



The interrelationships of fourth grade students reading achievement, oral generation and written production as determined by factors found in four readability formulas  
by Lynette Zuroff Mohler

A thesis submitted in partial fulfillment of the requirements for the degree of DOCTOR OF EDUCATION

Montana State University

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Abstract:

The purpose of this study was to determine the interrelationships existing among reading achievement, written language production and oral language generation of fourth grade students in Helena, Montana and Glendive, Montana through application of those verbal elements, found in the Lorge Readability Formula, the Lazdowski Sample Survey, the Fog Index and the Botel and Granowsky Syntactic Complexity Formula.

The problem was investigated by (a) administering the Gates MacGinitie Reading Achievement Test, Level D, Form I to 255 fourth grade students; (b) asking these students to complete, in writing, a story starter; (c) having the students orally tell a story; (d) transcribing the oral generations into written form; (e) applying the Lorge Readability Formula, the Fog Index, the Lazdowski Sample Survey and the Botel and Granowsky Syntactic Complexity Formula to each oral and written sample.

After the Pearson product-moment correlation was employed the results of this study indicated that (a) there was no statistically significant relationship between fourth grade students' total reading achievement scores and their writing levels as measured by the Lorge Readability Formula, the Lazdowski Sample Survey, nor the Fog Index; (b) there was a statistically significant relationship between fourth grade students' writing levels as measured by the Lazdowski Sample Survey and their reading comprehension levels; (c) there was a statistically significant relationship between fourth grade students' total reading achievement scores and their writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula; (d) there was no statistically significant relationship between fourth grade students' reading achievement levels and their oral production as measured by the four readability formulas; (e) there was no statistically significant relationship between written generation and oral production as measured by the Lorge Readability Formula, the Lazdowski Sample Survey or the Fog Index; (f) there was a statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula.

Stepwise multiple regression identified an  $R^2$  of .42800 after the inclusion of seventy-two independent variables used in this study. It was concluded that the variables employed in this study, when applied to written and/or oral productions, did not provide an effective linear prediction of reading achievement.

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THE INTERRELATIONSHIPS OF FOURTH GRADE STUDENTS  
READING ACHIEVEMENT, ORAL GENERATION AND  
WRITTEN PRODUCTION AS DETERMINED BY  
FACTORS FOUND IN FOUR READABILITY  
FORMULAS

by

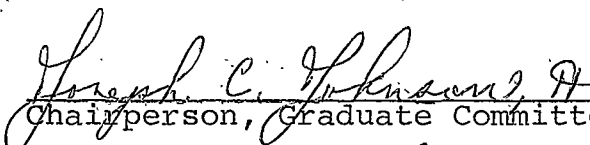
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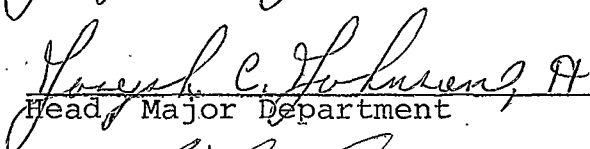
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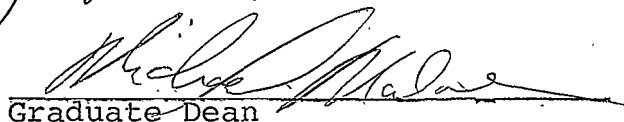
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## ABSTRACT

The purpose of this study was to determine the interrelationships existing among reading achievement, written language production and oral language generation of fourth grade students in Helena, Montana and Glendive, Montana through application of those verbal elements found in the Lorge Readability Formula; the Lazdowski Sample Survey, the Fog Index and the Botel and Granowsky Syntactic Complexity Formula.

The problem was investigated by (a) administering the Gates MacGinitie Reading Achievement Test, Level D, Form I to 255 fourth grade students; (b) asking these students to complete, in writing, a story starter; (c) having the students orally tell a story; (d) transcribing the oral generations into written form; (e) applying the Lorge Readability Formula, the Fog Index, the Lazdowski Sample Survey and the Botel and Granowsky Syntactic Complexity Formula to each oral and written sample.

After the Pearson product-moment correlation was employed the results of this study indicated that (a) there was no statistically significant relationship between fourth grade students' total reading achievement scores and their writing levels as measured by the Lorge Readability Formula, the Lazdowski Sample Survey, nor the Fog Index; (b) there was a statistically significant relationship between fourth grade students' writing levels as measured by the Lazdowski Sample Survey and their reading comprehension levels; (c) there was a statistically significant relationship between fourth grade students' total reading achievement scores and their writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula; (d) there was no statistically significant relationship between fourth grade students' reading achievement levels and their oral production as measured by the four readability formulas; (e) there was no statistically significant relationship between written generation and oral production as measured by the Lorge Readability Formula, the Lazdowski Sample Survey or the Fog Index; (f) there was a statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula.

Stepwise multiple regression identified an  $R^2$  of .42800 after the inclusion of seventy-two independent variables used in this study. It was concluded that the variables employed in this study, when applied to written and/or oral productions, did not provide an effective linear prediction of reading achievement.

## Chapter I

### INTRODUCTION

Matching students with appropriate reading material is an area of continual concern for educators (Johns, 1977). To determine what a student is capable of reading and then to find reading material which meets the child's needs requires time, knowledge and money. Standardized reading tests provide valuable information in that they provide an indication of a child's reading achievement. However, these tests are costly and are not always available to the teacher during all times of the school year (Lazdowski, 1976).

In an attempt to alleviate this problem, Lazdowski investigated the feasibility of using students' writing samples as a means of assessing their reading achievement. This study revealed a positive relationship between reading ability and writing production. A regression formula developed during this study was able to predict, within one grade level, and with a reliability of .88, the reading ability of the writer after applying the formula to the writing samples of students (Lazdowski, 1976).

Thomas studied the degree to which children's

reading vocabulary, reading comprehension, reading achievement, and reading expectancy could be predicted from oral and written production by applying Fry's Readability Formula. Significant statistical relationships were found between writing and vocabulary in second and fifth grade; between writing and reading comprehension for second graders with average-to-high I.Q.; between writing and reading achievement in second graders and average-to-low I.Q. fifth graders; between writing and reading expectancy in average-to-high I.Q. eighth graders; between oral language and reading expectancy of average-to-high I.Q. fifth graders, and average-to-high I.Q. eighth graders (Thomas, 1978).

Because the measures used in Fry's Readability Formula were the only ones employed, her findings indicated that relationships did exist between reading ability, oral production, and written production but they did not account for other factors found in readability formulas (Thomas, 1978).

The application of readability formulas to children's written and oral products is based on the assumption that the language arts---writing, speaking,

listening and reading---are interrelated. In the literature there was general agreement that these skills did have common elements, and therefore were related. As Dawson summarized:

That there should be interrelationships among these language arts seems inevitable. There are common elements of vocabulary, language structure, idea relationships and verbal reasoning (1954:23).

Although it is believed that the language arts are somewhat interrelated, it is not conclusive to what degree the language arts are interdependent (Lazdowski, 1976). Analysis of this interdependency may be more clearly delineated through application of professionally accepted readability formulas. This study attempted to assess the relationships obtaining among reading achievement, oral production, and written production of fourth grade students using factors found in the Lorge Readability Formula, Lazdowski's Sample Survey, Fog Index and the Botel and Granowsky Syntactic Complexity Formula.

This chapter contains the statement of the problem, the need for the study, general questions to be answered, general procedures used, limitations and delimitations, definition of terms, and summary.

### The Problem Statement

The problem of this study was to determine if interrelationships exist among reading achievement, written language production and oral language generation of fourth grade students in Helena, Montana and Glendive, Montana through application of those verbal elements found in the Lorge Readability Formula, the Lazdowski Sample Survey, the Fog Index and the Botel and Granowsky Syntactic Complexity Formula.

### Need for the Study

Although the literature reflected a general agreement that the language arts are interrelated, there has been little research employing variables found in readability formulas, focusing on specific elements relating reading achievement to speaking and writing production (Lazdowski, 1976; Thomas, 1978).

Thomas, after conducting an investigation of the relationships existing among expressive language and reading vocabulary, reading comprehension, reading achievement and reading expectancy of second, fifth and eighth grade students, suggested research be undertaken that employs a method for evaluating the oral and written samples of children which takes into account

more than the measures found in the Fry Readability Formula employed in her study (Thomas, 1978).

Using students in grades five through thirteen, Lazdowski found statistically significant relationships between written production and reading achievement. He concluded:

The apparent paucity of related research seems to indicate an endemic need to investigate this relationship more thoroughly. If a relationship such as this can be affirmed, then what of similar propinquities between other skill pairs? Barring the considerations of physiological abnormalities, could there likewise be a homology existing among all four---reading, writing, speaking and listening (Lazdowski, 1976:84-85)?

It is significant to note that neither Thomas nor Lazdowski used fourth grade students as subjects in their studies. Because it is at this time that a student must begin to become an independent reader (Heilman, 1962) and inasmuch as it is at this grade that the transition from excellence in oral English to transition in excellence in written English takes place (Lull, 1929), the interrelatedness of these language arts must be studied at fourth grade level (Lazdowski, 1976 and Thomas, 1978).

It is also important to note that the knowledge of

the relationship between writing and speaking as determined by Lorge Readability Formula, the Botel and Granowsky Syntactic Complexity Formula, the Fog Index, and Lazdowski's Sample Survey may aid the teacher of writing. As Sodowsky wrote:

The sooner we find out what the correlations between the way students talk and the way students write, the sooner we can be more effective teachers of writing (1977:11).

Knowledge obtained from the present study may enhance efficiency and economy in diagnosing students' reading, speaking and writing needs as well as providing a method for determining a need for further in-depth testing of a child. It may also alert the teacher to a specific need in advancing students' oral and/or written production.

Traditionally, public school teachers have been concerned with reading achievement levels of students (Thomas, 1978). This concern is demonstrated when students are administered standardized reading achievement tests in order to identify reading levels so that appropriate and relevant reading materials and reading instruction may be assigned (Johns, 1977). Standardized reading achievement tests are not always available to the

classroom teacher and many students fear the administration of reading tests (Lazdowski, 1976). To provide appropriate reading materials for students, a teacher may, as a result of the present study, be able to estimate reading achievement by applying factors found in readability formulas to oral, and/or written samples of students' productions.

#### General Questions to be Answered

This study addressed thirteen questions. They were:

1. Is there a statistically significant relationship between fourth grade students' standardized reading achievement scores and their writing levels as measured by the Lorge Readability Formula?

2. Is there a statistically significant relationship between fourth grade students' standardized reading achievement scores and their writing levels as measured by the Lazdowski Sample Survey?

3. Is there a statistically significant relationship between fourth grade students' standardized reading achievement scores and their writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula?

4. Is there a statistically significant relationship



between fourth grade students' standardized reading achievement scores and their writing levels as measured by the Fog Index?

5. Is there a statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Lorge Readability Formula?

6. Is there a statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Lazdowski Sample Survey?

7. Is there a statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Botel and Granowsky Syntactic Complexity Formula?

8. Is there a statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Fog Index?

9. Is there a statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Lorge Readability Formula?

10. Is there a statistically significant relationship

between fourth grade students' speaking and writing levels as measured by the Lazdowski Sample Survey?

11. Is there a statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula?

12. Is there a statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Fog Index?

13. Which variables, when applied to written and/or oral productions, provide the most effective linear prediction of reading achievement? The independent variables studied were:

1. syllables
2. Lazdowski's T-Units
3. average sentence length
4. Lazdowski's polysyllabic words
5. number of sentences
6. Fog's Polysyllabic words
7. prepositional phrases
8. number of words not contained in the Dale 769 Word List (Appendix)
9. two-three lexical items
10. simple transformations
11. coordinate clauses with the word "and"
12. non-sentence expressions
13. four lexical items
14. adjectives
15. possessives
16. predeterminers
17. adjectives in the participle position
18. adverbs
19. modals

20. negatives
21. set expressions
22. gerunds
23. infinitives not in the S-V-INF pattern nor used as subjects
24. coordinate clauses other than "and"
25. paired coordinates
26. deletion in coordinate clauses
27. passives
28. paired conjunctions
29. dependent clauses
30. comparatives
31. participles not in the adjective position
32. infinitives as subjects
33. appositives
34. conjunctive adverbs
35. clauses as subjects
36. absolutes
37. Lorge Readability Formula
38. Fog Index
39. Lazdowski Sample Survey
40. Botel and Granowsky Syntactic Complexity Formula

#### General Procedure

The procedures for this study were such as to identify the interrelationships obtaining among students' reading achievement, oral generation levels and written production levels as measured by the Lorge Readability Formula, the Lazdowski Sample Survey, the Fog Index and the Botel and Granowsky Syntactic Complexity Formula. Specifically, the following procedures were employed:

1. After reviewing factors found in readability formulas, four formulas containing components frequently used in readability formulas were

adopted for use in this investigation. The first, the Lazdowski Sample Survey formula considers the number of syllables, Lazdowski T-Units, average sentence length, polysyllabic words and number of sentences in a sample (Lazdowski, 1976). Secondly, the Fog Index considers average sentence length and polysyllabic words (Klare, 1974-1975). Thirdly, the Lorge Readability Formula is predicated on word lists, specifically, the Dale List of 769 Easy Words. In addition, the Lorge Formula takes into account sentence length in words and prepositional phrases per one hundred words (Klare, 1974-1975). Fourthly, the Syntactic Complexity Formula, developed by Botel and Granowsky was chosen because it provides analysis of syntactic structures in terms of complexity and yields a grade level score (Botel and Granowsky, 1972).

2. A search for related literature was done using ORBIT IV, ERIC.

3. Seven fourth grade classrooms in Helena, Montana and seven fourth grade classrooms in Glendive, Montana were involved in this study.

4. Each child was asked by the researcher to write a story pertaining to a haunted house. The researcher

read the following paragraph so that all students would be exposed to the same information:

Davey was shivering as he faced the steps of the deserted Thompson mansion. The sky was dark and gloomy and he knew it would be even darker and gloomier inside. If only Cliff had not dared him to go in by himself! He reached out and slowly opened the door (Petty and Bowen, 1967:27).

5. Each child within the classrooms was administered the Gates MacGinitie Reading Test, Level D., Form 1 according to the directions found in the Gates MacGinitie Teachers' Manual.

6. Each child within the selected classrooms was asked to tell a story as it was recorded on magnetic tape. The people recording the stories read the following paragraph so that each child would have the same information:

You are a famous explorer who has just made an important discovery. You are being interviewed on television. What does the interviewer ask you? What are your answers? What things will you be sure to mention if he doesn't ask about them (Petty and Bowen, 1967:22)?

7. The taped samples were transcribed into written form by the researcher.

8. The Lorge Readability Formula, Lazdowski's Sample Survey, Fog Index and the Botel and Granowsky

Syntactic Complexity Formula were applied to each writing and speaking sample.

9. Variables contained within each formula as well as each grade level score were determined and recorded for each student.

10. Pearson  $r$  was applied to determine the relationships obtaining among reading achievement, oral generation and written production as measured by the four selected formulas.

11. Step-wise multiple regression techniques were then applied through utilization of each variable found within the four formulas identified previously (see Page 9-10).

#### Limitations and Delimitations

This study was limited by certain factors for which no control was attempted. These factors include the physical facilities of the testing environment, the physical and emotional health of the children and the time of day during which each test was administered.

The findings were limited by the reliability and validity of the Lorge Readability Formula, the Fog Index, the Lazdowski Sample Survey and the Botel and Granowsky

Syntactic Complexity Formula and the Gates MacGinitie Reading Test.

The study was delimited to fourteen fourth grade classrooms in Montana. Seven classes were from Helena, Montana and seven classrooms were from Glendive, Montana.

Definitions of Terms

The Lazdowski Sample Survey is:

$$PRL = 2.34 + 0.25 \left( \frac{\text{syll}}{\text{T-Units}} \right) + 0.2 (\text{ASL}) + 2.5 \frac{(\text{PSW})}{S}$$

Where:

PRL = Predicted reading ability grade level  
 Syll = Tally of syllables in a sample of at least fifty words  
 T-Units = Units of thought as defined by Lazdowski  
 ASL = Average sentence length  
 PSW = Number of polysyllabic words  
 S = Number of sentences in the sample

Fog Index is:

Reading Grade Level = .4 (average sentence length + number of Fog polysyllabic words)

The Lorge Readability Formula is:

$$x_1 = .06 x_2 + .10 x_3 + .10 x_4 + 1.99$$

Where:

$x_1$  = grade placement

$x_2$  = average sentence length

$x_3$  = number of prepositional phrases per 100 words

$x_4$  = number of different words not on the Dale list of 769

The Botel and Granowsky Syntactic Complexity Formula is "...the arithmetical average of the complexity counts of the sentences evaluated (Botel and Granowsky, 1973: 515)."

Where:

0-Count Structures are:

1. Sentences with two or three lexical items
2. Simple transformations
3. Coordinate clauses joined by "and"
4. Non-sentence expressions

1-Count Structures are:

1. Sentences with four lexical items
2. Adjectives
3. Possessives
4. Pre-determiners
5. Participles in the natural adjective position
6. Prepositional phrases
7. Adverbials that do not immediately follow the verb in the S-V-Adv. pattern
8. Modals
9. Negatives
10. Set expressions
11. Gerunds
12. Infinitives that do not immediately follow the verb in the S-V-Inf pattern
13. Coordinate clauses other than "and"
14. Paired coordinates



15. Each deletion in a coordinate clause

2-Count Structures are:

1. Passives
2. Paired conjunctions
3. Dependent clauses
4. Comparatives
5. Participles not used in the usual adjective position
6. Infinitives as subjects
7. Appositives
8. Conjunctive adverbs

3-Count Structures are:

1. Clauses used as subjects
2. Absolutes

Readability Formulas refer to "a method of measurement intended as a predictive device designed to provide quantitative, objective estimates of the style of difficulty of writing (Klare, 1963:3)."

Fourth Grade Students applies to students in the Helena, Montana School System and the Glendive, Montana School System who were enrolled in a regular fourth grade classroom regardless of the students' ages or number of years repeated or advanced.

Lazdowski Thought Unit or T-Unit is:

a singular thought or idea which may be expressed in a simple word, such as an interjection or verb, or may be contained in a phrase, clause, sentence or perhaps an entire paragraph (Lazdowski, 1976:76).

Six specific examples include:

1. The law of June 14, 1977
2. establishing the stars and stripes
3. has an interesting history.
4. After the Declaration of Independence
5. colonial vessels were hampering enemy communication
6. and preying on British trade (Lazdowski, 1976:76).

Modals are auxiliary verbs such as should, would, must, ought to (Botel and Granowsky, 1973).

Lexical Items are "...units of the vocabulary of the language such as a word, phrase or term that fulfills a grammatical role in a sentence, and carries semantic meaning (Hartmann and Stork, 1972:129)." Three examples include:

1. The man with the white hair
2. quickly hid
3. the stolen money

Simple Transformations are those elements that are interrogative, exclamatory, or imperative sentences.

Hard Words are those words not contained in the Dale List of 769 Easy Words (Appendix).

Average Sentence Length is the number of words in a sample divided by the total number of sentences in the sample (Lazdowski, 1976).

Reading Achievement is the total composite reading

score as obtained from Gates MacGinitie Reading Achievement Test, Level D, Form 1.

Pre-determiner is a word or group of words which can occur in front of an article or another determiner in a noun phrase (Hartmann and Stork, 1972). Examples include "...some of, none of, twenty of (Botel and Granowsky, 1973: 515)."

Paired Coordinate is a coordinate clause linked together by such words as both...and (Botel and Granowsky, 1973).

Paired Conjunction is a conjunction joined by words such as either...or, neither...nor (Botel and Granowsky, 1973).

Absolutes are sentence elements that have no specific function in the sentence. An example is "'The day being finished...'" in "The day being finished, the people went to the movie (Botel and Granowsky, 1973:515)."

Appositive is a phrase separated by commas that further describes or identifies a noun. An example is "'my neighbor' in 'Mrs. Smith, my neighbor, arrived early' (Botel and Granowsky 1973:515)."

The following terms are defined as in common usage:

adjectives  
possessives

participles  
prepositions  
prepositional phrases  
adverbials  
negatives  
gerunds  
infinitives  
coordinate clauses  
passives  
infinitives  
syllables

Fog Polysyllabic Words are words with three or more syllables except those words that are proper nouns, easy compound words, or three syllable words due to the addition of -ed or -es (Gunning, 1952).

Lazdowski Polysyllabic Words are words with three or more syllables (Lazdowski, 1976).

### Summary

The problem of this study was to determine the interrelationships existing among reading achievement, written language production and oral language generation of fourth grade students in Helena, Montana and Glendive, Montana through application of those verbal elements found in the Lorge Readability Formula, the Lazdowski Sample Survey, the Fog Index and the Botel and Granowsky Syntactic Complexity Formula.

Although the literature reflected a general agreement that the language arts are interrelated, there has been

little research employing variables found in readability formulas focusing on specific elements relating reading achievement to speaking and writing production (Lazdowski, 1976; Thomas, 1978).

Thirteen general questions were identified. The first twelve questions related to reading achievement, writing production and oral generation and their relationship as measured by the grade level produced after the application of the Lorge Readability Formula, the Fog Index, the Lazdowski Sample Survey and the Botel and Granowsky Syntactic Complexity Formula. The thirteenth question focused on the most effective linear prediction of reading achievement using the variables found in the Lorge Readability Formula, the Fog Index, the Lazdowski Sample Survey and the Botel and Granowsky Syntactic Complexity Formula.

This study was limited to fourteen fourth grade classrooms. Seven fourth grade classrooms were from Glendive, Montana and seven fourth grade classrooms were housed in Helena, Montana.

## Chapter II

### REVIEW OF RELATED LITERATURE

#### Introduction

It is the general concensus of authors surveyed that the language arts are interrelated. However, little research has been conducted using variables contained in readability formulas regarding specific interaction among these interrelationships averred to obtain among reading, writing, speaking and listening (Lazdowski, 1976; Thomas, 1978). The purpose of this study was to determine the interrelationships existing among reading achievement, written language production and oral language generation of fourth grade students in Helena, Montana and Glendive, Montana through application of those verbal elements found in the Lorge Readability Formula, the Lazdowski Sample Survey, the Fog Index and the Botel and Granowsky Syntactic Complexity Formula.

The literature review displayed in this chapter has been organized under the rubrics of: 1) history of readability formulas; 2) variables contained in readability formulas; 3) methods of determining reading achievement, and 4) interrelationships obtaining among the language arts.

### History of Readability Formulas

"Except ye utter by the tongue words  
easy to be understood, how shall it  
be known what is spoken? For ye  
shall speak into the air."

1 Corinthians, 14:9

In order for communication to be successful, a sender must construct a message to meet a particular receiver's ability to comprehend that message. Although this concept can be evidenced as early as the writing of the Corinthians, researchers continue to identify variables involved in analyzing the comprehensibility of a sender's message (Marshall, 1979)..

The first evidence of educators' interest in controlling the difficulty of a message was about 1840 in the publication of McGuffey Readers when ease of understanding was believed to be measured in terms of vocabulary (Klare, 1963).

Twelve years later, Herbert Spencer wrote the Elements of Style, a tone considered by many educators to be the first introduction to the subject of readability (Harris and Jacobson, 1979).

Word counts compiled between 1898 and 1921 set the stage for the development of the 1921 Teacher's Word Book by E.L. Thorndike. Klare considers this publication to

be "... the most important occurrence in the period just prior to the development of formulas (1963:30)."

In 1923 Lively and Pressey developed the first formula for measuring readability (Klare, 1963) and Rudolf Flesch (1948) popularized the concept of readability formulas (Klare, 1963). As of 1974, more than fifty-eight formulas had been developed, excluding the more than fifty recalculations and revisions of those formulas (Klare, 1974-1975).

Limitations of readability formulas have been noted by recognized reading experts. These include: 1) The level is only an approximation of difficulty; 2) Varying degrees of difficulty may be found within one text; 3) Content are materials often do not evidence a gradation of difficulty; 4) It is virtually impossible to hold constant all of the factors that affect the difficulty level (Lapp and Flood, 1978).

Most formulas were originally developed for predicting the reading ease of materials but they were often used to determine the oral comprehensibility of a message (Allen, 1952; Vancura, 1955). In 1962 Rogers developed a new formula specifically for measuring oral difficulty (Rogers, 1962). In the same year Rogers developed his formula,



Strickland studied children's oral productions and found a means of quantifying the children's oral language (1962). Using Strickland's investigation as a foundation, Botel and Granowsky developed the Syntactic Complexity Formula (1972). As was Strickland's work, this formula was based on:

1. transformational grammar theory which suggests that complex sentences can be thought of as derived from the process of adding and embedding underlying structures (simple sentences);
2. experimental data on children's processing of syntactic structures;
3. language development and performance studies of the oral and written language used by children (Granowsky and Botel, 1974:33).

When matching a reader to written material, three possible avenues are available. One is to guess, another is to test and the third is to apply readability formulas (Klare, 1974-1975). Although guessing, or judgements, can be useful in determining written difficulty, the practice does not have reliability or validity nor does it yield a grade level score (Klare, 1974-1975).

Readability formulas, however, do produce a grade level score and can have reliability. Traditionally, readability formula developers have employed the McCall-Crabbs Standard Test Lessons in Reading to determine the

validity of their readability formulas. They have done so due to the fact that:

...there are a large number of reading passages, covering a wide range of difficulty, resting upon extensive testing, and providing detailed grade scores (Klare, 1974-1975:66).

However, recent studies have used the cloze procedure in place of the McCall-Crabbs Standard Test Lessons in Reading to determine the validity of their formulas (Klare, 1974-1975).

#### Variables Used in Readability Formulas

The primary concepts on which most readability formulas are based include: 1) measures of vocabulary difficulty; 2) measures of sentence structure difficulty (Harris, 1974), and to a lesser extent, 3) measures of human interest (Lorge, 1944).

Vocabulary difficulty. Word difficulty is generally measured against some systematized matrix of collected words, for example, the Thorndike Word List. Degree of word difficulty may be ascertained and subsequently defined as:

1. Words learned early in life
2. Short words (in terms of either syllable or letter length)
3. Words of Anglo-Saxon rather than

- of Norman, Greek or Latin derivation
4. Nontechnical words
  5. Words familiar in writing (some spoken words, like "pshaw" are not as familiar in print as in speech)
  6. Words used through their most common meaning
  7. Concrete or definite, rather than abstract words (Klare, 1963:19).

Harris adds that word vocabulary difficulty may be more specifically ascertained when measured by: 1) counts of vowel letters; 2) prefix or suffix counts; 3) pronoun counts; 4) preposition counts (1974). Since the advent of the development of syntactically based formulas, other word vocabulary difficulty measures have been added. These included measures based on noun modifiers, adverbial modifiers, modals, infinitives, gerunds and participles (Hittleman, 1976).

A common way of measuring word difficulty is by comparing words to word lists. The word lists have been developed to represent words having a high level of usage, and consequently, are more easily recognized. Historically, word lists were developed in an hierarchial sequence frequency to represent words having a high level of usage in a descending order and consequently those

appearing first on the list are more easily recognized and comprehended. Later, word lists, such as the Dale List, were compiled in alphabetical sequence.

Marks, Doctorow, and Wittrock used sixth graders as subjects and were able to conclude that students receiving "high frequency" words according to the American Heritage Word Frequency Book averaged twenty-five percent higher on comprehension measures than the group with "low frequency" words (1974). It is believed that words uttered with a higher frequency aid comprehension while lower frequency words retard comprehension (Standal, 1978).

Sentence structure difficulty. Sentence structure difficulty is generally measured by: prepositional phrases; indeterminate clauses; simple sentences; sentence length (Lorge, 1944); clause types; types of sentences and sentence transformations (Hittleman, 1976).

Human interest. Human interest is used as a measure of comprehensibility, although it is not as frequently found in readability formulas as vocabulary difficulty and sentence structure difficulty assumptions. Human interest has been measured in various formulas through use of personal pronouns, words expressing human

interest, colorful words and words representing fundamental life experiences (Lorge, 1944).

#### Methods for Determining Reading Achievement

Informal reading inventories. Johns believes that "Informal reading inventories provide a viable alternative to using standardized reading survey tests (1977:134)." This type of evaluating students' reading achievement is described by Olson and Dillner:

Although specific individual formats and details of administration may vary widely, all informal reading inventories consist of a series of graded reading selections ranging from the least difficult to the most difficult material that the pupil being tested might be expected to read. Much like the word list test, the informal reading inventory is administered by asking the student to read material on progressively more difficult levels until their amount of reading errors exceed the number determined as a cutoff point. Thus, an informal reading inventory may be administered by asking a child to read the first selection to himself or herself. After having read the second reading selection, the child is asked to answer the comprehension questions that follow. Following this, the teacher may read selected passages aloud, and the student may answer the questions that follow. This procedure is continued until the level that is appropriate for the child can be determined from his or her responses (Olson and Dillner, 1982:126).

Various authors have suggested means of evaluating students' responses during the informal reading inventory.

Among them are Goodman's and Burke's work (1973) and Gray's publication (1963).

Standardized reading survey tests. "Standardized reading survey tests are designed to give an overview of the general reading ability of the student (Olson and Dillner, 1982:125)." These tests make comparisons of children's performance in reading with children of the same age group (Stoodt, 1981:271).

Criterion-referenced tests. These tests are based on specific criteria set by the local school system or classroom teacher. The criticism of this type of test has been that school system personnel cannot state all of the skills and abilities necessary for reading proficiency (Stoodt, 1981).

Basal reader tests. These tests are based on the belief that after the students have been exposed to a certain amount of material within a basal, these materials should be tested. Additionally, it is based on the assumption that testing should be done on the skills taught in a division within the basal reader text (Stoodt, 1981).

Cloze tests. This procedure was designed with the express purpose of determining whether specific reading

material has the appropriate level of difficulty for a child.

Cloze tests are constructed as described by Bormuth:

a.) passages are selected from the material whose difficulty is being evaluated, b.) every fifth word in a passage is deleted and replaced by underlined blanks of a standard length, c.) the tests are duplicated and given, without time limits, to students who have not read the passages from which the tests were made, d.) the students are instructed to write in each blank the word they think was deleted, e.) responses are scored correct when they exactly match (disregarding minor misspellings) the words deleted (Bormuth, 1968).

#### Interrelationships of the Language Arts

It is averred that the language arts---listening, speaking, writing and reading---are interrelated (Dawson, 1954). Furthermore, the research reveals a sequential order to the development of the skills for most children. For example, most children first listen with understanding and then speak. Next, such children learn to read and finally to write (Hildreth, 1948). For non-physiologically or intellectually impaired children, speech skill development is a prerequisite to learning to read and becomes the foundation for reading. Such readers easily learn those words that are familiar through first-hand

experience and are used in everyday speech. Reading, on the other hand, facilitates oral communication in that it provides new terms to be added to the speaking and understanding vocabulary (Dawson, 1954). Hildreth adds:

The speaking and writing level that the pupil has reached indicates his potentiality for progressing in reading and sets a limit to progress. The pupil ordinarily advances no faster in reading than language development permits. Maturity in language makes possible rapid growth in reading, and activities that encourage growth in language contribute to reading (Hildreth, 1948:538-539).

Hughes, after studying 332 fifth graders, concluded that high achievement in any one of the language arts tended to be associated with above average achievement in the other areas of the language arts (1953). Dawson avers that the bulk of these relationships are due to common elements such as vocabulary and the concepts the words convey as well as the structure of our language (1954).

Zeman analyzed the relationship of the application phase of two of the language arts: reading comprehension and writing production. He used second and third graders as subjects and studied their written compositions in terms of basic sentence types and basic sentence structural patterns used. After comparing these elements of writing



with reading comprehension, he concluded:

1. the use of simple sentences decreases from second to third grade
2. as the level of reading comprehension increases, the frequency of simple sentence use will decrease
3. as the level of reading comprehension increases, the frequency of compound and complex sentences will increase
4. the difference in frequency in use of complex sentences is not independent of the level of reading comprehension
5. the difference in frequency in use of compound sentences is not independent of the level of reading comprehension (Zeman, 1969:149).

Lazdowski also investigated the relationship between reading and writing of students in grades five through thirteen. He found that more mature readers used simple sentences with greater frequency and employed the word "the" more often to provide fluency and included longer and more difficult words. The writings of students with superior reading abilities were more cohesive and unified. After comparing students with high reading ability and low reading ability, he found the average length of words in terms of letters and syllables contrasted greatly at these two ability extremes. As the reading ability increased, so did the use of polysyllabic words (Lazdowski, 1976).

Strickland analyzed the relationship between three of

the language arts: speaking, reading and listening. After studying the syntactic structures of oral language, she compared listening and reading abilities with speech production. She found:

1. Children who ranked high in silent reading comprehension, oral reading interpretation, and listening comprehension made more use of the common structural patterns than did children who ranked low on these variables. The use of these patterns was more closely related to listening comprehension than to any other variable.
2. These high-ranking pupils used fewer short utterances and had a higher mean sentence length than did pupils in low-ranking groups.
3. The children who ranked high on these variables made greater use of movables and elements of subordination and elaboration than did children who ranked low on these variables.
4. Utilization of the chi square test of significance showed significance at the one per cent level between use of movables and oral reading interpretation, significance at the two per cent level between use of movables and silent reading comprehension, and no significance between use of movables and listening comprehension.
5. The chi square test indicated no significance between use of elements of subordination and silent reading comprehension or listening comprehension, though there was significance at the one per cent level between the use of elements of subordination and oral reading interpretation (Strickland, 1962:105).

Ruddell studied the relationship of oral language and reading comprehension. Using Cloze comprehension tests on fourth grade students, he found a statistically significant difference between comprehension scores over written material designed to have high frequency patterns of oral language structure and comprehension scores over the written material designed to have low frequency patterns of oral language. He concluded that similarity of oral language in reading material obviously has an effect on the comprehensibility of that material (1964).

While studying the relationship of three of the language arts---reading, writing and speaking---Thomas found certain factors to be significant. She used 240 students from second, fifth and eighth grades and identified them as average-to-high I.Q. (93-120 range) and average-to-low I.Q. (70-87 range). Using the Fry Readability Formula, she assessed the written language and transcribed oral language of the subjects. Her study was designed to determine the relationship of oral language and written language to reading expectancy, reading comprehension, vocabulary skills and overall reading achievement. She stated:

Generally it is concluded that written

language alone may be used to predict all four dependent variables for second grade students in the average-to-high I.Q. group; reading vocabulary and reading achievement for second grade students in the average-to-low I.Q. group; reading vocabulary and reading achievement at the fifth grade level for both groups; and reading expectancy for average-to-high I.Q. students at the eighth grade level (Thomas, 1978:68).

Statistically significant relationships were also found between oral language and reading expectancy of average-to-high I.Q. eighth graders and average-to-high I.Q. fifth graders (Thomas, 1978).

In an attempt to find the relationships between two of the language arts---writing and speaking---Sadowsky studied college Freshmen's oral and written production. He found that in syllables-per-word, students had a higher count in their written production than in their spoken production (1977). Conflicting results occurred regarding average number of words per sentence, however. Students classified as "F" students had the lowest written average while "B+" students had four and one-half words fewer in their written work than in their spoken production. The "A" students had three words more in their written work, while "C" students had 14.1 more words in written production than in spoken. The students

who received the highest grades repeated words more often than those scoring lower. The "C" students used 10.9 more words in speaking while "A" students used .3 more words in speech than in writing (Sodowsky, 1977).

Lull studied the relationship of oral and written communication of fifty students in grades one through eight. Oral and written samples were taken from the students and those samples were judged on content, grammar and diction. Content included quality and orderly sequence. Grammar was judged in terms of complete sentences, placing modifiers, using compound sentences and having agreement of verb forms. Diction included vocabulary use, omission of words, superfluous spoken communication and written discourse. He found that spoken production was superior to written production until grade four while greater excellence in writing took place between the fourth and fifth grades (Lull, 1929).

Another study comparing oral and written production was done by DeVito. He collected three hundred word oral and written samples from speech professors at the University of Illinois. Eighty-five students enrolled in a basic public speaking course at the University were subjected to the Cloze test on both the transcribed

oral and the written samples. It was found that the oral and written discourse of the professors did not differ significantly in comprehensibility. Vocabulary, however, was statistically more significant in written language than in oral when the Thorndike-Lorge List and length of words were considered. According to the index of verbal diversification (the average number of words intervening between successive occurrences of "the") the oral and written samples did not differ significantly. However, written samples were significantly more varied than were oral samples, as measured by the type token ratio (the average number of different words per one hundred words). Oral and written samples did not differ significantly in sentence length, but simple sentences were significantly more frequent in written language than in oral language. The density of ideas, as measured by both the total number of content words and by the number of different content words, was statistically more significant in written language than in oral discourse. Neither personal words nor personal sentences differed significantly in either type of communication (DeVito, 1965).

Summary

In about 1840, the McGuffey Readers provided the first evidence of educators' interest in controlling the difficulty of the written message (Klare, 1963). Twelve years later, Herbert Spencer wrote the Elements of Style, a tone considered by many educators to be the first introduction to the subject of readability (Harris and Jacobson, 1979). In 1921 E.L. Thorndike's Teacher's Word Book was published. This was the result of word counts compiled between 1898 and 1921 (Klare, 1963). Lively and Pressey developed the first formula for measuring readability (Klare, 1963). As of 1974, more than fifty-eight formulas had been developed, excluding the more than fifty recalculations and revisions of those formulas (Klare, 1963; Klare, 1974-1975).

The primary concepts on which most readability formulas are based include: 1) measures of vocabulary difficulty; 2) measures of sentence structure difficulty (Harris, 1974), and to a lesser extent, 3) measures of human interest (Lorge, 1944).

Various methods of determining reading achievement are possible. They include: 1) informal reading inventories (Olson and Dillner, 1982); 2) standardized

reading survey tests; 3) criterion-referenced tests; 4) basal reader tests (Stoodt, 1981), 5) and cloze tests (Bormuth, 1968).

It is averred that the language arts---listening, speaking, writing and reading---are interrelated (Dawson, 1954). Furthermore, research reveals a sequential order to the development of these skills (Hildreth, 1948; Dawson, 1954; Hughes, 1953; Zeman, 1969).

Statistically significant relationships have been found between writing production and reading comprehension (Zeman, 1969; Lazdowski, 1976) and Strickland has found statistically significant relationships between speaking, reading and listening (1962). Ruddell has concluded that there are statistically significant relationships between similarity of oral language in reading comprehension and the comprehensibility of the material (1964). Using the Fry Readability Formula, Thomas found certain factors to be statistically significant when analyzing reading, writing and speaking (1978). Studies regarding relationships between oral and written communication have been conducted by Sodowsky (1977), Lull (1929) and DeVito (1965).



## Chapter III

### PROCEDURES

#### Introduction

This study was designed to determine the interrelationships existing among fourth grade students' reading achievement, writing generation and speaking production as determined by the Lorge Readability Formula, the Fog Index, the Lazdowski Sample Survey and the Botel and Granowsky Syntactic Complexity Formula.

Information was gathered from students in seven fourth grade classrooms in Helena, Montana and seven fourth grade classrooms in Glendive, Montana. Each student was administered the Gates MacGinitie Reading Achievement Test, Level D, Form I. The students were asked by the researcher to write a story pertaining to a haunted house. The students were also asked, individually, to tell a story to a listener as that story was recorded on magnetic tape. The people who listened and recorded the story asked the children to tell a story centering on an imaginary discovery. Subsequently, the oral stories were transcribed into written form by the investigator. The Lorge Readability Formula, the Fog Index, the Lazdowski Sample Survey and the Botel and Granowsky

Syntactic Complexity Formula were then applied to each oral and written sample. The variables contained within each formula were determined and recorded for each student as well as the written and oral grade levels obtained.

The reading achievement grade levels obtained from the Gates MacGinitie Reading Test were correlated with the grade levels derived from each of the four readability formulas for each oral and written sample. Also, the oral grade levels obtained from each of the four readability formulas were correlated with the written levels generated by the same readability formulas.

Stepwise multiple regression techniques were applied using the variables comprising each formula to determine which factors were statistically significant predictors of reading achievement.

#### Population

The population for this study was composed of all the fourth grade students in the Helena School District, Helena, Montana and all of the fourth grade students in the Glendive School District, Glendive, Montana. Fourth grade students enrolled in fourth grade classrooms that were combined with another grade level for the majority of the

day were excluded from the study.

Approximately 575 students were enrolled in a regular fourth grade classroom in the Helena School District and approximately 150 fourth grade students were enrolled in the Glendive School District.

### Sampling

Because there were seven fourth grade classrooms in the Glendive School District and all were used, no sampling procedure was employed. The Helena School District contained twenty-two fourth grade classrooms. The sampling procedure for this school district was done by the Helena School System's administration by utilizing arbitrary sampling procedures (Tuckman, 1976).

### Collection of Data

The Gates MacGinitie Reading Test, Level D, Form 1, was administered to the sample. Directions found within the Gates MacGinitie Teacher's Manual were followed during the administration of the test. Each student's test was hand scored and the total grade equivalent score was documented according to the data displayed in the test manual.

Each student within the sample was asked by the

researcher to write a story pertaining to a haunted house. The researcher read the following paragraph so that all students would be exposed to the same information:

Davey was shivering as he faced the steps of the deserted Thompson mansion. The sky was dark and gloomy and he knew it would be even darker and gloomier inside. If only Cliff had not dared him to go in by himself! He reached out and slowly opened the door (Petty and Bowen, 1967:27).

Individually, each student was asked to tell a story to a listener while that story was being recorded on magnetic tape. Each listener read the following so that all students would be exposed to the same information:

You are a famous explorer who has just made an important discovery. You are being interviewed on television. What does the interviewer ask you? What are your answers? What things will you be sure to mention if he doesn't ask about them (Petty and Bowen, 1967:22)?

The listeners were given instructions as to what information should be conveyed if the listener thought the oral sample did not equal or exceed fifty words.

The oral stories were collected and subsequently transcribed into written form by the investigator.

The Lorge Readability Formula, the Fog Index, the Lazdowski Sample Survey and the Botel and Granowsky Syntactic Complexity Formula were applied to each oral

and each written sample. Variables contained within each formula as well as each grade level were determined and recorded for each student. Any sample containing less than fifty words was not included in the study. Any student who missed one or more of the testing situations was also excluded from the study.

In applying the Lorge Readability Formula and the Fry, Index, at least one hundred samples were needed. If any sample fell below this number, one hundred was divided by the actual number of words in the sample and then that quotient was multiplied by the number of variables in the formulas in order to achieve a total of at least a one hundred word equivalent (Thomas, 1978).

#### Null Hypotheses

To determine the relationships obtaining among speaking, writing and reading, thirteen null hypotheses were tested. They were:

1. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their writing levels as measured by the Lorge Readability Formula.
2. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their writing levels as measured by the Lazdowski Sample Survey.

3. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula.
4. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their writing levels as measured by the Fog Readability Formula.
5. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Lorge Readability Formula.
6. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Lazdowski Sample Survey.
7. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Botel and Granowsky Syntactic Complexity Formula.
8. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Fog Readability Formula.
9. There is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Lorge Readability Formula.
10. There is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Lazdowski Sample Survey.
11. There is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Botel and

Granowsky Sample Survey.

12. There is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Fog Readability Formula.
13. There are no variables, when applied to written and/or oral productions, that will provide an effective linear prediction of reading achievement.

### Testing Instruments

The Gates MacGinitie Reading Test used in this study was reviewed by Byron H. Van Roekel. He stated:

The level manuals and the technical manual are quite complete, well organized and easy to follow. The standardization appears to have been rather carefully done (Buros, 1972:1082).

William Powell added:

As compared with other general reading tests, the Gates MacGinitie Reading test would provide usable data on achievement in comprehension, vocabulary, and speed (Buros, 1972:1082).

The publisher of the Gates MacGinitie Reading Test, Level D, Form 1, employed the Kuder-Richardson Formula 20 and reported a reliability coefficient of .90 for the vocabulary section and .88 for the comprehension portion (MacGinitie, 1978).

Construct validity studies were performed by relating the Gates MacGinitie Reading Tests to two

historically well validated tests, the Metropolitan Achievement Test and the Cognitive Abilities Test (Buros, 1972). Total reading achievement tests were reported to have a correlation coefficient of .91 between the Gates MacGinitie Reading Test and the Metropolitan Achievement Test. When studying the correlation between Gates MacGinitie Reading Test and the Cognitive Abilities Test, .85 was reported (MacGinitie, 1981).

The Lorge Readability Formula was correlated with the Standard Test Lessons in Reading. A correlation coefficient of .77 was reported (Klare, 1974-1975).

An inter-judge reliability study was conducted using the Botel and Granowsky Syntactic Complexity Formula. A correlation coefficient of .89 was reported (Miller and Hintzman, 1975).

The Fog Index has been reported to correlate with the Standard Test Lessons in Reading at the level of .58 (Klare, 1974-1975).

The Lazdowski Sample Survey Formula was reported to have a reliability of .88 when applying the formula to students' writing samples in order to predict the students' reading achievement levels (Lazdowski, 1976).



Statistical Tools

After data were collected, the Pearson product-moment correlation technique was applied to correlate reading achievement with the grade level scores obtained after applying the Lorge Readability Formula, the Fog Readability Formula, the Lazdowski Sample Survey and the Botel and Granowsky Syntactic Complexity Formula from both oral and written productions. Pearson product-moment correlations were employed for null hypotheses one through twelve in this study because the strength of the relationships existing between two interval-level variables required analysis (Nie, Hull, Jenkins, Steinbrenner and Bent, 1975).

Stepwise multiple regression was used to determine which variables from the four readability formulas, when applied to fourth grade students' written and/or oral language, would provide an effective linear prediction of reading achievement. This procedure was selected because it yields an optimal prediction equation with as few terms as possible (Nie, Hull, Henkins, Steinbrenner and Bent, 1975).

The .05 level of significance was established for the relationship to be accepted as statistically significant.

### Analysis of Data

An electronic computer, Honeywell CP6, was utilized for the statistical treatment of the data. The programs for stepwise multiple regression and Pearson product-moment correlation were derived from the SPSS Statistical Package for Social Sciences (Nie, Hull, Jenkins, Steinbrenner and Bent, 1975).

### Summary

The population for this study was composed of all the fourth grade students in the Helena School District, Helena, Montana and all of the fourth grade students in the Glendive School District, Glendive, Montana. Fourth grade students enrolled in seven fourth grade classrooms in Glendive, Montana and fourth grade students enrolled in seven fourth grade classrooms in Helena, Montana were included in this investigation.

Each child included in this study was administered a Gates MacGinitie Reading Test, Level D, Form 1. Also, each student within the sample was asked to write a story pertaining to a haunted house and, individually, each student was asked to tell a story to a listener while that oral generation was being recorded on magnetic tape.

The oral stories were collected and subsequently

transcribed into written form by the researcher.

The Lorge Readability Formula, the Fog Readability Formula, the Lazdowski Sample Survey and the Botel and Granowsky Syntactic Complexity Formula were applied to each oral and each written sample. Variables contained within each formula as well as each grade level were determined and recorded for each student.

Thirteen null hypotheses were identified. The first twelve related to reading achievement, writing production and oral generation and their relationship as measured by the grade level produced after the application of the four readability formulas previously identified. The thirteenth hypothesis focused on the most effective linear prediction of reading achievement using the variables found in the same four readability formulas.

The Gates MacGinitie Reading Test, Level D, Form 1 was reported to have a reliability coefficient of .90 for the vocabulary section and .88 for the comprehension portion after computing Kuder-Richardson Formula 20 (MacGinitie, 1978). Construct validity studies were performed relating the Gates MacGinitie Reading Tests to the Metropolitan Achievement Test and the Cognitive Abilities Test. Total reading achievement tests were

reported to have a correlation coefficient of .91 between the Gates MacGinitie Reading Test and the Metropolitan Achievement Test. The correlation between the Gates MacGinitie Reading Test and the Cognitive Abilities Test was reported to be .85 (MacGinitie, 1981).

A correlation coefficient of .77 was reported between the Lorge Readability Formula and the Standardized Test Lessons in Reading.

An inter-judge reliability study was conducted using the Botel and Granowsky Syntactic Complexity Formula. A correlation coefficient of .89 was reported (Miller and Hintzman, 1975).

The Fog Index has been reported to correlate with the Standardized Test Lessons in Reading at the level of .58 (Klare, 1974-1975).

The Lazdowski Sample Survey was reported to have a reliability of .88 when applying the formula to students' writing samples in order to predict the students' reading achievement levels (Lazdowski, 1976).

After data were collected, the Pearson product-moment correlation was applied to correlate reading achievement with the grade level scores obtained after applying the Lorge Readability Formula, the Fog Index, the Lazdowski

Sample Survey and the Botel and Granowsky Syntactic Complexity Formula from both the oral and written generations.

Stepwise multiple regression was used to determine which variables from the four readability formulas, when applied to fourth grade students' written and/or oral language, would provide an effective linear prediction of reading achievement.

The .05 level of confidence was required for the relationship to be accepted as statistically significant.

An electronic computer, Honeywell CP6, was utilized for the statistical treatment of the data. The programs for stepwise multiple regression and Pearson product-moment correlation were derived from the SPSS Statistical Package for Social Sciences (Nie, Hull, Jenkins, Steinbrenner and Bent, 1975).

## Chapter IV

### DESIGN AND ANALYSIS OF THE STUDY

#### Overall Design

The sample for this study was comprised of seven fourth grade classrooms in Helena, Montana and seven fourth grade classrooms in Glendive, Montana. Two hundred fifty-five students were examined for this study.

Each student in the fourteen classrooms was administered a Gates MacGinitie Reading Achievement Test, Level D, Form 1. Each student was asked to orally complete a story starter while the oral production was recorded on magnetic tape. These oral generations were then transcribed into written form by the researcher. In addition, each child was asked to complete a story starter in writing.

A vocabulary, comprehension and total score were assigned for each student following the directions found in the Gates MacGinitie Reading Achievement Test Teacher's Manual for Level D, Form 1.

The transcribed generations and the written productions were analyzed by applying the Lazdowski Sample Survey, Lorge Readability Formula, Fog Index and Botel and Granowsky Syntactic Complexity Formula (See Chapter II,

pages 14-15). Using these four formulas a grade level equivalency was assigned for each student for both the oral generation and the written productions.

This information was obtained to find the inter-relationships of speaking, writing and reading as determined by factors found in the Lazdowski Sample Survey, Lorge Readability Formula, Fog Readability Formula and Botel and Granowsky Syntactic Complexity Formula.

#### Null Hypotheses

To determine the relationships obtaining among speaking, writing and reading, thirteen null hypotheses were tested. They were:

1. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their writing levels as measured by the Lorge Readability Formula.
2. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their writing levels as measured by the Lazdowski Sample Survey.
3. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula.
4. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their writing

levels as measured by the Fog Readability Formula.

5. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Lorge Readability Formula.
6. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Laczowski Sample Survey.
7. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Botel and Granowsky Syntactic Complexity Formula.
8. There is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Fog Readability Formula.
9. There is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Lorge Readability Formula.
10. There is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Lazdowski Sample Survey.
11. There is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Botel and Granowsky Sample Survey.
12. There is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Fog Readability Formula.
13. There are no variables, when applied to written



and/or oral productions that will provide an effective linear prediction of reading achievement.

Recall that to show the relationship between fourth grade students' reading achievement and their writing levels as determined by the Lorge Readability Formula, the Lazdowski Sample Survey, the Botel and Granowsky Syntactic Complexity Formula and the Fog Index (See Chapter II, pages 14-15) the Pearson product-moment correlation was used. The relationship between speaking levels as measured by these four readability formulas and reading achievement was shown in the same manner. Stepwise multiple regression was employed to determine if there were variables from these four readability formulas that, when applied to written and oral samples, would provide an effective linear prediction of reading achievement.

### Analysis and Results

Table I indicates the means and standard deviations by frequency of all independent variables analyzed in this study except for independent variables 6, 8, 11, 40, 46, 48, 50 and 80. Because these are results of application of readability formulas, they are written in grade

equivalency form. For example, variable six indicates that the mean grade level equivalency for written generation as measured by the Lazdowski Sample Survey was 7.53, or seventh grade, fifth month, while variable eight shows that the mean grade level equivalency for written generation as measured by the Fog Index was 7.63, or seventh grade, sixth month.

The other variables indicate mean frequency of use. For example, variable one indicates the mean number of syllables used in written samples was 118.43 with a standard deviation of 8.99 points. Inspection of Table 1 indicates that paired coordinate clauses and paired conjunctions were not used in either the oral or the written samples. In addition, absolutes were not generated in writing.

TABLE I

MEANS, STANDARD DEVIATIONS AND RANGES

OF ALL INDEPENDENT VARIABLES

VARIABLE	MEAN	SD	RANGE
1. *syllables	118.43	8.99	104.00
2. *Lazdowski T-Units	30.80	7.32	49.00
3. *average sentence length	18.05	20.18	183.00
4. *Lazdowski polysyllabic words	1.46	1.59	18.00
5. *sentences	8.34	3.79	9.00
6. *Lazdowski Sample Survey	7.53	.03	4.40
7. *Fog polysyllabic words	.99	1.33	7.00
8. *Fog Index	7.63	.80	7.28
9. *prepositional phrases	7.18	3.12	17.00
10. *hard words	12.28	4.02	24.00
11. *Lorge Readability Formula	5.03	.13	12,80
12. *two or three lexical items	14.97	3.58	22.00
13. *simple transformations	.35	.97	10.00
14. *coordinate clauses	3.69	2.84	19.00
15. *non-sentence expressions	.60	1.40	9.00
16. *four lexical items	.81	1.51	8.00
17. *adjectives	4.79	3.18	22.00
18. *possessives	.95	1.23	7.00
19. *pre-determiners	.43	.65	3.00
20. *adjectives in the participle position	.15	.53	5.00
21. *adverbs	5.37	3.74	22.00
22. *modals	1.18	1.17	4.00
23. *negatives	.91	1.06	5.00
24. *set expressions	.18	.43	2.00
25. *gerunds	.05	.23	2.00
26. *infinitives not in the S-V-INF pattern nor used as subjects	.24	.56	3.00
27. *coordinate clauses other than "and" coordinate clauses	.82	1.23	8.00
28. *deletions in coordinate clauses	2.92	2.73	14.00
29. *passives	.04	.21	2.00
30. *paired coordinate clauses	0	0	0
31. *paired conjunctions	0	0	0

TABLE I (Continued)

VARIABLE	MEAN	SD	RANGE
32. *dependent clauses	1.46	1.40	7.00
33. *comparatives	.19	.47	3.00
34. *participles not in the adjective position	.44	.89	6.00
35. *infinitives used as subjects	.00	.06	1.00
36. *appositives	.06	.30	3.00
37. *conjunctive adverbs	.59	1.06	7.00
38. *clauses as subjects	.01	.09	1.00
39. *absolutes	0	0	0
40. *Botel and Granowsky Syntactic Complexity Formula	3.14	.09	1.30
41. **syllables	119.93	9.02	79.00
42. **Lazdowski T-Units	32.12	6.72	36.00
43. **average sentence length	13.80	13.43	98.00
44. **Lazdowski polysyllabic words	3.32	2.69	42.00
45. **number of sentences	7.46	11.74	14.00
46. **Lazdowski Sample Survey	7.22	.43	3.54
47. ***Fog polysyllabic words	2.18	2.04	9.00
48. **Fog Index	6.39	.54	4.12
49. **prepositional phrases	6.80	2.85	16.00
50. **hard words	12.71	4.95	32.00
51. **Lorge Readability Formula	4.78	.09	7.00
52. **two-three lexical items	12.22	4.36	51.00
53. **simple transformations	.34	.80	6.00
54. **"and" coordinate clauses	5.51	3.86	43.00
55. **non-sentence expression	4.88	4.39	30.00
56. **four lexical items	.98	1.47	10.00
57. **adjectives	6.15	3.77	21.00
58. **possessives	.92	1.22	10.00
59. **predeterminers	.76	1.17	7.00
60. **adjectives in the participle position	.09	.44	5.00
61. **adverbs	4.11	3.09	17.00
62. **modals	2.22	2.07	13.00
63. **negatives	1.49	2.17	15.00
64. **set expressions	.09	.34	2.00
65. **gerunds	.03	.22	2.00

TABLE I (Continued)

VARIABLE	MEAN	SD	RANGE
66. **infinitives not used in the S-V-Inf sentence pattern nor used as subjects	.29	.62	3.00
67. **coordinate clauses other than "and" coordinate clauses	.58	.94	6.00
68. **deletions in coordinate clauses	2.71	3.60	24.00
69. **passives	.02	.13	1.00
70. **paired coordinate clauses	0	0	0
71. **paired conjunctions	0	0	0
72. **dependent clauses	1.02	1.28	7.00
73. **comparatives	.23	.60	3.00
74. **participles not in the adjective position	.15	.46	3.00
75. **infinitives as subjects	.00	.06	1.00
76. **appositives	.04	.21	2.00
77. **conjunctive adverbs	.26	.73	6.00
78. **clauses as subjects	.02	.15	2.00
79. **absolutes	.01	.09	1.00
80. **Botel and Granowsky Syntactic Complexity Formula	3.06	.08	4.30

\*Written number of  
\*\*Oral number of

It should be noted that although obtained correlation coefficients are referred to in the discussions of the hypotheses as having significance and are subsequently associated with a probability level, the reader should not assume that causality is to be imputed to the numerical relationship.

#### Hypothesis 1

The null hypothesis that there is no statistically significant relationship between fourth grade students' reading achievement scores and their writing levels as measured by the Lorge Readability Formula was accepted. As Table II indicates, the correlation between the Lorge Readability Formula and vocabulary scores was .0006. This is associated with a probability of .992. The correlation shown in Table II between the Lorge Readability Formula and comprehension was  $-.0743$ , a probability of .237. Between the Lorge Readability Formula and the total reading score, the correlation was  $-.0404$ , a probability of .520. It was

concluded that fourth grade students' writing samples, when measured by the Lorge Readability Formula, did not demonstrate a relationship to fourth grade students' reading achievement levels.

TABLE II

PEARSON CORRELATION COEFFICIENTS FOR WRITTEN  
LANGUAGE AS MEASURED BY LORGE READABILITY  
FORMULA WITH READING ACHIEVEMENT

	Vocabulary	Comprehension	Total
Written Language as Measured by Lorge Readability Formula	c = .0006 p = .992	c = .0743 p = .237	c = .0404 p = .520

<sup>c</sup>correlation coefficient  
<sup>p</sup>probability

Hypothesis 2

The null hypothesis that there is no statistically significant relationship between fourth grade students' reading achievement scores and their writing levels as measured by the Lazdowski Sample Survey could not be rejected. Table III shows the correlation coefficient of  $-.1030$  between Lazdowski's Sample Survey and the total

reading achievement score. This yields a probability level of .101 which was not sufficient to be statistically significant. Table III also indicates that the correlation between vocabulary scores and fourth grade students' writing levels as measured by the Lazdowski Sample Survey was  $-.0695$ , a probability of .269, which was not sufficient to be statistically significant. However, the correlation between comprehension scores and the writing levels as measured by the Lazdowski Sample Survey was  $-.1276$ , a probability of .042, which was statistically significant at the .05 level of confidence. It was concluded that the Lazdowski Sample Survey, when applied to fourth grade students' writing samples, did show a relationship to fourth grade students' comprehension levels. It was further concluded, however, that fourth grade students' writing levels as measured by the Lazdowski Sample Survey did not indicate a statistically significant relationship with regard to vocabulary and reading achievement levels.



TABLE III

PEARSON CORRELATION COEFFICIENTS FOR WRITTEN  
LANGUAGE AS MEASURED BY THE LAZDOWSKI  
SAMPLE SURVEY WITH READING  
ACHIEVEMENT

	Vocabulary	Comprehension	Total
Written Language as measured by the Lazdowski Sample Survey	c = .0695 p = .269	c = .1276 p = .042	c = -.1031 p = .101

<sup>c</sup>correlation coefficients  
<sup>p</sup>probability

### Hypothesis 3

The null hypothesis that there is no statistically significant relationship between fourth grade students' reading achievement scores and their writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula was rejected at the .02 level of confidence. Table IV shows that the relationship between vocabulary scores and students' writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula was .1165, a probability of .063 which was not sufficient to be statistically significant. However, the relationship

between fourth grade students' writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula and the other two reading scores, comprehension and total reading achievement, was significant. The correlation coefficient, as indicated in Table IV, was .1343, a probability of .032, for comprehension and .1431, a probability of .022, for total reading achievement. It was therefore concluded at the .02 level of confidence that fourth grade students' writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula could be related to fourth grade students' reading achievement levels.

TABLE IV

PEARSON CORRELATION COEFFICIENTS FOR WRITTEN LANGUAGE  
 AS MEASURED BY THE BOTEL AND GRANOWSKY SYNTACTIC  
 COMPLEXITY FORMULA WITH READING  
 ACHIEVEMENT

	Vocabulary	Comprehension	Total
Written language as measured by the Botel and Granowsky Syntactic Complexity Formula	c = .1165 p = .063	c = .1343 p = .032	c = .1431 p = .022

<sup>c</sup>correlation coefficients  
<sup>p</sup>probability

Hypothesis 4

The null hypothesis that no statistically significant relationship exists between fourth grade students' reading achievement scores and their writing levels as measured by the Fog Index was accepted. As Table V indicates, the correlation coefficient between students' writing levels as measured by the Fog Index and the students' vocabulary scores was  $-.0500$ , a probability of  $.427$  which was not sufficient to be statistically significant. Table V also displays the relationship between students' comprehension levels and their writing levels as measured by the Fog

Index. Note the correlation coefficient was  $-.1179$ , a probability of  $.06$ , which was not significant at the  $.05$  level of confidence. In addition, Table V indicates the relationship between total reading achievement and writing scores as measured by the Fog Index. The correlation coefficient was  $-.0897$ , a probability of  $.153$  which is not significant at the  $.05$  level of confidence. It was concluded that fourth grade students' writing levels as measured by the Fog Index did not have a sufficient relationship with fourth grade students' reading achievement scores.

TABLE V  
PEARSON CORRELATION COEFFICIENTS FOR WRITTEN  
LANGUAGE AS MEASURED BY THE FOG INDEX  
WITH READING ACHIEVEMENT

	Vocabulary	Comprehension	Total
Written language as measured by the Fog Index	c = $-.0500$ p = $.427$	c = $.1179$ p = $.060$	c = $-.0897$ p = $.153$

<sup>c</sup> correlation coefficients  
<sup>p</sup> probability

Hypothesis 5

The null hypothesis that there is no statistically significant relationship between fourth grade students' reading achievement scores and their speaking levels as measured by the Lorge Readability Formula could not be rejected. As indicated in Table VI, the correlation coefficient between fourth grade students' oral generations as measured by the Lorge Readability Formula and their reading vocabulary scores was .1018, a probability of .105. Also shown in Table VI are the correlation coefficients of fourth grade students' oral generations as measured by the Lorge Readability Formula with their comprehension and total reading achievement scores. Please note that the relationship between reading comprehension and oral generation was .0458, a probability of .467 and the relationship between oral generation and total reading achievement was .094, a probability of .138. It was therefore concluded that a relationship did not exist at the .05 level of confidence between fourth grade students' oral levels as measured by the Lazdowski Sample Survey and their total reading achievement.

TABLE VI

PEARSON CORRELATION COEFFICIENTS FOR ORAL LANGUAGE  
AS MEASURED BY THE LORGE READABILITY FORMULA  
WITH READING ACHIEVEMENT

	Vocabulary	Comprehension	Total
Oral language as measured by the Lorge Readability Formula	c = .1018 p = .105	c = .0611 p = .331	c = .0943 p = .133

<sup>c</sup>correlation coefficients  
<sup>p</sup>probability

#### Hypothesis 6

The null hypothesis that there is no statistically significant relationship between fourth grade students' reading achievement scores and their speaking levels as measured by the Lazdowski Sample Survey was accepted. Table VI displays the relationships of fourth grade students' reading vocabulary, reading comprehension and total reading achievement scores and their oral generation scores as measured by the Lazdowski Sample Survey. Note that the correlation coefficient of vocabulary and oral generations was .1060, a probability of .091, and the correlation coefficient of comprehension and oral generation was .0458, a probability of .467. Also note that

the correlation coefficient between oral generations and total reading achievement was .0930, a probability of .138. None of these relationships was statistically significant at the .05 level of confidence. It was therefore concluded that reading achievement levels of fourth grade students did not have a statistically significant relationship with fourth grade students' oral generations as measured by the Lazdowski Sample Survey.

TABLE VII  
PEARSON CORRELATION COEFFICIENTS FOR ORAL LANGUAGE  
AS MEASURED BY THE LAZDOWSKI SAMPLE SURVEY  
WITH READING ACHIEVEMENT

	Vocabulary	Comprehension	Total
Oral Language as measured by the Lazdowski Sample Survey	c = .1060 p = .091	c = .0458 p = .467	c = .0930 p = .138

<sup>c</sup>correlation coefficients  
<sup>p</sup>probability

#### Hypothesis 7.

The null hypothesis that there is no statistically significant relationship between fourth grade students' reading achievement scores and their speaking levels as

measured by the Botel and Granowsky Syntactic Complexity Formula could not be rejected. As Table VIII indicates, the correlation coefficient of fourth grade students' oral levels as measured by the Botel and Granowsky Syntactic Complexity Formula and their vocabulary reading scores was .1015, a probability of .106, and therefore is not significant at the .05 level of confidence. The correlation coefficient between fourth grade students' reading comprehension scores and their oral generations as measured by the Botel and Granowsky Syntactic Complexity Formula was .0910, a probability of .144, which was not significant at the .05 level of confidence. Table VIII also displays the relationship between fourth grade students' oral generations as measured by the Botel and Granowsky Syntactic Complexity Formula and their total reading achievement scores. It will be noted that the correlation coefficient is .0998, a probability of .112, which, again, was not statistically significant at the .05 level of confidence. It was concluded that the Botel and Granowsky Syntactic Complexity Formula was not an effective measure to employ to relate fourth grade students' oral generations to their reading achievement levels.



TABLE VIII

PEARSON CORRELATION COEFFICIENTS FOR ORAL LANGUAGE AS  
 MEASURED BY THE BOTEL AND GRANOWSKY SYNTACTIC  
 COMPLEXITY FORMULA WITH READING ACHIEVEMENT

	Vocabulary	Comprehension	Total
Oral Language as measured by the Botel and Granowsky Syntactic Complexity Formula	c = .1015 p = .106	c = .0919 p = .144	c = .0998 p = .112

<sup>c</sup>correlation coefficients  
<sup>p</sup>probability

#### Hypothesis 8

The null hypothesis that there is no statistically significant relationship between fourth grade students' reading achievement scores and their speaking levels as measured by the Fog Index was accepted. Table IX indicates that the correlation coefficient between fourth grade students' oral production as measured by the Fog Index and their reading vocabulary level was .1004, a probability of .110. Table IX also shows that the correlation coefficient between fourth grade students' comprehension scores and their oral levels as measured by the Fog Index was .0532, a probability of .398. The relationship between fourth grade

students' oral generations as measured by the Fog Index and their total reading achievement score is also displayed in Table IX. Please note that the correlation coefficient is .0934, a probability of .137, which was not statistically significant at the .05 level of confidence. It was concluded that there is no statistically significant relationship between fourth grade students' speaking levels as measured by the Fog Index and their standardized reading achievement scores.

TABLE IX  
PEARSON CORRELATION COEFFICIENTS FOR ORAL LANGUAGE  
AS MEASURED BY THE FOG INDEX  
WITH READING ACHIEVEMENT

	Vocabulary	Comprehension	Total
Oral language as measured by the Fog Readability Formula	c = .1004 p = .110	c = .0532 p = .398	c = .0934 p = .137

<sup>c</sup>correlation coefficients  
<sup>p</sup>probability

#### Hypothesis 9

The null hypothesis that there is no statistically significant relationship between fourth grade students'

speaking and writing levels as measured by the Lorge Readability Formula was accepted. As Table X indicates, the correlation coefficient between fourth grade students' speaking levels as measured by the Lorge Readability Formula and fourth grade students' oral generations as measured by the Lorge Readability Formula was .0068, a probability of .914, which was not significant at the .05 level of confidence. It was concluded that the speaking and writing levels of fourth grade students had no statistically significant relationship when measured by the Lorge Readability Formula.

#### Hypothesis 10

The null hypothesis that there is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Lazdowski Sample Survey could not be rejected. Table X shows that the correlation coefficient between fourth grade students' speaking levels as measured by the Lazdowski Sample Survey and their writing levels as measured by the Lazdowski Sample Survey was .0348, a probability of .580, which was not significant at the .05 level of confidence. It was concluded that fourth grade students' speaking and writing

levels as measured by the Lazdowski Sample Survey Formula did not have a statistically significant relationship.

#### Hypothesis 11

The null hypothesis that there is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula was rejected at the .05 level of confidence. The correlation coefficient of .2306, a probability of .001, is displayed in Table X. It was concluded that the Botel and Granowsky Syntactic Complexity Formula, when applied to fourth grade students' oral generations and written productions, did show that speaking and writing are related.

#### Hypothesis 12

The null hypothesis that there is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Fog Index was accepted. As Table X indicates, the correlation coefficient of fourth grade students' oral levels as measured by the Fog Index and their written scores as measured by the Fog Index was .0038, a probability of .952. It was concluded that fourth grade students' oral

generations when measured by the Fog Readability Formula, and their written productions when measured by the Fog Readability Formula were not significantly related.

TABLE X  
PEARSON CORRELATION COEFFICIENTS FOR  
ORAL GENERATIONS WITH  
WRITTEN PRODUCTIONS

Formula	Correlation Coefficient	Probability
Large Readability Formula	.0068	.914
Lazdowski Sample Survey	.0348	.580
Botel and Granowsky Syntactic Complexity Formula	.2306	.001 <sup>a</sup>
Fog Readability Formula	-.0038	.952

<sup>a</sup>Significant at the .01 level of confidence.

### Hypothesis 13

The null hypothesis that there are no variables, when applied to written and/or oral productions, which will provide an effective linear prediction of reading achievement was accepted.

Table XI depicts the stepwise multiple regression analysis between fourth grade students' standardized reading achievement levels and the forty variables applied to the students' written generations. The  $R^2$  value for the forty variables was .26029 which indicated that 26 per cent of the fourth grade students' reading achievement levels was explained after the inclusion of the forty written production variables.

For reasons of statistical procedure efficiency stepwise multiple regression technique was again applied after setting three parameters on the written variables. The first parameter was a restriction on the number of variables to be included in the equation. The number ten was chosen because ten variables would enhance computation efficiency. The second parameter was the F value which was limited to 2.41. With this restriction all variables included in the equation were statistically significant. Tolerance, the third parameter, was specified at .8. This limitation restricted the inclusion of variables that were already explained by the variables in the equation. In other words, the limitation of .8 indicated that 80 per cent of the variance of the variable under

TABLE XI  
 STEPWISE MULTIPLE REGRESSION ANALYSIS SUMMARY  
 READING ACHIEVEMENT: WRITTEN  
 INDEPENDENT VARIABLES

No.	Variable	Multiple R	R <sup>2</sup>	R <sup>2</sup> Increase	Beta
1.	Dependent Clauses	.21386	.04574	.04574	.13853
2.	Hard Words	.28416	.08075	.03501	.12659
3.	Negatives	.32082	.10292	.02217	.10574
4.	Set Expressions	.34681	.12028	.01735	.09652
5.	Participles not in Adjective Position	.36464	.13296	.01269	.01290
6.	Lazdowski Polysyllabic Words	.38170	.14569	.01273	.06635
7.	Non-Sentence Expressions	.39376	.15505	.00935	.13529
8.	Simple Sentences	.40648	.16523	.01018	-.09231
9.	Predeterminers.	.41657	.17353	.00831	.05707
10.	Passives	.42719	.18249	.00896	.10283
11.	Adverbs	.43862	.19239	.00990	-.02303
12.	Coordinate Clauses	.44451	.19759	.00520	.04588
13.	Two-Three Lexical Items	.44975	.20228	.00469	-.08405
14.	Botel and Granowsky S.C.F.	.45804	.20980	.00753	.27025
15.	Syllables	.46254	.21395	.00414	.11119
16.	Conjunctive Adverbs	.46534	.21654	.00259	-.15794
17.	Lazdowski T-Units	.46769	.21873	.00220	.04375
18.	Deletions in Coordinate Clauses	.46930	.22024	.00151	-.15331
19.	Comparatives	.47150	.22231	.00207	-.10617
20.	Lazdowski Sample Survey	.47295	.22368	.00137	-.07822

TABLE XI (Continued)

	Multiple R	R <sup>2</sup>	R <sup>2</sup> Increase	Beta
21. Fry Index	.47587	.22645	.00277	2.14139
22. Average Sentence Length	.49272	.24277	.01632	-2.12897
23. Fry Polysyllabic Words	.50026	.25026	.00749	-.14869
24. Adjectives	.50332	.25333	.00307	-.19886
25. Infinitives not in S-V-Inf. nor as Subjects	.50518	.25520	.00187	-.06980
26. Infinitives as Subjects	.50643	.25647	.00126	.03700
27. Sentences	.50728	.25733	.00087	.03970
28. Possessives	.50780	.25786	.00053	-.06202
29. Adjectives in Participle Position	.50829	.25836	.00050	-.03925
30. Prepositional Phrases	.50894	.25902	.00067	-.09020
31. Modals	.50948	.25957	.00055	-.04359
32. Clauses as Subjects	.50988	.25998	.00041	-.02460
33. Four Lexical Items	.51001	.26011	.00014	-.02252
34. Appositives	.51012	.26023	.00011	-.01184
35. Gerunds	.51019	.26029	.00006	.00844

Constant = 26.11066



consideration was explained by the independent variables already in the equation if that variable was to be accepted. These parameters yielded the results found in Table XII.

TABLE XII  
STEPWISE MULTIPLE REGRESSION ANALYSIS  
READING ACHIEVEMENT: WRITTEN  
INDEPENDENT VARIABLES

Step No.	Variable	Multiple R	R <sup>2</sup>	Beta	F Value
1.	Dependent Clauses	.21386	.04574	.21602	13.717*
2.	Hard Words	.28416	.08075	.10783	3.200*
3.	Negatives	.32082	.10292	.15296	6.463*
4.	Set Expressions	.34681	.12028	.11966	3.933*
5.	Participles <sup>a</sup>	.36464	.13296	.10573	3.271*
6.	Lazdowski Poly-syllabic Words	.38170	.14569	.11148	3.557*
7.	Non-Sentence Expressions	.39376	.15505	.13824	4.965*
8.	Simple Transformations	.40648	.16523	-.09743	2.596*
9.	Predeterminers	.41657	.17353	.10008	2.687*
10.	Passives	.42719	.18249	.09550	2.674*

Constant = 43.62159

<sup>a</sup>not in the adjective position

\*significant at the .05 level

Careful study of this table reveals that R<sup>2</sup> was .18249. It should be recalled that the R<sup>2</sup> value generated after the

inclusion of the forty variables applied to written productions was .26029. The increase in  $R^2$  was only .0578, or six per cent, after the inclusion of the forty written variables.

Table XII also shows that the prediction equation when employing these ten variables would be written as:

$$RL = 43.62159 + .21602(WDEP) + .15296(WNEG) + .11966(WSET) + .10573(WRPT) + .11148(WLPL) + .13824(WNON) + (-.09743)(WSIM) + .10008(WPRD) + .09550(WPAS)$$

Where:

- WDEP = the number of written dependent clauses
- WNDW = the number of written words not on the Dale List of 769 easy words
- WNEG = the number of written negatives
- WSET = the number of written set expressions
- WRPT = the number of written participles not used in the regular adjective position
- WLPL = the number of written Lazdowski Polysyllabic Words
- WNON = the number of written non-sentence expressions
- WSIM = the number of written simple transformations
- WPRD = the number of written predeterminers
- WPAS = the number of written passives

Because the parameter of 2.41 was placed on the F value to be included in the equation, all variables entered were statistically significant at the .05 level of confidence. Table XII indicates this significance.

It was concluded that this formula would not be an

effective linear prediction of fourth grade students' reading achievement levels inasmuch as the formula accounts for only eighteen per cent of the students' reading achievement levels.

Table XIII shows the stepwise multiple regression analysis of the forty variables that were applied to fourth grade students' oral generations. Note that five of the variables applied to their oral generation were not entered into the equation. These variables were the number of simple transformations in oral generation, the number of non-sentence expressions in oral generation, the number of paired coordinate clauses in oral generation, the number of paired conjunctions in oral generation and the number of clauses as subjects in oral generation.

The  $R^2$  value listed in Table XIII after the inclusion of the thirty-five variables was .16869. That is, seventeen per cent of the variance of the fourth grade reading achievement levels are explained by application of these thirty-five variables.

Three parameters that were applied to the written productions were again set for the oral generations for statistical efficiency, and stepwise multiple regression was again employed. The maximum number of variables

TABLE XIII  
 STEPWISE MULTIPLE REGRESSION ANALYSIS SUMMARY  
 READING ACHIEVEMENT: ORAL  
 INDEPENDENT VARIABLES

Variable	Multiple R	R <sup>2</sup>	Increase In R <sup>2</sup>	Beta
Fog Polysyllabic Words	.18000	.03240	.03240	.12197
Lazdowski Polysyllabic Words	.24860	.06180	.02940	-.24198
Adverbs	.27796	.07726	.01546	.21858
Deletions in Coordinate Clauses	.30270	.09163	.01436	.20347
Adjectives	.32190	.10362	.01199	-.10480
Possessives	.33560	.11262	.00900	.10139
Dependent Clauses	.34669	.12019	.00757	-.08097
Set Expressions	.35729	.12766	.00747	.09532
Average Sentence Length	.36360	.13221	.00455	-.06907
Infinitives as Subjects	.36901	.13617	.00396	-.08582
Two-Three Lexical Items	.37504	.14065	.00449	-.08072
Four Lexical Items	.37793	.14283	.00218	-.04630
Passives	.38148	.14553	.00269	.05895
Adjectives in Participle Position	.38415	.14757	.00204	.05692
Modals	.38647	.14936	.00179	.05131
Lazdowski Sample Survey	.38877	.15114	.00179	.19816
"And" Coordinate Clauses	.39131	.15312	.00198	-.04397
Comparatives	.39335	.15472	.00160	.04276
Infinitives not in S-V-Inf nor as Subjects	.39499	.15602	.00130	.05150
Participles not in Adjective Position	.39672	.15739	.00137	-.03225

TABLE XIII (Continued)

Variable	Multiple R	R <sup>2</sup>	Increase In R <sup>2</sup>	Beta
Number of Syllables	.39767	.15814	.00075	.06074
Lazdowski T-Units	.39859	.15887	.00073	-.03683
Appositives	.39955	.15964	.00077	.04106
Botel and Granowsky S.C.F.	.40032	.16026	.00062	-.10584
Coordinate Clauses	.40119	.16096	.00070	.03682
Non-Sentence Expressions	.40203	.16163	.00067	-.08543
Negatives	.40247	.16198	.00035	.05068
Fog Index	.40299	.16240	.00042	.46640
Gerunds	.40315	.16253	.00013	-.01170
Predeterminers	.40329	.16264	.00011	-.00251
Hard Words	.40338	.16271	.00007	.38677
Lorge Readability Formula	.40440	.16354	.00082	-.72388
Prepositional Phrases	.40160	.16859	.00505	.25741
Conjunctive Adverbs	.41066	.16864	.00005	.01068
Absolutes	.41071	.16869	.00005	.00739

Constant = 87.08652

allowed in the equation was ten; the F value was restricted to 2.41, and the tolerance level was set at .8. Table XIV shows the results of the stepwise multiple regression application after the establishment of these restriction parameters.

TABLE XIV  
STEPWISE MULTIPLE REGRESSION ANALYSIS  
READING ACHIEVEMENT: ORAL  
INDEPENDENT VARIABLES

Step No.	Variable	Multiple R	R <sup>2</sup>	Beta	F Value
1.	Fog Polysyllabic Words	.18000	.03240	.18216	9.031*
2.	Lazdowski Poly-syllabic Words	.24860	.06180	-.13330	4.387*
3.	Adverbs	.27796	.07726	.15265	5.815*
4.	Deletions in Coordinate Clauses	.30270	.09163	.14808	5.803*
5.	Adjectives	.32190	.10362	-.10391	2.785*
6.	Possessives	.33560	.11262	.09727	2.516*

Constant = 59.81497

\*Significant at the .05 level

The R<sup>2</sup> value is shown to be .11262, indicating that 11 per cent of the variance of the fourth grade students' reading achievement levels is explained by the application

of these six variables. Recall that Table XII indicated the  $R^2$  value after the inclusion of thirty-five variables to be .16869. The  $R^2$  value difference between the inclusion of thirty-five variables and six variables is only .05607.

Table XIV shows that the prediction equation, when employing these ten variables, was:

$$\begin{aligned} \text{PRL} = & 59.81497 + .18216(\text{OFPL}) + (-.13330)(\text{OLPL}) + \\ & .15265(\text{OADV}) + .14808(\text{ODCC}) + (-.10391)(\text{OADJ}) + .09727 \\ & (\text{OPOS}) \end{aligned}$$

Where:

PRL = predicted reading level  
 OFPL = the number of oral Fog polysyllabic words  
 OLPL = the number of Lazdowski polysyllabic words  
 OADV = the number of oral adverbs  
 ODCC = the number of oral deletions in  
           coordinate clauses  
 OADJ = the number of oral adjectives  
 OPOS = the number of oral possessives

It was concluded that this formula would not be an effective linear prediction of fourth grade students' reading achievement levels because the formula accounts for only eleven per cent of the students' reading achievement levels.

Table XV displays the results of the stepwise multiple regression technique when all oral and all written independent variables are considered. There were

eight variables that this technique did not include in the equation. They were: 1) the written number of modals; 2) the written number of gerunds; 3) the written number of paired coordinate clauses; 4) the written number of paired conjunctions; 5) the written number of absolutes; 6) the oral number of paired coordinate clauses; 7) the written number of paired conjunctions, and 8) the oral number of appositives.

After the inclusion of the other seventy-two variables,  $R^2$  was .42800. This represents that only forty-three per cent of the variance of the fourth grade students' reading achievement levels is explained by the seventy-two variables from both the written productions and the oral generations.

Because of the low percentage of the accounted variability and because of the complexity of a formula containing seventy-two variables, it was concluded that the variables used in this study, when applied to written and/or oral productions, did not provide an effective linear prediction of reading achievement.



TABLE XV  
 STEPWISE MULTIPLE REGRESSION ANALYSIS SUMMARY  
 READING ACHIEVEMENT: WRITTEN AND ORAL  
 INDEPENDENT VARIABLES

Variable	Multiple R	R <sup>2</sup>	Beta	F Value
Written Dependent Clauses	.21386	.04574	.25178	3.445*
Written Hard Words	.28416	.08075	.19646	.612
Oral Adverbs	.33050	.10923	.32391	7.826*
Oral Fog Polysyllabic Words	.37150	.13801	-.03499	.036
Written Negatives	.39641	.15714	.14947	2.503*
Written Predeterminers	.41957	.17604	.08211	1.250
Written "And" Coordinate Clauses	.43706	.19103	.00310	.002
Written Two-Three Lexical Items	.44929	.20186	-.11740	2.569*
Oral Deletions in Coordinate Clauses	.46284	.21422	.28090	4.074*
Oral Adjectives	.47784	.22833	-.03803	.087
Written Adjectives	.48737	.23753	-.15343	.915
Oral Possessives	.49354	.24358	.01646	.039
Oral Lazdowski Polysyllabic Words	.50047	.25047	-.38518	7.422*
Oral Fog Index	.51102	.26114	1.24998	1.424*
Written Passives	.52055	.27097	.15230	4.825*
Oral Dependent Clauses	.52823	.27903	-.00028	.000
Oral Set Expressions	.53464	.28584	.06679	1.031
Written Lazdowski Polysyllabic Words	.53974	.29132	.03894	.158
Written Coordinate Clauses	.54480	.29681	.07079	.655
Written Conjunctive Adverbs	.54876	.30114	-.19533	3.104*
Written Syllables	.55570	.30880	.10865	1.373*

∞

TABLE XV (Continued)

Variable	Multiple R	R <sup>2</sup>	Beta	F Value
Written Non-Sentence Expressions	.56011	.31372	.11476	2.555*
Oral Hard Words	.56409	.31820	.61497	4.083*
Oral Comparatives	.56786	.32246	.09501	1.672*
Written Adverbs	.57140	.32650	.03518	.046
Oral Botel and Granowsky S.C.F.	.57426	.32977	-.34627	1.889*
Oral Coordinate Clauses	.57773	.33377	.10495	1.914*
Oral Prepositional Phrases	.58059	.33709	.45798	4.503*
Oral Lorge Readability Formula	.59095	.34922	-.97961	2.909*
Oral Negatives	.59509	.35413	.21011	2.877*
Written Four Lexical Items	.59832	.35799	.09816	.859
Oral Non-Sentence Expressions	.60178	.36214	.11996	1.423*
Written Simple Transformations	.60503	.36606	-.08274	1.450*
Oral Passives	.60746	.36901	.07021	1.091
Oral Infinitive as Subjects	.60946	.37144	-.08211	1.574*
Written Deletions in Coordinate Clauses	.61133	.37372	-.12423	.780
Oral Conjunctive Adverbs	.61307	.37585	.05641	.434
Written Clauses as Subjects	.61468	.37783	-.04783	.428
Written Set Expressions	.61638	.37992	.05723	.666
Written Lazdowski Sample Survey	.61779	.38166	-.20791	.633
Written Fog Index	.62220	.38713	2.37134	9.898*
Written Average Sentence Length	.63426	.40228	-1.83716	2.905*
Written Fog Polysyllabic Words	.64178	.41189	-.25197	3.157*
Written Number of Sentences	.64389	.41459	.12117	.691
Oral Two-Three Lexical Items	.64538	.41651	-.06488	.798
Oral Lazdowski Sample Survey	.64612	.41747	.22158	.627
Oral Adjective in Participle Position	.64681	.41836	.03162	.236

TABLE XV (Continued)

Variable	Multiple R	R <sup>2</sup>	Beta	F Value
Written Comparatives	.64748	.41922	-.06514	.706
Written Botel and Granowsky S.C.F.	.64831	.42031	.15890	.200
Oral Number of Sentences	.64883	.42098	-.10452	.515
Oral Average Sentence Length	.64956	.42193	-.76955	.451
Oral Infinitives not in S-V-Inf. nor as Subjects	.65025	.42282	.04392	.408
Written Infinitives not in S-V-Inf. nor as Subjects	.65073	.42345	-.03459	.240
Written Appositives	.65118	.42404	.02631	.139
Oral Number of Syllables	.65156	.42453	.04007	.217
Oral Clauses as Subjects	.65186	.42492	-.02355	.127
Written Adjectives in Participle Position	.65210	.42523	.01748	.063
Oral Simple Transformations	.65230	.42549	-.02682	.162
Written Lorge Readability Formula	.65252	.42578	-.43769	.291
Written Prepositional Phrases	.65297	.42637	.07473	.135
Oral Gerunds	.65315	.42661	-.02058	.097
Oral "And" Coordinate Clauses	.65333	.42684	.01795	.059
Oral Lazdowski T-Units	.65344	.42699	-.03315	.120
Oral Modals	.65357	.42715	-.03493	.112
Oral Predeterminers	.65374	.42737	-.02384	.095
Oral Four Lexical Items	.65387	.42755	-.02333	.058
Oral Absolutes	.65397	.42767	.01149	.024
Oral Participles not in Adjective Position	.65403	.42776	-.01076	.026
Written Participles not in Adjective Position	.65409	.42783	-.01834	.040
Written Possessives	.65414	.42790	-.01091	.017

TABLE XV (Continued)

Variables	Multiple R	R <sup>2</sup>	Beta	F Value
Written Lazdowski T-Units	.65418	.42795	.01368	.022
Written Infinitives as Subjects	.65421	.42800	.00775	.014

Constant = 84.11141  
 \*Significant at the .05 level

Summary

The analysis of data for the first twelve null hypotheses was accomplished through the Pearson product-moment correlation and the thirteenth hypothesis was analyzed through stepwise multiple regression.

The Pearson product-moment correlation permitted the generation of correlation coefficients which yielded the following results for each hypothesis.

Null hypothesis 1. The null hypothesis that there is no statistically significant relationship between fourth grade students' writing levels as measured by the Lorge Readability Formula and fourth grade students' standardized reading achievement levels was accepted.

Null hypothesis 2. The null hypothesis that there is no statistically significant relationship between fourth grade students' writing levels as measured by the Lazdowski Sample Survey and fourth grade students' standardized reading achievement levels could not be rejected. However, the fourth grade students' writing levels as measured by the Lazdowski Sample Survey did provide a statistically significant relationship with the students' reading comprehension levels at the .05 level of significance.

Null hypothesis 3. The null hypothesis that there is

no statistically significant relationship between fourth grade students' writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula and fourth grade students' standardized reading achievement levels was rejected at the .02 level of significance.

Null hypothesis 4. The null hypothesis that there is no statistically significant relationship between fourth grade students' writing levels, as measured by the Fog Index and fourth grade students' standardized reading achievement levels was accepted.

Null hypothesis 5. The null hypothesis that there is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Lorge Readability Formula could not be rejected.

Null hypothesis 6. The null hypothesis that there is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Lazdowski Sample Survey was accepted.

Null hypothesis 7. The null hypothesis that there is no statistically significant relationship between fourth grade students' standardized reading achievement scores

and their speaking levels as measured by the Botel and Granowsky Syntactic Complexity Formula could not be rejected.

Null hypothesis 8. The null hypothesis that there is no statistically significant relationship between fourth grade students' standardized reading achievement scores and their speaking levels as measured by the Fog Index was accepted.

Null hypothesis 9. The null hypothesis that there is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Lorge Readability Formula could not be rejected.

Null hypothesis 10. The null hypothesis that there is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Lazdowski Sample Survey could not be rejected.

Null hypothesis 11. The null hypothesis that there is no statistically significant relationship between fourth grade students' speaking and writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula was rejected at the .05 level of significance.

Null hypothesis 12. The null hypothesis that there is no statistically significant relationship between

fourth grade students' speaking and writing levels as measured by the Fog Index was accepted.

Null hypothesis 13. The null hypothesis that there are no variables, when applied to written generation and/or oral productions, that will provide an effective linear prediction of reading achievement was accepted. Through the application of stepwise multiple regression technique employing all 40 written independent variables, an  $R^2$  value of .26029 (26 per cent) was identified. After limiting the criteria for inclusion by applying the parameters of  $n=10$ ,  $f=2.41$  and tolerance = .8,  $R^2$  was found to be .18249 (18 per cent). After stepwise multiple regression technique was employed using the 40 oral independent variables,  $R^2$  was .16869 (17 per cent). Again setting the parameters of  $n=10$ ,  $f=2.4$  and tolerance = .8,  $R^2$  was reported as .11262 (11 per cent). After the inclusion of 72 variables from both the oral and written independent variables, an  $R^2$  of .42800 (43 per cent) was identified. Because of the low percentage of the accounted variability, it was concluded that the variables used in this study, when applied to written and/or oral productions, did not provide an effective linear prediction of reading achievement.



## Chapter V

### SUMMARY AND CONCLUSIONS

#### Purpose and Procedures

Although the literature reflected a general agreement that the language arts are interrelated, there has been little research employing variables found in readability formulas focusing on specific elements relating reading achievement to speaking and writing production (Lazdowski, 1976; Thomas, 1978).

Therefore, the problem of this study was to determine the interrelationships existing among reading achievement, written language production and oral language generation of fourth grade students in Helena, Montana and Glendive, Montana through application of those verbal elements found in the Lorge Readability Formula, the Lazdowski Sample Survey, the Fog Index and the Botel and Granowsky Syntactic Complexity Formula.

The specific procedures adopted were as follows:

1. After the most common variables found in readability formulas were identified through a survey of the literature, four readability formulas containing those variables were selected. The formulas adopted for this study were the Fog Index, the Lazdowski Sample Survey, the

Lorge Readability Formula and the Botel and Granowsky Syntactic Complexity Formula.

2. Fourth grade students enrolled in seven fourth grade classrooms in Glendive, Montana and fourth grade students enrolled in seven fourth grade classrooms in Helena, Montana were selected for this study.

3. Each child included in this study was administered a Gates MacGinitie Reading Test, Level D, Form 1. Also, each student within the sample was asked to write a story pertaining to a haunted house and, individually, each student was asked to tell a story to a listener while that oral generation was being recorded on magnetic tape.

4. The oral stories were collected and subsequently transcribed into written form by the researcher.

5. The Lorge Readability Formula, the Fog Index, the Lazdowski Sample Survey and the Botel and Granowsky Syntactic Complexity Formula were applied to each oral and each written sample. Variables contained within each formula as well as each grade level were determined and recorded for each student.

6. Thirteen null hypotheses were delineated. The first 12 related to reading achievement, writing

production and oral generation and their relationship as measured by the grade level produced after the application of the four readability formulas previously identified. Pearson product-moment correlation was employed to analyze the data obtained for the first 12 hypotheses.

Stepwise multiple regression was used to determine which variables from the four readability formulas, when applied to fourth grade students' written and/or oral language, would provide an effective linear prediction of reading achievement.

The .05 level of confidence was required for the relationship to be accepted as statistically significant.

#### Results and Conclusions

It was concluded that fourth grade students' writing samples as measured by the Lorge Readability Formula did not demonstrate a statistically significant relationship to fourth grade students' standardized reading achievement levels.

It was also concluded that the Lazdowski Sample Survey, when applied to fourth grade students' writing samples, did show a statistically significant relationship to fourth grade students' comprehension levels at the .05

level of confidence.

However, fourth grade students' writing levels as measured by the Lazdowski Sample Survey did not indicate a statistically significant relationship with vocabulary nor total standardized reading achievement levels.

Fourth grade students' writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula did show a statistically significant relationship to fourth grade students' standardized reading achievement levels.

It was concluded that fourth grade students' writing levels as measured by the Fog Index did not have a sufficient statistically significant relationship with fourth grade students' standardized reading achievement scores.

Furthermore, it was concluded that a statistically significant relationship did not exist between fourth grade students' total standardized reading achievement levels and their oral levels as measured by the Lorge Readability Formula, the Lazdowski Sample Survey, the Fog Index or the Botel and Granowsky Syntactic Complexity Formula.

It was also concluded that the speaking and writing levels of fourth grade students had no statistically significant relationship as measured by the Lorge

Readability Formula, Lazdowski Sample Survey, or Fog Index. However, it was concluded that fourth grade students' speaking and writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula, did indicate a statistically significant relationship.

After stepwise multiple regression technique was employed, seventy-two variables from both the oral and written independent variables were included in the regression formula. An  $R^2$  of .42800 (forty-three per cent) was identified. Because of the low percentage of accounted variability, it was concluded that the variables employed in this study, when applied to written and/or oral productions, did not provide an effective linear prediction of reading achievement.

#### Implications

The data obtained in this investigation have a number of implications for reading theory, experimentation within reading, speech theory and writing theory because this study focused on the relationships obtaining among fourth grade students' writing levels as measured by the Lazdowski Sample Survey, the Fog Index, the Botel and Granowsky Syntactic Complexity Formula and the Lorge Readability.

Formula. These implications are discussed below.

1. A statistically significant relationship was found between students' writing levels as measured by the Lazdowski Sample Survey and their reading comprehension levels. This result indicates that an educator could apply the Lazdowski Sample Survey to fourth grade students' writing samples to have an expedient method of determining reading comprehension levels.

2. Implication one also gives rise to the question, "If a student's reading comprehension level is known, could a teacher apply the Lazdowski Sample Survey to the student's writing sample to determine if the student is writing at a level of expected achievement?" This could lead to the practice of applying the Lazdowski Sample Survey to fourth grade students' writing samples in order to determine if students need corrective writing instructions.

3. In this study a statistically significant relationship was found between fourth grade students' writing levels as measured by the Botel and Granowsky Syntactic Complexity Formula and their reading comprehension and reading achievement scores. This raises the question, "Could the Botel and Granowsky Syntactic Complexity Formula be applied to fourth grade students' writing samples in order

to determine their reading comprehension and/or total reading achievement level?" By applying the Botel and Granowsky Syntactic Complexity Formula to fourth grade students' writing productions, the educator could have an expedient method of determining a students' reading comprehension level and total reading achievement level.

4. The third implication raises the question, "If a student's reading comprehension and total reading achievement score is known, could a teacher apply the Botel and Granowsky Syntactic Complexity Formula to the student's writing sample to determine if the student is writing at a level of expected achievement?" This could lead to the practice of applying the Botel and Granowsky Syntactic Complexity Formula to fourth grade students' writing samples in order to determine if students need corrective writing instruction.

5. A statistically significant relationship was found between fourth grade students' speaking levels as determined by the Botel and Granowsky Syntactic Complexity Formula and their writing levels as determined by the Botel and Granowsky Syntactic Complexity Formula. This implies that the Botel and Branowsky Syntactic Complexity Formula, when applied to fourth grade students' oral and written

levels, should have a strong relationship. The question then arises, "Could a teacher apply the Botel and Granowsky Syntactic Complexity Formula to a student's written and oral language to locate deficiencies in one of the skill pairs?" This could expand the oral generation and written production evaluation measures available to educators.

#### Recommendations for Further Research

In view of the results of this study, the following recommendations are suggested:

1. The present study should be replicated employing different population subsets. For example, bilingual, lower primary and upper intermediate and developmentally disabled students should be included.
2. Further study should be conducted using human interest variables in the linear prediction of reading achievement.
3. Further study should be conducted to include personality variables in the linear prediction of reading achievement.
4. Further research should be conducted using variables used in other readability formulas.
5. It is recommended that further research which employs readability formula variables to predict achieve-



ment levels of any of the language arts be approached with caution.

8. It is recommended that further research which employs variables found in readability formulas to determine relationships among any of the language arts be approached with caution.

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APPENDIX



THE DALE LIST OF  
769 EASY WORDS

<u>A</u>	<u>B</u>			
a	baby	body	carry	cried
about	back	bone	case	cross
above	bad	book	catch	crowd
across	bag	born	cause	crown
act	ball	both	cent	cry
afraid	band	bottom	center	cup
after	basket	bow	chair	cut
afternoon	be	box	change	
again	bear	boy	chief	<u>D</u>
against	beat	branch	child	dance
ago	beautiful	brave	children	dark
air	because	bread	choose	day
all	bed	break	Christmas	dead
almost	bee	breakfast	church	dear
alone	been	bridge	circle	deep
along	before	bright	city	did
already	began	bring	class	die
also	being	broken	clean	different
always	behind	brother	clock	dinner
am	believe	brought	close	do
American	bell	brown	cloth	doctor
an	belong	build	clothes	does
and	beside	building	cloud	dog
animal	best	built	coal	done
another	better	burn	coat	don't
answer	between	busy	cold	door
any	big	but	color	double
anything	bill	butter	come	down
apple	bird	buy	coming	draw
are	bit	by	company	dream
arm	black		cook	dress
around	bless	<u>C</u>	cool	drink
as	blind	cake	corn	drive
ask	blood	call	corner	drop
at	blow	came	cost	dry
away	blue	can	could	dust
	board	cap	count	
	boat	captain	country	<u>E</u>
		car	course	each
		care	cover	ear
		careful	cow	

early  
earth  
east  
easy  
eat  
edge  
egg  
eight  
either  
else  
end  
England  
English  
enough  
even  
evening  
ever  
every  
everything  
except  
expect  
eye

F

face  
fair  
fall  
family  
fancy  
far  
farm  
farmer  
fast  
fat  
father  
feed  
feel  
feet  
fell  
fellow  
felt  
fence  
few  
field

fight  
fill  
find  
fine  
finger  
finish  
fire  
first  
fish  
fit  
five  
fix  
floor  
flower  
fly  
follow  
food  
foot  
for  
forget  
fourth  
found  
four  
fresh  
friend  
from  
front  
fruit  
full

G

game  
garden  
gate  
gave  
get  
gift  
girl  
give  
glad  
glass  
go  
God  
going

gold  
golden  
gone  
good  
got  
grain  
grass  
gray  
great  
green  
grew  
ground  
grow  
guess

H

had  
hair  
half  
hall  
hand  
hang  
happy  
hard  
has  
hat  
have  
he  
head  
hear  
heard  
heart  
heavy  
help  
her  
here  
herself  
hide  
high  
hill  
him  
himself  
his  
hold

hole  
home  
hope  
horse  
hot  
house  
how  
hundred  
hunt  
hurry  
hurt

I

I  
ice  
if  
in  
Indian  
instead  
into  
iron  
is  
it  
its

J

jump  
just

K

keep  
kept  
kill  
kind  
king  
kiss  
knee  
knew  
know

L

lady  
laid  
lake  
land  
large  
last  
late  
laugh  
lay  
lead  
learn  
leave  
left  
leg  
lesson  
let  
letter  
lie  
lift  
light  
like  
line  
lion  
lips  
listen  
little  
live  
load  
long  
look  
lost  
lot  
loud  
love  
low

M

made  
mail  
make  
man  
many

march	neighbor	<u>P</u>	reach	send
mark	neither		read	sent
market	nest	page	ready	serve
matter	never	paint	real	set
may	new	pair	reason	seven
me	New York	paper	red	several
mean	next	part	remember	shake
measure	nice	party	rest	shall
meat	night	pass	rich	sahpe
meet	nine	path	ride	she
men	no	pay	right	sheep
met	noise	pen	ring	shine
middle	none	people	river	ship
might	noon	pick	road	shoe
mile	nor	picture	rock	shop
milk	north	piece	roll	short
mill	nose	place	roof	should
mind	not	plain	room	shoulder
mine	note	plant	rose	show
minute	nothing	play	round	shut
miss	now	please	now	sick
money	number	point	run	side
month		poor		sign
moon	<u>O</u>	post	<u>S</u>	silk
more		pound		silver
morning	oak	present	said	sing
most	ocean	press	sail	sir
mother	of	pretty	salt	sister
mountain	off	pull	same	sit
mouth	office	put	sand	six
move	often		sat	size
Mr.	old	<u>Q</u>	save	skin
Mrs.	on	quarter	saw	sky
much	once	queen	say	sleep
music	one	quick	school	slow
must	only	quiet	sea	small
my	open	quite	season	smile
myself	or		seat	smoke
	other		second	snow
<u>N</u>	our	<u>R</u>	see	so
	out	race	seed	soft
name	outside	rain	seem	sold
near	over	ran	seen	soldier
neck	own	rather	self	some
need			sell	something

sometime  
 song  
 soon  
 sound  
 south  
 space  
 speak  
 spot  
 spread  
 spring  
 square  
 stand  
 star  
 start  
 station  
 stay  
 step  
 stick  
 still  
 stone  
 stood  
 stop  
 store  
 stom  
 story  
 straight  
 street  
 strike  
 strong  
 such  
 sugar  
 suit  
 summer  
 sun  
 suppose  
 sure  
 surprise  
 sweet

T

table  
 tail  
 take

talk  
 tall  
 taste  
 teach  
 teacher  
 tear  
 tell  
 ten  
 than  
 thank  
 that  
 the  
 their  
 them  
 then  
 there  
 these  
 they  
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 thing  
 think  
 this  
 those  
 though  
 thought  
 thousand  
 three  
 through  
 throw  
 tie  
 till  
 time  
 tire (d)  
 to  
 today  
 together  
 told  
 tomorrow  
 tongue  
 too  
 took  
 top  
 touch

town  
 trade  
 train  
 tree  
 true  
 try  
 turn  
 twelve  
 twenty  
 two

U

uncle  
 under  
 until  
 up  
 upon  
 us  
 use

V

valley  
 very  
 visit

W

wait  
 walk  
 wall  
 want  
 war  
 warn  
 was  
 wash  
 waste  
 watch  
 water  
 wave  
 way  
 we  
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weather  
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 west  
 what  
 wheat  
 wheel  
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 where  
 whether  
 which  
 while  
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Y

yard  
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