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An Investigation of Relationships Between Oral Reading Rate and Reading Comprehension

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AN INVESTIGATION OF RELATIONSHIPS BETWEEN ORAL READING RATE AND READING COMPREHENSION

by

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ABSTRACT

An Investigation of Relationships between Oral Reading Rate and Reading Comprehension

Quantitative research methods were used including observations and tallies of reading rates, data compilation, generation of scatterplots, and descriptive statistical analysis of the results.

The research focused on observations of 69 fourth graders from two fourth grade classes in a private parochial elementary school in Las Vegas, Nevada. The students each read a 198-word passage to measure oral reading rate. A positive relationship between oral reading rate and reading comprehension was then determined. As a result, teachers may be able to use an oral reading rate test to design curriculum before the Terra Nova achievement test is administered in September.

This study provides a tool for more meaningful individualized instruction in reading before achievement tests are administered in September.

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Chapter 1

INTRODUCTION

Teachers plan their reading instruction and curriculum based on the reading skills of their students. Unfortunately, each year at the observed elementary school in Las Vegas, the skills of the students are not readily available until after Terra Nova tests are administered and processed. A tool to help faculty evaluate the skills of the classroom population would allow faculty to design appropriate lessons prior to the availability of the test scores.

Background of the Problem

All fourth grade students within the Diocese of Las Vegas Schools, including those participating in this study, must complete the Terra Nova achievement tests in the first trimester of each academic year. One of the three major components of the Terra Nova tests is "Reading Comprehension" and should students fail to do well on this portion of the test, they risk falling behind their peers in the fourth grade and without intervention, may need to repeat a grade or need additional tutoring.

In the article, “Print Skills (Alphabetics) Rate & Fluency” (n.d.), the National Institute for Literacy concludes that, “For most readers, accuracy, speed, and phrasing in oral reading are strongly related to reading comprehension. In fact, generally speaking, as oral reading skills increase, so too does reading comprehension. One reason for this might be that when word recognition becomes automatic (that is, oral reading rate goes up), a reader can dedicate more cognitive resources to understanding what he or she is

reading" (p. 1). Regarding oral reading skill, "When employed correctly, it can also serve as a useful scaffold ─ in this case, an intervention that focuses on the transitional needs of students as they move toward full engagement with the written word" (Designed Instruction, LLC., n.d., p. 1).

Statement of the Problem

According to a fourth grade teacher (M. Volker, personal communication, September 5, 2006) and the Assistant Principal (M. Futryk, personal communication, October 5, 2006) at the school observed, Terra Nova scores for reading comprehension of fourth graders at a Las Vegas, Nevada private parochial school have continued to decline over the past 2 years. In addition, observations of weekly test results in the fourth grade classrooms indicate poor oral reading skills and low reading comprehension.

Purpose of the Project

The purpose of this research project was to identify a reading assessment tool to help teachers predict and address reading deficiencies prior to the annual administration of the Terra Nova achievement tests. A new oral reading assessment tool should lead to higher student satisfaction/success in reading and higher scores on the reading component of the Terra Nova tests.

Research Questions

The following questions were addressed by this research project:

1. How do oral reading rates compare with fourth grade students' Terra Nova reading test results?
2. Will male and female fourth grade students' scores differ significantly on both the oral reading rate and the Terra Nova results?

3. What specific pre-Terra Nova reading strategies can be employed to improve students' scores on the reading component of the Terra Nova test?

Methods

The research problem and the research questions in this project were addressed by quantitative methodology. As part of their standard classroom reading activities, students at the studied school were observed individually while orally reading a 198-word passage from a short story titled “A Box in the Barn” (Daane, et al., 2005). “The story, from which the oral reading passage was excerpted, is one of the easiest passages on the fourth-grade National Assessment of Educational Progress (NAEP) reading assessment with relatively few complex language structures, simple vocabulary, and a familiar topic” (Daane, et al., 2005, p. 5).

Students were first given the passage to read silently and then timed on the 198-word passage to measure their oral reading rate (Daane, et al., 2005). Recognizing that oral reading rates may differ based on the time interval designated for rate calculations, and that the student may be fatigued or nervous, two measures were employed in this research. Students were timed both during the first minute of reading as well as for the entire passage. They were not asked to read the passage quickly but as if they were reading it to someone who had never heard it before. “…these reading rates may be considered a natural pace for most of the students—a rate they might assume when attempting to present their best oral reading performance” (Daane, et al., 2005, p. 19).

As each student read, the student’s progress was recorded at one minute and again when the passage was completed. Data for all students are displayed in the Appendix for analysis.

This study was limited to assessing oral reading rate only and not the students' accuracy or fluency. Further, the results for males and females were compared. In this study, the following techniques were used to analyze the data collected:

1. Frequency tables and scatterplots were constructed to display data.
2. A Pearson Product-Moment (PPM) correlation coefficient was calculated linking student performance on the Terra Nova achievement test to their oral reading rate. The coefficient indicates the strength and direction of a linear relationship between two random variables.

Summary

A valuable and necessary assessment tool is needed by elementary school faculty to address a decline in the reading comprehension skills of fourth grade students. This research presents measured oral reading rate data and compared these rates with actual Terra Nova reading comprehension test scores to determine whether a relationship exists.

Chapter 2

REVIEW OF LITERATURE

Research in the area of reading comprehension and the relationship to oral fluency has been ongoing since the early 1980s. This chapter reviews the literature in the areas of historical background, relevance to the stated problem and current research.

Historical Background of Oral Reading Research

Oral reading fluency measures a broad group of classroom- and curriculum-based tasks that are sensitive to increments in student performance and learning trends. In the early part of the last century, a stronger focus on fluency was evident. From before 1929 through the 1960s, approximately 20% of the reviewed tests assessed fluency in some format, about 10% via oral reading (Fuchs, Fuchs, Hosp & Jenkins, 2001). Oral reading fluency measures originated at the University of Minnesota in the early 1980's. They were developed as an alternative assessment model in reaction to a concern that standardized norm-referenced test items did not reflect local curriculum (Davidson & Anderson, 2000). Teachers and researchers, for the most part, have ignored not only theoretical and empirical accounts of the importance of fluency as an indicator of reading competence but also calls for stronger focus on oral reading fluency (Fuchs, et al., 2001).

Oral reading fluency has not traditionally been a strong focus for assessing the effects of treatments in the reading research literature. Researchers have made strides in developing and testing treatments to improve outcomes for young children at risk for reading failure. This literature has focused largely on the development of isolated word

reading accuracy rather than text fluency; the expectation that improved decoding skills automatically will translate into improved performance on text has not always materialized. The point here is that an explicit focus on the measurement of oral reading fluency, as an outcome of reading intervention, seems necessary both in research and practice (Fuchs, et al., 2001).

Subsequent research on CBM (Curriculum-Based Measurement) focused primarily on reliability and criterion validity. One of the largest studies to compare oral reading fluency with scores on standardized achievement tests was conducted by the National Assessment of Educational Progress (NAEP) in 1992.

In 2002, NAEP did a follow-up study, *Fourth-Grade Students Reading Aloud: NAEP 2002 Special Study of Oral Reading.* This study focused on one relevant, but sometimes overlooked, aspect of reading performance─oral reading ability. Oral reading performance, measured by the components of accuracy, rate, and fluency, constitutes a cluster of critical literacy proficiencies and functions as a significant indicator of overall reading ability (Daane, et al., 2005).

Relevance of Research to Improving Declining Reading Skills

"For most readers, accuracy, speed, and phrasing in oral reading are strongly related to reading comprehension. In fact, generally speaking, as oral reading skill increases, so too does reading comprehension. One reason for this might be that when word recognition becomes *automatic* (that is, oral reading rate goes up); a reader can dedicate more cognitive resources to understanding what he or she is reading. Conversely, when a reader has to spend time decoding words (that is, oral reading rate goes down), that reader is devoting cognitive resources to word analysis instead of

comprehension. It is the first step in an informal assessment of fluency" (National Institute for Literacy, n.d., p. 1) .

Fluent reading comprises the following three key elements: *accurate* reading of connected text at a conversation *rate* with appropriate *prosody* or expression. Reading rate comprises both word-level automaticity and the speed and fluidity with which the reader moves through the connected text. Automaticity is the quick effortless identification of words in or out of context. The automaticity with which a reader can decode or recognize words is almost as important as word-reading accuracy. Measurement of reading rate is most typically accomplished through timed readings (Hudson, Lane, & Pullen, 2005).

Maintaining a fairly rapid and moderately steady pace of oral reading can be essential to the process of making connections between ideas in a text. If reading proceeds too slowly or mechanically, these connections may become difficult or impossible to make. This aspect of oral reading has been shown to be closely connected to overall reading ability (Daane, et al., 2005). Since fluency depends on higher word recognition skills, it helps children move from decoding words to sight reading. This means less energy is spent on deciphering each word and more is spent on comprehending what is read (The National Reading Panel, n.d.).

In practice, a high number of words read correctly per minute, when placed in the proper developmental perspective, indicates efficient word-level processing, a robust vocabulary knowledge base, and meaningful comprehension of the text (Kame'enui & Simmons, 2001). Fluency is an important focus of instruction that encompasses but

extends beyond accurate word recognition and is a causal determinant of higher order skills such as reading comprehension (Good, Simmons, & Kame'enui, 2001).

Educational reform efforts emphasize increases in student performance as demonstrated by scores on criterion-referenced statewide achievement tests. Often, these tests are administered on an infrequent basis, providing teachers with limited information about students' ongoing progress toward mastering academic benchmarks. Furthermore, statewide achievement tests fail to provide teachers with diagnostic information related to student attainment of specific instructional goals. Despite these limitations, data from statewide tests are used to make high-stakes decisions about students' academic proficiency. Teachers need to adopt measurement systems capable of providing valid progress-monitoring data about the academic gains made by students (Crawford, Tindal, & Stieber, 2001).

Oral reading fluency measures represent an effective strategy for collecting student progress in reading. Students read aloud from a grade-appropriate passage for one minute while the tester records the number of words read correctly. Unlike broad, high-stakes achievement measures, oral fluency measures are directly derived from the curriculum (Davidson & Myhre, 2000).

A wealth of research supports the value of oral reading fluency as an indicator of overall reading competence and its utility for helping teachers plan better instruction and effect superior student outcomes (Crawford, Tindal, & Stieber, 2001; Fuchs, et al., 2001; Guthrie, et al., 2004). Nevertheless, many questions remain unanswered about CBM specifically and oral reading fluency more generally. One of the great mysteries to challenge researchers is how people learn to read and comprehend text rapidly and with

ease. A large part of the explanation lies in how they learn to read individual words. Skilled readers are able to look at thousands of words and immediately recognize their meanings without any effort (Ehri, 2002).

Current Research in Reading Instructional Strategies

Current research is useful in developing strategies to improve student scores on reading comprehension assessments. Comprehension difficulties are often not resolved solely by improving students' reading fluency. Although reading fluency is a necessary prerequisite, more is needed for comprehension. Most readers monitor their comprehension as they read, ensuring they glean important information from the text. Combining repeated reading and question generation into a single intervention allows students to work on two skills essential for comprehension — fluency and active text comprehension. The intervention is easy to implement and requires a minimal amount of instructional time per session (about 10 minutes per passage reading). Research has indicated that unlike good readers, poor readers do not automatically monitor their comprehension while reading information from the text (Therrien, Gormley, & Kubina, 2006).

It is increasingly evident that the acquisition of reading strategies and reading comprehension skills demands a large amount of effort and motivation and outstanding teachers invest substantial time and energy in supporting students' motivation and engagement in reading. One reason that motivation and engagement may influence the development of reading comprehension is that motivated students usually want to understand text content fully and, therefore, process information deeply. As they read

frequently with these cognitive purposes, motivated students gain in reading comprehension proficiency (Guthrie, et al., 2004).

Guthrie, et al., (2006) identified seven major instructional practices that increase motivation for reading and reading comprehension:

1. Using content goals for reading instruction expands students' interest and motivation. Interested students focus on gaining meaning, building knowledge, and understanding deeply, rather than on learning skills or gaining rewards.

2. Affording students choices in the classroom is a well-supported motivational practice. When students can choose the texts they read, the tasks they perform with the texts, or their partners during instruction, their intrinsic motivation for reading increases.

3. Properties of texts increase interest. When a topic is rated as interesting, when the format is appealing to students, and when materials are relevant to students' purposes in knowledge-development activities, interest and motivation increase.

4. Social goals or cooperative-learning structures in reading activities improve students' motivation and achievement.

5. Teacher involvement, which refers to students' perception that the teacher understands them and cares about their progress, is associated with intrinsic motivation for academic activities.

6. Extrinsic rewards and praise include such activities as reading for Pizza Hut prizes or working for recognition in reading are controversial, and, under some circumstances, undermine intrinsic motivation, which energizes long-term reading activities.

7. Emphasizing mastery goals in the classroom is a practice supported by most motivation theorists. When students read for mastery, they seek to gain knowledge from text, understand stories fully, and grasp the essence of literary texts, such as legends or poetry. When teachers emphasize such goals, students internalize them and become more self-determining learners, which increases their achievement in the long term. (p. 233)

Spear-Swerling (2006) studied Oral Reading Fluency (ORF) in easy text in relation to reading comprehension. Results indicate that text difficulty may be an

important variable to consider in investigations and educational evaluations of ORF. In particular, ORF in easy independent-level text may tap underlying processes such as oral language comprehension and single word reading speed rather differently than do conventional measures of reading comprehension. However, the findings are also consistent with the viewpoint (e.g., Fuchs et al., 2001; Good et al., 2001) that ORF, indexed by the number of words read correctly per second in text, is a useful tool in identification of at-risk readers (Spear-Swerling, 2006).

There are a few studies that examined relationships between gender and comprehension and oral reading ability and provided background for Research Question 2. A study by Bray & Barron (2004) used Hierarchical Linear Models (HLM) to examine the relationship between students' interest in reading passages and their performance on reading comprehension test items over those passages. The study involved 19,735 students in Grades 4 through 8. Stimuli consisted of 98 different reading passages. A small but significant relationship between interest and test performance was found, which was stronger for girls and for students of higher ability levels (Bray & Barron, 2004).

In the NAEP study of fourth grade students (Daane, et al., 2005), when rate was measured as words per minute in the first minute of oral reading, 60% of female students, as compared to 53% of male students , read at a rate of at least 130 words per minute during the first minute. Female students tended, on average, to read the entire passage at a faster rate than their male counterparts. Approximately 44% of the female fourth-graders and 33% of the male fourth-graders read the entire passage at an average rate of 130 words per minute.

Summary

Research in the area of reading comprehension and the relationship to oral fluency has been ongoing since the early 1980s. A wealth of research supports the value of oral reading fluency as an indicator of overall reading competence and its utility for helping teachers plan better instruction and affect superior student outcomes. Oral reading fluency measures a broad group of classroom- and curriculum-based tasks that are sensitive to increments in student performance and learning trends. For most readers, accuracy, speed, and phrasing in oral reading are strongly related to reading comprehension. In fact, generally speaking, as oral reading skill increases, so too does reading comprehension. Educational reform efforts emphasize increases in student performance as demonstrated by scores on criterion-referenced statewide achievement tests. It is increasingly evident that the acquisition of reading strategies and reading comprehension skills demands a large amount of effort and motivation and outstanding teachers invest substantial time and energy in supporting students' motivation and engagement in reading.

Chapter 3

METHODS

Introduction

A valuable and necessary assessment tool is needed by elementary school faculty to address a decline in reading comprehension skills of elementary level students. This research study presents measured oral reading rate data and compares these rates with actual Terra Nova reading comprehension test scores and determines that a relationship exists. The methods employed were patterned after those used in the 2002 NAEP study (Daane, et al., 2005).

Statement of the Problem

According to a fourth grade teacher at the school being observed (M. Volker, personal communication, September 5, 2006) and the Assistant Principal (M. Futryk, personal communication, October 5, 2006), Terra Nova scores for reading comprehension of fourth graders at a Las Vegas, Nevada private parochial school have continued to decline over the past 2 years. In addition, observations of weekly test results in the fourth grade classrooms indicate poor oral reading skills and low reading comprehension.

Research Questions

The following questions were addressed by this research project:

1. How do oral reading rates compare with the students' Terra Nova reading test results?
2. Will male and female students' scores differ significantly on both the oral reading rate and the Terra Nova results?
3. What specific pre-Terra Nova reading strategies can be employed to improve students' scores on the reading component of the Terra Nova test?

Research Design

This was a quantitative study designed to determine whether a relationship existed between oral reading rate and the reading comprehension component of the Terra Nova achievement test results. For the purposes of this study, Terra Nova test data for the students being evaluated in this test were compared to students' oral reading rates. The study addressed whether students' oral reading rate compares positively with reading comprehension. As part of their standard classroom reading activities, students were observed individually while orally reading a 198-word passage from a short story titled "A Box in the Barn"(Daane, et al., 2005). "The story, from which the oral reading passage was excerpted, is one of the easiest passages on the fourth-grade NAEP reading assessment"(Daane, et al., 2005, p. 5). Data were recorded and analyzed to determine if an association exists.

Another focus of this study was whether a difference existed between male and female students regarding their oral reading rate/Terra Nova comprehension comparison.

Procedures

To address Research Question Number One, "How do oral reading rates compare with the students' Terra Nova reading test results?", the following procedures were employed:

1. Students were observed individually while orally reading the 198-word passage to measure their oral reading rate.
2. Students were first given the passage to read silently and then timed on the passage to measure their oral reading rate.
3. Recognizing that oral reading rates may differ based on the time interval designated for rate calculations, and that the student may be fatigued or nervous, two measures were derived from this research.
4. Students were timed both during the first minute of reading as well as for the entire passage.
5. They were not asked to read the passage quickly, but as if they were reading it to someone who had never heard it before. "…these reading rates may be considered a natural pace for most of the students—a rate they might assume when attempting to present their best oral reading performance" (Daane, et al., 2005, p. 19).

To address Research Question Number Two, "Will male and female students' scores differ significantly on both the oral reading rate and the Terra Nova results?", as part of the procedures used in addressing Research Question Number One, the gender of the students was recorded. Data were analyzed by gender to determine whether any differences exist between males and females. The analysis consisted of plotting

comparative parallel bar graphs for male and female oral reading rates over four oral reading rate ranges.

To address Research Question Number Three, “What specific pre-Terra Nova reading strategies can be employed to improve students' scores on the reading component of the Terra Nova test?”, a review of the literature in the areas of instruction to improve reading comprehension was evaluated. Based on results of the study and the literature review, reading strategies are recommended.

Population

The research focused on observations of 69 fourth graders from two fourth grade classes (34 in class A; 35 in class B) in a private parochial elementary school in Las Vegas, Nevada. The observed student population consisted of 30 males and 39 females.

Instrumentation

Students were first given the passage to read silently and then were timed using a stop watch on the 198-word passage below (*A Box in the Barn*) to measure their oral reading rate (Daane, et al., 2005).

A Box in the Barn

Soon the house was buzzing with excitement. Megan sat on the stool watching while Mom and Aunt Nancy prepared the birthday dinner. Dad wouldn't be back for at least two hours. Jason wandered outside trying to think of something to do, but his thoughts kept returning to the box in the barn.

He started walking toward the barn, not at all sure what he'd do when he got there. He was hoping for just a glimpse of the box. Instead he heard a strange noise coming from inside the barn. He wished he could just turn back to the house, but his legs carried him into the barn. Jason saw the box. It was sitting between two bales of hay. He could hear loud wailing cries. Leaning over, Jason carefully lifted the lid. There was the most cuddly puppy he had ever seen!

‘You must be pretty scared, huh, fellow?" Jason said quietly as he held the wiggly dog. "Megan's

> going to love you!' He secretly wished the puppy was for him. After all, Mom and Dad knew that he had been wanting his own puppy. Probably Aunt Nancy didn't know that, and anyway Megan would be happy (Daane, et al., 2005, p. 59).

Recognizing that oral reading rates may differ based on the time interval designated for rate calculations, and that the student may be fatigued or nervous, two measures were derived from this research. Students were timed both during the first minute of reading as well as for the entire passage. They were not asked to read the passage quickly but as if they were reading it to someone who had never heard it before. "…these reading rates may be considered a natural pace for most of the students—a rate they might assume when attempting to present their best oral reading performance" (Daane, et al., 2005, p. 19).

As each student reads, the students' progress was recorded at one minute and again when the passage is completed. Also, the gender of each student was recorded. Data for all students are presented in the Appendix.

Data Analysis

A Pearson product-moment correlation coefficient (PPM) was calculated linking student performance on the Terra Nova achievement test to their oral reading rate. The PPM coefficient indicates the strength and direction of a linear relationship between two random variables. In this case the variables compared were oral reading rate and the Terra Nova scale score. A number of different correlation coefficients are used for different situations. "The best known is the Pearson product-moment correlation coefficient (r) …"(Wikipedia, 2006). Data were tabulated on the data collector form (see Appendix).

"A scatterplot, is a graph used in statistics to visually display and compare two or more sets of related quantitative, or numerical, data by displaying only finitely many points, each having a coordinate on a horizontal and a vertical axis" (Wikipedia, 2006). Scatter plots were created using Microsoft (MS) Excel. Oral reading rate was plotted using the horizontal axis and reading comprehension was plotted using the vertical axis. All graphs were created both for the reading rate measured in the first minute of reading as well as the rate measured over the entire passage.

"Several authors have offered guidelines for the interpretation of a correlation coefficient. Cohen (1998) has suggested the following interpretations for correlations in psychological research" (Wikipedia, 2006). MS Excel was used to calculate the PPM correlation coefficient for the data in the scatterplot.

Correlation	Negative	Positive
Small	-0.29 to -0.30	0.10 to 0.29
Medium	-0.49 to -0.30	0.30 to 0.49
Large	-1.00 to -0.50	0.50 to 1.00

In addition to the Pearson product-moment correlation coefficient (PPM), other descriptive statistics measuring points of central tendency (mode, mean, median and standard deviation) were evaluated and presented in tabular form in Chapter 4 Results.

Vertical bar graphs were created to show the distribution of oral reading rates using the same reading rate ranges used in the *Fourth-Grade Students Reading Aloud: NAEP 2002 Special Study of Oral Reading study* (Daane, et al., 2005). This allows for a comparison of the student base used in this study with the much larger base used in the

NAEP study. Vertical bar graphs were also created using the male/female gender for comparison over the same reading rate ranges. For all the bar graphs, reading rate is on the horizontal axis and percentage of total students is on the vertical axis.

Summary

This research study presents measured oral reading rate data and compares these rates with actual Terra Nova reading comprehension test scores to determine whether a relationship exists. This was a quantitative study designed to determine if a positive relationship exists between oral reading rate and the reading comprehension achievement test results. The research focused on observations of 69 fourth graders from two fourth grade classes (34 in class A; 35 in class B) in a private parochial elementary school in Las Vegas, Nevada. Students were first given the passage to read silently and then were timed using a stop watch on the 198-word passage to measure their oral reading rate. Also, the gender of each student was recorded. Data were tabulated on the data collector form (see Appendix). Scatter plots were created using MS Excel. The Pearson product-moment correlation (PPM) coefficient "r" (Leedy & Ormond, 2005, p. 266) was used to determine whether a relationship between oral reading rates and Terra Nova scale scores exists. Vertical bar graphs were created to show the distribution of oral reading rates for both the total student population observed and for the male/female population.

Chapter 4

RESULTS

This chapter presents the results of a research study investigating the relationship between oral reading rate and Terra Nova reading comprehension achievement test scores. Students were observed individually while orally reading the passage described in the Research Design. Students were first given the passage to read silently and then timed on the passage to measure their oral reading rate. Students were timed both during the first minute of reading as well as for the entire passage.

Descriptive Statistics

Research Question 1

How do oral reading rates compare with the students' Terra Nova reading test results?

Descriptive statistics for the study instruments can be found in Table 1. Study instruments include Terra Nova test scores, tabular data for oral reading rate at the one minute mark and for the total passage. For each measure, the number of students, mean, median, mode, minimum and maximum rates and the standard deviation are included. MS Excel was used to compile collected data and to generate descriptive statistics.

The oral reading rates for the observed population are higher than the rates observed in the NAEP 2002 study of oral reading rates for a much larger national population (Daane, et al., 2005). Raw data are presented in the Appendix.

Research Question 2

Will male and female students' scores differ significantly on both the oral reading rate and the Terra Nova results?

Descriptive statistics for the male and female component of the observed students can be found in Table 1. Study instruments include Terra Nova test scores, tabular data for oral reading rate at the one minute mark and for the total passage.

Table 1

Descriptive Results of Oral Reading Rates

Variable	N	Mean	Median	Mode	Min	Max	Standard Deviation
One Minute Oral Rate	69	143.7	142	143	94	198	22.19
Female One Minute	39	149.2	148	133	94	198	24.76
Male One Minute	30	136.6	135	143	109	170	16.02
Total Passage Oral Rate	69	137.7	135	145	84	205	25.00
Female Total Passage	39	144.2	141	145	84	205	27.65
Male Total Passage	30	129.4	129	132	96	167	18.35

The mean oral reading rate for females is greater than for males at both the one minute point as well as for the total passage. The minimum and maximum oral reading rates were both calculated and attributed to female students. These extreme rates, however, both lie very close to the trend line on the scatter plots (Chapter 4, Figures 1, 2, 4 and 6).

The standard deviations for the males are lower than for females at both the one minute point (16.02 male/24.76 female) and for the total passage (18.35 male/27.65 female). This would indicate the male oral reading rates generally are closer to their mean than the female rates.. The female rates are more "spread out" from their mean but correlate better (Table 2).

Data Presentation and Correlations

Research Question 1

How do oral reading rates compare with the students' Terra Nova reading test results?

Oral reading rate and Terra Nova test score data were collected and displayed in the data collector table (see Appendix). Figure 1 displays a scatterplot of the relationship between oral reading rate and Terra Nova reading comprehension test scores for the total observed student population reading the total passage.

A scatter plot consists of single data points representing WPM scaled on the abscissa and Terra Nova scores scaled on the ordinate of the plot. A positive slope of the trend line suggests a positive correlation. Scatter plots represent the association (not causation) between two variables. (Wikipedia, 2006). The slope of the trend line in Figure 1 is positive.

Figure 2 displays a scatterplot of the relationship between oral reading rate and Terra Nova reading comprehension test scores for the total observed student population reading for the first minute. The oral reading rate during the first minute of reading was measured and plotted since rates might drop after the first minute due to fatigue. The slope of the trend line in Figure 2 is positive.

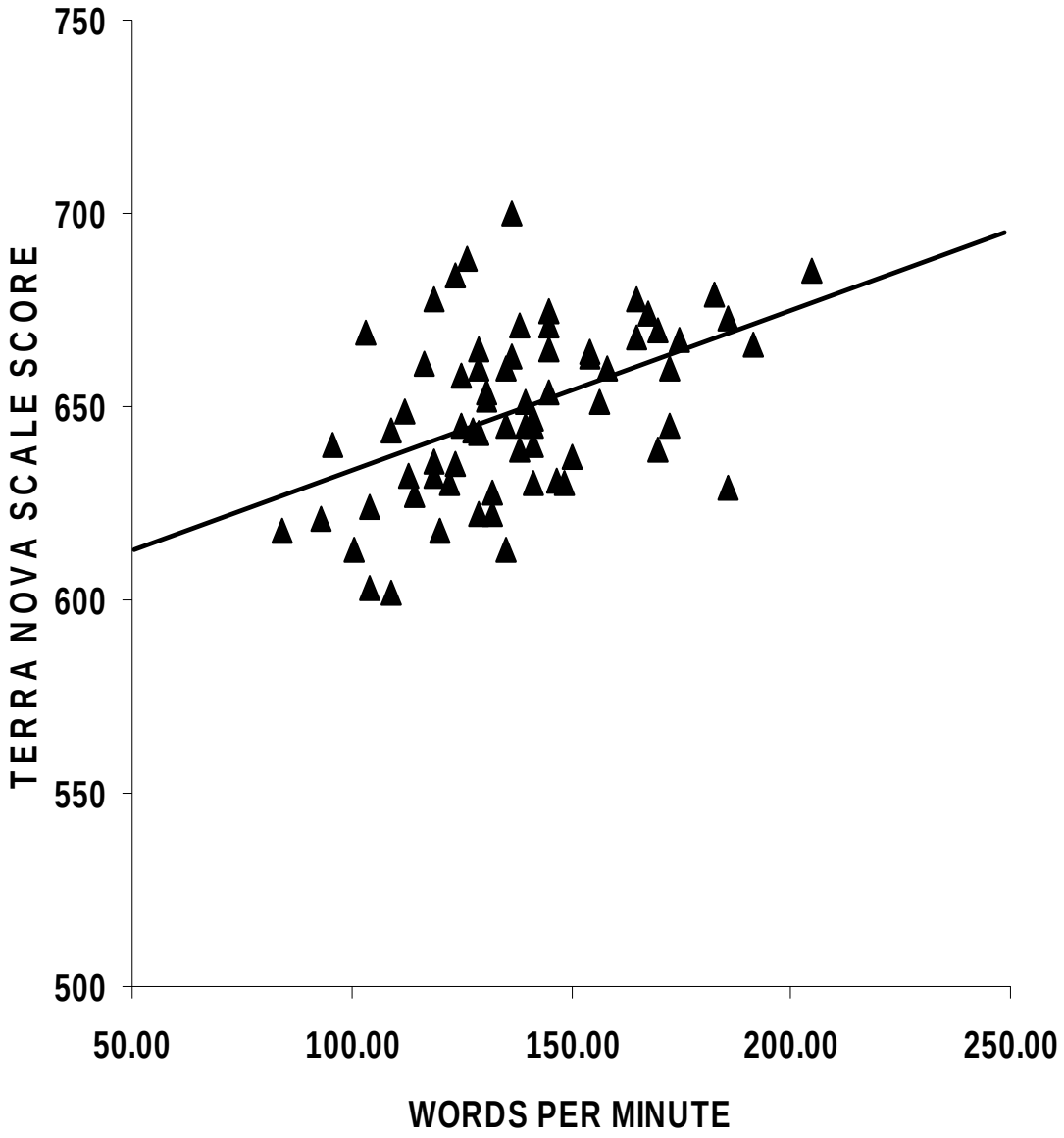

Figure 1. Scatterplot of the relationship between oral reading rate and Terra Nova reading comprehension test scores for the total observed student population (Total Passage).

Figures 3 and 4 display scatterplots for male and female oral reading rates versus Terra Nova test scores for reading the total passage. These plots are intended to indicate visually a difference in the distribution (or scatter) of the data points for males versus

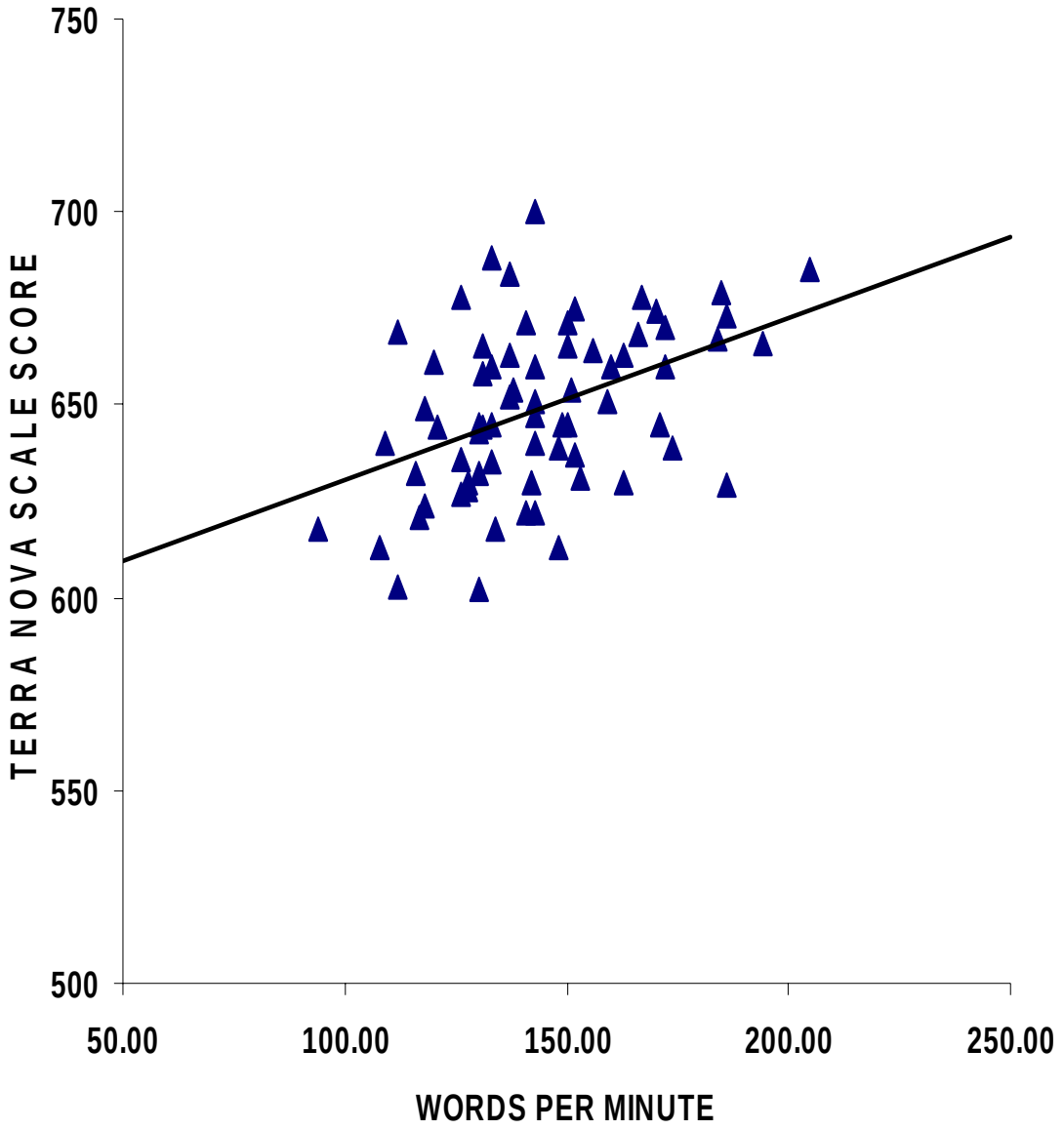

Figure 2. Scatterplot of the relationship between oral reading rate and Terra Nova reading comprehension test scores for the total observed student population (First Minute).

females for reading of the total passage. Figure 3 displays the male data and Figure 4 displays the female data. Both figures display a positive sloping trend line. The scatter of

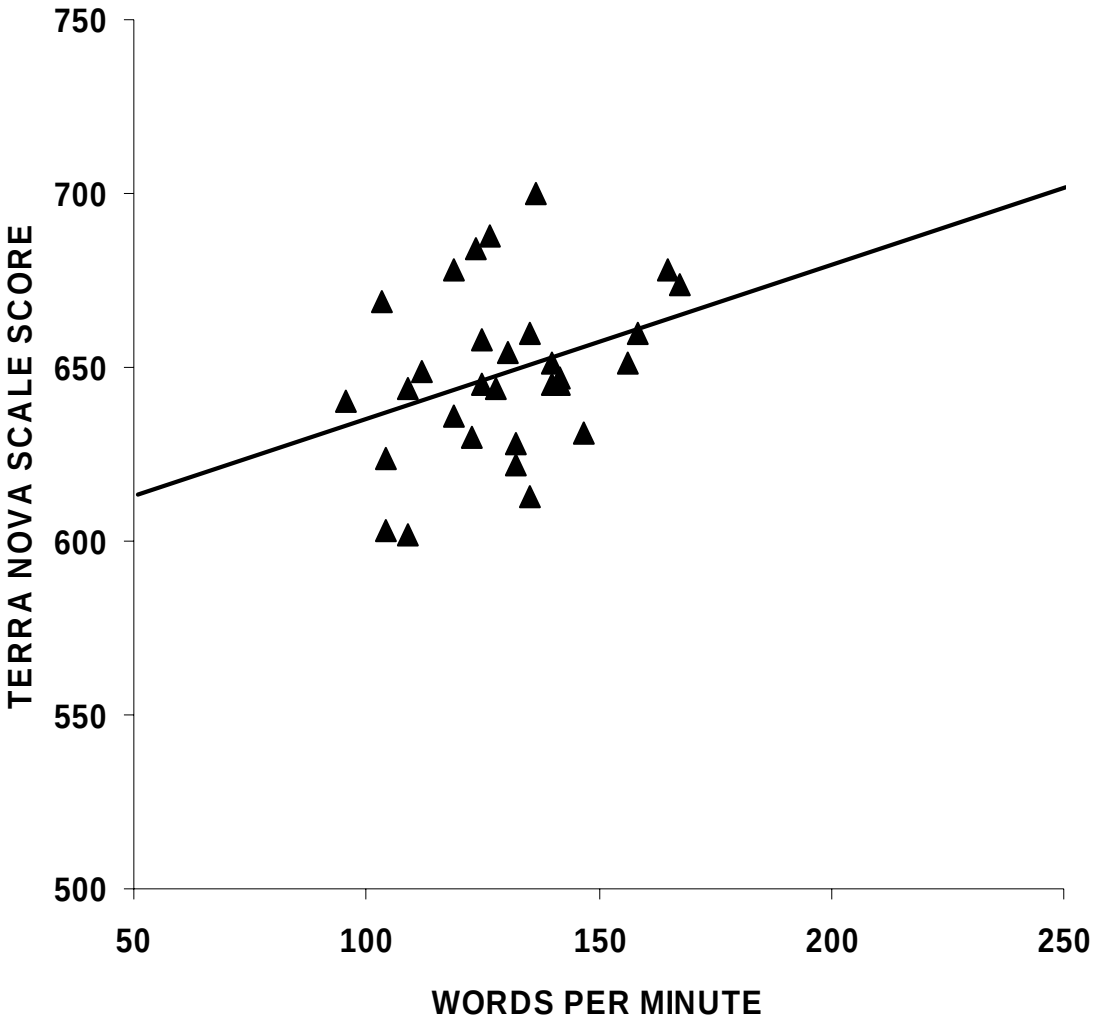

Figure 3. Scatterplot of the relationship between oral reading rate and Terra Nova reading comprehension test scores for the observed male student population (Total Passage).

the male data points is more pronounced than for the females and confirmed by a lower "r" value for males (Table 2).

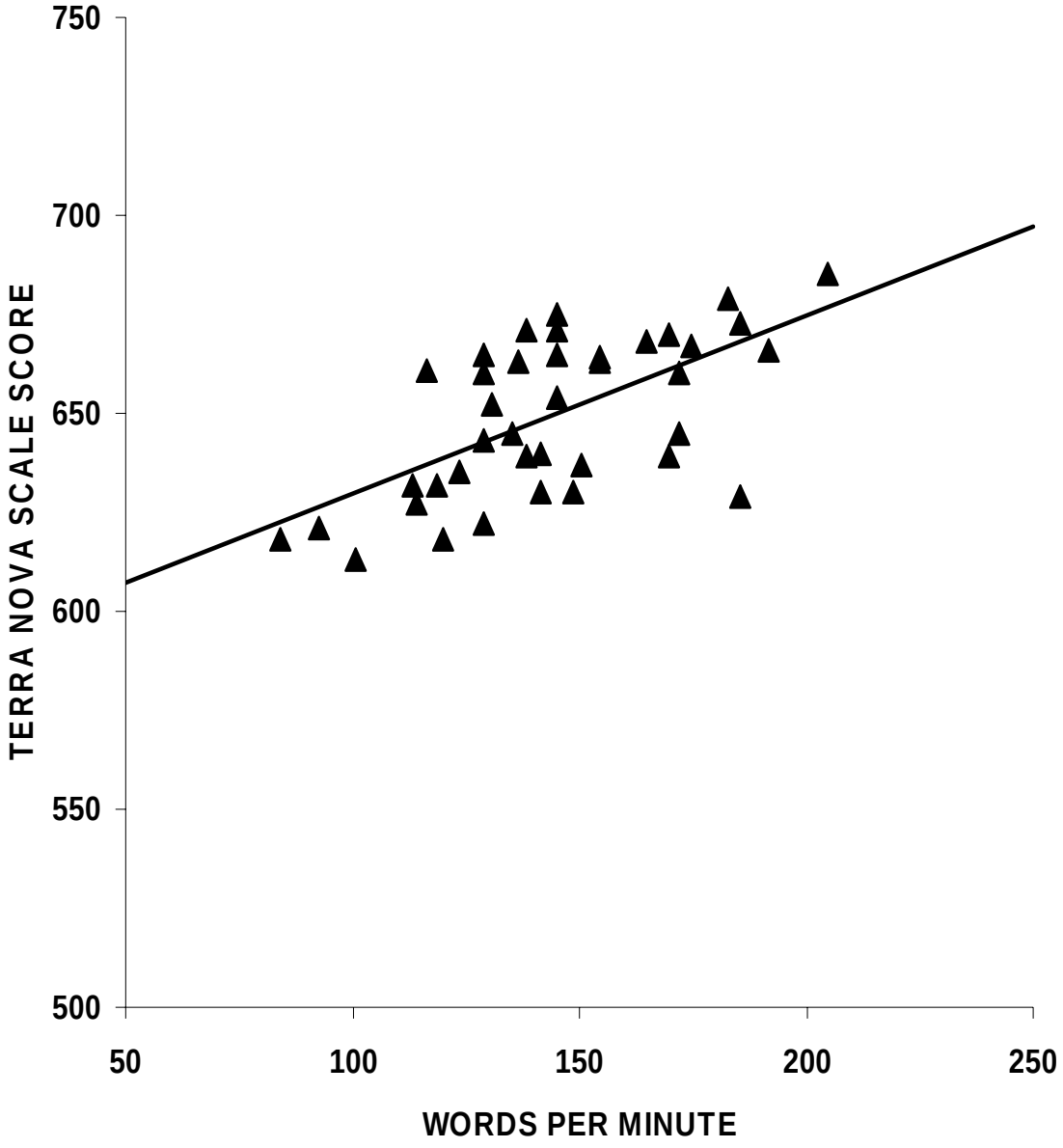

Figure 4. Scatterplot of the relationship between oral reading rate and Terra Nova reading comprehension test scores for the observed female student population (Total Passage).

Figures 5 and 6 display scatterplots for male and female oral reading rate versus Terra Nova test scores for reading after the first minute. These plots are intended to

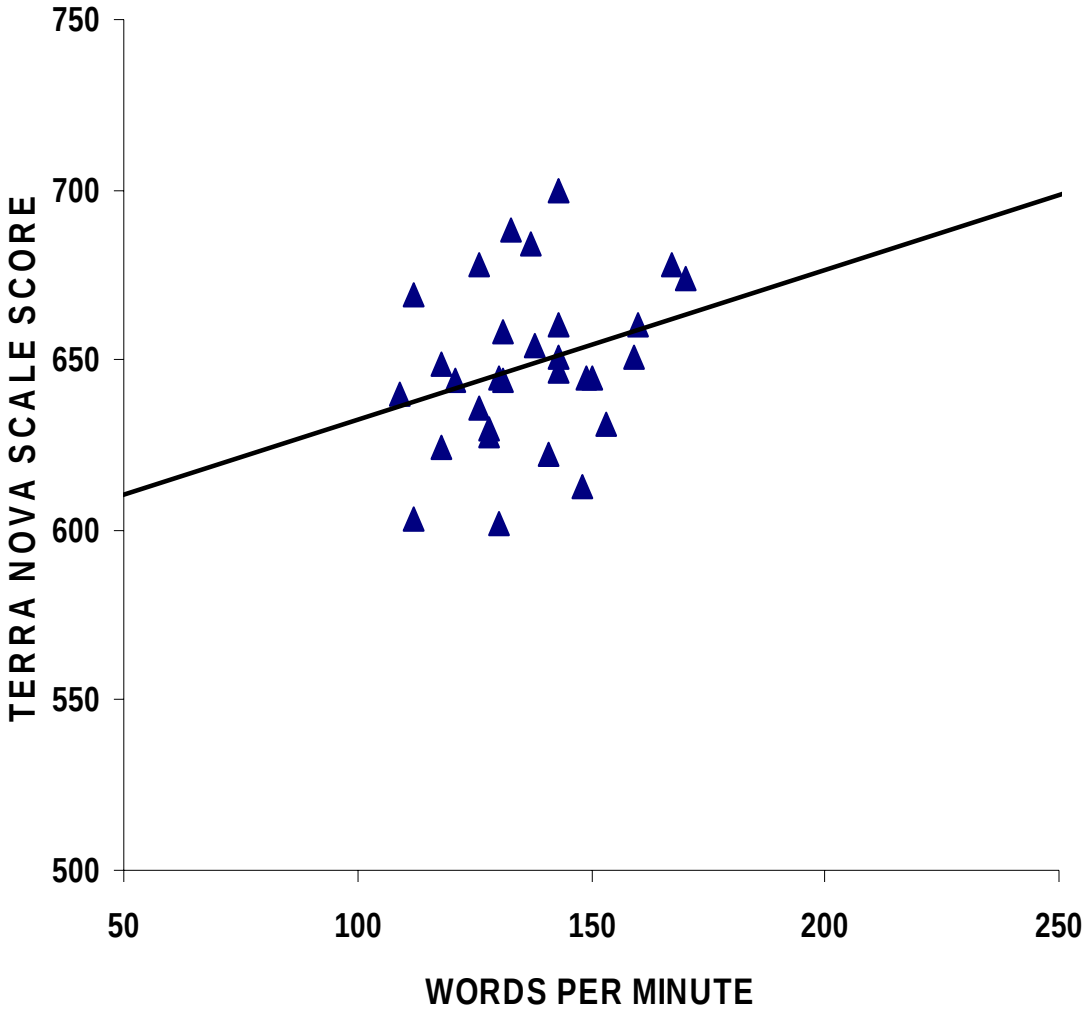

Figure 5. Scatterplot of the relationship between oral reading rate and Terra Nova reading comprehension test scores for the observed male student population (First Minute).

visually indicate a difference in the distribution (or scatter) of the data points for males versus females for reading after the first minute. Figure 5 displays the male data and

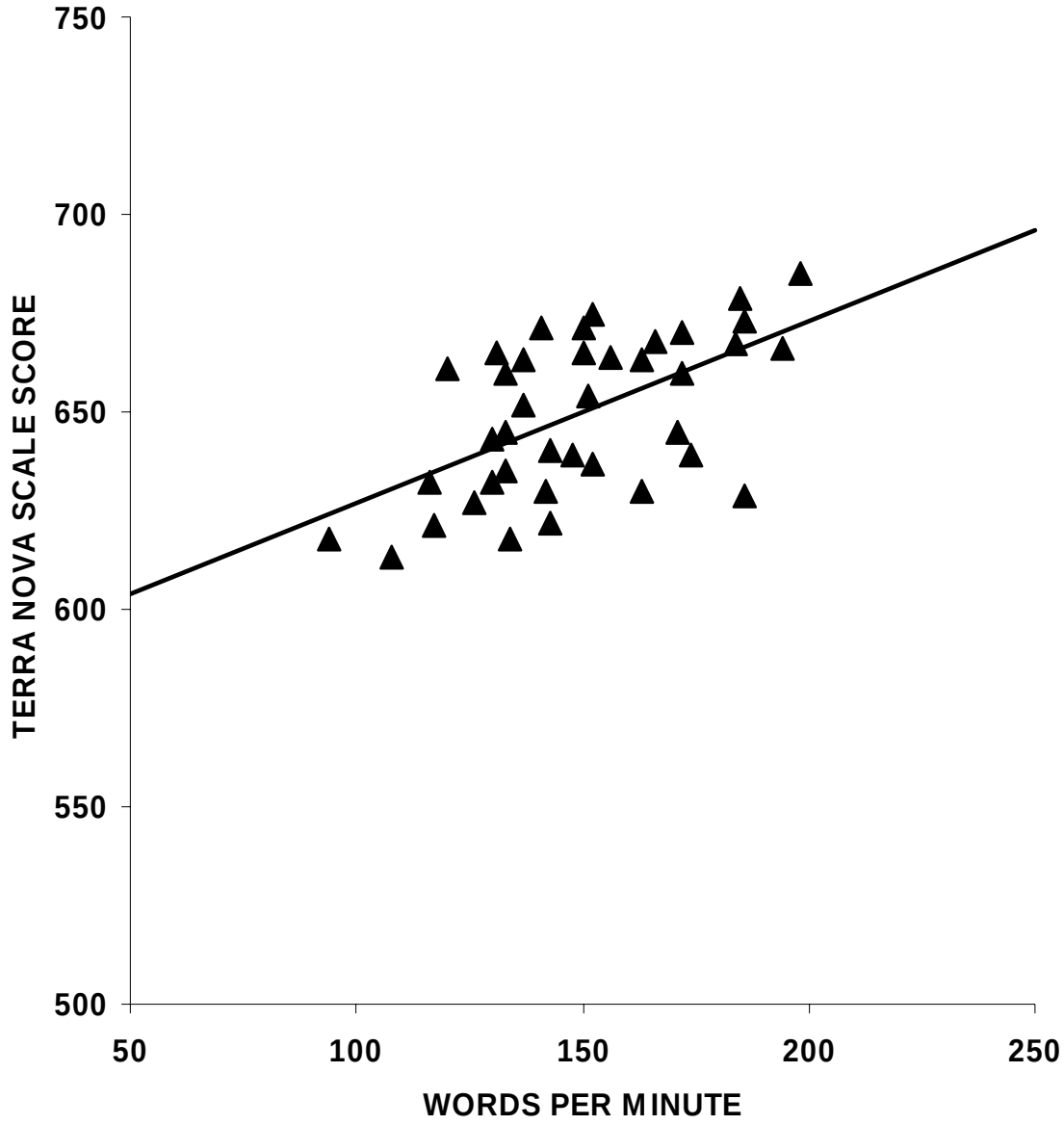

Figure 6. Scatterplot of the relationship between oral reading rate and Terra Nova reading comprehension test scores for the observed female student population (First Minute).

Figure 6 displays the female data. Both figures display a positive sloping trend line. The scatter of the male data points is more pronounced than for the females and confirmed by a lower "r" value for males (Table 2).

Pearson product-moment (PPM) correlation coefficients, "r", are calculated and tabulated in Table 2. An evaluation of the correlation suggested by Cohen (1998) is also displayed.

Table 2

Descriptive Results of Correlations

Variable	r[a]	Correlation[b]
Total observed population (Total Passage)	.48	Positive/Medium
Observed male population (Total Passage)	.33	Positive/Medium
Observed female population (Total Passage)	.63	Positive/Large
Total observed population (First Minute)	.44	Positive/Medium
Observed male population (First Minute)	.29	Positive/Small
Observed female population (First Minute)	.57	Positive/Large

Note. [a]Pearson product-moment (PPM) correlation coefficients. [b]Correlation = (Cohen, 1998)

If all data points fell directly on the trend line that would represent a perfect correlation (r = 1.0). The closer the data points cluster near the trend line, the better the correlation.

Research Question 2

Will male and female students' scores differ significantly on both the oral reading rate and the Terra Nova results?

Figures 7 and 8 present a comparison of male versus female oral reading rates for the first minute and total passage. A bar chart is used to graphically compare male and female oral reading rates in the WPM ranges used in the NAEP 2002 study. These four

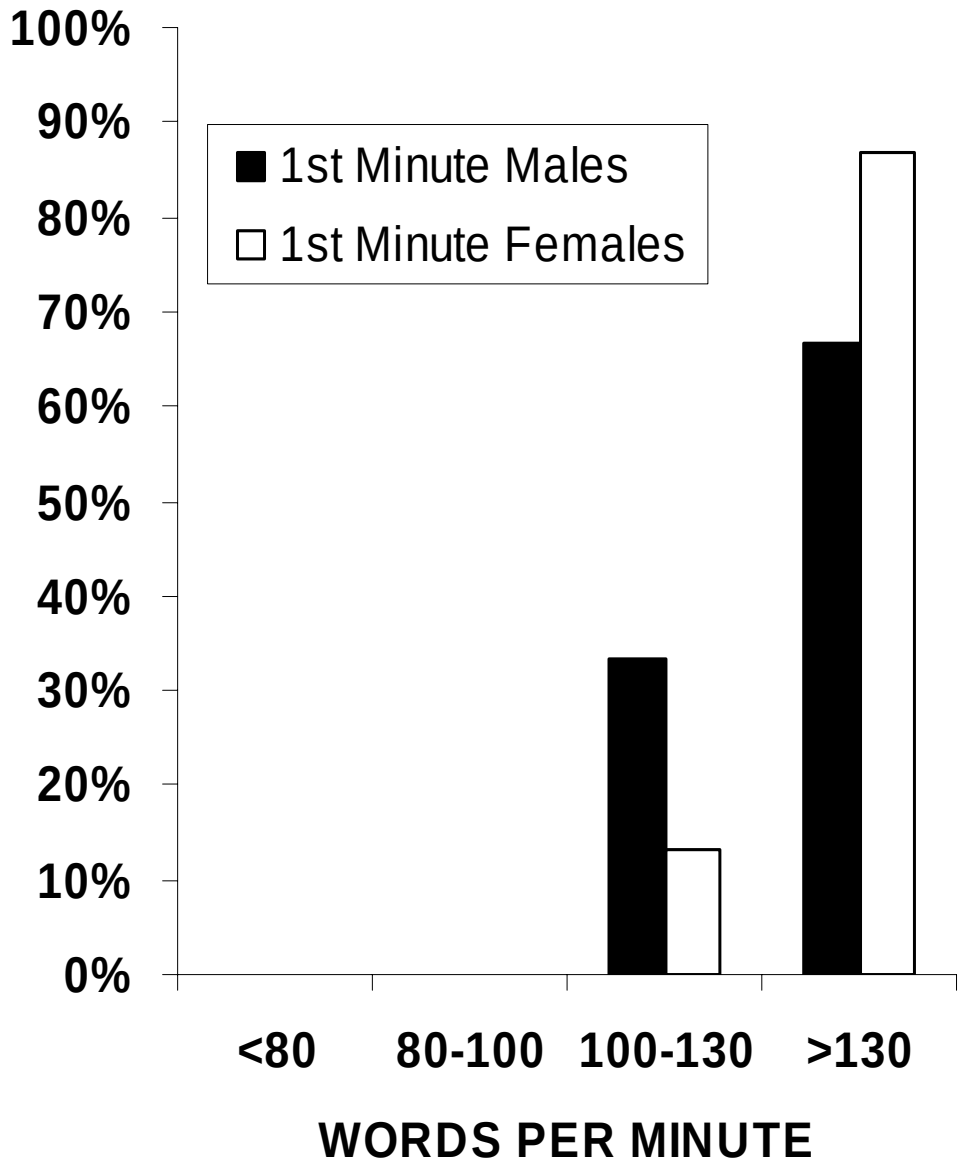

Figure 7. A comparison of male versus female oral reading rate during the first minute of reading.

ranges are scaled on the abscissa and the per cent of males/females is scaled on the ordinate. Figure 7 displays the comparative results for the first minute of reading. Figure 8 displays the comparative results for the total passage.

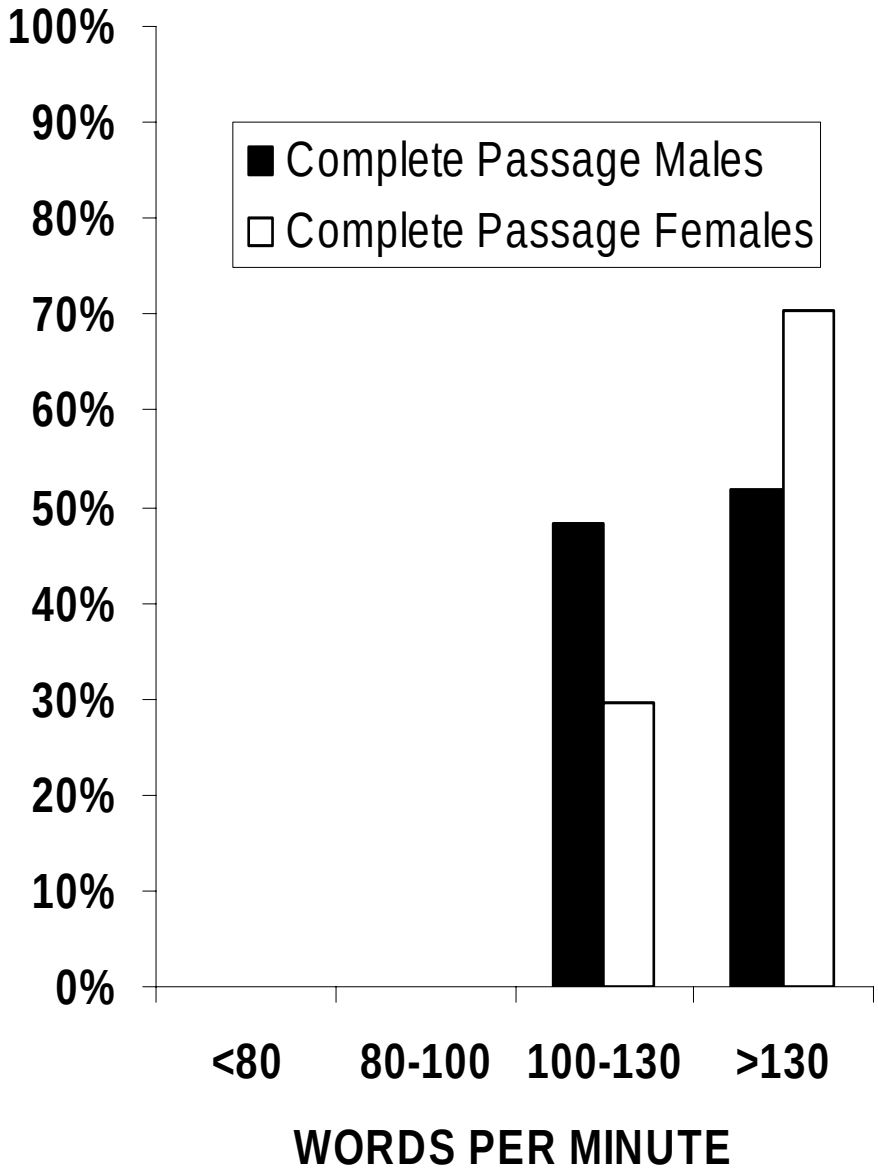

Figure 8. A comparison of male versus female oral reading rate during the total passage.

Figures 9 and 10 present a comparison of the observed population reading rates versus the NAEP 2002 population for the first minute and total passage respectively. In the interest of comparing students from the observed population with those from the NAEP 2002 study, bar graphs are plotted comparing those two groups over the same

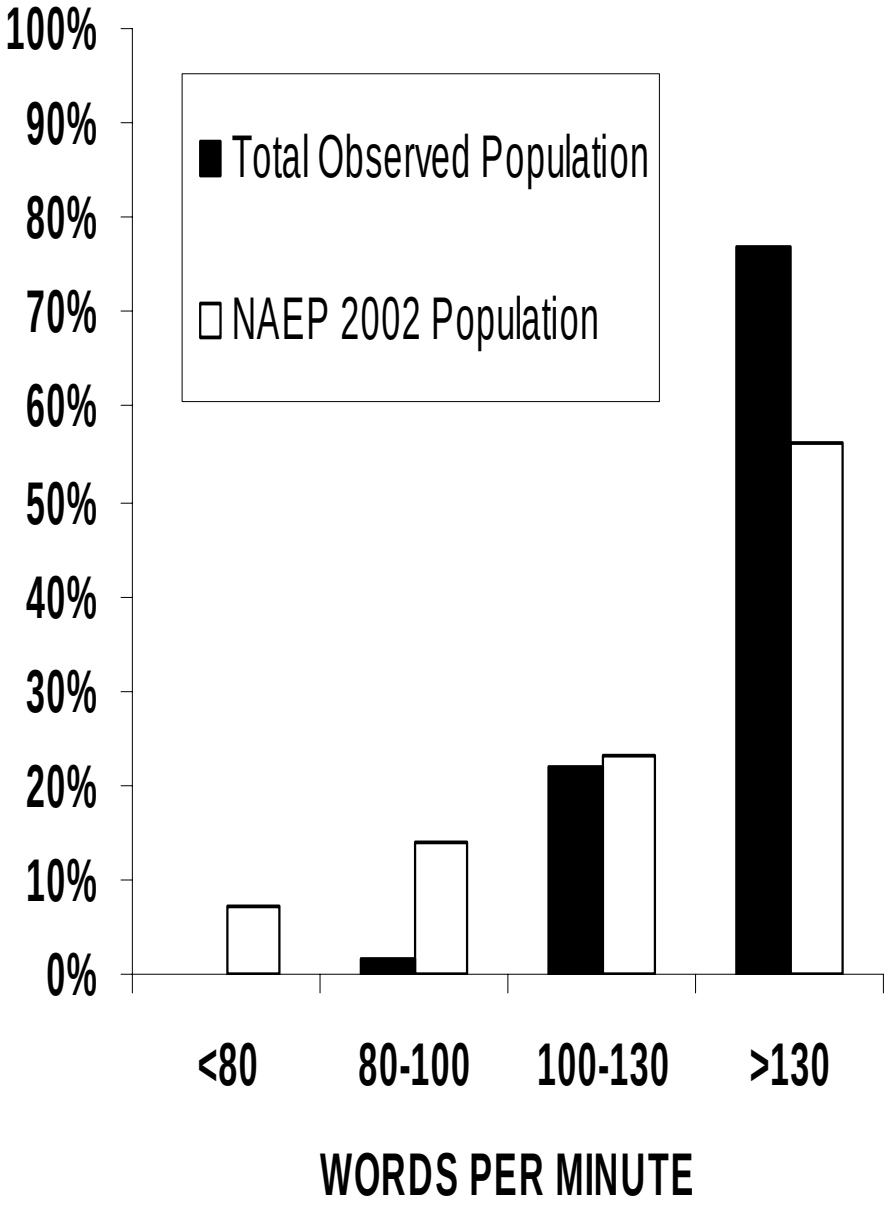

Figure 9. A comparison of the observed population versus the NAEP 2002 population oral reading rate for the first minute of reading.

WPM ranges at both the one minute point and for the total passage. Figure 9 represents the first minute of reading data and Figure 10 represents data the total passage.

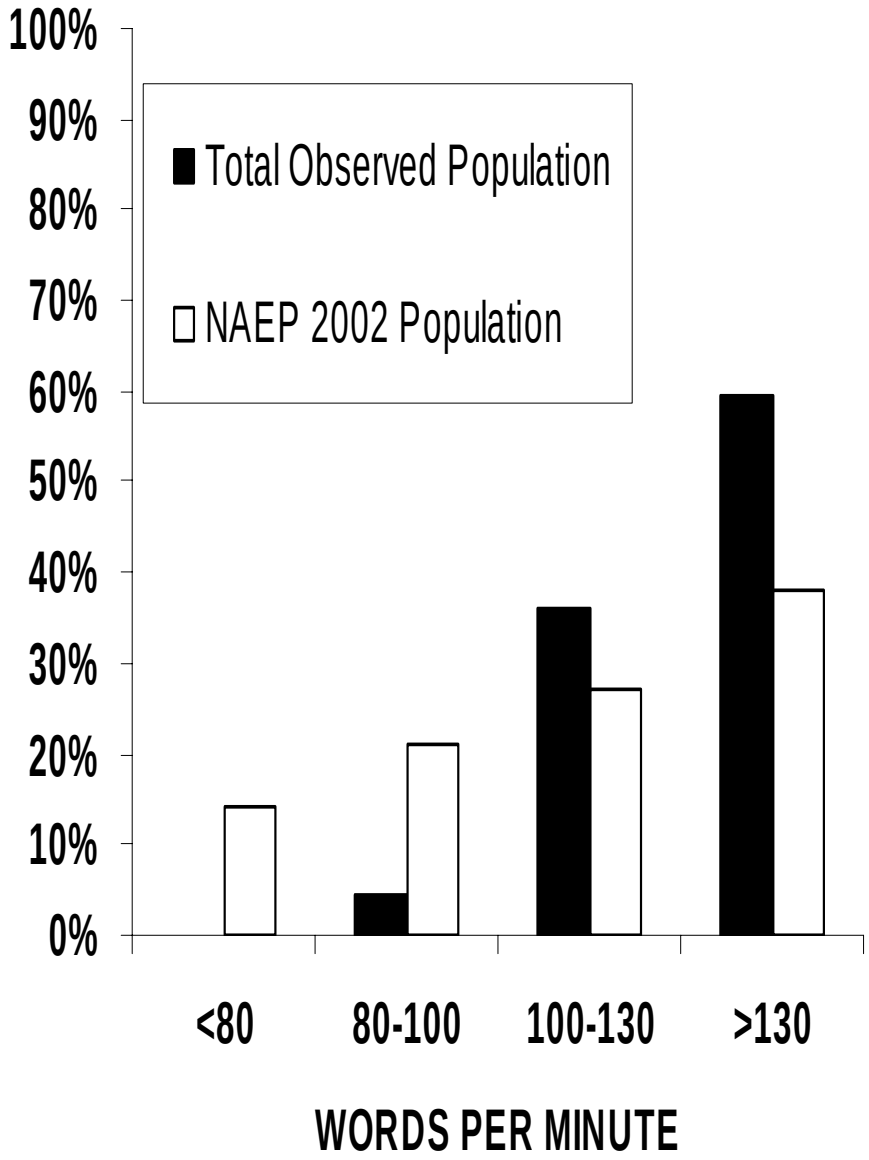

Figure 10. A comparison of the observed population versus the NAEP 2002 population oral reading rate for the total passage.

Research Question 3

Current research is useful in developing strategies to improve student scores on reading comprehension assessments as well as answer questions raised in Research Question 3: What specific pre-Terra Nova reading strategies can be employed to improve students' scores on the reading component of the Terra Nova test?

Research has indicated that unlike good readers, poor readers do not automatically monitor their comprehension while reading information from the text (Therrien, Gormley, & Kubina, 2006). Guthrie, et al., (2006) identified seven major instructional practices that increase motivation for reading and reading comprehension. These studies and suggested reading strategies to improve student's scores on the reading component of the Terra Nova test will be addressed in Chapter 5.

Chapter 5

DISCUSSION AND RECOMMENDATIONS

Introduction

The purpose of this research project was to identify a reading assessment tool to help teachers predict and address reading deficiencies prior to the annual administration of the Terra Nova achievement tests. A new oral reading assessment tool should lead to higher student satisfaction/success in reading and higher scores on the reading component of the Terra Nova tests. Several studies conducted in states in all regions of the country have found a positive, and in most cases, a statistically significant relationship between ORF and statewide tests of achievement (Crawford, Tindal, & Steiber, 2001; Daane, et al., 2005; Fuchs, et al., 2001; Good et al., 2001). This chapter discusses the results of this study in light of the research questions. Limitations of the study are presented along with implications for educators, and recommendations for further research.

Summary of the Study

A valuable and necessary assessment tool is needed by elementary school faculty to address a decline in reading comprehension skills of elementary level students. This research study presents measured oral reading rate data and compares these rates with actual Terra Nova reading comprehension test scores to determine whether a relationship exists. The following questions were addressed by this research project:

1. How do oral reading rates compare with the students' Terra Nova reading test results?

2. Will male and female students' scores differ significantly on both the oral reading rate and the Terra Nova results?
3. What specific pre-Terra Nova reading strategies can be employed to improve students' scores on the reading component of the Terra Nova test?

This was a quantitative study designed to determine if a relationship exists between oral reading rate and the reading comprehension component of the Terra Nova achievement test results. For the purposes of this study, Terra Nova test data for the students being evaluated in this test were compared to their oral reading rates. The study addressed whether students' oral reading rate compares positively with reading comprehension.

Students were observed individually while orally reading the passage described more fully in Chapter 3, Research Design. Students were first given the passage to read silently and then timed on the passage to measure their oral reading rate. Students were timed both during the first minute of reading as well as for completion of the entire passage. The results were recorded and tabulated. Data were then analyzed using descriptive statistics and a correlation coefficient (PPM) was calculated to determine whether a positive relationship existed between oral reading rate and Terra Nova reading comprehension results.

Discussion

The results of this study are presented by research questions as detailed below.

Research Question 1

How do oral reading rates compare with the students' Terra Nova reading test results?

A Pearson Product-Moment (PPM) correlation coefficient was calculated to determine whether there was a relationship between students' oral reading rate at both the one minute point and for the entire passage versus the Terra Nova scale. The overall correlation coefficients (PPM) calculated were .44 for the first minute of oral reading and .48 for reading the total passage which according to Cohen (1998) is a positive/medium correlation. Jacob Cohen has written the most on this topic. In his well-known book he suggested, a little ambiguously, that a PPM correlation of 0.5 is large, 0.3 is medium, and 0.1 is small (Cohen, 1998). The usual interpretation of this statement is that anything greater than 0.5 is large, 0.5-0.3 is moderate, 0.3-0.1 is small, and anything smaller than 0.1 is insubstantial, trivial, or otherwise not worth worrying about. A "positive" correlation means that an increase in one variable results in an increase in the corresponding variable. Correlation results for males and females are discussed under the Research Question 2 discussion.

The positive nature of the relationship is consistent with previous studies of students from all areas of the country (Crawford, Tindal, & Stieber, 2001). The Pearson product-moment (PPM) correlation coefficients for previous studies were somewhat higher than those calculated for this project. Possible explanations for this difference might be that the Terra Nova tests at the school in this project are administered very early in the school year in fall versus later for schools and districts in other areas of the country. Administering the test right after the summer school break is intended to measure the students' long-term memory retention. Other schools choose to test later in the school year possibly to measure learning for that term or to derive higher scores. Administering the Terra Nova test in the fall (as does the school in this project) has merit

in that it provides feedback for each student by December and thus allows the teacher the remainder of the term to address possible weaknesses. A spring time test however, could be optional in that it would provide the teacher who will have students for the following year more time to review the Terra Nova assessment and begin the new school year prepared to assist the children address their specific weaknesses.

Another explanation for the somewhat lower correlation for the school in this project might be the size of the population, the number of examiners and the time provided to perform testing. Past published studies covered large student bases and employed several examiners (Daane, et al., 2005)**.** This particular study was limited to a population of 69 students and one examiner with limited time. With a smaller population, the effect of outliers can be pronounced. Nevertheless, the resulting correlations are encouraging and would indicate that an oral reading rate tool could be useful in targeting low performing students to improve their reading comprehension.

A comparison of the observed population with the population studied in the NAEP 2002 study showed a major difference between the observed population and the larger national group in both the 100-130 WPM range as well as the over 130 WPM range. The national group has over 35% of the student population with an oral reading rate of less than 100 WPM versus 4.3 % for the observed group. Specifically, there were only two students in the school in this project who's oral reading rate was less than 100 WPM. A possible reason for this discrepancy might be that the observed population is from a private school where the student population does not include special education students or students with special needs.

Research Question 2

Will male and female students' scores differ significantly on both the oral reading rate and the Terra Nova results?

Correlations for the observed population by gender when comparing oral reading rate at both the one minute point and for the entire passage versus the Terra Nova scale score was “positive/large” related for the female gender and “positive/small” for the male gender (Chapter 4, Table 2). Possible explanations for the difference in male versus female performance might be the interest level of the male students compared to the female students. The passage selected was meant to be of interest to both males and females. Future assessments could benefit from using oral reading passages from curriculum-based measurement (CBM) materials.

The difference in correlation coefficients **(**Chapter 4, Table 2) for the observed male/female population is very pronounced in favor of the females. The percentage of students with oral reading rates greater than 130 words per minute (WPM) was 87% for the females versus 67% for males during the first minute of reading. Oral reading rate for the entire passage at greater than 130 WPM was in favor of the females by 70% versus 52%.

The results for the female versus male readers in this study are consistent though more pronounced than the results of the NAEP 2002 study when comparing oral reading rates. In the NAEP study of fourth grade students (Daane, et al., 2005), when rate was measured as “words per minute” in the first minute of oral reading, 60% of female students, as compared to 53% of male students, read at a rate of at least 130 words per

minute during the first minute. Female students tended, on average, to read the entire passage at a faster rate than their male counterparts. Approximately 44% of the female fourth-graders and 33% of the male fourth-graders read the entire passage at an average rate of 130 words per minute or greater.

Research Question 3

What specific pre-Terra Nova reading strategies can be employed to improve students' scores on the reading component of the Terra Nova test?

There are many references in the literature suggesting rewarding strategies to improve students' reading skills. The selection of reading materials can have a lot to do with motivating a reluctant reader. The following suggestions recommended by both Tankersley (2005) and Guthrie, Wigfield, Humenick, Perencevich, Taboada, and Barbosa (2006) are strongly recommended since they are both practical and current:

1. Permitting students to choose at least some of what they read in class can improve motivation.

2. Interest inventories can help teachers learn about what interests their students so they can recommend reading materials accordingly.

3. A simple rule is that if there are more than 7 unknown words among the first 100, the material is probably beyond the student's proficiency.

4. Students tend to read more when the texts are short, relevant, and captivating. For readers several years below grade level, there are many high interest, low vocabulary books and books on tape. Magazines and the Internet are also good resources.

5. Some teachers use discussion groups weekly and assign reading to be completed outside of class. Students read the material in preparation for the discussion and flag the interesting things they find in the text as well as parts they do not understand.

6. Teachers might use a read-aloud strategy accompanied by discussion to support students who were unable to complete the assigned reading.

7. As teachers visit each group and help direct the discussion, it may be necessary to remind groups to use examples from the text to support the point of view they expressed during the discussion.

8. At the end of the discussion, students can be asked to assess how well they performed as individuals and as a group.

Guthrie, et al., (2006) identified seven major instructional practices that increase motivation for reading and reading comprehension:

1. Using content goals for reading instruction expands students' interest and motivation. Interested students focus on gaining meaning, building knowledge, and understanding deeply, rather than on learning skills or gaining rewards.

2. Affording students choices in the classroom is a well-supported motivational practice. When students can choose the texts they read, the tasks they perform with the texts, or their partners during instruction, their intrinsic motivation for reading increases.

3. Properties of texts increase interest. When a topic is rated as interesting, when the format is appealing to students, and when materials are relevant to students' purposes in knowledge-development activities, interest and motivation increase.

4. Social goals or cooperative-learning structures in reading activities improve students' motivation and achievement.

5. Teacher involvement, which refers to students' perception that the teacher understands them and cares about their progress, is associated with intrinsic motivation for academic activities.

6. Extrinsic rewards and praise include such activities as reading for Pizza Hut prizes or working for recognition in reading are controversial, and, under some circumstances, undermine intrinsic motivation, which energizes long-term reading activities.

7. Emphasizing mastery goals in the classroom is a practice supported by most motivation theorists. When students read for mastery, they seek to gain knowledge from text, understand stories fully, and grasp the essence of literary texts, such as legends or poetry. When teachers emphasize such goals, students internalize them and become more self-determining learners, which increases their achievement in the long term. (p. 233)

Students who read well orally appear to have greater confidence in their reading ability and participate more in classroom discussions. As a result, building improved oral reading skills may have "value added" components in terms of greater participation in class activities by all students.

Limitations

The following limitations were noted in the design and implementation of this research:

1. The researcher was known to the participants. Since the researcher was from the school population being studied, results could be confounded because participants may have wanted to portray information in a certain way and/or the researcher may have held biases either positive or negative regarding specific students.
2. The data were collected over a short time frame using a small student population. Students health or attitude on the day of testing could introduce errors.
3. Research findings will also be less generalizable due to specificity of variables or the combination of specific variables (e.g., participants, time, content, conditions and variables).
4. Results are limited to specific student performance as identified in this project and are not generalized to other students in similar classrooms.

Implications for Educators

The results of this research indicate that a simple and reliable tool is available in the form of a short oral reading test on a short passage from curriculum-based materials

and the results of this test can be used to find lower performing readers that could benefit from interventions. Further, results could be used to form reading groups of students with like reading levels which leads to improved comprehension. Words "sounded out" may be unfamiliar to the student. Phonics should always be taught in context and in conjunction with other teaching strategies. Reading is a social activity that dictates our ability to communicate with others, shapes our thoughts, opinions, and ideas, and helps us to understand the world around us. It involves peers, teachers, and parents working together in support of reading and should be celebrated as a source of accomplishment and empowerment. Educators could associate readers prior knowledge, student interests and build on student experiences in choosing appropriate passages to test them in oral reading. The World Wide Web is a good resource for oral reading passages. For instance, Education World has an excellent curriculum article on reading aloud and discusses how students are never too old for oral reading (Education World, n.d.).

Recommendations

Recommendation for Improving Practice

It is recommended that reading teachers select three or four items from this extensive list of recommendations from the discussion of Research Question 3 to make progress in improving the reading scores of students. Educators need to provide, develop and foster the desire to read by engaging the students in daily reading for pleasure, information, and as a major tool for learning in all subject areas.

A good reader may be characterized as one who makes sense of print. In order to do that, the reader must employ a variety of cues to unlock meaning. These cuing systems include semantic cues (visual aids and context), structural cues (what sounds right), and

grapho-phonetic cues (letter/sound relationships). No single system alone can serve the reader well.

Another recommendation emanating from this research is to involve the parents in reading instruction and practice. Weekly newsletters emailed to parents can encourage oral reading at home and partnering with the goals of the teacher improves reading comprehension. Parental support is critical for reading improvement. A powerful tool that students enjoy using is the internet. This resource can help students with oral reading and improvement in comprehension.

Reading aloud, like other teacher demonstrations with text, helps student comprehension. Teachers need to read-aloud to give inexperienced readers access to information in the more difficult texts commonly used in content-area classes. Also, teacher "read-alouds" provide a format in which teachers can demonstrate for their students the mental processes they use to make sense of what they are reading (Ivey, 2002). Paraphrasing, summarizing, note-taking, webbing, and outlining can help students improve their reading comprehension. Teaching text structure and additional vocabulary enrichment affects reading comprehension. When students have trouble making sense of text, teachers can help by demonstrating the think-aloud strategy. The teacher selects a sample passage to read aloud to students and models the thinking processes involved in making sense of confusing sections of text. Students see the strategies that effective readers use to grapple with ambiguous passages, identify main ideas, and make logical inferences (Davey, 1983).

Recommendations for Further Research

Further research should address the limitations of the current study. First the investigator in any future study should be unknown to the student population to remove any influence caused by familiarity.

Second, results could be reviewed by multiple investigators to remove any bias introduced by a single investigator.

Third, data should be collected using a larger student population and not be subjected to tight time constraints.

Finally, longitudinal data collected from third through sixth grade when students take the school-wide Terra Nova tests would be beneficial. Through these data, a more complete picture of the long term identification effectiveness of oral reading rate versus Terra Nova test scores could be found. In addition, these data would provide information on best timing for interventions to improve reading scores.

Chapter Summary

The current study contributed to the research base by examining the relationship between oral reading rates and Terra Nova test score results. Consistent with previous research, oral reading rates were correlated significantly with fourth grade students' scores on the reading portion of the Terra Nova Achievement Test. It appears that an oral reading test similar to that explored in this study can be used to monitor students' performance in relation to Terra Nova outcomes. These data have several implications but must be interpreted with caution due to the limitations of the study.

REFERENCES

Bray, G. B. & Barron, S. (2004). Assessing reading comprehension: The effect of text-based interest, gender, and ability. *Educational Assessment, 9,* 3&4, 107-128. Retrieved October 2, 2006 from http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=14535998&site=ehost-live

Cohen, J., Cohen P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences.* (2nd ed.) Hillsdale, NJ: Lawrence Erlbaum Associates.

Correlation. (2006). In *Wikipedia, The Free Encyclopedia*. Retrieved October 4, 2006 from http://en.wikipedia.org/wiki/Correlation_coefficient

Crawford, L., Tindal, G., & Stieber, S. (August 1, 2001) Using oral reading rate to predict student performance on statewide achievement tests. *Educational Assessment*, 7, 303-323. Retrieved October 3, 2006 from *Expanded Academic ASAP* via Thomson Gale: http://find.galegroup.com.dml.regis.edu/itx/infomark.do?&contentSet=INGENTA&type=retrieve&tabID=T002&prodId=EAIM&docId=CA98710850&source=gale&userGroupName=regis_main&version=1.0

Daane, M.C., Campbell, J.R., Grigg, W.S., Goodman, M.J., & Oranje, A. (2005). *Fourth-grade students r*eading aloud: *NAEP 2002 Special study of oral reading* (NCES 2006-469). U.S. Department of Education. Institute of Education Sciences, National Center for Education Statistics. Washington, DC: Government Printing Office.

Davey, B. (1983). Think aloud: Modeling the cognitive processes of reading comprehension. *Journal of reading,* 27)1), 44-47.

Davidson, M., & Myhre, O. (2000). Measuring reading at grade level. *Educational Leadership*; 57, 25-28. Retrieved September 29, 2006 from 1chttp://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=3270126&site=ehost-live

Designed Instruction, LLC. (n.d.). *Improving reading comprehension: Making the oral reading connection in the early stages.* Retrieved September 22, 2006 from http://www.designedinstruction.com/learningleads/oral-reading-comprehension.pdf

Education World. (n.d.). *Reading aloud – Are students ever too old?.* Retrieved November 10, 2006 from http://www.education-world.com/a_curr/curr081.shtml

Ehri, L.C. (2002). Phases of acquisition in learning to read words and implications for teaching. In R. Stainthorp and P. Tomlinson (Eds.) *Learning and teaching reading.* London: British Journal of Educational Psychology Monograph Series II.

Fuchs, L. S., Fuchs, D., Hosp, M. K., & Jenkins, R. (2001). Oral reading fluency as an indicator of reading competence: A theoretical, empirical, and historical analysis. *Scientific Studies of Reading*; 5, 239-256. Retrieved September 28, 2006 from http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=4802798&site=ehost-live

Good, R. H., Simmons, D. C., & Kame'enui, E. J. (2001). The importance and decision-making utility of a continuum of fluency-based indicators of foundational reading skills for third-grade high-stakes assessment. *Scientific Studies of Reading* 5, 257-288. Retrieved October 1, 2006 from http://search.ebscohost.com/login.aspx?direct=true&db=aph&jid=7MY&site=ehost-live

Guthrie, J. T., Wigfield, A., Barbosa, P., Perencevich, K. C., Taboada, A., Davis, M. H., et al. (2004). Increasing reading comprehension and engagement through concept-oriented reading instruction. *The Journal of Educational Psychology,* 96.3, 403-423.

Guthrie, J. T., Wigfield, Humenick, N. M., Perencevich, K. C., Taboada, A., & Barbosa, P. (2006). Influences of stimulating tasks on reading motivation and comprehension. *The Journal of Educational Research,* 99.4, 232-245.

Hudson, R. F., Lane, H. B., & Pullen, P. C. (2005). Reading fluency assessment and instruction: What, why and how? *Reading Teacher*, 58, 702-705. Retrieved September 30, 2006 from http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=16830279&site=ehost-live

Ivey, G. (2002). Getting started: Manageable literacy practices. *Educational Leadership,,* 60, *22-23.*

Kame'enui, E. J., & Simmons, D.C. (2001). Introduction to this Issue: The DNA of reading fluency. *Scientific Studies of Reading, 5*, 203-210.

Leedy, P. D. & Ormrod, J. E. (2005). *Practical research* (8th ed.).New Jersey: Pearson Merrill Prentice Hall

National Institute for Literacy. (n.d.). *Print skills (Alphabetics) Rate & fluency.* Retrieved September 23, 2006 from http://www.nifl.gov/readingprofiles/MC_Oral_Reading_Rate.htm

Osborn, J., Lehr, F., & Osborn, J., Lehr, F., & Hiebert, E.H. (2003). *A Focus on Fluency A Focus on Fluency*. Monograph published by Pacific Resources for Education and Learning.

Spear-Swerling, L. (2006). Children's reading comprehension and oral reading fluency in easy text. *Reading and Writing, 19*, 199-220.

Tankersley, K. (2005). Highlights from *Literacy Strategies for Grades 4 to 12: Reinforcing the Threads of Reading*, ASCD. Retrieved October 2, 2006 from http://www.curriculum.org/thinkliteracy/files/Research.pdf.

The National Reading Panel. (n.d.). *Five components of reading instruction. Bethesda, MD.* Retrieved September 28, 2006 from http://www.nwrel.org/learns/resources/toolkit/NationalReadingPanel_FAQ.pdf

Therrien, J. T., Gormley, S., & Kubina, R. M. (2006). Boosting fluency and comprehension to improve reading achievement. *Teaching Exceptional Children*, 38, 3, 22-26. Retrieved October 2, 2006 from http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=20342162&site=ehost-live

Wikipedia, The Free Encyclopedia. (2006). *Scatterplot*. Retrieved November 9, 2006 from http://en.wikipedia.org/wiki/Scatterplot

APPENDIX

DATA COLLECTION TABLE

STUDENT NUMBER	GROUP	M/F	WPM (1 min)	TIME TO READ WHOLE PASSAGE Minutes	Seconds	WPM	TERRA NOVA SCORES (SCALE SCORE)
1	A	M	131.00	1	33	127.74	644
2	A	F	152.00	1	22	144.88	675
3	A	F	172.00	1	9	172.17	660
5	A	F	142.00	1	24	141.43	630
7	A	F	204.83	0	58	204.83	685
8	A	M	128.00	1	30	132.00	628
4	A	F	163.00	1	20	148.50	630
10	A	F	174.00	1	10	169.71	639
11	A	M	149.00	1	25	139.76	645
12	A	F	150.00	1	22	144.88	671
13	A	F	130.10	1	32	129.13	643
14	A	F	130.10	1	40	118.80	632
15	A	M	118.00	1	54	104.21	624
16	A	F	151.00	1	22	144.88	654
17	A	M	137.00	1	36	123.75	684
18	A	M	143.00	1	28	135.00	660
19	A	F	163.00	1	17	154.29	663
20	A	M	148.00	1	28	135.00	613
21	A	F	186.00	1	4	185.63	629
22	A	M	126.00	1	40	118.80	636
23	A	F	152.00	1	19	150.38	637
24	A	M	131.00	1	35	125.05	658
25	A	F	184.00	1	8	174.71	667
26	A	F	186.00	1	4	185.63	673
27	A	M	118.00	1	46	112.08	649
28	A	M	112.00	1	55	103.30	669
29	A	M	121.00	1	49	108.99	644
30	A	M	128.00	1	37	122.47	630
31	A	F	150.00	1	22	144.88	665
32	A	F	126.00	1	44	114.23	627
33	A	F	137.00	1	27	136.55	663
34	A	M	153.00	1	21	146.67	631
35	A	F	137.00	1	31	130.55	652
36	A	F	116.00	1	45	113.14	632

APPENDIX (continued)

DATA COLLECTION TABLE

STUDENT NUMBER	GROUP	M/F	WPM (1 min)	TIME TO READ WHOLE PASSAGE Minutes	Seconds	WPM	TERRA NOVA SCORES (SCALE SCORE)
1	B	F	117.00	2	8	92.81	621
2	B	F	166.00	1	12	165.00	668
3	B	F	131.00	1	32	129.13	665
4	B	M	141.00	1	30	132.00	622
5	B	F	171.00	1	9	172.17	645
6	B	F	156.00	1	17	154.29	664
7	B	M	130.10	1	35	125.05	645
8	B	M	126.00	1	40	118.80	678
9	B	F	143.00	1	32	129.13	622
10	B	F	120.00	1	42	116.47	661
11	B	M	143.00	1	27	136.55	700
12	B	M	143.00	1	24	141.43	647
13	B	M	133.00	1	34	126.38	688
14	B	M	130.10	1	49	108.99	602
15	B	M	138.00	1	31	130.55	654
16	B	F	172.00	1	10	169.71	670
17	B	M	150.00	1	24	141.43	645
18	B	F	94.00	2	21	84.26	618
19	B	M	167.00	1	12	165.00	678
20	B	M	109.00	2	4	95.81	640
21	B	F	143.00	1	24	141.43	640
22	B	F	194.00	1	2	191.61	666
23	B	M	112.00	1	54	104.21	603
24	B	F	185.00	1	5	182.77	679
25	B	M	160.00	1	15	158.40	660
26	B	F	133.00	1	28	135.00	645
27	B	F	108.00	1	58	100.68	613
28	B	F	133.00	1	36	123.75	635
29	B	F	134.00	1	39	120.00	618
30	B	M	159.00	1	16	156.32	651
31	B	M	170.00	1	11	167.32	674
33	B	F	141.00	1	26	138.14	671
34	B	F	148.00	1	26	138.14	639
35	B	F	133.00	1	32	129.13	660
36	B	M	143.00	1	25	139.76	651