflect their knowledge of the rules of frequency and redundancy.

While the prediction skills involved in the spelling process are probably not the same as those used when reading (Gould, 1976; Marino, 1979), spelling still requires problem solving strategies.

Gould (1976) states that the key in language which allows both the reader and the speller to make accurate predictions is redundancy. Weaver (1962) has estimated that the English language is 75% redundant and any given word or message provides more clues than are necessary to process it.

Smith (1975) mentions that the greater the number of alternatives in a language, the more time is required for a decision. Repetition of letters, letter patterns or words in reading or spelling minimizes the choices the brain must make when reading or spelling, and hence aids fluency.

Psycholinguists suggest that there are five different types of redundancy in our written language: 1. semantic, 2. syntactic, 3. graphemic, 4. phonemic, and 5. orthographic (Gould, 1976). All five are used in reading but the reader relies mostly on semantic and syntactic redundancy. In context, meaning and grammar interact to reduce the alternatives thereby speeding up the processing of the text (Gould, 1976).

Spellers rely on the phonemic, graphemic and orthographic redundancies in language. As experience is gained in language, semantic relationships grow stronger and redundancies of meaning serve as aids to spelling prediction (Gould, 1976).

In an informal study completed by Marino (1980) using a pencil-and-paper version of Word Mastermind with two groups of sixth graders, it was found that while effective responses did not distinguish the good from the poor spellers, the pattern of written responses differed. The poor spellers in the study were not operating with a well defined set of prediction strategies. This was illustrated by their unsystematic approach.

In the Marino study (1980) good spellers attempted to reduce the number of alternatives by testing the most likely letters. Poor spellers tended to eliminate only isolated words. The findings were supported by research (Marino, 1979; Wallach, 1963) which suggested that good spellers' knowledge of graphemic information is superior to that of poor spellers.

The use of prediction in reading translates well to being tested by the cloze format. The cloze procedure was first introduced as an alternative to the use of readability formulas by Taylor (1953). Since then, cloze has been used to measure readability, reading comprehension, learning, information, redundancy, thinking, numerous language variables, teaching, aptitude, readiness, listening, flexibility and context clues (Rankin, 1974). According to Smith (1978), comprehension depends on prediction. He says that "prediction is asking questions--and comprehension is getting these questions answered" (p. 58).

Cloze tests have been shown to be a valid measure of comprehension (Bormuth, 1968, 1969a; Rankin & Culhane, 1969, cited in Bickley, Ellington & Bickley, 1970). However, there does not appear to be much research on the use of cloze testing in the area of spelling.

Gould (1976) describes cloze procedure as a valuable tool to be used in spelling prediction. She recommends using cloze in a reading and spelling lesson together and suggests that the children first be encouraged to predict a missing word from semantic or syntactic clues and then predict the spelling of that word.

Greathouse and Neal (1976) state that the rationale underlying letter cloze procedure as applied to spelling is based on the same principles which underlie the original cloze procedure but in letter cloze the predictive aspects of the context are found in spelling pattern relationships.

Although it is not called a cloze procedure, C. Chomsky (1970) recommends a spelling exercise for children which leaves out a reduced vowel (e.g., dem_cratic). Students are asked to fill in the missing letter and then to justify their choice by thinking of a related word that retains the same vowel quality (e.g., democracy). Once they have related the words by noting the similar spelling patterns but different pronunciation, they should have no trouble spelling either word correctly.

It has been shown that reading and spelling are both linked to prediction since both require problem solving strategies. Since cloze has proven to be a reliable test of reading comprehension (which depends on prediction) would it also prove to be a reliable test of predictive spelling ability? Would a student who used predictive strategies and did well on a reading cloze test also exhibit those same strategies, but in a different form, on a spelling cloze test? Would that same student also use the language cues imbedded in a word and do well on the spelling word selection test? Would a high score on a standardized test of reading comprehension and spelling also indicate a high score on the reading and spelling cloze? How about those students who did poorly on standardized tests of reading comprehension and spelling? Would their performance also be poor on the reading and spelling cloze and the spelling word selection test?

Research Design

In an attempt to provide answers to these questions, three researcher-designed test instruments and the scores in reading comprehension and spelling from the Stanford Achievement Test for May, 1984, were used. The reading cloze test was based on material taken from a sixth grade text

currently not in use in the school district. A Dale-Chall readability formula was performed and the level was 6.1. The spelling cloze was constructed using nonsense words, with letters deleted in specified areas based on spelling rules and patterns, and were taken from Burmeister (1975), Durkin (1981) and Wilson and Hall (1984). For example, the second letter of a blend was left blank or the middle letter between two consonants in a three letter word was left blank. The subject was responsible for filling in the letters that made the nonsense word look and sound like a real word. In some cases, more than one letter was a correct answer.

The spelling word selection was based on the premise that spelling is sometimes a rapid decision making process and the choice among alternatives is based on the cues imbedded in the structure of the language (Wallace, Klein & Schneider, 1968). Non-words and nonsense words were used. The subject was presented with three non-words and one nonsense word in each group. Only the nonsense word followed spelling rules and patterns. He was then asked to circle the word he felt most resembled and sounded like a real word. The correct answers were the nonsense words and were taken from the word attack test section in the Woodcock Reading Mastery Test, Form A.

Definition of Terms

The following terms are defined in this section:

Prediction: Sometimes called hypothesis testing or guessing, it is the use that a reader must make of prior knowledge relevant to the material to be read. When using prediction, the reader samples just enough of the text to confirm or discard his hypotheses by using his experience with reading and knowledge of the subject matter (Smith, 1975).

Letter Frequency: How often a letter appears in a word (e.g., there are not three e's together in a four letter word) (Marino, 1980).

Letter Environment: This refers to the letters within a word (e.g., TUVWE, HJMPE, and ABCDE are all letter combinations and the W, J, and C would rarely appear in those environments) (Marino, 1980).

Pattern Frequency: This denotes letters that are commonly found together (e.g., ARE, OKE, ICE, BLE) (Marino, 1980).

Limitations of the Study

The subjects for this study were from a middle-class suburban elementary school in Western New York State and were limited to regular sixth graders, gifted fifth and sixth graders who were in the same reading class, and learning disabled students who were of sixth grade age but not doing sixth grade work. Class placement of the subjects was determined by the school district. No attempt was made to control for reading level, IQ, sex or spelling level.

Three of the test instruments were examiner-designed and were thus not standardized. It is possible other results could have been obtained by using standardized tests. The spelling cloze was especially difficult to construct. Since nonsense words were used, many of the answers given by the subjects were able to be pronounced even though they did not always follow the spelling rule or pattern used to construct the word. During scoring, synonyms were accepted as answers for the reading cloze test and nonsense words that could be pronounced and looked like a real word were also accepted as answers in the spelling cloze test even though they did not conform to accepted spelling rules or patterns.

Summary

The purpose of this study was to examine the relationship between predictive strategies as measured by the scores on reading and spelling cloze tests. Also to be determined was the relationship between standardized spelling and reading comprehension test scores and the three examiner-designed tests. The results investigated whether the subjects who scored high or low on standardized reading comprehension and spelling tests would also score the same on spelling and reading cloze tests, thus indicating whether predictive strategies in reading and spelling were utilized. The score on a spelling word selection test would be used to indicate if the subject was able to use the language cues imbedded in a word to help him select the correct one.

Chapter II

Review of the Literature

Purpose

The purpose of this study was to determine if a relationship existed between predictive strategies used in reading and predictive strategies used in spelling and to see if both could be measured using cloze tests. This study also sought to discover any relationship between a spelling score on a standardized test and a score on a spelling cloze test; a relationship between a reading comprehension score on a standardized test and a score on a reading cloze test; a relationship between a standardized spelling test score and a score on a spelling word selection test; a relationship between a standardized reading comprehension test score and a standardized spelling test score; and a relationship between a spelling cloze score and a spelling word selection test score.

The review of the literature covered in this chapter is organized as follows: psycholinguistics, reading and spelling; prediction, reading and spelling; cloze procedure, reading and spelling; and cloze procedure and prediction.

Psycholinguistics and Reading and Spelling

Psycholinguistics has been defined as "the scientific study of the uniquely human skills of language learning and use" (Smith, 1973, p.v., cited in Zutell, 1978). Zutell notes that psycholinguistics has aided in the development of process models and analytic tools in reading.

One such model is presented by Pearson (1976) who states that reading occurs when syntactic, semantic associational and graphophonemic information are used together.

Recent research in psycholinguistics has stressed a cognitive approach rather than a linguistic one (Smith, 1973). As a result, the psycholinguistic field has focused more attention on reading. The emphasis on a cognitive aspect has been stressed by Noam Chomsky and the school of generative transformational linguistics. According to Smith, N. Chomsky and others have shown the difference between two aspects of language: the surface structure, which are the sound waves that pass through the air in speech or the ink marks that appear on paper in writing, and the deep structure, which is the underlying meaning.

Syntax, the rules that organize words into sentences, is needed for understanding because meaning is not represented in the surface structure, and provides the bridge between the surface and deep structure.

Smith (1973) states that psycholinguistics has made two major contributions to reading. First, reading is not primarily a visual process because information comes from the printed page and the brain. Second, there is a limit to the amount of information the eye can process.

Goodman (1967) terms reading a psycholinguistic guessing game and says that the reader brings to his reading the sum total of his experience and his language and thought development. Gould (1976) agrees with Goodman, who states that reading is a selective process and that the reader does not use every bit of information from the printed page. Gould says that to read efficiently a good reader employs a hypothesis testing strategy which allows the reader to use what he needs from the

page and his brain, and discard the rest. This would be impossible if the reader processed letter-by-letter or word-by-word (Kolers, 1970).

Kolers adds that a skilled reader does more than identify letters or translate them into sounds or recognize word structure but instead treats words as symbols and uses them for their meanings and relations to other symbols. Goodman (1967) calls this selecting the fewest, most productive cues necessary to produce guesses that are right the first time.

Psycholinguistic research indicates that skilled readers make minimal use of the graphic symbols on the page when reading connected prose (Gove, 1976). A study by Smith and Holmes (1971) states that identification of letters is not a necessary preliminary to word identification and that identification of words is not a prerequisite for comprehension.

Gove (1976) agrees and states that the purpose of word identification is comprehension, not the ability to identify words on a page. In a study by Johnson (1975), subjects could identify a word faster than they could identify even the first letter of a word.

The idea that comprehension is hindered if words are read letter-by-letter was supported in a study by Kolers and Katzman (1966) that presented college students with six letter words that appeared one letter at a time. Results showed that when the letters were presented rapidly the subjects identified words better than individual letters. When the letters were shown at a slower pace the subjects were able to identify letters better than the words they spelled.

This study has some bearing on short-term memory since Smith (1971, 1973) says short-term memory plays an important role in reading. The

inefficient reader who attempts to sound out words letter-by-letter or read word-by-word risks overtaxing its capacity.

Short-term memory can process four or five letters and hold them for a short time. However, if attention is turned to more letters or another word, the previous information is gone.

Smith (1978) emphasizes that "comprehension gets lost in the bottleneck of short-term memory the moment we worry about getting individual words right, or become afraid that we might miss a significant detail" (p. 39). Instead of slowing down, readers should speed up and aim for general meaning.

Children who are encouraged to use syntactic and semantic information to aid comprehension will become more aware of the nonvisual aspects of reading and will not feel they have to process each piece of visual information they read (Tovey, 1976).

Much of the recent research in psycholinguistics and reading has contributed to the knowledge about how children learn to spell (Zutell, 1978). Marino (1980) says that spelling, like other psycholinguistic processes, involves the interplay between the structure of language and the linguistic knowledge which the learner brings to that structure.

Spelling was previously thought to be irregular, and spelling and reading difficulties were often blamed on this irregularity. However, because of the work completed by N. Chomsky and Halle (1968) showing that English orghography is a near optimal system for representing a spoken language, this is no longer so.

Their work stated that orthographic structure corresponds to a psychologically abstract level called "lexical representation" which has only enough phonological information represented to allow the

prediction of a word in various contexts. This theory says that words similar in meaning are spelled similarly. Superficial differences in pronunciation are handled by applying intuitive phonological rules. Therefore, an English speaker does not have to store every vocabulary item in his lexicon (dictionary-in-the-head) since many words do not have a separate entry but are derived from a single lexical item (e.g., elevation and elevator derive from elevate).

C. Chomsky (1970) agrees that spelling relationships make more sense when used with meaning in mind, and that the conventional spelling of words corresponds more closely to the psychologically abstract level than to the surface phonetic form (e.g., medicine does not show close grapheme-phoneme correspondence but retains a deep structure similarity to medicate). These underlying representations can be used for reading and spelling.

Venezky's (1967) view of orthography differs. He states a child should also learn the graphemic and morphophonemic features of the words. Graphemic features are acceptable letter combinations (BFHLW is not acceptable) and letter markers which affect the pronunciation of other letters (/a/ in boat). Morphophonemic features indicate that meaning elements in words are pronounced using their phonemic boundaries such as bomb in bomber, bombard and bombadier.

Venezky's research was based on earlier work by Francis (1958) which said that a "morphographic" relationship was continued in words like marine and mariner even though the spoken forms were phonetically different.

N. Chomsky and Halle's (1968) view on spelling operates on an abstract level, stressing the meaning-bearing function of orthography.

Frith (1980) terms it a formal linguistic description. Francis (1958) and Venezky (1967) put more of an emphasis on the surface features of words. Research has shown that both of these views are used by children in their spelling strategies but that they use them at different stages in their spelling development.

Read (1971) showed that children's spelling errors are not really errors but rather steps in their development as efficient spellers. Other studies have shown the use of a letter-name strategy in young children (Beers, 1975; Beers, Beers & Grant, 1977; Beers & Henderson, 1977; Zutell, 1976) and confirmed the progressive development of short and long vowel spelling strategies (Beers, 1975; Beers & Henderson, 1977).

Research has also shown the existence of progressive changes in the spelling of the past tense marker (Beers & Henderson, 1977), shown similar developmental patterns in the spellings of consonant doubling and derivationally related words, and reported a significant correlation between the level of spelling strategy and cognitive development (Zutell, 1976).

Learning to spell does not happen by habit and practice but involves the formulation and testing of rules and strategies (Zutell, 1978). Reading and spelling both exhibit signs of a complicated information processing system. They share some characteristics but are no longer thought to be reciprocal (Gould, 1976; Smith, 1972).

Frith (1980) points out that in the past, some teachers taught only spelling and thought that their pupils would automatically be able to read. Today, the reverse can be seen. Teachers teach reading and assume that spelling will follow naturally. However, if there really

is such a close relationship between reading and writing a word correctly, people who are good readers but poor spellers should not exist (Frith, 1980).

There are radical differences between the skills and knowledge used in reading and writing (Smith, 1972). Henderson (1981) says spelling seems to be more demanding than reading in the sense that mistakes can be made in reading and go unnoticed whereas in spelling they are picked up immediately.

Psycholinguistic research has helped to explain the relationship between spelling and reading (Gould, 1976). While the reader uses hypothesis testing the speller uses redundancy. According to Weaver (1962) the English language is 75% redundant and this helps the speller and reader because any given word gives more clues than are needed to process it.

Psycholinguists say there are five different types of redundancy: 1. semantic, 2. syntactic, 3. graphemic, 4. phonemic, and 5. orthographic (Gould, 1976). Readers rely mostly on semantic and syntactic redundancy because in context, meaning and grammar reduce alternatives. Spellers rely on phonemic, graphemic and orthographic redundancies. Experience strengthens semantic relationships and redundancies of meaning can be used as aids to spelling prediction.

Katz (1977) states that the perception of a single word, nonword or nonsense word is strongly affected by the redundancy of orthography. Redundancy in a single isolated word can occur in letter features, word length, word shape, letter case, morphological regularities and interletter transitions. Katz's study investigated one form of intraword

orthographic redundancy (the characteristic asymmetric spatial distributions of letters of the alphabet across serial positions within words).

Subjects were adults and fifth graders and results showed that adults and good fifth grade readers demonstrated a sensitivity to letter positional distributions. Fifth graders who were poor readers did not demonstrate such a sensitivity.

Prediction and Reading and Spelling

Recent analyses of reading emphasize the importance of the use of prior knowledge (Goodman, 1967, 1968; Hochberg, 1970; Kolers, 1970; Smith, 1971, 1973). Prediction, sometimes called hypothesizing or guessing, is based on this prior knowledge which is inside a reader's head, and is crucial to reading (Smith, 1975).

There is no need to teach prediction since Smith (1978) calls it a natural process and a part of living which is used in all daily activities. In reading, comprehension depends upon prediction since prediction asks the questions and comprehension provides the answer.

Smith (1975) cites four reasons why the use of prediction is important to the reader: 1. Individual words have too many meanings; 2. The spelling of words do not indicate how they should be pronounced; 3. The brain can only process a certain amount of visual information while reading; and 4. The capacity of short-term memory is limited.

Redundancy is also significant as an aid to helping prediction in reading by reducing the number of alternatives since there is more information available to the reader than he needs (Smith, 1975).

Statistical analyses of English words show that the average number of alternatives available to a letter is not twenty-six but eight (Smith, 1978). Sometimes there is more but often there are none. Smith says that "every other letter can be obliterated from many passages of English text without affecting comprehension at all" (p. 26).

Redundancy can be either interword (the ability to use sentence context) or intraword (the ability to use orthographic structure) (Biemiller, 1977/1978). Interword redundancy allows a word in a sentence to be guessed with better than chance accuracy because of the semantic and syntactic constraints used by the words around it. Intraword redundancy points out that a letter in a word is highly predictable because of its position in that word and the letters around it (Goodman, 1967; Smith, 1971).

Prediction, defined by Smith (1975) as the prior elimination of unlikely alternatives, is not accomplished without error. However, the errors are desirable because readers who never make mistakes are not reading efficiently. Prediction, though, must be separated from wild guessing. These errors can be easily distinguished because a reader who guesses randomly has no sense or meaning to his guesses.

In a 1967 study, Goodman examined the oral reading miscues of students and found that readers tended to use guessing strategies in a skillful way by taking syntactic and semantic cues into consideration.

Hypotheses about the text can also be tested by using an interactive reading process where mature readers draw on their semantic, syntactic, orthographic and lexical knowledge (Rumelhart, 1976, cited in Mendak, 1983).

Prior knowledge of language also enables readers to eliminate many unlikely alternatives in advance (Smith, 1975). In this way children can predict what they have not seen by the time they reach school because they have the command of an oral language and use complex syntactical patterns (Loban, 1963; Smith, Goodman, Meredith, 1970, cited in Tovey, 1976).

Proof of prior knowledge was shown in Tulving and Gold's (1963) study which showed that words presented tachistoscopically in the context of a meaningful sentence had lower recognition compared to words presented in anomalous contexts or in isolation.

Studies by Weber (1970) and Biemiller (1970) show that from the beginning of reading instruction, children choose to use some form of prediction strategy. They seem to prefer processing reading in larger chunks than letter-by-letter or word-by-word. Chunking allows short-term memory to be more efficient (e.g., the word horse is easier to hold in short-term memory than the same number of unrelated letters).

Carver and Darby (1971) indicate that previous research has suggested potential advantages for chunking in measuring comprehension in reading and listening.

Although the process of prediction is logical to skilled readers, Mendak (1983) points out that it may not seem that way to poor readers. Any form of hypothesizing has only a chance of being correct and experience has shown that remedial students are unwilling to take risks.

Biemiller (1970) and Weber (1970) studied first graders' oral reading errors. Weber found that beginning readers use grammar knowledge to narrow down words that compete for a given sentence slot. Good readers were sensitive to sentence context and corrected incorrect

responses. Poor readers were fearful of making mistakes and when they did make them they were unable to correct their grammatical errors.

Biemiller found that most of the errors made by poor readers were contextually constrained but most of the errors made by good readers were non-responses. He concluded a non-response was not an error since it indicated an awareness between the spoken and written word.

Since prediction is a part of being human, there have been many studies completed on hypothesis behavior. Hypotheses-testing models allow the way learning proceeds to be examined rather than focusing on the more common question of how much has been learned (Shapson, 1977).

Ingalls and Dickerson (1969) state that hypothesis theories help to describe behavior on concept-identification tasks. Models used in this area view problem solving as the result of testing in a trial-and-error way various predictions or hypotheses. When the subject finds the correct hypotheses, after appropriate feedback, he continues to use it. If no indication is given whether an answer is right or wrong, the same hypothesis is retained for use in the next trial (Levine, 1966).

Samuels, Dahl and Archwamety's (1974) research used a partial model of word recognition for hypothesis/test training on reading skill and suggested that recognition speed is partly determined by the amount of visual information from the target word. The less visual information required the faster the recognition. Predictions based on this model suggest that skilled readers have better word recognition due to superior word processing strategies.

Better readers were found to be more accurate when using context and less dependent on visual information when identifying the target word (Begy & Samuels, 1974, cited in Samuels et al.). They were also

better able to identify individual letters to help in recognition and were more willing to alter an incorrect identification of a target word. Results from this study showed that hypothesis/test training produces significantly superior word recognition and comprehension.

Spellers also make use of hypothesis testing but the reader and writer differ in what is used as the basis for the predictions (Gould, 1976; Marino, 1979).

In informal trials with ten reading graduate students and fifteen classroom teachers (Gould, 1976) 70 percent of the subjects agreed on the spelling of a nonsense word. Although none could explain the reason for their choice, some said they based it on their previous knowledge of a real word that resembled the nonsense word.

Wallace, Klein and Schneider (1968) conclude that spelling is a rapid decision making process with choice among alternatives determined by cues imbedded in language structure. Confronted with a choice between two alternate word spellings, a speller may use a knowledge of sequential probabilities of given letter combinations. Their study asked good and poor spellers to choose a nonsense word that most resembled a real English word. Results supported the hypothesis that good spellers would perform significantly better than poor spellers.

Wallach (1963) investigated the speed of perceptual recognition of approximations to English words by good and poor spellers and found good spellers capable of recognizing reasonable approximations to English more readily than poor spellers.

Hanna, Hodges and Hahna (1971) have stated that efficient spelling reflects an awareness of the structure and pattern of language.

Marino (1980) infers that good spellers use prediction strategies and that these reflect a knowledge of frequency and redundancy rules. She theorized that the guesses of poor spellers would be more haphazard. An informal study using a pencil-and-paper version of Word Mastermind was administered to sixth graders and results showed that poor spellers did not operate with a well defined set of prediction strategies while good spellers did.

The Marino study showed that as a group good spellers seemed to be aware of letter frequencies (the fact that some letters appear more often than others) while poor spellers were not. Good spellers also selected common letter patterns but poor spellers did not seem to be aware of pattern frequency and chose improbable combinations. Environmental constraints were familiar to good spellers and they knew that some letters frequent certain environments. Poor spellers put any letters together.

Marino concludes that there is some evidence that an awareness of sequential dependencies is developmental and that poor spellers find it difficult to use the orthographic constraint of letter environment but have less difficulty preserving spelling patterns (e.g., the final silent e in navigate).

In a 1979 study, Marino explored the relationship between children's use of three kinds of linguistic information in spelling, grade in school and grouping by reading and spelling ability. Her research supported the conclusions that spelling errors yield clues to spelling processing strategies and that to view errors as reflections of a psycholinguistic process the acts of reading and spelling had to be related to language acquisition.

Results of the study revealed significant differences between linguistic levels and supported the hypothesis that phonetic, graphemic and morphophonemic cue systems are meaningful levels of processing for young spellers. The phonetic level remained salient to some as late as the fourth grade, while neither grade nor group effects were found for the graphemic level. Of the three cue systems, the morphophonemic appears to be the least accessible to spellers.

Cloze Procedure and Reading and Spelling

In 1953, Taylor introduced the cloze procedure as an alternate to the use of readability formulas. Since then, cloze has been used to measure ability in many areas of reading (Rankin, 1974) and has been shown to be a valid measure of comprehension (Bormuth, 1969b; Rankin & Culhane, 1969). After reviewing the research on the use of cloze tests for individual reading comprehension, Bormuth concluded that scores on cloze tests correlated well with standardized comprehension tests (Bormuth, 1969a).

Taylor (1953) used exact replacement of the original word and subsequently upheld his original design by noting that there was no advantage in scoring synonyms. However, Ruddell (1964) found that cloze tests scored by the exact replacement method and by using synonyms to be about the same in reliability and validity. Mendak (1983) adds that in judging correctness of a response, accepting synonyms and any logical reply is a positive reinforcement of the guessing process.

Guilford (1967) has listed the following divergent thinking abilities which are liable to affect cloze performance: associational fluency (the ability to rapidly make synonyms for a given word);

expressional fluency (the ability to generate sentences given the first letter of each word) and flexibility (the ability to generate potential completions in a variety of categories). Bryne, Feldhusen and Kane (1971) add that verbal intelligence may also have an effect on cloze performance.

The patterns of non-prespecified responses on a written and oral cloze test given to above average, average and below average readers were analyzed by Tumarkin (1981). Results showed that all three groups showed different reading strategies that reflected their varying abilities on a written cloze test.

Research using a spelling cloze technique as a test appears to be scarce and it is usually described as an instructional tool. Gould (1976) describes cloze procedure as a valuable tool to be used in spelling prediction. In an article on instructional applications of spelling cloze, Thomas (1978) uses it as an aid to phonic generalizations, in digraphs or any other phonic element, leaving the first two letters of the digraph as a clue.

Greathouse and Neal (1976) note that the rationale underlying letter cloze procedure as applied to spelling is based on the same principles which are used in reading cloze. However, in letter cloze the predictive aspects of the context are found in spelling pattern relationships. By deleting letters systematically in a word, practice is given in letter sequence identification and knowledge of spelling patterns is increased. Letter cloze appears to be useful, especially with children who have difficulty finding and internalizing structure in spelling patterns.

Although it is not called a cloze procedure, C. Chomsky (1970) recommends a spelling exercise leaving out a reduced vowel (e.g., dem_cratic). The missing letter is filled in and the choice must be justified by producing a related word that has the same vowel quality (e.g., dem_cracy). Even though they do not exhibit a close grapheme/phoneme correspondence, words like these are able to maintain their deep structure similarities and these underlying representations can be of use to the reader and speller.

Even though the research in recent years on the cloze procedure has been extensively reported, Bortnick and Lopardo (1973) state that cloze is still not visible enough in the classroom. Cloze can be used as a class procedure with language redundancy within the passage acting as clues for the reader. Unacceptable responses can be eliminated using prediction.

Cloze Procedure and Prediction

An often cited objective of cloze procedure used in instruction is to help students refine their prediction skills (Dahl & Samuels, 1977). However, if prediction is the goal of cloze instruction it is unfair to expect the child to practice on unpredictable materials (Marino, 1981). Deleted words should be predictable and related to purposes for instruction.

Cloze helps students to learn to use prediction or confirmation strategies during reading by using their knowledge of syntax, phonics and word meanings (Schoenfeld, 1980). Deleted material for the purpose of prediction can be individual letters, parts of words, entire words, phrases, clauses, portions of sentences or entire sentences (Valmont, 1983). All of these deletion patterns require the reader to use different thinking and performance behaviors.

Summary

This chapter has focused on some of the research concerning the role of psycholinguistics in reading and spelling. It has also discussed the part played by prediction in these areas and how the cloze procedure can be used to aid predictive strategies. The research has stated that both reading and spelling involve interaction of thought and language. Recent psycholinguistic research has moved away from a strictly linguistic interpretation of reading and has begun to emphasize the cognitive approach.

An efficient reader or speller does not read or spell word-by-word or letter-by letter. This would seriously overload the working capacity of the brain and short-term memory and cause other valuable information to be lost. If this occurs, the result is a lack of comprehension.

Efficient readers and spellers both rely on predictive strategies but they use different types. In the speller, redundancy in the language comes from phonemic, graphemic and orthographic cues. Poor spellers are unable to make maximum use of these cues. As spellers mature, their knowledge of semantics grows along with them and meaning redundancies also become useful for spelling prediction.

Comprehension depends upon prediction and cloze tests have been shown to be valid measures of comprehension. The use of prediction in reading translates well to being tested by the cloze format. However, the research does not offer much on the use of cloze testing in the area of spelling.

Research in spelling cloze as a test technique or instructional tool is limited. There are suggestions for its use in the classroom but not many studies follow up on this instruction. However, an

often cited objective of cloze instruction is to help students refine their prediction skills. Reading cloze has utilized this objective to its advantage. It would seem that a cloze format could also be adapted to test predictive strategies in spelling.

Chapter III

Design of the Study

Purpose

Smith (1975) contends that reading is impossible without prediction.
He cites four reasons for this statement. First, individual words have
too many meanings. Skilled readers are able to quickly eliminate those
which do not fit the context. Second, pronunciation of words is not
indicated by their spelling so the reader must use them syntactically
and semantically. Third, the brain is able to process a limited amount
of visual information while reading and thus the reader must provide
much information (called prior knowledge) from the brain itself and can-
not rely on vision for all material. Fourth, the capacity of short-term
memory is limited and the reader is able to retain more information by
chunking the input or by utilizing the inherent redundancy (both interword
and intraword) of the language.

Prediction is also used by the speller but the reader and the writer
do not use the same basis for their predictions (Gould, 1976; Marino,
1979). Both use a knowledge of frequency and redundancy but the speller
uses the phonemic, graphemic and orthographic constraints of a word as
well as a knowledge of letter frequencies, letter patterns and environmental
constraints.

According to the research, good readers and good spellers demonstrate
a knowledge and use of these predictive strategies. Poor readers and
poor spellers do not. Therefore, the purpose of this study was to see

if a significant relationship existed between the use of predictive strategies in reading and predictive strategies in spelling using cloze tests.

Questions

1. Is there a significant relationship between the use of predictive strategies on a reading cloze test and the use of predictive strategies on a spelling cloze test?

2. Is there a significant relationship between a spelling score on a standardized test and a score on a spelling cloze test?

3. Is there a significant relationship between a reading comprehension score on a standardized test and a score on a reading cloze test?

4. Is there a significant relationship between a score on a standardized spelling test and a score on a spelling word selection test?

5. Is there a significant relationship between a reading comprehension score on a standardized test and a spelling score on a standardized test?

6. Is there a significant relationship between a score on a spelling cloze test and a score on a spelling word selection test?

Preparatory Instruments and Procedures

Development of Test Instruments

According to Bormuth (1969b) and Rankin and Culhane (1969) cloze tests are a valid measure of comprehension. The reading cloze material used to test reading comprehension in this study was taken from a sixth grade reading text, Green Salad Seasons, published by Ginn and Company, 1982. It is currently not in use in the school district used for the study. A Dale-Chall readability formula showed the reading level of the selection at 6.1. In keeping with the nature of the study's design, the

examiner chose to use one reading selection at the 6.1 readability level for all the different groups tested.

The reading passage followed standard cloze procedure. It was approximately 250 words in length with every fifth word deleted and with uniform blanks throughout (Cunningham & Cunningham, 1978). The first and last sentences were left intact. It was also decided by the examiner, based on research by Ruddell (1964), that synonyms would be accepted as correct answers when scoring the tests. The reading cloze used consisted of fifty-two blanks.

The spelling cloze was based on informal research which contends that a good speller uses predictive spelling strategies in the form of a knowledge of letter patterns, frequencies and environmental constraints (Gould, 1976; Marino, 1980). Greathouse and Neal (1976) have stated that the rationale for spelling cloze is the same as that used in reading cloze except that in spelling the predictive aspects of the context are found in spelling pattern relationships. A review of the research failed to show use of a spelling cloze test but did outline its application as an instructional technique. The examiner theorized that if it was useful in instruction, it could also test predictive spelling strategies.

Nonsense words were used in the construction of the spelling cloze. Letters were deleted in specific areas based on spelling rules and patterns (see Appendix B). The nonsense words were taken from Burmeister (1975), Durkin (1981) and Wilson and Hall (1984) (see Appendix A). There was no special arrangement of nonsense words on the test. Most words contained one blank with a few words containing two blanks. All of the blanks were of uniform length. In some cases, more than one letter was a correct answer

(e.g., in the case of a b blend, both bl and br were acceptable). In addition, because nonsense words were used and the subject had no way of knowing which rule the examiner was testing, answers were also accepted if they made the nonsense word look like a real word (e.g., there were not four vowels in a row) or made it pronounceable. The spelling cloze contained twenty-five items.

Wallace, Klein and Schneider (1968) have stated that spelling is sometimes a rapid decision making process and the choice among alternatives is based on the cues imbedded in the structure of the language. Accordingly, a spelling word selection was also used in the study to test the subjects' knowledge of language. In this test, groups of four pseudo-words were used. Three were non-words (they made absolutely no sense and were simply letters placed together) and one was a nonsense word. Through the use of predictive spelling strategies, the subject should deduce that the correct answer was the nonsense word, which was taken from the word attack test section in the Woodcock Reading Mastery Test, Form A. The pseudo-words in this test were presented in three columns with no special arrangement given to the groups. However, in this test there was only one right answer. The spelling word selection used twenty-five groups.

The standardized spelling and reading comprehension tests used were from the Stanford Achievement Test, which was administered in May, 1984.

Pilot Study

A pilot study was conducted in a middle-class suburban elementary school in May, 1984. This was a different school district than the one used in the final study. The purpose of the pilot study was to refine the three examiner-designed tests and to eliminate any problems in the

administration of the tests on a group basis. Subjects were an above average sixth grade reading class (n = 25). No time limit was set for completion of the tests.

As a result of the pilot study and a computer analysis to determine test validity, the following results were obtained: on all tests the odd scores were compared with the even scores and the Spearman Brown formula was applied to correct for test length. Test validity for the reading cloze was r = 0.91, with three test items deleted. Test validity for the spelling cloze was r = 0.75, with seven test items deleted. Test validity for the spelling word selection was r = 0.76, with no test items deleted.

Design of the Final Study

Subjects

This study was conducted in a middle-class suburban elementary school district in western New York state, and used a total of eighty-nine students: fifty-five regular sixth graders, fourteen gifted sixth graders and eleven gifted fifth graders who were in the same reading class, and nine learning disabled students who were not doing sixth grade work but were of sixth grade age. The learning disabled students and the gifted class were determined by the school district. Each test (examiner-designed and standardized) was administered in a group setting and before testing began parental permission was received via a form letter sent home with all subjects at the school district's request.

Test Instruments

The final form of the reading cloze test (see Appendix B) consisted of a reading selection approximately 250 words in length, with every fifth

word deleted and a uniform blank substituted in its place. The first and last sentences were left intact. The three words eliminated in the pilot study were left as blanks in the final test so the continuity of blanks would not be interrupted. They were eliminated when scoring took place. There were forty-nine blanks scored as answers.

Eighteen nonsense words appeared in the final form of the spelling cloze test (see Appendix B). Some of the words had one letter blank to be filled in and others had two. All blanks were of uniform length. There were no items deleted in the final form of the spelling word selection (see Appendix B) and it consisted of twenty-five groups of three non-words and one nonsense word. The subjects were asked to circle the correct answer which was the nonsense word.

The standardized reading comprehension test and spelling test were part of the Stanford Achievement Test, which was administered in May 1984 to all subjects. The sixth grade Stanford was given to the regular sixth grade students and the gifted sixth grade students. The gifted fifth grade students took the fifth grade Stanford, except for two students who took the sixth grade level. The learning disabled students were given the fifth grade Stanford test. After discussions with advisors, however, it was determined by the examiner that the tests were similar enough so that the results of this study would not be affected.

Procedure for the Reading Cloze Test

This test was administered in early June 1984 to all of the subjects at times that were convenient for each teacher. Each group was tested in its own classroom setting. Prior to testing the administrator made sure the subjects were aware that the test would not affect their grades.

However, they were told it was required and they were expected to do their best.

Directions were given orally and were also printed at the top of the test. Subjects were asked to fill in the blank with a word that made sense in the story. The examiner noted the time the group began the test and the subjects were asked to record the time they finished on their paper. The examiner stressed that there was no time limit but if for some reason completion was impossible the time finished was still to be noted on the test. The time factor was not critical to the study but the examiner was interested in knowing how long it took the various reading groups to complete the test and how many subjects experienced frustration and were not able to finish.

Procedure for the Spelling Cloze Test

The two spelling tests were also administered in early June 1984 but at a different sitting than the reading cloze. The exception was the gifted class which took all three tests in the same sitting. Again, each group was tested in its own classroom setting at the convenience of the teacher. Both spelling tests were administered in the same sitting but not at the same time. The same explanation about the tests not affecting their grades was given and they were again reminded to do their best. The examiner also noted the time each of these tests was begun for the same reason mentioned in the reading cloze section.

The spelling cloze test was given first and the subjects were given oral directions. The same directions were also printed at the top of the test. Subjects were asked to fill in the blank with the letter that made the word look and sound like a real word. There was no time limit and they were asked to write down the time they finished.

Procedure for the Spelling Word Selection Test

The spelling word selection test was administered next and the directions were similar to the spelling cloze test. This time however they were asked to circle the word that looked and sounded like a real word. There was no time limit and they were told to record their completion time.

Data Analysis

Each test was scored and the subjects' number of right answers was recorded in a column next to his/her name and the appropriate test name. The time for each individual was recorded in a separate column for each test. The standardized test scores for reading comprehension and spelling from the Stanford Achievement Test were placed in two other columns.

As had been previously mentioned, synonyms were accepted for the reading cloze test. Blanks not filled in were recorded as wrong answers.

In the spelling cloze test, answers were also accepted that did not follow the spelling rules and patterns used to design the test. This was because nonsense words were used. The subjects had no way of knowing which rule or pattern was being tested and they were told to fill in the blanks with letters that made the nonsense word look and sound like a real word. In many cases more than the correct answer would achieve this and credit was given if the subject's answer produced a nonsense word that looked right and could be pronounced. Blanks that were not filled in were counted as wrong answers.

The spelling word selection test used non-words and nonsense words. The nonsense words were the only correct answers and there was only one in each group of four pseudo-words. The subject was either right or wrong in this test. Any group without a word circled was considered incorrect and marked as such.

Summary

The purpose of this study was to determine whether there was a significant relationship between the use of predictive strategies in reading and spelling. This was tested by means of examiner-designed cloze procedures and a language-based test and standardized scores from the Stanford Achievement Test in reading comprehension and spelling.

The reading cloze test was constructed using standard cloze procedure. The spelling cloze test also relied on the cloze procedure but used blanks for letters instead of whole words. This change was necessary because reading and spelling use different predictive strategies. Reading relies on syntactic and semantic clues. Spelling relies on phonemic, graphemic and orthographic clues. The spelling word selection test was based on the premise that a choice among alternatives is based on the cues imbedded in the language.

The reading cloze test consisted of forty-nine items. The spelling cloze test contained eighteen items. The spelling word selection test had twenty-five items. All three of these tests were administered to a total of eighty-nine students. Fifty-five were regular sixth graders, fourteen were gifted sixth graders and eleven were gifted fifth graders who were in the same reading class, and nine were learning disabled students who were not doing sixth grade work but were of sixth grade age.

The reading comprehension and spelling tests from the Stanford Achievement Test were also administered to the subjects. Two of the gifted fifth graders took the sixth grade Stanford and all of the learning disabled students took the fifth grade Stanford. However, it was determined that this would not affect the results of the study.

The examiner-designed tests were scored and the number of right answers were recorded along with the time it took each subject to take the tests. Standardized scores for reading comprehension and spelling from the Stanford Achievement Test were also recorded.

Chapter IV

Analysis of Data

Purpose

The purpose of this study was to determine the relationship between
predictive strategies used in reading and predictive strategies used in
spelling and to see if both could be measured using cloze tests. A
secondary purpose was to see if there was a relationship between a spelling
score on a standardized test and a score on a spelling cloze test; a
relationship between a reading comprehension score on a standardized test
and a score on a reading cloze test; a relationship between a standardized
spelling test score and a score on a spelling word selection test; a
relationship between a standardized reading comprehension test score and a
standardized spelling test score; and a relationship between a spelling
cloze test score and a spelling word selection test score. Subjects used
were regular sixth grade students, gifted fifth and sixth grade students
who were in the same reading class, and learning disabled students who
were of sixth grade age but not doing sixth grade work. All subjects took
the fifth or sixth grade level of the Stanford Achievement Test and the
same reading and spelling cloze tests and spelling word selection test.

Data Analysis

To determine if any significant relationship was present between the
test scores a correlation coefficient or r-value was determined for each
of the six questions using the Pearson Product-Moment method. Raw scores
were used from both the examiner-designed tests and the standardized tests

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(see Appendix C). In all tests the raw score reflects the number of right answers. The r-values for the relationships under investigation are shown separately from the test scores (see Table 1).

Table 1

Correlation Coefficients Among the Variables

Relationship	r-value
Reading Cloze/Spelling Cloze	0.560*
Standardized Spelling/Spelling Cloze	0.454*
Standardized Reading Comprehension/Reading Cloze	0.674*
Standardized Spelling/Spelling Word Selection	0.342*
Standardized Reading Comprehension/Standardized Spelling	0.661*
Spelling Cloze/Spelling Word Selection	0.500*

critical value for r = 0.2087
n = 89
df = 87
*significant correlations

In this study the Pearson Product-Moment correlation coefficient was used to calculate the r-value. Degrees of freedom (df) were 87 and the critical value of r was 0.2087. The null hypothesis was rejected if the r-value was greater than the critical value.

The first question asked if there was a significant relationship between predictive strategies used on a reading cloze test and a spelling cloze test. The data revealed an r-value of 0.560. The null hypothesis was that there is no significant linear relationship between reading cloze predictive strategies and spelling cloze predictive strategies. Because the r-value is greater than the critical value the null hypothesis was rejected and there is a significant linear relationship between the two variables. Figure 1 depicts this graphically.

Spelling Cloze Test

Figure 1. Relationship between predictive strategies used in reading and predictive strategies used in spelling using cloze tests

Question two investigated the possibility of a significant relationship between a standardized spelling test score and a spelling cloze test score. The null hypothesis stated that there was no significant linear relationship between a spelling score on a standardized spelling test and a spelling cloze test score. The r-value determined was 0.454. Because the r-value is greater than the critical value the null hypothesis was rejected and there is a significant correlation between the two variables. See Figure 2 for a pictorial view.
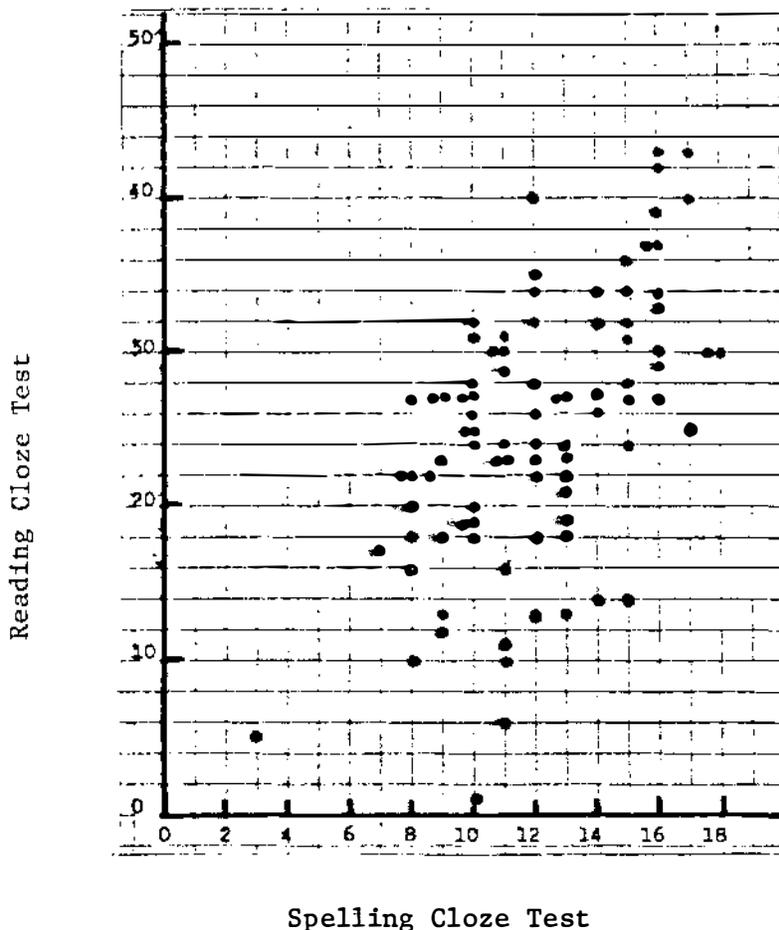
Spelling Cloze Test
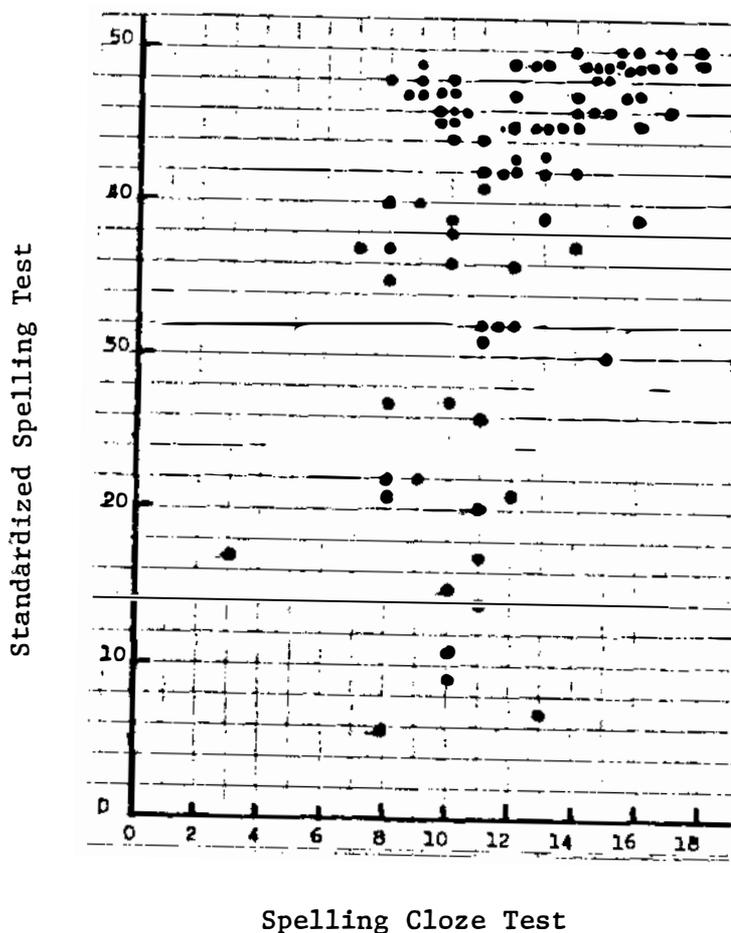
Figure 2. Relationship between standardized spelling test score and spelling cloze test score

Is there a significant relationship between a score on a standardized reading comprehension test and a score on a reading cloze test? The r-value for this question, which is number three, is 0.674. The null hypothesis was that there is no significant linear relationship between a standardized reading comprehension test score and a score on a reading cloze test. Because the r-value is greater than the critical value, the null hypothesis was rejected and a significant correlation is shown to exist between the two variables. Figure 3 shows this in the form of a graph.
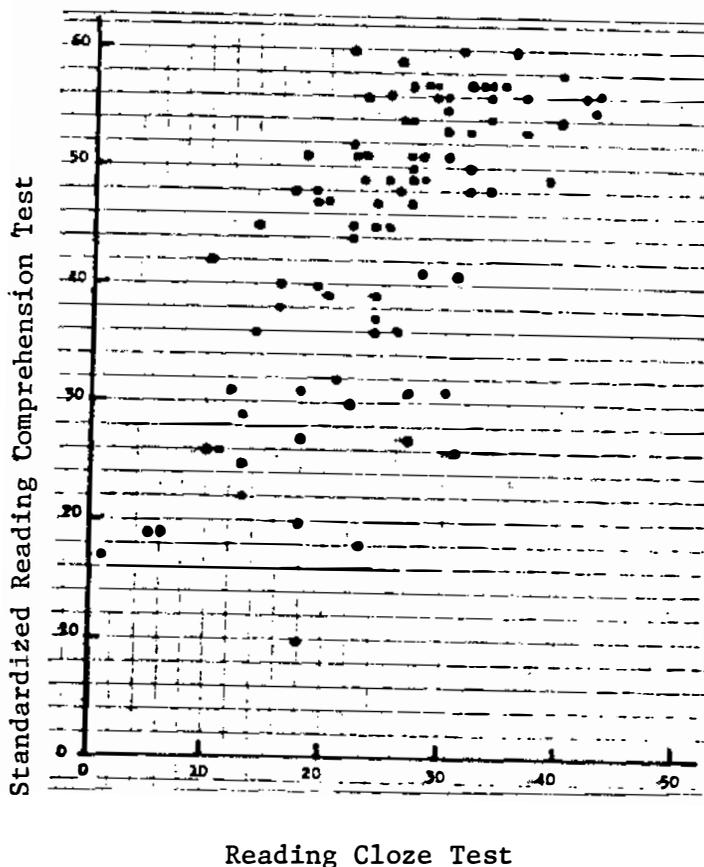
Reading Cloze Test

Figure 3. Relationship between standardized reading comprehension test score and reading cloze test score

The fourth question asked if there was a significant relationship between a spelling score on a standardized test and a score on a spelling word selection test. The r-value was found to be 0.342. The null hypothesis stated that there was no significant linear relationship between a spelling score on a standardized test and a spelling word selection test score. Because the r-value is greater than the critical value the null hypothesis was rejected. There is a significant correlation between the two variables. The graph representing this is Figure 4.


Spelling Word Selection Test

Figure 4. Relationship between standardized spelling test score and spelling word selection test score

The r-value for question number five, which asked if there was a
significant relationship between a score on a standardized reading
comprehension test and a score on a standardized spelling test, was 0.661.
The null hypothesis stated that there was no significant linear relationship
between a reading score on a standardized reading comprehension test and
a score on a standardized spelling test. Because the r-value is greater
than the critical value, the null hypothesis was rejected and a significant
correlation between the two variables was found. Figure 5 details this
r-value graphically.

Standardized Spelling Test
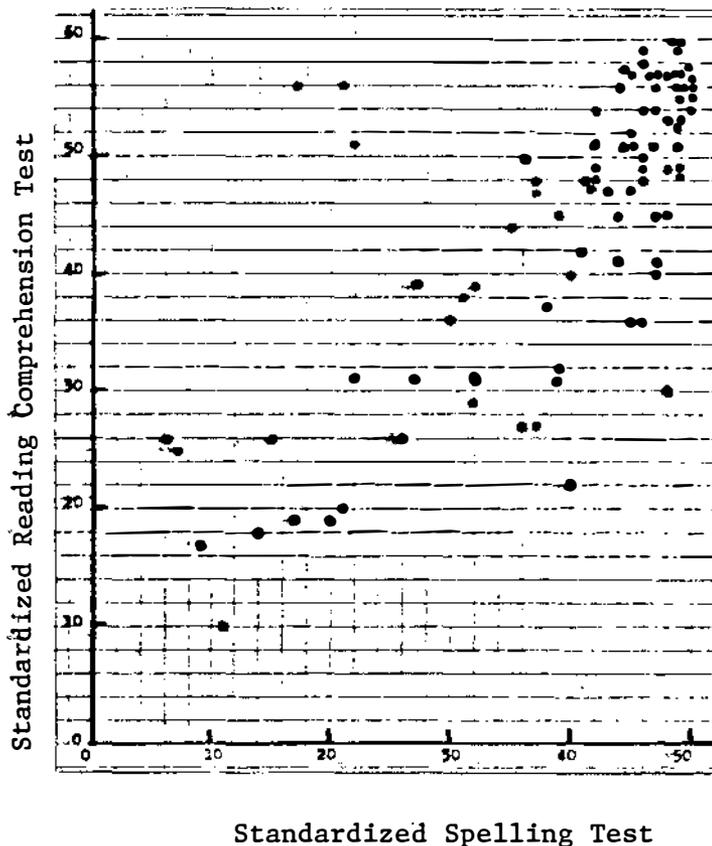
Figure 5. Relationship between standardized reading comprehension test
score and standardized spelling test score

The final question, number six, sought to determine if there was a significant relationship between a score on a spelling cloze test and a score on a spelling word selection test. The data showed an r-value of 0.500. The null hypothesis stated that there was no significant linear relationship between a score on a spelling cloze test and a score on a spelling word selection test. The r-value is greater than the critical value and the null hypothesis was rejected. There is a significant linear relationship between the two variables. The graph in Figure 6 presents the data.
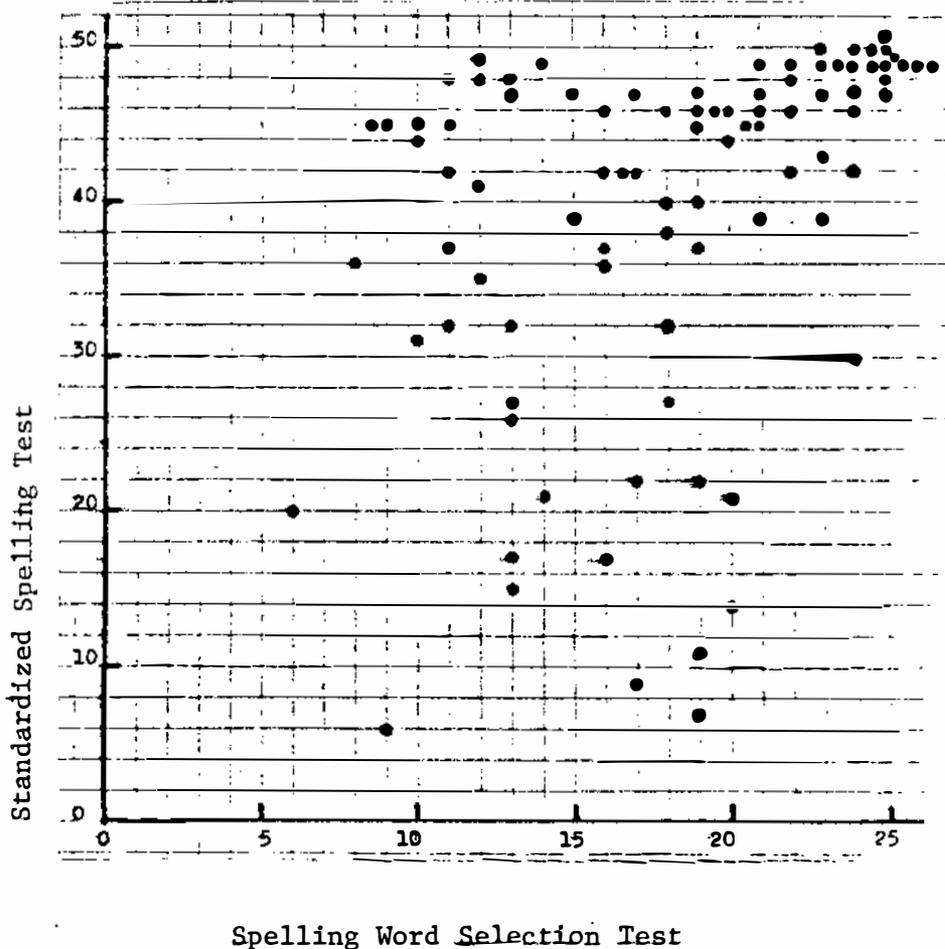

Spelling Word Selection Test
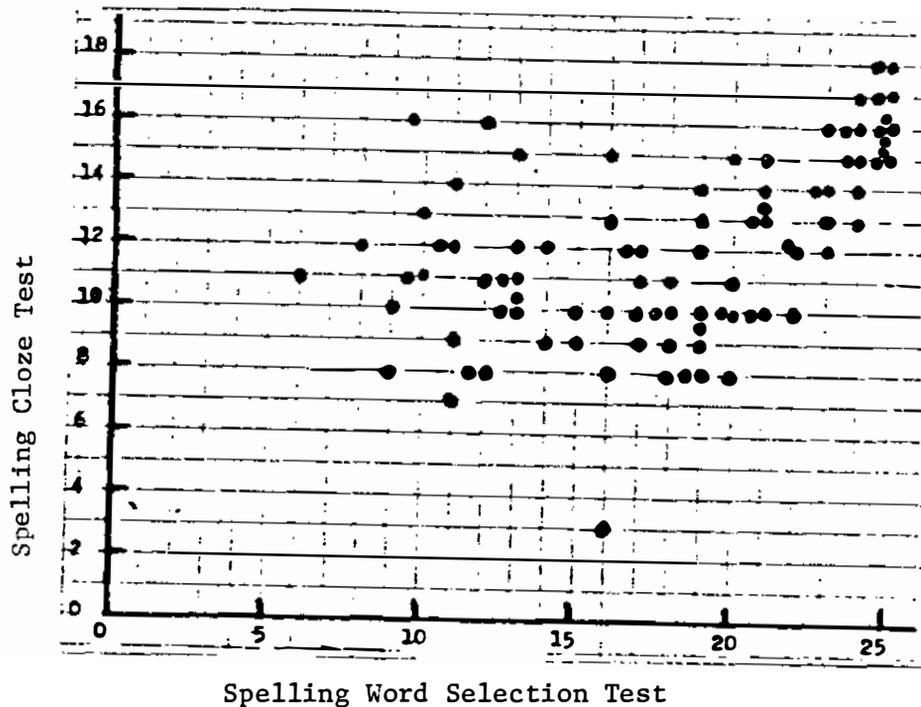
Figure 6. Relationship between spelling cloze test score and a spelling word selection test score

Informal Analysis of Additional Data

The subjects had no time limit for completing the reading and spelling cloze tests and the spelling word selection test. The examiner kept track of the time each test was begun and all subjects were asked to record the time they finished on their papers regardless of whether they completed the entire test or stopped early because of frustration.

Reading class lists were obtained so the students could be divided into reading groups for the regular sixth grade. The learning disabled and gifted classes were already considered reading groups by the school. The times and scores for each class and each test were added and divided by the number of subjects in each reading group (e.g., low, medium, high regular sixth grade, gifted fifth, gifted sixth, learning disabled) to determine an average time and score.

The informal analysis using averages (see Table 2) revealed that better readers took more time and got more answers right in the reading cloze. Poorer readers took less time and did not do as well. The exception was the learning disabled class which took as much time as the gifted class but still scored the lowest. An analysis of individual poor reader test papers showed that for some it was frustration (many of their blanks were not filled in at the end of the test), for others it was simply a case of filling in any word in a rush to finish, and still others showed a general lack of comprehension throughout the entire selection because they failed to use syntactic and semantic cues.

The spelling cloze and spelling word selection average times were very similar for all groups but average scores were higher for good readers. This seems to indicate that good readers are also good spellers and that they are able to use their predictive spelling strategies to determine

letter patterns and letter frequency. Poor readers, although they often completed both tests in the same amount of time as the good readers, seemed to display a lack of awareness for patterns and frequency. An individual analysis of poor readers' papers showed they often put a vowel where a consonant was called for or vice versa in the spelling cloze. In the spelling word selection test they circled many of the non-words (these were simply clusters of letters together that made no spelling sense).

Table 2

Average Scores and Times for Reading Cloze, Spelling Word
Selection and Spelling Cloze

	Reading Cloze	Spelling Word Selection	Spelling Cloze
High Reading Group (Regular Sixth Grade)	T-18 S-28	T-4 S-19	T-3 S-12
Medium Reading Group (Regular Sixth Grade)	T-15 S-23	T-4 S-17	T-3 S-11
Low Reading Group (Regular Sixth Grade)	T-11 S-18	T-3 S-14	T-2 S-11
Gifted (Fifth Grade)	T-25 S-30	T-4 S-21	T-4 S-15
Gifted (Sixth Grade)	T-22 S-34	T-4 S-20	T-5 S-15
Learning Disabled	T-25 S-14	T-3 S-16	T-6 S-10

T = Time (in minutes)

S = Scores (# right)

Summary

The subjects used for this study were regular sixth grade students, gifted fifth and sixth grade students who were in the same reading class, and learning disabled students who were of sixth grade age but not doing sixth grade work. All subjects took the fifth or sixth grade level of the Stanford Achievement Test and the same reading and spelling cloze tests and spelling word selection test.

The r-values were as follows: the relationship between predictive strategies used in reading and spelling using cloze tests: 0.560; the relationship between a standardized spelling score and a spelling cloze score: 0.454; the relationship between a standarized reading comprehension score and a reading cloze score: 0.674; the relationship between a standardized spelling test score and a spelling word selection test score: 0.342; the relationship between a standardized reading comprehension test score and a standardized spelling test score: 0.661 and the relationship between a spelling cloze score and a spelling word selection score: 0.500. All the r-values were significant and since the critical value was 0.2087, which was less than the r-values, the null hypotheses were rejected.

In an informal analysis using average times and scores for the reading groups (low, medium, high regular sixth grade, gifted fifth, gifted sixth, learning disabled), it appeared that good readers utilized their predictive strategies in reading and spelling better than poor readers. It seemed that taking more time with the reading cloze produced better results (with the exception of the learning disabled class), while taking the same amount of time with the spelling cloze and spelling word selection test by all groups showed that good readers appeared to be better spellers than poor readers.

Chapter V

Conclusions and Implications

Conclusions

The data from this study shows a significant linear relationship between: 1. predictive strategies used in reading and predictive strategies used in spelling using cloze tests; 2. a standardized spelling test score and a spelling cloze test score; 3. a standardized reading comprehension test score and a reading cloze test score; 4. a standardized spelling test score and a spelling word selection test score; 5. a standardized reading comprehension test score and a standardized spelling test score, and 6. a spelling cloze test score and a spelling word selection test score.

The significant correlation found in question one, between predictive strategies used in reading and spelling using cloze tests, is interesting to note. The examiner has been unable to find any previous studies that have used a spelling cloze or that have correlated spelling cloze with reading cloze. However, the varying responses by reading groups in this study, as noted by the informal analysis of time and scores, supports the conclusions formed by Tumarkin (1981) who noted that above average, average, and below average readers showed different reading strategies reflecting their abilities on a written cloze test.

Questions two, four and six concerned relationships in spelling prediction and showed a significant correlation between a standardized spelling test score and a spelling cloze test score; between a standardized

spelling test score and a spelling word selection test score and between a spelling cloze test score and a spelling word selection test score. In all of these tests the subjects were required to use some form of predictive spelling strategy. The results supported the informal study by Gould (1976) which found that 70 percent of the subjects used agreed on the spelling of a nonsense word. Their agreement was based on their prior knowledge of a word that resembled the nonsense word used in Gould's study.

The significant correlation found in questions two, four and six also supported Wallach (1963) who said that good spellers recognize reasonable approximations to English more readily than poor spellers, and Marino's (1980) informal study results which showed that good spellers use prediction strategies (reflected in their use of frequency and redundancy rules).

An analysis of individual spelling cloze tests showed that good spellers (identified as those subjects with a high score on the spelling cloze test) indicated a strong awareness of letter patterns, letter frequencies and environmental constraints when choosing a letter to fill in a blank.

In addition, the significant correlation in question four, between a standardized spelling test score and a spelling word selection test score, lends credence to Wallace, Klein and Schneider (1968) who reported that spelling may not be just the retrieval of stored units. It may also be, in part, a rapid decision making process with choice among alternatives built into the language structure. Their conclusions showed that good spellers performed significantly better than poor spellers on the choice-discrimination problems using nonsense words.

Research in reading cloze and standardized reading tests has shown a correlation between these two items (Gallant, 1965; Schneyer, 1965). The significant relationship in question three, between a standardized reading comprehension test score and a reading cloze test score, substantiates those findings. In addition, Bormuth (1969a) has stated that cloze test scores correlate well with standardized comprehension tests.

Frith (1980) concludes there is a positive correlation between reading and spelling performance although standardized tests were not cited as the means used to measure this correlation. Question five in this study shows a significant correlation between a standardized reading comprehension test and a standardized spelling test, and this appears to substantiate Frith's conclusions.

The informal analysis of time and examiner-designed test scores in this study supported Tumarkin's (1981) findings and showed that good readers scored higher in the reading cloze test than poor readers, thus reflecting their superior predictive strategies. This validates Smith's (1975) contention that prediction is crucial to reading. In addition, the informal analysis in this study showed that on the average, good spellers scored higher in the spelling word selection and spelling cloze tests than poor spellers. This agrees with Gould's (1976) statement that prediction is also necessary for efficient spelling.

According to the informal analysis, on the average, poor readers (the learning disabled class) took as long to complete the reading cloze as good readers, yet they did not score as high. This supports Mendak's (1983) statement that while prediction is logical to skilled readers, poor readers are not likely to use it since prediction is often

wrong. Mendak stated that poor readers are unwilling to take risks.
In this study, poor reader's reading cloze tests were often incomplete.
This indicated they were easily frustrated and were unwilling to take a
guess when completing blanks, even though the examiner encouraged them
to do so. Instead of trying they simply stopped and recorded their time.

These results also support Begy and Samuels (1974), cited in Samuels
et al. (1974), who said that better readers were more willing to alter
an incorrect identification of a target word.

Jorm (1983) states that poor readers who are poor spellers seem to
have a problem with sound-to-print conversion. A study by Massaro and
Taylor (1980) revealed that poor sixth grade readers did not utilize
orthographic structure to the same degree as very good sixth grade readers
(orthographic structure refers to the constraints describing how letters
are sequenced in writing). This study's informal analysis of time and
examiner-designed test scores appears to confirm the above statements
since a breakdown of subjects into reading groups showed that poor readers
also appeared to be poor spellers, according to test scores, and good
readers were good spellers. An individual analysis of each good reader
to see if he were a good speller, or each poor reader to see if he were
a poor speller, was not undertaken in this study.

Testing Observations

The subjects were willing to be tested for this study, but all groups
experienced a problem with the cloze format. The examiner was told that
they had not had much practice with it since it was not used on a daily
basis. The gifted class showed a great amount of interest in the examiner-
designed tests while the learning disabled subjects appeared to be the most

uncomfortable. The regular sixth graders did not show great enthusiasm nor did they exhibit total disinterest.

Implications for Further Research

The area of predictive strategies used in reading and spelling needs to be explored further because of the significant correlation that appears to be present between them. Reading and spelling are related to language acquisition and a further understanding of both through research can help educators understand their relationship to each other and to the cognitive process of reading.

Further research should be undertaken using the spelling cloze technique as a test. The choice of nonsense words used in the test is logical because they eliminate the possibility of the subjects' having seen or spelled any of the test words. According to Jorm (1983) nonsense words must generally be spelled by sound-to-print conversion rules and this provides a test of a student's ability to spell using this mechanism. However, nonsense words might also be spelled by analogy and this combines not only sound-to-print rules but also the use of the subject's mental lexicon.

Future spelling cloze tests could strive to be more specific and use nonsense words which only use one of the above methods—either sound-to-print rules or mental lexicon.

Because of the significant correlation between reading cloze and spelling cloze that appears in this study, further research needs to be conducted in this area.

Implications for Classroom Practice

Teachers should urge their students to use predictive strategies in reading and spelling. Although Smith (1978) describes prediction as something students are born with and not taught, they need to be encouraged to use it.

Prediction in reading can be encouraged in young children by using predictable books. These books show the prediction cycle because they have repetitive language patterns or repeated cumulative story events (Tompkins & Webeler, 1983).

Blachowicz (1983) encourages teachers to use modeling. The teacher should participate with the pupil in the material, posing questions which are prototypes of higher level thinking. The reader can then move through the text and the teacher can provide examples for later self-questioning.

Text that has a missing word or letter is a good format for guessing (Mendak, 1983). Teachers should use sequencing activities and cause and effect exercises. These can be adjusted to give the student an opportunity to predict plausible outcomes of a sequence of actions in a story or hypothesize about probable causes of certain events.

Mendak reports one way to do this is to have students read portions of stories and make predictions about story development based on personal knowledge as well as information in the story. The student can also be given a story which stops at a critical point and then predict a plausible ending.

Predictive strategies in spelling can be encouraged by classwide participation in exercises which require the speller to fill in strategically placed blanks in words, to list words which have alternate spellings of a given sound or to name the next letter in a sequence (Marino, 1980).

The spelling cloze procedure has often been used as an instructional technique and it is especially useful in aiding spelling prediction (Gould, 1976). By leaving a letter, or a series of letters blank in a word, the student is encouraged to use prediction to fill in the blanks.

Reading vocabulary lists can also be helpful in spelling if the teacher uses them to point out word parts which are unpredictable in spelling (Gould, 1976).

Reviews in content area reading may also be used to build skill in orthographic prediction by using the spell-o-gram (mixing up the letters in each word and having the student try to figure out the word) (Gould, 1976).

Summary

The data from this study showed a significant linear relationship between: 1. predictive strategies used in reading and predictive strategies used in spelling using cloze tests; 2. a standardized spelling test score and a spelling cloze test score; 3. a standardized reading comprehension test score and a reading cloze test score; 4. a standardized spelling test score and a spelling word selection test score; 5. a standardized reading comprehension test score and a standardized spelling test score, and 6. a spelling cloze test score and a spelling word selection test score. These significant correlations supported the research by showing that predictive strategies in reading and spelling are used by good readers and good spellers. The analysis of informal data by time and examiner-designed test scores, indicated that poor readers were also poor spellers and were apparently not able to utilize predictive strategies in either area.

Further research should be conducted in predictive strategies, in the use of the spelling cloze technique as a test, and the use of a reading cloze test and a spelling cloze test together.

Teachers should urge students to use predictive strategies when reading and spelling and provide guidelines for them. Of special use to students are predictable books, modeling by teachers, use of reading and spelling cloze instructional materials and reading and spelling games that promote guessing.

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Appendix A

Nonsense Word Sources

Nonsense Word Sources

Books

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Philippines: Addison-Wesley Publishing.

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Appendix B

Test Instruments

READING CLOZE TEST

Name _____   Teacher _____

Directions: Fill in the blank with a word that makes sense in the story.

In the blue haze sixty feet away he saw the hammerhead. It was coming straight _____ towards the harpooned fish, _____ it came from the _____ water on the other _____ of the reef. The _____ shark closed the distance _____, and its dorsal fin _____ straight up in the _____.

Fear gripped the boy. _____ the shark came in _____ he measured its length _____ his eye, and the _____ around his heart bit _____ little deeper. It was _____ of nine feet long, _____ it was not its _____ alone which was so _____. What chilled him was _____ impression of dormant power _____ indestructibility that the sleek _____ body conveyed as he _____ its pitiless and unhurried _____.

If only I had _____ knife, he thought, but _____ the back of his _____ he knew that even _____ knife would be of _____ use against such a _____. Their skins were unbelievably _____ and thick, and he _____ seen a smaller shark _____ this one with an _____ buried deep in its _____, thrashing and snapping as _____ bit and struck and _____ the planking of a _____ boat.

He remembered the _____ he had been hauling _____, and which he had _____ about when he first _____ the shark. He knew _____ was not much, but _____ would be better than _____ pair of empty hands. _____ minute he started hauling _____ the line the shark _____ toward the fish on _____ end of the harpoon. _____ lazy rhythm of its _____ tail did not change, _____ he knew without a _____ that it was moving _____. He wondered fearfully how fast it could move in the water.

TIME FINISHED: _____

SPELLING CLOZE TEST

Name _____ Teacher _____

Directions: Fill in the blank with the letter that is needed to make the
word look and sound like a real word.

1. b__aitas

2. plee__k

3. skit__ing

4. strie__t

5. s__uicess

6. quie__g

7. __kn__t

8. n__x

9. sc__iat

10. s__roftan

11. br__art

12. __hanitt

13. hefut__ier

14. strind__e

15. thad__

16. flunc__es

17. cr__d__x

18. d__r

TIME FINISHED: _____

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SPELLING WORD SELECTION TEST

Name _____   Teacher _____

Directions: Circle the word that looks and sounds the most like a
              real word could.

1. eekotn
    balrmot
    rsad
    bafmotbem

2. grzlat
    quib
    bdroam
    fsable

3. sding
    dreecm
    weet
    wrtew

4. netg
    zevvz
    biftel
    isopmn

5. lundy
    cdrat
    mtorg
    thdarm

6. ngigz
    etbom
    otblze
    fooom

7. goimmt
    pertome
    rooglle
    stbriam

8. goigb
    letzv
    tqoud
    expram

9. gercm
    efrfect
    nolhod
    eebteq

10. candifp
    sdtpel
    twib
    accievd

11. tash
    gcsatm
    ztroq
    pdeat

12. aaime
    oabdt
    rejune
    loshvnm

13. vleej
    laip
    wmol
    htoom

14. fubwit
    gblom
    plsiaf
    chsud

15. pwling
    gkoat
    ucdpie
    cigbet

16. awlne
    conration
    nfreeg
    frzwap

17. pifozvd
    ut
    nwtoag
    inlbog

18. tqoge
    rrsiel
    logslbve
    stabe

19. dinlan
    nrfyd
    witll
    bhop

20. fcomp
    thwaos
    eldop
    bplop

21. kawrls
    zlenvl
    imbaf
    qren

22. hrem
    jomlm
    yzewcle
    plon

23. osvtlip
    tob
    moootv
    avqpe

24. knap
    gzaim
    tldim
    rogdfy

25. krseen
    gzfraw
    shenning
    iakwdir

TIME FINISHED: _____

SPELLING CLOZE TEST

Nonsense Word	Spelling Patterns/Rules	Expected Answer
1. b__aitas	consonant blend	r,l
2. plee__k	consonant digraph	c,n (1)
3. skit__ing	double medial consonant	e
4. strie__t	consonant blend	s
5. s__uicess	consonant blend	sp,st,sk,sl,sh,sq
6. quie__g	consonant digraph	n
7. __kn__t	one vowel per syllable	a,e,i,o,u (y)
8. n__x	one vowel per syllable	a,e,i,o,u (y)
9. sc__iat	consonant blend	r
10. s__roftan	consonant blend	h,t,c,p
11. br__art	vowel digraph	o,e
12. __hanitt	consonant digraph	s,t,c
13. hefut__ier	double medial consonant	t
14. strind__e	schwa sound	l
15. thad__	silent e	e
16. flunc__es	consonant digraph	h,k
17. cr__d__x	one vowel per syllable	a,e,i,o,u (y)
18. d__r	one vowel per syllable	a,e,i,o,u (y)

Appendix C

Raw Test Scores

Raw Test Scores

Student Number	Reading Cloze	Spelling Selection	Spelling Cloze	Standardized Spelling	Standardized Reading
101	40	17	12	42	54
102	18	21	13	45	51
103	32	18	10	46	50
104	43	24	16	50	56
105	25	25	17	50	56
106	26	11	14	45	36
107	20	16	8	37	47
108	19	19	10	46	48
109	22	23	12	49	60
110	27	23	13	43	47
111	31	21	10	47	41
112	35	22	12	49	57
113	28	21	15	49	49
114	23	14	9	49	51
115	28	17	12	47	51
116	37	25	16	49	56
117	27	19	9	47	54
118	22	21	13	45	52
119	22	12	8	48	30
120	26	20	10	46	59
201	23	14	12	21	56
202	14	23	14	47	45
203	25	22	10	46	49
204	23	17	11	42	51

Raw Test Scores

Student Number	Reading Cloze	Spelling Selection	Spelling Cloze	Standardized Spelling	Standardized Reading
205	16	19	8	40	40
206	27	19	8	22	51
207	25	15	10	39	45
208	27	22	10	48	49
209	17	11	7	37	48
210	24	20	15	46	36
211	30	13	11	17	56
212	28	20	10	44	41
213	22	11	9	48	45
214	10	12	11	41	42
215	26	11	12	42	48
216	24	10	11	44	45
217	23	20	11	14	18
218	32	19	12	45	57
219	24	24	13	49	47
220	24	18	10	38	37
221	23	16	13	42	49
301	18	18	8	27	31
302	31	13	10	15	26
303	18	8	12	36	27
304	10	9	8	6	26
305	20	13	10	27	39
306	14	24	15	30	36
307	24	13	12	32	39
308	12	17	9	22	31

Raw Test Scores

Student Number	Reading Cloze	Spelling Selection	Spelling Cloze	Standardized Spelling	Standardized Reading
309	16	10	11	31	38
310	22	12	8	35	44
311	19	13	10	47	40
312	13	18	9	40	22
313	21	21	13	39	32
314	13	11	12	32	29
401	34	25	16	50	56
402	32	13	15	48	53
403	39	25	15	49	49
404	29	12	16	49	57
405	36	24	15	49	60
406	42	25	16	47	56
407	40	24	17	46	58
408	27	16	15	46	56
409	31	25	15	49	60
410	30	9	16	45	51
411	27	15	9	47	57
412	34	23	14	50	54
413	37	25	16	49	53
414	34	22	12	42	48
501	27	21	14	46	54
502	33	24	16	47	57
503	32	24	14	42	48
504	43	25	17	49	55
505	29	9	10	45	57

Raw Test Scores

Student Number	Reading Cloze	Spelling Selection	Spelling Cloze	Standardized Spelling	Standardized Reading
506	27	16	10	36	50
507	19	10	13	45	47
508	30	25	18	49	53
509	34	25	15	48	57
510	27	23	16	39	31
511	30	25	18	50	55
601	5	16	3	17	19
602	18	20	8	21	20
603	18	19	10	11	10
604	30	18	11	32	31
605	27	19	14	37	27
606	1	17	10	9	17
607	11	13	11	26	26
608	13	19	13	7	25
609	6	6	11	20	19