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Comparing the Reading Behaviors in Three Groups of First Grade Students - Students Who Discontinued from Reading Recovery, Students Who Did Not Discontinue from Reading Recovery, and Students Who Never Needed Reading Recovery

Sharon Greaney

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COMPARING THE READING BEHAVIORS IN THREE GROUPS OF FIRST GRADE STUDENTS - STUDENTS WHO DISCONTINUED FROM READING RECOVERY, STUDENTS WHO DID NOT DISCONTINUE FROM READING RECOVERY, AND STUDENTS WHO NEVER NEEDED READING RECOVERY

By

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A DISSERTATION

Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Education (in Literacy Education)
The Graduate School
The University of Maine

May, 2010

Advisory Committee:
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The purpose of this study was to compare the variety, complexity, and frequency of reading behaviors of three groups of first grade students – students who discontinued from Reading Recovery (D-RR), students who did not discontinue from Reading Recovery (ND-RR), and students who never needed Reading Recovery (A-NRR).

Students were asked to read from four frequently used assessments – The Scott-Foresman Testing Packet, The Qualitative Reading Inventory – 4, Oral Reading Fluency and the Burt Word Test. An analysis of over 3,000 reading actions revealed four categories: (a) solving behaviors, (b) substitutions, (c) repetitions, and (c) behaviors that did not fit into the other categories. Students demonstrated the complexity of reading through varied reading actions and the word-solving strategies used. Students worked at
the word and sub-word level, taking from one to five steps to solve or attempt to solve a word and displayed 103 different word-solving patterns.

This study found that all readers displayed a wide range of reading actions when they read, but there were differences between the two Reading Recovery groups. D-RR and A-NRR read at similar reading level, while ND-RR read at lower levels. The two higher groups also displayed different reading actions than ND-RR. The more proficient readers - D-RR and A-NRR - made more successful attempts in their reading. Their substitutions were more likely to make sense and be visually similar. When solving words, D-RR and A-NRR tended to use larger word parts when they solved. When the strategies for reading words in isolation and continuous text were compared, D-RR used smaller word parts when they read words in isolation.

The findings suggested that there were differences between ND-RR and D-RR beyond reading level, while D-RR looked similar to A-NRR in most respects. This study demonstrated the complexity of the reading process and the need for teachers to understand this complexity as they teach students to read. Implications for teaching word learning to early readers were also explored.
DEDICATION

I dedicate this work to my father, Arthur Greaney. Through your example, you taught me what it means to be a life-long learner. I wish you were here at the end of this journey.
ACKNOWLEDGEMENTS

First, I would like to thank the members of my Advisory Committee, Janice Kristo, Rosemary Bamford, Janet Fairman, Mary Rosser, and Janet Spector. Without your help and guidance, I would never have completed this research. I am especially grateful to Dr. Janice Kristo for always being there to answer questions, offer support, and keep the process going. Special thanks to Dr. Janet Spector who guided me through the statistical analysis with unwavering patience. Mary Rosser, whose expertise in Reading Recovery, provided the background I needed for this endeavor.

I would like to thank Dr. Judith Pusey who provided encouragement and made it possible for me to continue to work as I completed this dissertation. Her support and faith in me were invaluable.

I am grateful to all the administrators and teachers who generously welcomed me into their schools and I am grateful to the parents who allowed me to observe their children. In particular, I am thankful to the children who read their very best while I observed them. I have learned so much from each and every one of these youngsters.

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## TABLE OF CONTENTS

DEDICATION .................................................................................................................. iii

ACKNOWLEDGEMENTS ............................................................................................... iv

LIST OF TABLES ........................................................................................................... xi

LIST OF FIGURES ......................................................................................................... xii

Chapter

1. INTRODUCTION ......................................................................................................... 1

   Rationale for This Study ............................................................................................. 2

   Purpose of the Study .................................................................................................. 4

      Problem Statement and Research Question ......................................................... 4

   Definition of Terms ..................................................................................................... 6

   End of Program Status for Reading Recovery Students ........................................... 6

      Discontinued .......................................................................................................... 6

      Not Discontinued ................................................................................................... 6

   Reading Behaviors ................................................................................................. 6

   Reading Recovery Site .............................................................................................. 7

   Running Records ....................................................................................................... 7

   Strategic Activities .................................................................................................... 8

   Strategic Processing .................................................................................................. 8

   Word-Solving ............................................................................................................ 8

   Word-Solving Patterns ............................................................................................. 8

   Organization of the Dissertation .............................................................................. 9
2. REVIEW OF THE LITERATURE ................................................................. 10

Description of Reading Recovery ......................................................... 10

Reading Recovery Lesson Framework ................................................... 11

Rereading Two or More Familiar Books .................................................. 12

Rereading Yesterday’s New Book and Taking a Running Record ................. 12

Working with Magnetic Letters ............................................................. 12

Writing a Story ....................................................................................... 12

Hearing and Recording Sounds ............................................................... 13

Reconstructing the Cut-up Story ............................................................... 13

Listening to the New Book Introduction .................................................. 13

Attempting to Read the New Book ........................................................... 14

Training and Professional Development .................................................. 14

Effectiveness of Reading Recovery ......................................................... 19

Clay’s Theory of Early Literacy Acquisition .............................................. 20

Observing the Reading Process ............................................................... 29

Systematic Observation ........................................................................... 29

Running Records .................................................................................... 30

Miscue Analysis ...................................................................................... 31

Strengths and Criticisms of Error Analysis .............................................. 32

Reading Behavior Using Continuous Text ................................................. 34

Longitudinal Studies .............................................................................. 34

Text Reading at One Point in Time .......................................................... 38
Summary of the Studies ................................................................. 40
A Synthesis of the Literature ......................................................... 41

3. DESIGN AND PROCEDURES ...................................................... 44
Research Design ........................................................................... 44
Subjects ....................................................................................... 45
Data Collection ............................................................................ 47
Selection of Instruments ............................................................... 47
  Running Records of Text Reading ............................................... 47
  Qualitative Reading Inventory 4 (QRI-4) ................................. 49
  Scott-Foresman Testing Packet (SFTP) ........................................ 50
  Burt Word Reading Test (BWT) ................................................ 50
  Oral Reading Fluency (ORF) .................................................... 51
General Data Collection Procedures ............................................ 52
  Administration of Tasks .............................................................. 52
    SFTP .................................................................................... 53
    QRI-4 ................................................................................ 53
    BWT .................................................................................. 53
    ORF .................................................................................. 54
Scoring Procedures ...................................................................... 54
  Running Records of Continuous Text: SFTP, QRI-4, ORF ........ 54
  Burt Word Reading Test ............................................................ 56
  Oral Reading Fluency ............................................................... 57
4. RESULTS ............................................................................................................. 58
Reading Levels ....................................................................................................... 58
  Students Meeting Grade Level Expectations ..................................................... 58
  Mean Score Differences .................................................................................... 59
  Mean Accuracy of Text Reading ........................................................................ 61
Reading Behaviors ............................................................................................... 62
  Categories of Reading Behaviors on Continuous Text ...................................... 62
  Categories of Reading Behaviors on Words in Isolation ................................. 64
  Successful Attempts ......................................................................................... 64
Substitutions ......................................................................................................... 66
  Real Word Substitutions on Continuous Text .................................................. 67
  Real Word Substitutions on Words in Isolation ............................................... 66
  Visually Similar Substitutions on Continuous Text ......................................... 69
  Visually Similar Substitution on Words in Isolation ......................................... 70
  Meaningful Substitutions on Continuous Text .................................................. 70
Word-Solving Behaviors ..................................................................................... 71
  Word-Solving Behaviors on Continuous Text .................................................. 72
  Word-Solving Behaviors on Words in Isolation ............................................... 74
A Summary of the Findings ................................................................................ 76
  Similarities Between All Three Groups ......................................................... 76
  Similarities Between D-RR and A-N-RR ......................................................... 77
  Other Differences Between Groups ................................................................. 79
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. DISCUSSION</td>
<td>80</td>
</tr>
<tr>
<td>Major Findings and Conclusion</td>
<td>80</td>
</tr>
<tr>
<td>Achievement</td>
<td>81</td>
</tr>
<tr>
<td>Reading Behaviors</td>
<td>83</td>
</tr>
<tr>
<td>Between-Group Differences in Behaviors</td>
<td>86</td>
</tr>
<tr>
<td>Substitutions</td>
<td>87</td>
</tr>
<tr>
<td>Word-Solving</td>
<td>88</td>
</tr>
<tr>
<td>Text Level</td>
<td>92</td>
</tr>
<tr>
<td>Reading Rate</td>
<td>92</td>
</tr>
<tr>
<td>Reading Words in Isolation</td>
<td>93</td>
</tr>
<tr>
<td>Reading Behaviors in First Versus Second Grade Students</td>
<td>96</td>
</tr>
<tr>
<td>Implications</td>
<td>98</td>
</tr>
<tr>
<td>Understanding the Complexity of the Reading Process</td>
<td>99</td>
</tr>
<tr>
<td>Teaching for Meaning</td>
<td>100</td>
</tr>
<tr>
<td>Teaching for Word Learning</td>
<td>101</td>
</tr>
<tr>
<td>Use of Varied Assessments and Multiple Measures</td>
<td>104</td>
</tr>
<tr>
<td>Using Running Records Effectively</td>
<td>105</td>
</tr>
<tr>
<td>Recommendations for Future Research</td>
<td>107</td>
</tr>
<tr>
<td>Study Design</td>
<td>107</td>
</tr>
<tr>
<td>Other Questions for Further Research</td>
<td>109</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>110</td>
</tr>
<tr>
<td>APPENDICES</td>
<td>117</td>
</tr>
<tr>
<td>Appendix A. Conventions of Running Records</td>
<td>118</td>
</tr>
</tbody>
</table>
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Reading Levels for Three Groups of Readers</td>
<td>60</td>
</tr>
<tr>
<td>4.2</td>
<td>Mean Percentages of Accuracy of Text Reading</td>
<td>62</td>
</tr>
<tr>
<td>4.3</td>
<td>Mean Percentages of Types of Behaviors in Three Groups of Readers</td>
<td>63</td>
</tr>
<tr>
<td>4.4</td>
<td>Mean Percentages of Types of Successful Attempts by Reader Group</td>
<td>65</td>
</tr>
<tr>
<td>4.5</td>
<td>Mean Percentages of Types of Substitutions by Reader Group</td>
<td>68</td>
</tr>
<tr>
<td>4.6</td>
<td>Ways of Initiating Solving in Three Groups of Readers, Showing Percentage of Attempts by Solving Approach</td>
<td>72</td>
</tr>
<tr>
<td>4.7</td>
<td>Ways of Initiating Solving on Words in Isolation Between Three Groups of Readers</td>
<td>75</td>
</tr>
<tr>
<td>5.1</td>
<td>Characteristics of Leveled Texts</td>
<td>91</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

Figure 2.1 Four Types of Information in Print .................................................. 24
Figure 3.1 Reading Behavior Log ............................................................... 55
Figure 4.1 Solving Approaches That D-RR, ND-RR, and A-NRR Initiated on
Continuous Text ................................................................................. 74
Figure 4.2 Solving Approaches Where Groups Initiated Word Solving on
Words in Isolation ........................................................................... 76
Chapter 1

INTRODUCTION

Most people agree that one of the primary jobs of schools is to teach students how to read. Indeed, as Boyer (1995) states, “Learning to read is without question, the top priority in elementary education” (p. 69), and the success of an elementary school is judged by its students’ reading proficiency. Educators understand that literacy is the foundation of schooling, and they work to ensure that students become skilled readers and writers. In their report on the National Assessment of Educational Progress results, Lee, Grigg, and Donahue (2007) reported that most students learn to read. They found that 67% of fourth grade students performed at or above the basic level.

However, some students have difficulty learning to read and need additional help beyond the classroom. In 1965, the Federal Government established and funded the Title I program, making supplemental help for reading and writing widely available in public schools. Anderson, Hiebert, Scott, and Wilkinson (1985) criticized the state of literacy instruction in general and supplemental help in particular. Soon after, in a longitudinal study, Juel (1988) found that there is an almost 90% chance that a child who is a poor reader at the end of grade one will be a poor reader in grade four. This prompted a search to develop more effective interventions. Researchers (Allington, 2009; Caldwell & Leslie, 2009; Pikulski, 1994; Snow, Burns, & Griffin, 1998; Strickland, 2002; Wasik & Slavin, 1993) examined successful programs and noticed patterns across the more effective interventions. They found that early intervention, daily instruction, on-going assessment, use of highly trained personnel, and small groups or one to one instruction were all hallmarks of effective interventions.
The study described herein focused on the outcomes of one particular intervention, Reading Recovery. Reading Recovery has all of the hallmarks of an effective intervention as identified by researchers (Allington, 2009; Caldwell & Leslie, 2009; Pikulski, 1994; Snow, Burns, & Griffin, 1998; Strickland, 2003; Wasik & Slavin, 1993). Schmitt, Askew, Fountas, Lyons, and Pinnell (2005) described Reading Recovery as an early intervention in which trained teachers select the lowest achieving first grade students for daily, one on one instruction. Schmitt, et al. (2005) reported that over half of these students successfully discontinue from their lessons and read at or above the average level of their class. A complete description of Reading Recovery is included in Chapter 2.

**Rationale for This Study**

Many researchers have examined students while they read continuous text. Some studies (Blaxall & Willows, 1984; Clay & Imlach, 1971; Kaye, 2002; Pumfrey & Fletcher, 1989; Williams & Clay, 1982) described different ways of problem solving students demonstrated when they read, but these studies did not examine Reading Recovery students who had completed their series of lessons. Other studies have examined comprehension of continuous text (Alverman, 1984; Juel, Griffith, & Gough, 1986) or fluency as students read continuous text (Rasinski, 1994; Reutzel & Hollingsworth, 1993). Because of their narrower focus, these studies did not provide a complete picture of reading or strategic processing. Still other researchers observed young readers and their oral reading strategies or sources of error on continuous text (Blaxall & Willows, 1984; Clay & Imlach, 1971; Pumfrey & Fletcher, 1989; Williams & Clay, 1982) but they did not compare the behaviors of different groups of young readers.
Kaye (2002) examined the reading behaviors of proficient second grade students and "described the variety, complexity, and change in reading behaviors" (p. 3) but she examined only competent readers.

None of these studies has yielded a description of the strategic processing, the monitoring, and the problem solving readers do and none of them examined students who have completed a series of Reading Recovery lessons. Such a description would help teachers identify the important behaviors their students need to have learned during their Reading Recovery intervention in order to read as well as their successful peers. According to Clay (2005a, p. 53) a successful student who is nearing the end of his Reading Recovery lessons "should be able to"

- monitor his own reading and writing,
- anticipate a possible syntactic structure,
- search for different kinds of information in word sequences, in meaning and in sound-letter sequences,
- discover new things for himself,
- cross-check one source of information with another,
- repeat as if to confirm his reading and writing so far,
- self-correct taking the initiative for making decisions or getting words right in every respect,
- solve new words by these means."

While there is a great deal of research examining the success of Reading Recovery students (Askew, et al. 1998; D’Agostino & Murphy, 2004; Romei, 2002; Ruhe & Moore, 2004), these studies examined test scores rather than the reading behaviors
students demonstrate. An examination of the reading behaviors of first grade students who have completed the Reading Recovery intervention could reveal the variety and complexity of the reading behaviors of these students after they have completed their intervention. An examination of the reading behaviors of successful and less successful readers could describe the differences beyond level between these readers and allow teachers to focus their instruction on the behaviors that can help their students be more efficient readers. Consequently, there is a need to examine the reading behaviors of first grade students who successfully discontinued from Reading Recovery, students who did not need Reading Recovery, and students who did not discontinue from Reading Recovery.

**Purpose of the Study**

**Problem Statement and Research Question**

The purpose of this study was to compare the variety, complexity, and frequency of reading behaviors of three groups of first grade students: students who successfully discontinued from a Reading Recovery intervention (D-RR), students who were making average progress and never needed Reading Recovery (A-NRR), and students who did not discontinue from their Reading Recovery lessons (ND-RR). The specific question that guided this inquiry was:

How do the reading behaviors differ between three groups of first grade students, D-RR, A-NRR, and ND-RR?

Previous studies (Biemiller, 1970; Blexall & Willows, 1984; Clay, 1982; Kaye, 2002; Weber, 1970; Williams & Clay, 1982) identified a variety of reading behaviors, including
inserting or omitting words, substituting words in the text, and a range of problem solving strategies that students use when they read.

At the end of a series of lessons, students are either discontinued from Reading Recovery or recommended for further, long-term specialist help. This decision is made by the Reading Recovery team that includes Reading Recovery teacher(s), classroom teachers, and administrators, and other school personnel. Clay (2005a) stated,

There can be no hard and fast criteria [for discontinuing] because the aim will be to have a child work with a class group in which he can continue to make progress, and this will differ from child to child and from school to school (p. 56).

However, students who are ready to discontinue from Reading Recovery are reading at or above the average of the class and are developing a self-extending system. Clay described students who are developing a self-extending system as readers whose “reading and writing improves whenever children read and write [and] the reader who problem-solves independently has continual access to new learning” (p. 40). Students who have discontinued are expected to perform the same way as students who never needed Reading Recovery. When students do not discontinue from Reading Recovery, they are recommended for long-term intervention with the expectation that they will perform differently from their peers who discontinued or never needed Reading Recovery. This study identified the reading behaviors of three groups of students: students who discontinued from Reading Recovery, students who did not discontinue from Reading Recovery and students who were making average progress and never needed Reading Recovery. The study then compared the three groups of students looking for differences in reading strategies and differences in the frequency of some of the behaviors.
Definition of Terms

The following terms are defined in order to clarify their meaning in this study.

End of Program Status for Reading Recovery Students

The following categories are assigned to students as they leave the Reading Recovery program.

**Discontinued.** Students who have discontinued from their Reading Recovery lessons have reached the average level of their class and are developing a self-extending system. Clay (2005a) described students who are developing a self-extending system as independent readers who improve every time they read and write.

**Not Discontinued.** Students who did not discontinue from their Reading Recovery lessons have not reached the average level of their class and are recommended for further assessment and/or intervention after receiving Reading Recovery lessons for twenty weeks.

Reading Behaviors

Reading behaviors can be described as overt behaviors that can be seen. These are the behaviors readers take when they encounter difficulty in their reading. Students do this work by attending to many types of information when they encounter an unknown word. This information includes the context of the word, the letters, the combinations and patterns of letters, and the sounds in a word. The reading behaviors a reader displays may indicate what information the reader is attending to and can be observed and recorded. Clay (1991) stated that when reading “Much of the action ‘is in the child’s head,’ implicit and not expressed in some overt form” (p. 210), but there are some overt behaviors that can be observed and recorded. These deviations may take the form of errors, corrections,
attempts to solve words, and repetitions. It is these overt behaviors and deviations from the text that are examined in this study.

**Reading Recovery Site**

A Reading Recovery site includes at least one Teacher Leader, who is charged with training new Reading Recovery teachers and supporting the professional development of trained Reading Recovery teachers. Nationally and internationally, sites may include Reading Recovery teachers from a single school district or the site may include schools and teachers across several districts. Typically, a Reading Recovery Teacher Leader works with 25 to 45 Reading Recovery teachers. In 2010, Maine had eight Reading Recovery sites and each one included several schools and districts.

**Running Records**

Usually administered by a teacher, running records are written records of an individual students' oral reading of continuous text. The teacher uses a system of check marks and notations to represent the student's correct responses, errors, appeals, and repetitions. Running records are described in more detail in Chapter 3.

**Strategic Activities**

Clay (2001, p. 127) used the term strategic activity “to refer to what goes on in any of the aspects of processing ... when the brain:

- picks up information,
- works on it,
- makes a decision,

and evaluates the response”.
In other words, strategic activity is the “in the head” work that students do when they read and write. By using a variety of strategic activities, the young reader learns how to monitor and problem-solve flexibly in order to work with more complex written language.

**Strategic Processing**

Students engage in strategic processing when students use a variety of strategic activities to make links between what they already know and new information rather than just accumulating items of knowledge. These links allow students to work on text and problem-solve independently.

**Word-Solving**

Word solving is the work that readers do to figure out unknown words. Word-solving occurred in three ways (a) sub-word level with letters, clusters of letters or word parts (e.g., “m-a-ma-made” or “sh-shel-shelf”); (b) sub-word level combined with whole words (real and nonsense words) (e.g., “a-and-ad” and “wor-worked”); and (c) multiple substitutions of whole words (e.g., “worded-wanted-worried” and “someone-someboy-somebody”). These solving behaviors resulted in both correct and incorrect reading. These solving behaviors which may or may not have resulted in correct reading, provided insight into how students used information to figure out unknown words.

**Word-Solving Patterns**

When students solved words, they displayed a variety of patterns. Some students used the first letter, the root part of the word and then the word. Another pattern was to start with the root part of the word and then add an ending. Collectively, the readers in this study displayed many different patterns as they attempted to solve words. Some
patterns were used once by one student while other patterns were used several times by several different students. Many of these word-solving patterns were similar and the differences may have been as slight as repeating the initial letter two or three times. Even so, 110 different word-solving patterns emerged and they are listed in Appendix C.

**Organization of the Dissertation**

Chapter One provided the background and rationale for the study, the research question, and definitions for terms. Chapter Two is a review of the literature that includes an examination of the reading process as well as Clay’s theory of literacy acquisition, a description of methods to systematically observe and interpret reading behavior, and a synthesis of studies examining reading behavior of young children. The third chapter describes the research design and methodology including the procedures used for selecting participants, collecting data, and analyzing the results. Chapter Four reports the results and analysis of the data. The final chapter discusses the results and implications for further study.
Chapter 2

REVIEW OF THE LITERATURE

This chapter reviews the literature pertinent to this study and is organized as four major sections and concludes with a summary. The first section describes Reading Recovery and summarizes its effectiveness. The next section examines Clay’s theory of literacy at the acquisition stage. The third section reviews methods to systematically observe and interpret reading behaviors, and the last section offers a synthesis of studies examining oral reading behavior using continuous text.

Description of Reading Recovery

Reading Recovery was developed by Marie Clay, cognitive psychologist, in New Zealand and was introduced into the United States in 1984. The National Data Evaluation Center (NDEC, 2008) tracks Reading Recovery and reported that over 1.8 million students in 49 states have received Reading Recovery lessons since 1984. Reading Recovery provides individualized instruction to first grade students who need additional support to learn to read and write. The lowest achieving students are selected based on the recommendations of classroom teachers and the results of the Observation Survey of Early Literacy Achievement (Clay, 2002) a first grade assessment of reading and writing. Students receive 30 minute lessons daily for up to 20 weeks. These individual lessons are designed to teach students to become strategic processors who are able to problem solve new text in reading and writing. According to Schmitt, Askew, Fountas, Lyons and Pinnell (2005), “The individually designed lessons allow the child’s rate of learning to occur faster than that of his or her classmates, leading to the accelerated progress needed to catch up with his peers” (p. 87). When students no longer need extra help, they are
discontinued from their Reading Recovery lessons. Clay (1993) recommended that students successfully discontinue when they have reached the average level of the class and are developing a self-extending system. Clay (2005a) described readers who are developing a self-extending system as independent readers who improve every time they read and write. Clay (2001) explained that

A self-extending system can be thought of as bringing about new forms of mediation, or altering an existing working system to become more effective, or compiling more effective assemblies of systems. Such changes would come from powerful interactions with teachers, from building larger reading vocabularies, from comparing and evaluating decisions, from extending a network of strategies for problem-solving, and from increasing the range of texts read and therefore the opportunities to work the system. (p.136)

Reading Recovery teachers are trained to observe and identify this self-extending system in their students. When students do not make accelerated progress in their Reading Recovery lessons, they are referred for further assessment and intervention. Clay (2005a) explained that this is a positive outcome because this allows students to receive further, intensive help rather than “struggling up through the next classes of the elementary school, never having caught up” (p. 56).

**Reading Recovery Lesson Framework**

Students have the opportunity to read familiar and new text as well as write during every lesson. Students perform complex literacy tasks as they move up a steep gradient of difficulty. While the individual teaching is carefully matched to each child’s strengths and needs, lessons follow a consistent framework of activities designed to provide learning opportunities in reading, writing, and word learning. This section includes the components of a Reading Recovery lesson and the rationale for each component.
Rereading Two or More Familiar Books. Students have the opportunity to read books that they have read before. By rereading books children are able to read books that are easy, practice a range of complex reading behaviors, and monitor their reading as they use many sources of information to read this easy text.

Rereading Yesterday’s New Book and Taking a Running Record. In this component of the lesson, the child is able to reread the book that was new the day before while the teacher takes a running record. A running record documents the child’s reading behaviors and is described in more detail in Chapter 3. The child has the chance to independently monitor his reading and problem-solve on continuous text while the teacher observes his strategic processing. Based on those observations, the teacher then chooses one or two teaching opportunities to “shape up fast, efficient processing of continuous text” (Clay, 2005b, p. 97).

Working with Magnetic Letters. In this component of the lesson, the child manipulates magnetic letters to learn to attend to the details of letters and to discriminate visual features quickly and automatically. Later, this activity shifts to breaking words into parts. According to Clay (2007a), the child is learning that letter order and orientation are important and begins to notice that the same letters or clusters are found in different words. This allows students to use what he knows about one word to read or write another word and begin to use analogy.

Writing a Story. In the writing component, the student composes and writes a brief story and has an opportunity to produce and read one’s written language. The writing allows the student to make a detailed analysis of the sequences of sounds in words, attend to visual details and letter formation, build a writing vocabulary, and use analogy to
construct new words (Schmitt, et al., 2005, p. 85). In addition to learning about writing and spelling, the student is able to use what he/she has learned about writing to help read. Clay (2005b) refers to this relationship between reading and writing as the reciprocity of reading and writing and this concept is discussed in more detail later in this chapter.

**Hearing and Recording Sounds.** This segment of the writing helps students learn how to hear and record the sounds heard in words. First, the student learns how to articulate words and hear the individual sounds within words. Then “Elkonin boxes” (Clay, 2005b, p. 72) help the student identify where they hear sounds in words and record them in the appropriate place with the word’s sequence of letters. When the student is able to hear and record the sounds heard in sequence, the teacher helps the student attend to orthographic patterns in words.

**Reconstructing the Cut-up Story.** After the story has been written, the teacher writes it on a sentence strip and cuts it apart for the child to reassemble. The story is cut into words and words may be further divided into smaller units to draw attention to word segments. In order to reassemble the sentence, the student needs to “self-monitor, check, self-correct, search for verbal and visual matches” (Clay, 2001, p. 227). The sentence is sent home to be reassembled each day, thus providing another reading activity and opportunity to process information within texts.

**Listening to the New Book Introduction.** The teacher carefully selects a new book based on the student’s strengths and needs. An introduction is designed to help the reader access features of the book and make connections to what is already known. This book introduction may include information about the story plot, the structure of the book, new
or unusual phrases or language structures, or words that may be hard for the child to solve independently.

**Attempting to Read the New Book.** Next, the child attempts to read the new text, integrating new knowledge into his existing system of neural networks. Reading a novel text becomes “a testing ground for emerging strategies, consolidating some and opportunity for learning others” (Clay, 2001, p. 227).

These components provide a fixed routine or framework of activities for each Reading Recovery lesson. However, within this framework, Reading Recovery teachers choose from a variety of procedures. Choosing which procedure to use and when to use it is a teacher decision and it is this variety within the lesson framework that allows teachers to meet the individual needs of each child. When students no longer need extra help, they are discontinued from their Reading Recovery series of lessons. Most Reading Recovery students have daily lessons for 12 to 20 weeks. Discontinued students have reached the average level of their class and have demonstrated the use of a self-extending system. Clay (2005a) described readers who have developed a self-extending system as independent readers who improve every time they read and write. Data collected from the NDEC (2008) shows students discontinued early in the year continue to make progress during grade one.

**Training and Professional Development**

A distinctive characteristic of the Reading Recovery training model is the three-tiered training design that provides continuing professional development and assistance for Reading Recovery professionals at all levels. The training and on-going professional development ensures that teachers have the support to remain strong and effective.
Reading Recovery teachers are trained by Teacher Leaders. Teacher Leaders hold at least a Master’s degree and train at a University Training Center for a full year. Like Reading Recovery teachers, teacher leaders are trained to work with students. They also receive additional study in literacy and learning theory drawing on research from four domains: early childhood education, learning difficulties, literacy education, and leadership. Smith-Burke, Pinnell, Jackson, Wey, Askew, and Hambright-Brown (2002) pointed out that the teacher leader learns how to “train and support Reading Recovery teachers; advise on all aspects of delivery of the program in a school, district or consortium of districts; and creates understanding [of Reading Recovery] at all levels” (p. 3).

Trainers are the first tier of the Reading Recovery design and provide an additional level of leadership. These university-based professors “prepare Teacher Leaders at university centers, advise about new developments and provide guidance on issues that may facilitate or impede the delivery of effective programs” (Smith-Burke et al., 2002, p. 3). Trainers meet regularly and attend meetings with other trainers to formulate and engage in research agendas, examine and refine effective teaching-learning procedures, develop and implement international and national policy, and engage in a process of continuous personal professional development.

Reading Recovery teachers are experienced teachers who must participate in comprehensive training. After one year of intensive training, additional continuing professional development is provided throughout the Reading Recovery teacher’s career to allow teachers to refine their thinking and remain current with research and practice. Darling-Hammond (1998) said Reading Recovery “also helps teachers who participate in
professional development to improve their general teaching of reading by offering them
techniques they may never before have encountered in their preparation” (p. 2).

Lyons, Pinnell, and DeFord (1993) maintained that, “Reading Recovery is based
on the view that learning is a process of making meaning so teachers need to participate
in constructing their own understandings” (p. 12). In the initial training year, teachers
attend weekly class sessions facilitated by a Reading Recovery Teacher Leader (who is
charged with training new teachers and supporting trained teachers) and receive six
graduate credits for their coursework. Teachers can, and often do, apply these credits
toward an advanced degree. In addition to the time spent in class, teachers tutor Reading
Recovery students in their schools. In this year-long program, teachers study literacy
acquisition as they integrate theory, research, and practice. After the initial training year,
teachers participate in ongoing professional development for the duration of their careers
as Reading Recovery teachers as provided by the teacher leader from their Reading
Recovery site.

As they train new Reading Recovery teachers, Teacher Leaders employ a gradual
release model (Pearson and Gallagher, 1983) of instruction that provides a high level of
support early in the training using demonstrations through a one-way glass. As the
Reading Recovery teachers in training gain experience, the support from the Teacher
Leader is gradually reduced and the teachers work more and more independently. The
Reading Recovery training model was designed to allow novice Reading Recovery
teachers to work closely with an expert (the Teacher Leader) to jointly problem-solve.
Each element of the training model allows the Teacher Leader to scaffold teacher
learning. Weekly classes that include teaching demonstrations at the one-way glass are
one element of the training model. A second element is the requirement that teachers in training teaching Reading Recovery students every day and a third element is school visits when the Teacher Leader observes the teacher with students and provided feedback.

During the year-long training, Reading Recovery teachers meet weekly for sessions that connect theory, research, and practice. These classes include teaching demonstrations at the one-way glass which provide opportunities for teachers to observe a child's literacy processing and, as a group, construct their knowledge of literacy learning. Discussions following the observation of teaching provide further opportunities for the group to discuss their teaching and learning.

Another way novice Reading Recovery teachers connect theory with practice is by working with Reading Recovery students on a daily basis. As they teach, these teachers in training continually learn and extend their repertoires of knowledge and skills. Teachers learn to scaffold their students' learning so that "the child [is] never left alone when he [is] in difficulty nor [is] he 'held back' by teaching that [is] too directive and intrusive" (Wood, 1998, p. 100). Providing just the right amount of help at just the right time is what Wood refers to as contingent teaching and it is what Reading Recovery teachers strive to provide for their students. As they learn more about the reading process, learning theory, Reading Recovery procedures, and the strengths and needs of each individual student they become better able to do this. Rogoff (1990) pointed out that, "More skilled partners often gain understanding of the process they attempt to facilitate" (p. 205) and teaching Reading Recovery students aids teachers in training as they learn about early literacy acquisition.
The opportunity to teach students facilitates the learning of Reading Recovery teachers in training, but they also become more skilled as they discuss their teaching and learning with their colleagues who are also in training. These discussions led by the Teacher Leader in weekly classes allow teachers in training to share their experiences and refine their thinking. School visits from the Teacher Leader and colleagues provide additional opportunities to make connections between theory and practice. During these visits, the Teacher Leader is able to observe the teacher with students and scaffold their thinking.

Colleague visits allow teachers to see each other in their own teaching environment and provide another opportunity for teachers to give and receive input. Reading Recovery provides a support system for teachers. When they need help, they are encouraged to ask a colleague or the teacher leader to come and observe their teaching. These observations coupled with regular teaching demonstrations at the one-way glass, provide teachers with assistance when they feel they need it.

After the initial training year, Reading Recovery teachers continue to take part in ongoing professional development. Experienced Reading Recovery teachers attend six to eight continuing professional development sessions each year. These sessions provide teaching demonstrations and opportunities to discuss current theories and practices in addition to problem solving issues related to child literacy processing and contingent teaching. Experienced teachers also receive school visits from their teacher leader. They make and receive colleague visits to their teaching and are encouraged to attend regional and state conferences to help them maintain their expertise.
Effectiveness of Reading Recovery

There is a large body of research supporting Reading Recovery’s success with the lowest performing first grade students (D’Agostino & Murphy, 2004; Hiebert, 1994; Pinnell, Lyons, DeFord, Bryk, & Seltzer, 1994; Schwartz, 2005; Shanahan & Barr, 1995). NDEC (2008) reported that since 1984, Reading Recovery has served over 1.8 million students in the United States. From 1998 to 2004, 59% of student participants met discontinuing criteria. In a meta-analysis of 36 studies of Reading Recovery, D’Agostino and Murphy (2004) concluded that “Reading Recovery was reaching its fundamental goal of increasing the lowest performing first graders’ reading and writing skills to levels comparable with their classroom peers” (p. 25).

In addition to increasing the lowest progressing students’ reading levels in first grade, research shows that Reading Recovery has positive long-term effects. Askew, Fountas, Lyons, Pinnell, and Schmitt (1999) reported on a study at New York University where researchers followed up on almost 1600 grade two students and 600 grade three students who had successfully discontinued from Reading Recovery. Reading Recovery students and a group of random sample students were given the Slosson Oral Reading Test (1990). Second grade students who had discontinued from Reading Recovery reflected average performance on this test. Third grade Reading Recovery students’ mean achievement was slightly higher than average based on national norms. In addition, 93% of the second grade students and 98% of the third grade students were at or above grade level on a text reading measure.

Askew et al. (1998) conducted a study in Massachusetts that produced similar results. In this study, results from the Slosson Oral Reading Test (1990) and the Gates
MacGinitie Comprehension Test (1989) showed that former Reading Recovery students who were completing third grade performed within the average band of achievement of the random sample.

D’Agostino and Murphy’s (2004) meta-analysis of Reading Recovery studies tracked student success into grade two and found that discontinued students closed the gap with regular students on achievement tests. Furthermore, students who did not discontinue surpassed low achievers who had not received Reading Recovery.

In Maine, Romei (2002) examined Reading Recovery students’ performance on the Maine Educational Assessment (MEA). Her findings indicated that 85% of students who discontinued from Reading Recovery in first grade met the standard on the reading portion of the MEA when they were in fourth grade. This is impressive, given that these students were identified as the lowest achievers in their first grade classrooms. Ruhe and Moore (2005) also examined the MEA results and found that fourth grade students who had discontinued from Reading Recovery in first grade scored within the average band of the reading subtest of the MEA.

Clay’s Theory of Early Literacy Acquisition

Clay (2005a) described reading and writing as complex processes that utilized many sources of information including meaning, structure, and visual (graphophinic) information. In 1963-1964, Clay observed the reading progress of 100 students through the first year of school taking weekly records of what those students were saying and doing in reading and writing. Those observations were reported in her doctoral dissertation and she used the observations from those weekly records to identify the high-
progressing and low-progressing readers and develop her theory of early literacy acquisition.

Clay (1991) viewed reading as a complex process that includes the directional constraints of the language and attention to verbal and perceptual behaviors. Reading includes “looking at print with purposeful direction finding an integrated way of extracting a sequence of cues from a text that yields a meaningful and specific communication” (p. 243). This description of the reading process illustrates the complexity of reading. While good readers use their oral language and expectation of meaning to problem-solve the written word they still need to attend carefully to the visual aspects of text using many sources of information to read. Readers need to examine the individual letters in a particular order and combine this visual and phonological information with meaning and structure. Integrating this information provides knowledge the reader needs to understand the text. Clay (2005a) defined reading as a message-getting process, writing as a message-sending process, and said that both are problem-solving activities.

Clay (2005a) made three assumptions that serve as the basis for her theory of early literacy acquisition: (1) a theory of reading continuous texts cannot arise from a theory of word reading, (2) a child begins to read by attending to many different aspects of prints and these responses change as the child learns more about print and the interrelationships of aspects of print, and (3) that tasks that at first require the learner’s close attention gradually require less conscious attention. Each will be discussed in turn from a theoretical perspective. The first refers to the complexity of reading:
a theory of reading continuous texts cannot arise from a theory of word reading. It involves problem-solving and the integration of behaviors not studied in a theory about analyzing words. It must, however, explain the role of word reading and letter recognition with the theory of reading continuous text. (p. 19)

According to Clay, when we read and write “networks [are] created in the brain linking things we see [print on a page] and things we hear [the language we speak]. Messages flow in and out of those networks” (p. 1). All strategic activities occur in the learner’s brain or neural networks. These activities can be described as literacy processing systems, and they must be infinitely flexible during the acquisition of literacy to allow early readers to try out a variety of approaches as they discover how texts work. Literacy processing systems are activated when a child composes or reads continuous text. Literacy processing systems become active on continuous text, rather than individual letters and words. Successful readers are active learners who take responsibility for their own learning.

Clay (2005b) pointed out that young readers “solve their problems by using their theories of the world and their theories of how to work with written language” (p. 100). During the reading process, students begin to notice different kinds of information in print and check one source of information against other sources. They look for the option that is the best fit. In the early phases of literacy acquisition, readers reveal, through their attempts and talk, insights into what they are and are not attending to. This information provides indications of what the child is thinking and can guide the teachers’ decisions about what to teach the child. It becomes more difficult to determine what students are attending to as they become more proficient and their reading work is undertaken more quickly and silently. Our brains do not attend to everything, but sort through input and
students are more likely to notice things in print that they can connect to prior learning. As Clay (1991) explained, “Reading instruction often focuses on items of knowledge - words, letters, sounds. Most students respond to this teaching in active ways. They search for links between the items and they relate new discoveries to old knowledge” (p. 39). Through the links they make, successful readers learn to use what they already know to problem-solve what they don’t know. The more links they make, the more easily they are able to integrate new information into existing neural networks. As students make these links, they learn to problem-solve and as Clay (2001) said they “actively process information, to find and relate information from different sources, to bring it together, construct a decision, and monitor the effectiveness of that decision” (p. 101). According to Clay we can only observe readers’ behaviors and infer the strategic activities that we think a child is using. She explained that strategic activity is an active search for a word, meaning or correction that appears to be a fast reaction in the brain and seems to be automatic and rarely conscious (p. 103). Poor readers need to be explicitly taught how to actively search and make links. Then they need opportunities to practice this searching and linking in order these behaviors to become automatic.

When they search texts, readers use many sources of information. The four sources of information that Reading Recovery teachers pay particular attention to are: meaning, structure, visual, and phonological information. These different types of information can be checked, one against another, to confirm predictions. The interaction between these sources of information is represented in Figure 2.1. Although this diagram was designed by Clay (2005b, p. 112), she cautioned that this is a “grossly simplistic diagram” that does not fully represent the links the brain is making.
Learning to read and write "is about learning how to recognize the visible symbols and making some invisible links to how we speak" (Clay, 2005a, p. 1). All of these sources of information must be used together and integrated in order to produce effective reading. Readers make links between these sources of information, quickly and automatically as they process text. As they read, they check their responses against each of these sources of information. As well as making sense, their responses need to fit syntactically, sounding right and fitting structurally. The sounds and letters also need to match their response.

While this diagram shows four sources of information, the phonological information and the letters and letter sequences are inextricably linked as readers usually use the sounds and visual cues together as they work to figure out new words. In her
writing, Clay (2005b, 2001, 1993, 1991) refers to three sources of information, meaning, structure and visual. Following Clay’s lead, for the purposes of this study, sounds and visual cues have been merged.

In her observations of high progress readers, Clay (2002) noticed that these readers pull many different kinds of information together to read accurately.

When he [the reader] reads, he appears to focus on the meaning of the text. ... this can be checked by a rapid search with his eyes [where] he picks up visual information, triggers sound-to-letter associations [or letter-to-sound associations] or clusters of letters and words already known.... Throughout this entire flexible process the competent reader manages to stay focused on the message conveyed by the text, while unpicking the detailed information stored in the print on the page. (p. 15)

The complex process described above requires the reader to use all sources of information, meaning, structure, visual, and sound, quickly, with little conscious thought, in order to problem solve and make sense of the printed text. This process of picking up, working on, and putting together information is referred to as integration.

Clay’s (2005a) second theoretical assumption is concerned with the many aspects of print and the changes in ways young readers respond to print. Clay asserted that a child begins to read by attending to many different aspects of printed texts (letters, words, pictures, language, messages, stories). ... Those responses change in two ways: 1) the child learns more about each of these areas, and 2) the child learns to work on the interrelationships of these areas. (p. 19)

The perception of printed text is much different from the perception we have of the world around us. Typically, when we enter a room for the first time, we scan it quickly, but in no particular order. Depending on the type of room, we may look right to left, up and down, or down and then up. We may look at one side of the room, look to the other side, and glance back to the first side. Order and sequence are unimportant as we
examine this space. When reading the printed word, order and sequence are imperative if we are to make sense of the text. The order of the text matters – left to right, top to bottom – and the order within the words matter. F-o-r-m spells one word; f-r-o-m spells another. The orientation of each letter is equally important. When many letters are turned around they become another letter. For example, an upside down u is an n and a backwards p is a q. The importance of order and orientation makes reading tricky for novices. Attention to differences that are often miniscule means that readers must learn to examine print carefully and quickly if they are to become efficient and effective readers. When readers are able to examine print automatically and in detail, they are free to attend to other information such as the meaning of text.

Clay’s (2005a) third theoretical assumption pertains to the amount of close attention young reader’s require and she contended that:

tasks that at first require the learner’s close attention gradually require less and less conscious attention (unless some local problem arises and needs to be solved). This means that what the reader is attending to and how his mind is working on the task must change over the first years of literacy learning. The beginning reader who reads quite slowly and aloud becomes the fluent, fast silent reader by about nine years of age. There are changes over time, not only in what is known, but also in how the reading or writing task is carried out. (pp. 19-20)

Much of early readers’ attention is focused on visual (graphophonic) information including letters and words. As they gain experience, their searching becomes rapid and requires little conscious attention. This allows the reader to attend to other things. At times, readers may problem-solve an unknown word, but most of their attention is freed up to think about the meaning of the text. Readers are able to make predictions, confirm them, visualize a story, and think deeply about what they are reading. As this happens,
Another principle of Clay’s theory of early literacy acquisition was that reading and writing are reciprocal processes. Reading is the process of receiving information from text, and writing is the process of expressing information through text. Both reading and writing employ identical elements of written language and are based on the same principle of reciprocity. Clay (2005a) stated, “The writing knowledge serves as a resource of information that can help the reader” (p. 27). The information that students use to read can help them to write and vice versa. Often, early learners have learned more about reading or writing. The observant teacher can use strength in one area to scaffold the other.

One example of the reciprocity of reading and writing is in the ways of knowing words. In writing, Clay (2005b) described four ways of knowing words. One way is to just know the word and be able to write it with little attention. Another “essential way to get to new words in English is by trying to hear the sounds in spoken words” (p. 59). In many words, writers can listen carefully to identify the sounds and record the corresponding letters in the word. Constructing a new word because it is like a word he already knows is a third way of getting to words. Finally, at times, “the teacher acts as an authority when she demonstrates particular features of printed English” (p. 60), noting orthographic patterns. As students become more experienced with the orthography of English they begin to use these features independently.

In reading, the ways of knowing words are similar to the ways of knowing words in writing. There are words that young readers know automatically and read with little
conscious attention. Sometimes, they use letter-sound relationships to identify words. For some words, students are able to make analogies by using words or word parts that they already know to help them identify new words. Other times, the teacher helps the child attend to the orthographic patterns in English to problem-solve a new word. More experienced readers are able to figure out these new words on their own. Because reading and writing work in reciprocal ways, students can use what they know about reading to learn more about writing and what they know about writing to learn more about reading.

Underpinning Clay’s theory of early literacy acquisition was a belief that each learner comes to an understanding of literacy in his or her own unique way. Each child learns differently because of their diverse experiences, understandings, strengths, and challenges. Therefore, no one program or sequence of lessons will be successful for all students. Instead, having highly skilled teachers who sensitively observe young readers, build on their strengths and make thoughtful decisions about their learning will make a difference. When Nye, Konstantopoulos and Hedges (2004) examined the effects of teachers on student reading achievement, they found that the impact of the teacher was the most powerful variable in explaining student reading achievement. Each child’s literacy acquisition happens in a different sequence to meet his or her particular learning needs. Every reader and writer takes different paths to common outcomes.

In summary, Clay’s (2005a) theory of early literacy acquisition views reading and writing as complex processes. As they acquire literacy, early readers and writers must use a variety of sources of information as they learn to carefully attend to the visual aspects of print and connect it to their oral language in order to make sense of text. Readers who
have learned to do this are developing a self-extending system who are independent readers who improve every time they read and write (Clay, 2005a).

**Observing the Reading Process**

This section describes two methods of systematic observation of reading, running records and miscue analysis, and their uses as assessment tools. Running records were designed by Marie Clay and are used daily in Reading Recovery lessons to document Reading Recovery students’ reading and strategic processing. Running records are used widely and their use has been well documented (Allington, 2009; Johnson, 2006; Johnston, 1997). Miscue analysis is another commonly used form of error analysis that has been well documented (Goodman, Watson & Burke, 1987; Goodman & Goodman, 1994). Both running records and miscues analysis are tools that are commonly used to assess reading and to observe reading behaviors such as substitutions, repetitions, and word-solving attempts. This section includes some of the strengths and criticisms of error analysis procedures.

**Systematic Observation**

Bakeman and Gottman (1986) defined systematic observation as an approach that allows us to quantify “naturally occurring behavior observed in naturalistic contexts” (p. 4). When the observation is systematic, two properly trained observers should produce identical protocols when they witness the same behavior.

Teachers have been observing the oral reading of students for many years in order to learn more about their literacy learning. When Weber (1968) surveyed the literature, she found a long history of examining students’ oral errors in order to reveal their literacy processing. At that time, researchers’ concerns fell into two categories; an examination of
reading errors in order to find a starting point for remediation, and an examination of reading errors by successful readers to delineate the strategies readers use. Weber found that the classification systems used by researchers were so varied that it was difficult to compare findings.

In order to help students learn to read and write, Clay (2001) recommended that teachers focus on "behaviors or acts which can be observed and which can provide the observer with signals" (p. 41). She called this perspective "an unusual lens [which] refers to any observational tool or research methodology which gathers detailed data on changes in the literacy behaviors of young students as they learn to read and write continuous texts over a period of time" (p. 42). This unusual lens is different from more common methodologies that use tests to assess what the child has already learned. These more common methodologies are static and progress is often measured by letter, sound, or word knowledge. Systematic observation allows the researcher to describe the reading process based on data collected over time while the child is engaged in actual and authentic reading acts.

By using systematic observation, educators can observe a child's reading behaviors and make some informed assumptions about that child's literacy processing. Two common forms of systematic observation are described below.

**Running Records**

Clay (2001) designed running records as a tool to observe a student's text reading. They "provide evidence of how well students are learning to direct their knowledge of letters, sounds and words to understanding the messages in the text" (pp. 49-50). As a child reads, the teacher or researcher records the responses using a series of conventions.
A complete description of the recording conventions and guidelines for interpretation appear in Clay’s (2001) *An observation survey of early literacy achievement 2nd Edition* and a summary of these conventions is included in Appendix A. Running records allow teachers to observe and record the reading process in a natural setting.

A completed running record allows the teacher or researcher to analyze the child’s reading behaviors. Substitutions, omissions, additions, repetitions, and self-corrections all give clues to what the child is thinking about and doing as he reads. As Johnson (1997) pointed out, these unexpected responses “suggest the kind of mental processing taking place and allow us to examine the leading edge of the learner’s development” (p. 192). After taking a running record the teacher or researcher can determine an accuracy score, calculate a self-correction rate, record observed behaviors, and make inferences about the strategies and information sources the reader may have used while reading. This produces insights into a reader’s literacy processing or in-the-head thinking on that text.

**Miscue Analysis**

Miscue analysis has been used frequently as a tool to examine the reading process. Miscue analysis was developed by Kenneth and Yetta Goodman (1972) to study the reading process. They describe a miscue as an unexpected response and contended that “everything that happens during reading is caused, that a person’s unexpected responses are produced in the same way and from the same knowledge, experience and intellectual processes as expected responses” (p. 105). Therefore, examining miscues (substitutions, omissions and insertions) allows the observer to infer what information that reader is using on that particular text. Using the procedures provided in *The Reading Miscue Inventory* (Goodman, Y. M. & Burke, 1972) or *Reading Miscue Inventory:*
Alternative Procedures (Goodman, Y. M., Watson, & Burke, 1987) teachers and researchers can record, describe, and interpret readers’ processing of text. Because of these standard procedures, teachers and researchers obtain a high degree of reliability in using them.

As Hansen (1998) pointed out miscue analysis is useful for a variety of reasons. Miscue analysis has a history of use and has been utilized in many studies. It is a direct assessment that observes the actual reading process rather than parts like letters and words. Miscue analysis allows observers to develop “a more complex understanding of cognitive processes” (p. 125). Miscue analysis is another procedure that produces insights into that reader’s literacy processing on that text but it is not without criticism. This is discussed below.

Strengths and Criticisms of Error Analysis

Running records and miscue analysis are frequently used methods of recording and analyzing oral errors. In his review of oral error analysis research, Leu (1982) found that this approach “seems particularly promising because it employs high ecological validity and measures one of the few observable manifestations of processing” (p. 421). However, he expressed concerns about methodological weaknesses. He found that error behavior was often poorly defined and this resulted in “widely divergent scoring systems” which made it difficult to synthesize the findings across studies. A second methodological problem is the lack of attention given to passage length and difficulty even though these factors may influence error types. A third methodological problem, according to Leu is the way in which investigators distinguish between sources of information when the error appears to reflect the use of multiple sources of information.
Again, Leu found inconsistencies in the way these behaviors were identified and reported.

Leu (1982) also expressed concerns about the assumption that oral reading behavior reflects the same behaviors used in silent reading. In a review, Weber (1968) found no conclusive evidence indicating that the oral and silent reading processes were identical. However, in a study of fourth grade students, Beebe (1980) compared product measures of silent and oral reading and found that “an analysis of oral reading miscues is an effective way of inferring what kinds of miscues may occur during silent reading” (p. 335). In a brief review of the literature, Leslie and Caldwell (2005) concluded that “overall differences in oral and silent reading may be minimal”, although “the most consistent findings appear to be that poor readers at the fourth grade level and below tend to comprehend better when reading orally” (p. 9).

In a discussion of informal reading inventories, Walpole and McKenna (2006) warned that “brief samples of oral reading are insufficient to direct the design for word-level instruction, particularly for beginning readers and struggling older readers” (p. 592). When reading rate or accuracy is a concern, they contend that the problem may be inadequate knowledge of sight words, lack of knowledge of specific grapheme-phoneme correspondences, or lack of reading practice. They asserted that other measures would be more useful in diagnosing a child’s instructional needs than miscue analysis.

McKenna and Picard (2006) revisited the role of miscue analysis in effective teaching and questioned the role of contextual information. They concluded that miscue analysis has a useful but limited role in effective teaching of reading. First, they recommended the continued use of error totals to determine a student’s instructional and
independent levels. They recommended teachers to view meaningful miscues as “evidence of inadequate decoding skills, and not an end result to be fostered” (p. 379) and finally, they contended that miscue analysis provides a look at the child’s use of graphophonic and contextual cues and advise teachers to “study miscues to monitor their students’ progress toward relying more and more on decoding” (p. 379) but remind teachers that miscue analysis can do little to identify instructional needs in the area of word recognition.

**Reading Behavior Using Continuous Text**

As described earlier in this chapter, there is a history of examining young readers’ literacy learning by recording and analyzing their oral reading in a systematic way. This section reviews four longitudinal studies that describe reading behavior over time and two studies that examined text reading at one point in time.

**Longitudinal Studies**

In her longitudinal study, Clay (1982) observed 100 students throughout their first year of school. She made weekly observations and administered formal tests three times during the year. In her weekly observations, she attempted to record observable behaviors in order to obtain a total record. She began her research with no preconceived theories “deliberately adopt(ing) an atheoretical, no-hypothesis stance” (p. 8). After analyzing more than 10,000 oral reading errors, Clay concluded that students’ oral language provided a rich source of information as they read. She also found that language syntax expectancies provided a rich source of information and 72% of all substitutions were grammatically correct. Clay also observed the emergence and control of directional behaviors. As she observed the changes in reading behaviors, Clay concluded that the
visual discrimination of letter forms developed slowly over the first year of school and that progress in the visual discrimination of letter forms was highly correlated with progress in reading. She noticed a relationship between the error ratio and the self-correction rate. Students who had lower error rates also had higher self-correction rates. Clay concluded that "the good reader manipulates a network of language, spatial and visual perception cues and sorts these implicitly but efficiently, searching for dissonant relations and best-fit solutions" (p. 28).

Biemiller (1970) observed forty-four first grade students weekly from October to May. Their errors were recorded and individual students made 12 to 114 errors. These errors were analyzed and divided into two groups – response and non-response errors. Response errors included substitutions, insertions, omissions, and self-corrections. Non-response errors were places where the child stopped reading just before a word and it was assumed the child did not know the word. In his analysis of errors, Biemiller theorized that beginning readers moved through three phases. In the first phase, the pre non-response phase, student’s errors were mostly substitutions, insertions, omissions, and self-corrections and these errors were overwhelmingly contextually acceptable. Biemiller hypothesized that this was "an attempt by the child to minimize the use of graphic information" and found that students who stayed in this phase the longest were the poorest readers. In the next phase, the non-response (NR) phase, 50% or more of the errors were non-response meaning the child stopped at unknown words. While fewer errors were substitutions and self-corrections the number of graphically similar errors increased significantly. During this transition, Biemiller theorized that students are beginning to associate one specific word with each graphic pattern and are attending
more carefully to each written word. In the last phase, the post non-response phase, the number of non-response errors decreased while the number of graphically and contextually acceptable errors increased appreciably. With this increased attention to words, student’s efficiency in perceiving written words increased greatly. Biemiller found that while the length of time that each child spent in each phase varied, all of them moved through these phases and no child skipped from the first phase to the last phase. He ascertained that, “the earlier a child moved into the NR phase, the better his reading performance was at the end of the first grade” (p. 91).

Weber (1970) observed 21 first grade students from December to June. She examined response patterns for high and low groups. When she calculated error rates in April and May, she found that the high group read with 96% accuracy and the low group averaged 93% accuracy. She found that the better readers’ errors showed more graphic similarity than those of the lower group. She also found that graphic similarity improved during the year. Over 90% of the errors were grammatically acceptable and most of these errors were also semantically acceptable. She concluded that an examination of errors reflects the readers’ strategies and the information that they are using.

In her study of second grade students, Kaye (2002) examined the oral reading behaviors of 21 proficient second grade readers at the beginning, middle, and end of the school year on three reading tasks. Running records of text reading from *The Qualitative Reading Inventory* provided data about students’ reading behaviors on continuous text. Responses from *The Burt Word Reading Test* revealed how students solved words out of context and *The Record of Phrasing* investigated the way students’ grouped words as
they read. Kaye analyzed more that 2,500 text reading behaviors and discovered six major categories:

- Substitution – one-step action in which the child said an incorrect word for the word in the text
- Solving – one-step and multi-step actions students took to solve words in text working at the sub-word level, combining sub-word level work with reading whole words and/or multiple substitutions of whole words
- Repetition – repeated a word, phrase or whole sentence while reading.
- Omission – omitted a word or series of words while reading
- Insertion – inserted a word or series of words while reading
- Other – included times when a child made no attempt, asked for help, or was told a word

Kaye (2002) administered the three instruments discussed above - text reading, word reading and record of phrasing – to each participant in September, January, and April of the school year. She organized the data, established categories and subcategories, and analyzed the data. She found that proficient readers flexibly controlled a range of processing behaviors. This was evidenced by the large stretches of relatively error-free text they read, the rapid searching, checking, and self-correcting they engaged in, and the increasingly difficult texts they read across the year. Kaye also found that these proficient readers have a large repertoire of ways to problem-solve new and unknown words. These readers displayed more than 50 different multi-step solving behaviors.
Text Reading at One Point in Time

Williams and Clay (1982) studied 120 Standard One students (the equivalent of second grade in the United States). They had students read five graded passages and based on their reading; students were divided into three groups:

- High Accuracy Group (H) made fewer than 5 errors per 100 words read
- Average Accuracy Group (Av) made 5 to 10 errors per 100 words
- Low Accuracy Group (L) made more than 10 errors per 100 words.

When errors were analyzed, 90% were single words that were omissions, insertions, and substitutions. While most of these errors were syntactically acceptable, better readers were more likely to have syntactically acceptable errors (H-80%, Av-70%, L-62%).

While readers retained meaning more than half the time, better readers were most likely to retain meaning (H 80%, Av 65%, L 54%). Errors were likely to reflect attention to visual cues, but there was no clear difference between the groups (H 83%, Av 91%, L 85%). The researchers looked for evidence of word-solving which they defined as audible analysis of single sounds or syllables, or a long delay followed by a correct response, or a self-correction following an error or repetition. They found audible analysis in 5.5% of all instances of successful word solving. In 6% of responses, there was a long delay that might have indicated word-solving. Almost half the word-solving was accomplished through self-correction with better readers having higher self-correction rates. While the Low group only self-corrected one in eight errors, the Average group corrected 25% of their errors, and the High group corrected 33% of their errors.

Williams and Clay (1982) concluded that High and Average readers were able to read accurately, solve new or difficult words, and correct many of their errors. They
appeared to use language structure, meaning cues and letter sound relationships in association with one another as they read. On the other hand, the Low group “used visual cues or letter-sound relationships as much as good readers but they frequently neglected cues given by structure or meaning” (p. 52) and did not appear to integrate multiple cue sources.

Blaxall and Willows (1984) selected equal size groups of readers who were identified as good, normal, and poor readers using a method to determine the discrepancy between observed and expected reading achievement based on IQ scores and the results of standardized tests. Each group of 14 grade two students was asked to read aloud a series of paragraphs representing a range of difficulty and errors were categorized. Some errors were graphically similar which was defined as errors that had at least half the letters of the word in the text. Errors were categorized as grammatically similar if the sentence up to and including the error could be completed in a grammatically consistent way from the part where the error occurred. An error was judged to be semantically appropriate if it conformed to the meaning of the story up to that point. It was possible for an error to be judged as belonging to each category.

There were significant increases in graphically similar substitutions as the text became more difficult and the number of grammatically acceptable errors increased as the difficulty of the text increased. Reading accuracy was influenced by reading ability. Poor and normal readers had more semantically appropriate errors than good readers. As text difficulty increased, the students generally increased their use of graphic cues while grammatically acceptable and semantically appropriate errors decreased. However, the better readers were more likely to display this shift while poor readers did not
significantly increase their use of graphic cues as difficulty increased. Blaxall and Willows (1984) concluded that, “better readers are able to alter their reading strategies as the difficulty of the material changes, whereas poorer readers are less flexible in their use of the different sources of cues available” (pp. 339-340).

**Summary of the Studies**

Clay (1982), Biemiller (1970), Weber (1970) and Kaye (2002) all examined young readers over time. These researchers found that students’ reading behaviors changed over time as they developed more varied and complex strategies to read text. Clay noted the relationship between error and self-correction rates and found that readers with lower error rates also had higher self-correction rates. Biemiller (1970) and Weber (1970) both found that the number graphically similar errors increased over time, and better readers were more likely to make graphically similar errors than less able readers. This seems to indicate that these readers are able to make more sophisticated use of graphic information as they mature as readers. Clay (1980) and Kaye (2002) both observed that when good readers are reading they are able to use a variety of processing behaviors and are flexible in their use of these behaviors.

Williams and Clay (1982) and Blaxall and Williams (1984) described second grade students who read continuous text at one point in time. Both pairs of researchers examined high, average and poor readers. Williams and Clay found no clear differences between the three groups in their attention to graphic information but found that better readers were more likely to have miscues that were grammatically and semantically correct. They also found that high and average readers were able to use all sources of information, meaning, structure, and visual together as they read while low readers often
neglected structure and meaning relying more on graphic information. Blaxall and Williams found that good readers were better able to alter their reading strategies flexibly by using more graphic information as text difficulty increased.

To summarize, these researchers described the reading behaviors of young readers and found that most miscues were grammatically correct and many of them also retained meaning. Over time, as readers improved, their errors became more graphically similar. Proficient readers were able to use a variety of processing strategies that they control flexibly.

**A Synthesis of the Literature**

This review of the literature included four parts: a description of Reading Recovery and its effectiveness, a summary of Clay’s theory of early literacy acquisition, a description of running records and miscue analysis as methods of systematic observation, and a review of studies examining reading on continuous text.

The first section of the chapter provides a description of Reading Recovery and its effectiveness. Reading Recovery provides individualized instruction to first grade students who are having difficulty learning to read. Teachers select from a variety of procedures within the lesson framework to design a series of individualized lessons to meet the unique needs of each child. There is a large body of research showing Reading Recovery’s short and long-term effectiveness and this chapter reviews some of those studies.

The second section of the chapter provides an overview of Clay’s theory of early literacy acquisition. Clay (2005a) views reading and writing as complex processes. Early readers and writers must learn to use a variety of sources of information to problem-solve
on text. They learn to attend to visual aspects of print carefully and connect it to their oral language and expectations of meaning as they make sense of text. They develop a self-extending system and become what Clay described as students with a self-extending system who are independent readers who improve every time they read and write.

The third section of the chapter reviewed systematic observation as a way to view reading through, what Clay (2001) calls “an unusual lens” was reviewed. Running records, designed by Clay (2002), were intended to allow teachers and researchers to observe the reading process in a natural setting. By using the standard conventions of the running record format, the observer records reading behaviors and analyzes them in order to hypothesize the sources of information and mental processing the reader might be using. Miscue analysis, designed by the Goodmans (1994) examined miscue or unexpected responses in order to study the reading process. Leu (1982) reviewed error analysis and found it to be a promising approach to examine reader’s processing but identified methodological problems with this approach. These problems included “widely divergent scoring systems, lack of attention to passage length and difficulty and inconsistencies in the ways that reading behaviors were identified and reported” (p. 421). Walpole and McKenna (2006) warned that brief samples of oral reading did not provided sufficient information to design instruction at the word level. McKenna and Picard (2006) concluded that miscue analysis had a useful but limited role in the effective teaching of reading.

Finally, the chapter delineated studies that examined reading behavior on continuous text. Clay (1982), Biemiller (1970), Weber (1970) and Kaye (2002) observed young readers over time and found that their reading behaviors changed as they
developed varied and complex strategies to read text. In studies that observed reading of continuous text at one point in time, Williams and Clay (1982) and Blaxall and Willows (1984) found that good readers tended to use meaning, structure and visual (graphophonic) information together while poor readers were more likely to use those sources of information in isolation.

Clay's literacy acquisition theory which is the theoretical foundation of Reading Recovery teaching was described because this study examined the reading behaviors of Reading Recovery students. Examples of studies of reading continuous text and behaviors on continuous text were included. Chapter 3 will describe the design and methodology of this study and how running records were used to record and analyze Reading Recovery students' reading behavior.
Chapter 3

DESIGN AND PROCEDURES

This study was designed to describe and compare the variety, complexity, and frequency of reading behaviors in three groups of first graders: students who discontinued from Reading Recovery (D-RR), students who did not discontinue from Reading Recovery (ND-RR), and students who never needed Reading Recovery (A-NRR). The specific question that guided this study was:

How do the reading behaviors differ between three groups of first grade students, D-RR, A-NRR, and ND-RR?

This chapter explains the research design and methodological procedures used. The chapter is organized into three major sections. The first describes the research design and the procedures for selecting participants. The second section explains the data collection procedure including instrumentation and the procedures for data collection, and the third section describes data analysis procedures.

Research Design

This study investigated the oral reading behaviors of 30 first grade students in terms of variety, complexity, and frequency of students’ reading behaviors. Reading behaviors were counted, analyzed, and compared across three groups.

Clay (2001) described the process of gathering “detailed data on changes in the literacy behaviors of young students as they learn to read and write continuous texts over a period of time” (p. 42). She emphasized the need to examine reading behavior on continuous text because it includes meaningful passages and these “richer texts themselves provide supporting structures” (Clay, p.105). As described in Chapter 2,
several studies examined young students reading continuous text. Some of those studies have examined readers' strategic processing (Biemiller, 1970; Clay, 1982; Kaye, 2002) and others have compared good and poor readers (Blaxall & Willows, 1984; Weber, 1970; Williams & Clay, 1982). However, none of the previous investigations have observed the strategic processing of students who have completed a series of Reading Recovery lessons.

In this study, the oral reading behaviors of three groups of first grade students were analyzed. One group was composed of ten children who successfully discontinued their Reading Recovery lessons (D-RR). It was expected that they would display reading behaviors similar to their peers who never needed Reading Recovery. Another group of ten students received a full series of Reading Recovery lessons but were unable to discontinue (ND-RR). It was expected that they would perform at lower reading levels than their peers and would display reading behaviors that were different from the students reading at or above grade level. The final group of ten students was identified as average readers who never needed Reading Recovery (A-NRR).

The variety, complexity, and frequency of reading behaviors of these three distinct groups were identified and analyzed and then, the mean rates of reading accuracy and self-correction for each group were compared.

**Subjects**

Before subjects were selected, I contacted school administrators to secure permission (See Appendix B). Students who had completed the Reading Recovery intervention were identified and students who never needed Reading Recovery, but were identified as typically progressing readers, were also identified to serve as a control
Based on the outcome of their Reading Recovery lessons, students were invited to participate in the study. As the Teacher Leader for this area, I had access to the end of program status for all Reading Recovery students in these schools. I asked thirty-six students who had completed a series of Reading Recovery lessons to participate. Another twelve children were identified by classroom teachers as typically progressing students who did not need Reading Recovery. A total of forty-eight students were invited to participate in the study. Parents and caregivers of these students were contacted in a letter sent through the mail (See Appendix B), explaining the purpose of the study, the time commitment, and the procedures for ensuring confidentiality. Parents, caregivers, and school personnel were assured of confidentiality with no actual names of students identified in the study. Descriptions of the students and schools would be general and the location would not be more specific than the state of Maine. Thirty-two parents/caregivers gave permission for their children to participate. The first ten students from each group who returned their permission forms were selected to actually participate in the study.

The ten students in the D-RR group attended the same school. Five were female and five were male. Five students started their Reading Recovery lessons in the fall and completed them in January. They returned to the classroom with no additional support until the end of the year. The other five students began their lessons in January and completed them by the end of the year.

In the ND-RR group, there were six females and four males who received a full series of Reading Recovery lessons over the course of twenty weeks. No single school in the area had ten students who did not discontinue, so students were recruited from three
different schools. This group was made up of six students from one school and four students who were recruited from two schools in another system. Nine of the students began their lessons in the fall and exited Reading Recovery in January. One student began lessons in January and exited them at the end of the year.

In the A-NRR group, six of ten students were female and all attended the same school. These students were identified by their classroom teachers as average students and were not candidates for Reading Recovery.

**Data Collection**

**Selection of Instruments**

Four instruments were employed: the Qualitative Reading Inventory-4 (Leslie and Caldwell, 2005), Scott-Foresman Testing Packet (Scott, Foresman, and Company, 1979), the Burt Word Reading Test (Gilmore, Croft, and Reed, 1981), and the DIBELS Oral Reading Fluency test (Dynamic Measures Group, 2002). Each instrument was selected in examining various characteristics of reading behavior. Responses were recorded as well as any comments from the students about the passage or their reading performance. Behaviors, such as pointing during reading were noted. Two of these instruments use running records to record student reading behavior. The next section describes running records, each instrument, and the reason(s) it was selected.

**Running Records of Text Reading.** Clay (2001) designed running records to provide written evidence of an individual student’s oral reading behaviors on continuous text. Running records can be taken at any time with a set of conventional markings (See Appendix A). The strengths and criticisms of error analyses like running records are enumerated in Chapter 2. Running records have been found to have a high degree of
reliability. For example, Clay (2002) reported the reliability of a trained observer’s recording and scoring of error rates and self-correction rates with two year’s interval between the two analyses (r = .98 for error scoring and r = .68 for self-correction rate). Clay (1993a) recommended that, for research purposes, “the most reliable records would be obtained by scoring an observation immediately following its manual recordings, and rechecking immediately with a taped observation” (p. 28). In this study, running records were scored immediately and the audio-tapes of each student’s reading were reviewed within a month of administering the task. The tapes captured rapidly occurring behaviors that might have been missed in the moment. As another check of inter-rater reliability, two experienced Reading Recovery teachers were each given one student’s set of records and asked to listen to the audio-tapes and take running records. Both teachers hold graduate degrees and have several years experience administering and analyzing running records. Between them, they analyzed nine running records, with a total of 189 reading behaviors. Those running records were compared with those of the researcher with results yielding 99% agreement for error scoring and 100% agreement for self-correction rate.

Although all students were first graders, they represented a range of reading abilities. To meet the range and needs of these students, passages were selected that represented a gradient of difficulty. When considering which texts for students to read orally, the following factors were considered.

1. Passages needed to be a whole story rather than being an excerpt of a story. This made the task more similar to the students’ every day reading experiences.

2. Passages needed to be available at a range of reading levels.
3. Passages at and above the second grade level needed to have at least 100 words in order to obtain an adequate sample of oral reading behavior.

4. Multiple passages needed to be available at each grade level so that students had a sufficient number of passages to read at or above their instructional level. Because Clay (2005) defined texts read at or above 90% accuracy to be at an instructional level, only texts read at or above 90% accuracy were considered instructional level and analyzed.

5. To ensure the instrument's validity and reliability, technical data about passage leveling and readability needed to be available

**Qualitative Reading Inventory 4 (QRI-4).** This assessment includes a set of graded reading passages from pre-primer to high school levels. Each passage is a complete short story with five stories at each grade level. One passage is nonfiction and the other four are narrative. In order to ensure consistency across students, only narrative passages were used. With the exception of the pre-primer level, passages were at least 100 words long. In the test manual, Leslie and Caldwell (2005) provided technical information about the development of this instrument. For this study, the information about how the passages were developed was most pertinent. In order to estimate the level of difficulty for each passage, three readability formulas were used and the authors looked for agreement from at least two out of the three formulas. Regarding reliability of the test passages, “the QRI-4 measures consistency of scores in three ways: inter-scorer reliability, internal consistency reliability, and alternate-form reliability” (p. 466). However, inter-scorer reliability was the only measure that examined agreement between independent examiners identifying oral reading miscues and 99% agreement was reached
Construct validity was also determined by correlating various types of data. “The inter-correlations among word identification, on the word lists, total oral reading accuracy, semantically acceptable accuracy, rate of reading and corrected rate were positive and statistically significant through third grade (rs ranged from .34 to .59 with n's of 275-434, all ps < .001)” (p. 475).

Scott-Foresman Testing Packet (SFTP). This set of leveled text passages is used in the United States as the text reading portion of the Observation Survey at the end of Reading Recovery lessons. The testing packet includes 27 leveled stories ranging from level 1 to level 30. Alternate texts are provided for levels 8 to 18. This testing packet met four of the five criteria listed above. Multiple passages are not available at most levels but the books are leveled according to Reading Recovery levels and there are many levels at each grade level. However, the other criteria were met. Each booklet includes a complete story although at some levels, students are only asked to read part of the story. The passages at or above the middle of first grade have at least 100 words. National Data Evaluation Center (NDEC, 2008) tracks the testing results of every Reading Recovery student. NDEC provided technical information and reliability is high (r = .83, Item r = .98).

Burt Word Reading Test (BWT). This instrument was designed by Gilmore, Croft, and Reid (1981) and is an established assessment using real words rather than pseudowords to measure word recognition. However, the authors indicate that students’ inaccurate attempts to gain an understanding of the reading process can also be examined. The test is relatively quick to administer and was selected to provide data about the way students solved words when they had no context to assist them. This test is made up of 110 words arranged in approximate order of difficulty. Students are asked to read words aloud until
they make ten consecutive errors. The test was slightly altered because two words in the original test appear with British spellings. These words, *encyclopaedia* and *labourers* were changed to American spellings. The authors reported test-retest reliability ranging from 0.95 to 0.99 when used with students from ages 6 to 13. Internal consistency was established with reliability coefficients of 0.96, 0.96, and 0.97 for groups of 6-, 8-, and 10-year-olds, respectively. Criterion validity was examined through correlation with performance on five tests: *PAT Reading Comprehension* (0.57 – 0.79), *Reading Vocabulary Tests* (0.52 – 0.87), *Test of Scholastic Abilities* (0.72 – 0.79), *Schonell Graded Word Reading Test* (0.90 – 0.98), and *Oral Word Reading Test* (0.92 and 0.96).

**Oral Reading Fluency (ORF).** This instrument is a subtest of the Dynamics Indicators of Basic Early Literacy Skills (DIBELS) test and is designed to measure a student’s reading rate. Students are given one minute to read as much of a grade level passage in that time with the number of words read correctly counted. This measure, words correct per minute, provides information about the child’s reading rate. National norms are available from DIBELs. This instrument met four of the five criteria listed above: passages are entire stories although students do not read them in their entirety, the stories are longer than 100 words although, students may not have read 100 words of each passage within a one minute span, multiple passages were available at each grade level, and reliability and validity data are available. Although ORF provides a range of grade levels, the test requires first grade students to read first grade passages.

According to the DIBELS web site (2008), test-retest reliability for elementary students ranged from 0.92 to 0.97 and alternate form reliability of different reading passages drawn from the same level ranged from 0.89 to 0.94. Good and Jefferson (1998)
examined criterion-related validity in eight separate studies in the 1980’s and reported coefficients ranging from 0.52 to 0.91.

**General Data Collection Procedures**

This section describes the sequence and frequency of data collection. Data were collected for each student during the last three weeks of May. In the interests of standardization the tasks were administered in the following order:

1. Running record of oral text reading from the *Scott-Foresman Testing Packet* (SFTP)
2. Running record of oral text reading from the *Qualitative Reading Inventory-4* (QRI-4)
3. *Burt Word Reading Test* (BWT)
4. *Oral Reading Fluency* (ORF)

Most students were able to complete all of the reading in a single session, but two tired and completed the reading in a second session on the next day.

**Administration of Tasks**

This section describes the specific procedures for administering each of the four instruments as well as the procedures for recording student behavior during the administration of each task. Each instrument was administered individually with responses recorded in writing by the researcher. Responses were also tape recorded to provide a back up to ensure accuracy. Students were asked to read passages from the SFTP and QRI-4 with running records taken. The conventions and scoring procedures for running records are detailed in Appendix A. Additional procedures for scoring each
instrument are described below. Because of the focus on reading behaviors students used in oral reading, comprehension of text was not assessed on continuous text.

**SFTP.** Students were presented with a book at their Reading Recovery level. The researcher read the standard introduction provided for each book and then students were instructed to read the story. Students continued to read stories as long as they were successful hoping to obtain one passage at an easy level (95% and above), one at an instructional level (90%-94%) and one at a difficult level (below 90%). Not all students read stories at each level of difficulty. Some read a passage at the easy level and read the next at the difficult level and others never did read a passage at the easy level but every student read multiple passages at 90% accuracy or above. During the reading, the researcher recorded their behaviors using a running record.

**QRI-4.** As was the case for the SFTP, multiple stories were used to obtain easy, instructional, and difficult levels. All texts were narrative and each story was photocopied onto a sheet of white cardstock. Students were presented with the story and instructed, “I’d like you to read this story out loud to me. It’s called (name of story). If you get to a tricky part, do your best.” Running records documented their reading.

**BWT.** In order to provide for the spelling alterations, the 110 words on the test were typed onto white cardstock in a layout and font similar to the original test materials. The researcher said, “Here are some words I think you can read. Let’s see which ones you know. Start here and read the words going across the card”. At difficulty, students were encouraged to, “Give it a try.” or “Just do your best.” If students made no attempt in 10 seconds, they were asked to try the next word. Following printed instructions for the test,
the task ended when a child missed 10 consecutive words. Student responses were recorded on a student record.

**ORF.** Students were asked to read aloud a story. If the student had difficulty with the word or paused for three seconds, the word was provided. At the end of one minute, the student was asked to stop. Each was asked to read three stories and the number of words read correctly in one minute was recorded as the reading rate. As instructed in the DIBELS manual, the middle reading rate was used as the student’s rate.

**Scoring Procedures**

**Running Records of Continuous Text: SFTP, QRI-4, ORF.** The running records of continuous text from the SFTP and QRI-4 were analyzed separately but with the same procedures. Following the oral reading of each text, accuracy rates and self-correction ratios were computed. After each round of data collection, the researcher listened to audiotapes to confirm the running record, clarify students’ responses, and make additional notes. Once accuracy rates and self-correction ratios were determined, reading behaviors were recorded from all four of the instruments. The reading behaviors of these students were analyzed as described below and assigned to one of four categories. These categories include solving behaviors, substitutions, repetitions and other behaviors that did not fall into the three other categories. Solving behaviors included one-step and two-step behaviors where students worked at the sub-word and whole word level to figure out unknown words. Solving may or may not have resulted in correct reading. Examples of solving include “s-, st-, stone” for stone and “s-, sounded, shouded, soundown” for shadows. Substitutions occurred when the student substituted an incorrect word for the word in the text. Repetitions happened when the student reread one or more words
without any solving behaviors. Other behaviors included insertions and omissions as well as times when the student asked for help. At times, when students just stopped for several seconds the researcher provided the word.

Three documents were used to organize, document, define, and count specific behaviors. These documents were created by Kaye (2002) following the study described above that examined the reading behaviors of second grade students. The documents listed below served as a starting point for this analysis but were modified by the researcher to meet the particular needs of this study.

1) The *Reading Behavior Log* is a form used to review running records, record individual reading behaviors and establish categories. A Reading Behavior Log was completed for each student. (See sample, Figure 3.1.)

<table>
<thead>
<tr>
<th>Behavior</th>
<th>Word-Solving Behaviors</th>
<th>Substitutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ball</td>
<td></td>
<td>Sub-RW-vs *</td>
</tr>
<tr>
<td>Bill</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cry</strong>-<strong>crying</strong></td>
<td>S-O-RP-W**</td>
<td></td>
</tr>
<tr>
<td>Calling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\sqrt{-r})</td>
<td>R-CW ***</td>
<td></td>
</tr>
<tr>
<td>Head</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* substitution – real word-visually similar ** solving-one step-root part-word *** repetition – correct word

*Figure 3.1 Reading Behavior Log*

2) The *Guide to Reading Behaviors* was designed and used as a guide to analyze and code each deviation from the text. The Guide is divided into the four reading behavior categories and includes a definition for each category, the codes that were used, and examples. The *Guide to Reading Behaviors* is included in the appendix (See Appendix C).
3) The Analysis Grid is a matrix used to tally each student’s behaviors. The grid also served as a repository for all of the analyzed text reading behaviors (See example in Appendix D).

Once the specific reading behaviors were identified and defined, the mean frequencies in each group were calculated. These means were used to compare reading behaviors between the three groups. In order to establish the reliability of the data coding, inter-rater reliability was checked. An experienced teacher was asked to code the behaviors of two students. After the coding system was explained, the Guide for Reading Behaviors for Text Reading was used (see Appendix C) and with .95 agreement.

**Burt Word Reading Test**

When students read items on the Burt Word Reading Test, their responses were recorded. Again, based on Kaye’s (2002) analysis of word reading, responses were recorded on two documents. These documents were modified to meet the needs of this particular study.

1. The Analysis Grid used with continuous text was used for the words in isolation. A tally was kept of occurrences of every behavior for each student as well as an analysis of the behaviors. (See Appendix D).

2. The Burt Word and Behaviors Guide is similar to the Guide to Reading Behaviors but was modified to analyze the reading behaviors on words in isolation and contains definitions, codes, and examples for each behavior (See Appendix E).
Oral Reading Fluency

The reading rate for each child was calculated, and national norms from the DIBELS web site was used to identify which students met the grade level benchmarks. If students read these passages with at least 90% accuracy (easy or instructional levels), miscues were analyzed in the same manner used for the QRI-4 and the SFTP. These passages were written at an end of first grade reading level and many students in the study were unable to read the passages at an instructional level, so the behavior for this reading were not analyzed. However, a reading rate was obtained for all students.

This chapter has described the design of the study, the selection of participants, and the instruments used. Data collection and analysis were explained. Once this was completed, a series of statistical analyses were conducted to examine the data more closely. These analyses are described in the next chapter.
Chapter 4

RESULTS

As stated in Chapter 1, the purpose of this study was to describe and compare the variety, complexity, and frequency of reading behaviors in three groups of first grade students – students who successfully discontinued from Reading Recovery (D-RR), students who did not discontinue from Reading Recovery (ND-RR), and students who did not need Reading Recovery (A-NRR). The findings from the study are reported below: (a) the reading levels of each group, and (b) the reading behaviors of each group.

Reading Levels

Each of the 30 students in the study was given four assessments: the Scott-Foresman Testing Packet (SFTP), the Qualitative Reading Inventory-4 (QRI-4), the Burt Word Test (BWT) and DIBELS Oral Reading Fluency (ORF). Two sets of analyses were used to compare performance of the groups on each of the measures. First, chi-square tests were used to compare the number of students in each group that met grade level expectations on each assessment. Second, ANOVAs were used to compare the mean performance of each group on each measure. Results are described below.

Students Meeting Grade Level Expectations

The four measures use different approaches to benchmarking; however, all four provide indices for identifying students who met grade level expectations. Specifically, grade level performance was defined as a score of level 18 on the SFTP (NDEC, 2008), at least 90% accuracy on first grade passages of the QRI-4 (Leslie & Caldwell, 2005), identifying 28 words on the BWT (Gilmore, Croft, & Reid, 1981), and reading 40 or more words correct on DIBELS (Dynamics Measurement Group, 2008). I expected
that most or all of D-RR and A-NRR would meet or exceed grade level standards on each of the four measures while few, if any, of ND-RR would be at or above grade level.

Results for each instrument are shown in Table 4.1. Chi-square tests were used to identify possible differences between the groups in regard to the number of students who were and were not at grade level. As predicted, results indicated significant between group differences on the SFTP ($\chi^2 (3, N = 30) = 17.95, p < .001$) and on the QRI-4 ($\chi^2 (3, N = 30) = 15.20, p = .001$). Significant between group differences were also found on ORF ($\chi^2 (3, N = 30) = 10.00, p = .007$) and the BWT ($\chi^2 (3, N = 30) = 15.20, p = .001$).

As Table 4.1 shows, no ND-RR students met the grade level expectations on any instruments. In contrast, nine D-RR and nine A-NRR students met or exceeded grade level expectations on at least one of the assessments and a majority of D-RR and A-NRR met or exceeded the grade level expectation on all instruments.

**Mean Score Differences**

To determine if there were significant differences among the three groups in reading levels, four one-way analyses of variance (ANOVA) were conducted, one for each of the four assessments. ANOVA results indicated significant differences on SFTP ($F (2, 27) = 32.88, p < .000, \eta^2 = .71, d = 2.93$), BWT ($F (2, 27) = 13.54, p < .000, \eta^2 = .50, d = 2.16$), QRI ($F (2, 27) = 10.10, p < .001, \eta^2 = .43, d = 2.00$), and ORF ($F (2, 27) = 11.98, p < .000, \eta^2 = .47, d = 2.05$). However, results of post-hoc tests (Tukey’s HSD, p < .05) revealed that significant differences were between ND-RR and each of the two higher performing groups, D-RR and A-NRR. The effect size for the difference between ND-RR and each of the other two groups was large on all assessments indicating practical as well as statistical significance. More specifically, on all four tests, ND-RR scored more than 2
standard deviations lower than D-RR (SFTP, \(d = 2.93\), BWT, \(d = 2.15\), ORF, \(d = 2.19\)) and A-NRR (SFTP, \(d = 3.93\), BWT, \(d = 2.11\), ORF, \(d = 2.05\)).

Table 4.1

Reading Levels for Three Groups of Readers

<table>
<thead>
<tr>
<th></th>
<th>D-RR (n=10)</th>
<th>ND-RR (n=10)</th>
<th>A-NRR (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFTP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Level (SD)</td>
<td>18.6 (2.99)</td>
<td>11.6 (1.58)</td>
<td>19.4 (2.32)</td>
</tr>
<tr>
<td>No. of Students Meeting Grade Level Benchmark</td>
<td>7</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>QRI-4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students at Grade Level</td>
<td>7</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>ORF</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean No. of Words Read Correctly per Minute (SD)</td>
<td>47.9 (13.32)</td>
<td>25.4 (7.67)</td>
<td>53.8 (18.05)</td>
</tr>
<tr>
<td>No. of Students Meeting Grade Level Benchmark</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>BWT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of Words Read Mean (SD)</td>
<td>28.30 (4.00)</td>
<td>20.60 (3.10)</td>
<td>31.10 (6.31)</td>
</tr>
<tr>
<td>No. of Students Meeting Grade Level Benchmark</td>
<td>7</td>
<td>0</td>
<td>8</td>
</tr>
</tbody>
</table>

Note. D-RR = students who discontinued from Reading Recovery; ND-RR = students who did not discontinue from Reading Recovery; A-NRR = students who did not need Reading Recovery. SFTP = Scott-Foresman Testing Packet; QRI-4 = Qualitative Reading Inventory (4th edition); ORF = Oral Reading Fluency; BWT = Burt Word Test.
On the SFTP, students read two to five texts and mean accuracy rates were similar across groups, ranging from 90 % to 97%. A-NRR had the highest mean level, followed closely by D-RR while ND-RR’s mean was considerably lower. On the QRI-4 all groups read a similar number of texts and their accuracy rates were comparable. On ORF, D-RR and A-NRR were similar on mean number of correct words read per minute and they read almost twice as many correct words per minute as ND-RR. As was the case before, more than half of D-RR and A-NRR met the grade level benchmark while none of ND-RR met the benchmark. On the BWT, A-NRR and D-RR read a similar number of words while ND-RR was considerably lower. Most of D-RR and A-NRR met the grade level benchmark but no one in ND-RR met the benchmark.

**Mean Accuracy of Text Reading**

As explained in Chapter 3, all students had to be reading with at least 90% accuracy for the text to be considered successful, and thus for the errors to be included in the error pool. In order to determine if there was variation in the level of accuracy of text reading between the groups, a one-way ANOVA was conducted. As Table 4.2 shows, D-RR and A-NRR read text at 93% accuracy while ND-RR read at a slightly lower level however, ANOVA results indicated no significant differences between the groups (F (2, 27) = 2.29, p < .12, η²= .145).
Table 4.2

Mean Percentages of Accuracy of Text Reading

<table>
<thead>
<tr>
<th></th>
<th>D-RR (n=10)</th>
<th>ND-RR (n=10)</th>
<th>A-NRR (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>.93 (.01)</td>
<td>.92 (.01)</td>
<td>.93 (.02)</td>
</tr>
</tbody>
</table>

Note: D-RR = students who discontinued from Reading Recovery; ND-RR = students who did not discontinue from Reading Recovery; A-NRR=Students who did not need Reading Recovery.

Reading Behaviors

Students were asked to read a variety of passages from three different assessments; (a) the SFTP, (b) the QRI-4 and (c) ORF, as well as words in isolation from the BWT. As students read, behaviors were recorded. Because Clay (2005) considered texts read at or above 90% accuracy to be an instructional level, texts that were read at or above 90% were treated as “successful” reading, and the behaviors on those texts were subjected to further analysis. Texts for which accuracy fell below the 90% benchmark were considered to be at the frustration level, and therefore, behaviors on those texts were not analyzed.

Categories of Reading Behaviors on Continuous Text

As described in Chapter 3, reading behaviors were coded on continuous text into four categories: (a) solving behaviors, (b) substitutions, (c) repetitions, and (d) other behaviors (i.e., actions that did not fit into the other three categories). Solving behaviors occurred when students worked at (a) the sub-word level, (b) combined sub-word level work with reading whole words, or (c) made multiple substitutions of whole words. Substitutions were errors that occurred when the student said an incorrect word for the
word in the text. Repetitions were occurrences when students reread one or more words.
The “other behaviors” category included lower frequency behaviors such as insertions, omissions, appeals for help and pauses that were followed by the tester supplying the word.

Table 4.3

Mean Percentages of Types of Behaviors in Three Groups of Readers

<table>
<thead>
<tr>
<th>Behavior</th>
<th>D-RR M (SD)</th>
<th>ND-RR M (SD)</th>
<th>A-NRR M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Continuous text</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substitutions</td>
<td>57.08 (11.21)</td>
<td>49.32 (11.54)</td>
<td>54.86 (11.38)</td>
</tr>
<tr>
<td>Solving</td>
<td>17.46 (7.66)</td>
<td>20.46 (9.29)</td>
<td>17.64 (9.16)</td>
</tr>
<tr>
<td>Repetitions</td>
<td>19.44 (5.67)</td>
<td>22.14 (8.17)</td>
<td>17.51 (6.83)</td>
</tr>
<tr>
<td>Other behaviors</td>
<td>5.37 (4.44)</td>
<td>10.66 (6.27)</td>
<td>9.12 (18.05)</td>
</tr>
<tr>
<td><strong>Words in Isolation</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substitutions</td>
<td>.64 (.21)</td>
<td>.63 (.21)</td>
<td>.72 (.22)</td>
</tr>
<tr>
<td>Solving</td>
<td>.18 (.09)</td>
<td>.16 (.10)</td>
<td>.16 (.16)</td>
</tr>
<tr>
<td>Omissions</td>
<td>.07 (.16)</td>
<td>.14 (.20)</td>
<td>.09 (.14)</td>
</tr>
</tbody>
</table>

*Note.* D-RR = students who discontinued from Reading Recovery; ND-RR = students who did not discontinue from Reading Recovery; A-NRR = average students who did not need Reading Recovery.

As Table 4.3 shows, the most common behavior for all three groups was substitutions, followed by solving, repetitions, and other behaviors (i.e., actions that did not fit into the other three categories). To determine if there were differences among the three groups in the types of behaviors they displayed, three one-way Analyses of
Variance were conducted. The results indicated no significant differences between the three groups in the percentage of reading behaviors that fell into each category - substitutions \( F (4, 25) = .260, p < .615 \), solving \( F (4, 25) = .062, p < .806 \), repetitions \( F (4, 25) = .605, p < .444 \), and other behaviors \( F (4, 25) = .312, p < .581 \).

**Categories of Reading Behaviors on Words in Isolation**

While the majority of the reading that students were asked to do was on continuous text, they also read some words in isolation. On the BWT, the students were presented with a list of successively more difficult words to read. In addition to correct reading, students displayed three categories of behaviors: (a) substitutions, (b) solving, and (c) skipping or omitting the word. In all groups, substitutions were the most common behavior, followed by solving, then omissions. Means and standard deviations for each group are shown in Table 4.3. Three one-way ANOVAs were conducted to see if there were differences between the three groups in the frequency of each category of reading behavior. As on continuous text, ANOVA results indicated no significant differences between the three groups in prevalence of these reading behavior: substitutions \( F (2, 27) = .479, p = .624, \eta^2 = .034 \), solving \( F (2, 27) = .088, p = .916, \eta^2 = .007 \), and omissions \( F (2, 27) = .428, p = .656, \eta^2 = .031 \).

**Successful Attempts**

An examination of the reading behaviors these readers took revealed that only some resulted in successful reading. Successful reading attempts were broken down into three categories: the percentage of overall successful attempts, the percentage of self-corrections, and the percentage of successful word-solving attempts. The means and standard deviations are shown for each group in Table 4.4.
Table 4.4

Mean Percentages of Types of Successful Attempts by Reader Group

<table>
<thead>
<tr>
<th></th>
<th>D-RR (n=10)</th>
<th>ND-RR (n=10)</th>
<th>A-NRR (n=10)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>Overall successful attempts</td>
<td>.35 (.09)</td>
<td>.31 (.07)</td>
<td>.45 (.06)</td>
</tr>
<tr>
<td>Self-corrections</td>
<td>.18 (.10)</td>
<td>.33 (.11)</td>
<td>.20 (.07)</td>
</tr>
<tr>
<td>Successful word-solving attempts</td>
<td>.46 (.14)</td>
<td>.59 (.15)</td>
<td>.62 (.16)</td>
</tr>
</tbody>
</table>

Note. D-RR = students who discontinued from Reading Recovery; ND-RR = students who did not discontinue from Reading Recovery; A-NRR = students who did not need Reading Recovery.

A one-way ANOVA was conducted to find out if the groups varied in prevalence of overall successful solving attempts. ANOVA results indicated significant differences between the groups in the percentage of successful attempts (F (2, 27) = 4.82, p < .016, \( \eta^2 = .20 \)). Results of the post-hoc tests (Tukey’s HSD, p< .05) revealed that the only significant difference was between ND-RR and A-NRR. Descriptively, A-NRR exhibited a higher proportion of successful solving attempts than ND-RR. The effect size was large (\( d = 1.38 \)), demonstrating both practical as well as statistical significance. Whereas the typical A-NRR student was successful on roughly one out of two attempts, the typical ND-RR student was successful on only one out of three attempts. A-NRR made more successful attempts than D-RR but the difference between the two was not statistically significant.

An examination of the number of self-corrections was made. Self-corrections occurred when a student substituted a word for the word in the text but then corrected the
reading resulting in successful reading. A one-way ANOVA was conducted to find out if the groups varied in prevalence of self-corrections. ANOVA results indicated significant differences between the groups in the percentage of self-correction rates \(F(2, 27) = 7.52, p < .003, \eta^2 = .36\). Results of the post-hoc tests (Tukey’s HSD, \(p < .05\)) revealed significant differences between ND-RR and the other two groups, A-NRR and D-RR. Descriptively, ND-RR exhibited a higher proportion of self-corrections than D-RR or A-NRR. The effect size for the difference between ND-RR and each of the other two groups was large demonstrating both practical as well as statistical significance. Whereas the typical ND-RR student self-corrected one out of three attempts, the typical D-RR or A-NRR student self-corrected one out of five attempts.

Another reading behaviors students displayed was word-solving which occurred when students used word parts to attempt to figure out a new word. An examination of the word-solving attempts of these readers showed that there was some variation between the groups in the success rate for solving words. However, one-way ANOVA results indicated no statistical differences between the three groups on success rate \(F(2, 27) = 2.91, p = .07, \eta^2 = .178\).

**Substitutions**

Because substitutions accounted for the largest percentage of behaviors in each group on both continuous text and words in isolation, this category was examined more closely. Three specific categories of substitutions were examined. On both continuous text and words in isolation, I noted when students substituted real words for target words, and when they substituted nonsense words. Next, Clay’s (2005b) three sources of information, meaning, structure and visual, were considered. The words (real or nonsense
word) that were substituted for visually (i.e., grapho-phonically) similar words were noted. With no context, it was impossible to consider whether or not substitutions were meaningful or structurally adequate. However, on continuous texts, whether or not substitutions were meaningful was determined. Because of time restraints, structural adequacy was not considered for this particular study.

**Real Word Substitutions on Continuous Text.** Most of the time when students made substitutions, they substituted a real word for the word in the text (i.e., “sat” for set or “pictures” for pieces). On a few occasions, they substituted a nonsense word for the word in the text (i.e., “twowl” for towel, “ospen” for opossum). The proportion of real word substitutions out of total substitutions was compared across groups. The means and standard deviations are shown for each group in Table 4.5. A one-way ANOVA was conducted to investigate between group differences. Most substitutions in all three groups were real words and ANOVA results indicated no significant between-group differences in the percentage of real word versus nonsense substitutions ($F (2, 27) = 1.102, p < .347, \eta^2 = .075$).
Table 4.5

Mean Percentages of Types of Substitutions by Reader Group

<table>
<thead>
<tr>
<th></th>
<th>D-RR (n = 10)</th>
<th>ND-RR (n = 10)</th>
<th>A-NRR (n = 10)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M (SD)</td>
<td>M (SD)</td>
<td>M (SD)</td>
<td></td>
</tr>
<tr>
<td>Continuous Text</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real Word Substitutions</td>
<td>.97 (.03)</td>
<td>.93 (.07)</td>
<td>.93 (.07)</td>
</tr>
<tr>
<td>Visually Similar Substitutions</td>
<td>.72 (.07)</td>
<td>.53 (.20)</td>
<td>.72 (.17)</td>
</tr>
<tr>
<td>Meaningful Substitutions</td>
<td>.70 (.08)</td>
<td>.44 (.17)</td>
<td>.77 (.15)</td>
</tr>
<tr>
<td>Words in Isolation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real Word Substitutions</td>
<td>.88 (.16)</td>
<td>.84 (.20)</td>
<td>.65 (.24)</td>
</tr>
<tr>
<td>Visually Similar Substitutions</td>
<td>.88 (.16)</td>
<td>.75 (.15)</td>
<td>.97 (.06)</td>
</tr>
</tbody>
</table>

Note. D-RR – students who discontinued from Reading Recovery; ND-RR = students who did not discontinue from Reading Recovery; A-NRR = students who did not need Reading Recovery.

Real Word Substitutions on Words in Isolation. As with continuous text, the most common reading behavior on words in isolation was substituting real or nonsense words for the word in the text. As noted in the previous section, the three groups did not differ in percentage of real versus nonsense word substitution when reading connected text. I was interested in whether this was also true for words in isolation. Means and standard deviations for each group are shown in Table 4.5. To determine if there were differences among the three groups, a one-way ANOVA was conducted. ANOVA results indicated significant differences between the three groups in the proportion of real word substitutions (F (2, 27) = 3.628, p = .040, η² = .212). Descriptively, D-RR had the highest
percentage of real word substitutions followed by ND-RR and both of these groups made proportionately more real word substitutions than A-NRR. However, the results of post-hoc tests (Tukey’s HSD, p = .05) revealed that the only significant differences was between D-RR and A-NRR. For D-RR, four out of five substitutions were real words while less than two out of three substitutions were real words for A-NRR. The effect size was large indicating practical as well as statistical significance (d = 1.13).

**Visually Similar Substitutions on Continuous Text.** Many of the substitutions the students made reflected attention to the printed information in the text. For this study, words were categorized as visually similar (i.e., making use of grapho-phonetic cues) if the child’s attempt to pronounce the word included two or more parts (beginning, middle, and end) of the target word. Examples of this type of substitution include *wouldn’t* for *won’t* and *here* for *there*.

Means and standard deviations for each group are shown in Table 4.5. A one-way ANOVA was conducted to identify possible between group differences in visually (graphophonically) similar substitutions. The ANOVA results indicated a significant difference in the percentage of visually similar substitutions between the groups (F (2, 27) = 5.029, p < .014, η² = .271). Results of post-hoc tests (Tukey’s HSD, p < .05) revealed that D-RR and A-NRR were more likely than ND-RR to make visually similar substitutions. Whereas D-RR and A-NRR made visually similar substitutions on almost three out of every four errors, ND-RR substituted a visually similar word on only one out of every two errors. The effect size between D-RR and ND-RR was large (d = 1.27) as was the magnitude of difference between A-NRR and ND-RR (d = 1.02) indicating practical as well as statistical significance.
**Visually Similar Substitutions on Words in Isolation.** As with the reading of continuous text, substitutions were categorized as visually (graphophonically) similar if the child’s attempt reflected attention to two or more parts (beginning, middle, end) of the word. When reading continuous text, ND-RR made substantially fewer visually similar substitutions than the other two groups and there was a significant difference between ND-RR group and each of the other two groups, D-RR and A-NRR. In order to see if this held true with words in isolation, a one-way ANOVA was conducted.

Means and standard deviations for each group are shown in Table 4.5. ANOVA results indicated significant differences between the three groups on whether their substitutions were visually (graphophonically) similar (F (2, 27) = 7.214, p = .003, η² = .348). Descriptively, A-NRR and D-RR made more visually (graphophonically) similar substitutions than ND-RR. However, the results of post-hoc tests (Tukey’s HSD), p = .05) revealed that the only significant difference was between ND-RR and A-NRR. Specifically, while almost all of the substitutions made by the A-NRR group were visually (graphophonically) similar only three out of four substitutions made by the ND-RR group were visually (graphophonically) similar (d = 1.93).

**Meaningful Substitutions on Continuous Text.** All real word substitutions were examined to infer the sources of information students used in their response. As explained in Chapter 2, readers can use three sources of information: (a) meaning (semantic acceptability), (b) structure (syntactic acceptability), and (c) visual information (graphophonic similarity). Because reading is a meaning-getting process and good readers are expected to make sense as they read, I expected that most substitutions would be meaningful. Means and standard deviations for each group are shown in Table 4.5. To
determine if there was a difference among the three groups in meaningful substitutions, a one-way ANOVA was conducted. ANOVA results indicated a significant difference between the three groups (F (2, 27) =14.401, p < .000, \( \eta^2 = .526 \)). Results of post-hoc tests (Tukey’s HSD, p <.05) revealed that there were significant differences between ND-RR and each of the higher performing groups, A-NRR and D-RR. Specifically, about three out of four substitutions for D-RR and A-NRR were meaningful substitutions while less than half of the substitutions made by ND-RR were meaningful substitutions. The effect size between D-RR and ND-RR was large (\( d = 1.96 \)) as was the effect size between A-NRR and ND-RR (\( d = 2.06 \)) indicating practical as well as statistical significance.

**Word-Solving Behaviors**

As described in Appendix C, solving behaviors occurred in three ways: (a) sub-word level with letters, clusters of letters or word parts (e.g., “m-a-ma-made” or “sh-shelfshelf”); (b) sub-word level combined with whole words (real and nonsense words) (e.g., “a-and-ad” and “wor-worked”); and (c) multiple substitutions of whole words (e.g., “worded-wanted-worried” and “someone-someboy-somebody”). These solving behaviors resulted in both correct and incorrect reading.

Solving behaviors also varied in the number of steps. An example of solving in one step is “s- sun”. Students exhibited seventeen different one-step solving patterns. An example of two-step solving is “s-, st-, stone” and an example of multi step solving is “w-, wiv-, wife, wives”. Students exhibited 93 different patterns of two-step and multi-step patterns (See Appendix D). These solving behaviors which may or may not have resulted in correct reading, provided insight into how students used information to figure out unknown words. A closer examination of these reading behaviors was made,
comparing the groups in two ways: (a) the success rate of problem solving between the
groups and (b) the way students began to solve words. With respect to the latter, onsets,
onset with a vowel, or whole words were examined.

**Word-Solving Behaviors on Continuous Text**

When students solved words in continuous text, they initiated their solutions with
either (a) onsets - a single letter or cluster (e.g., *d-dirt, st-stone*), (b) an onset and a vowel
or vowel and consonant syllable (e.g., *pud-puddles, some-someone*), or (c) a whole word
(e.g., *that's-what's, shirt-short-soft*). Means and standard deviations for each group are
shown in Table 4.6. As the table indicates, none of the groups used whole words very
often so no further analyses were conducted using the category – initiating with a whole
word. D-RR and A-RR used onsets and onsets plus a vowel almost equally often while
ND-RR used onsets more than twice as often as onsets plus a vowel.

Table 4.6

**Ways of Initiating Solving in Three Groups of Readers, Showing Percentage of Attempts**

By Solving Approach

<table>
<thead>
<tr>
<th></th>
<th>D-RR M (SD)</th>
<th>ND-RR M (SD)</th>
<th>A-NRR M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous Text</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using Onsets</td>
<td>.47 (.15)</td>
<td>.61 (.15)</td>
<td>.46 (.23)</td>
</tr>
<tr>
<td>Using Onsets Plus A Vowel</td>
<td>.41 (.16)</td>
<td>.25 (.15)</td>
<td>.50 (.20)</td>
</tr>
</tbody>
</table>

*Note*. D-RR – students who discontinued from Reading Recovery; ND-RR = students
who did not discontinue from Reading Recovery; A-NRR = students who did not need
Reading Recovery.
When examined at the level of the individual student, the data suggested that some students showed a decided preference for one way of solving. After examining the ways that individual students initiated their solving, the students were categorized accordingly. Three major patterns became apparent: (a) use of onsets more than half the time, (b) use of onsets plus a vowel more than half the time, and (c) equal use of onsets and onsets plus a vowel. Student preferences are shown in Figure 4.1. A chi-square test was performed to determine if there were differences among the three groups in the prevalence of each approach to solving words. The results indicated significant between group differences ($\chi^2 (3, N = 30) = 11.13, p = .025$). Specifically, eight out of ten ND-RR students used onsets more often than other approaches to initiate their word solving (i.e., the first pattern identified above) while a majority of D-RR (n=6) used a balance of onsets and onsets plus vowels (i.e., the second pattern identifies above). A-NRR showed no decided preference. That is, almost the same number (n=3) relied more heavily on onsets, as relied more heavily on onset plus vowels (n=4), or were characterized by a balance between the two approaches (n=3).
As I described above, there was a significant difference between the three groups in how students initiated their solving behaviors. I looked to see if this trend held true for words in isolation. As was the case on connected text, not one student initiated their solving with a whole word on words in isolation, so no further analyses were conducted on that approach.
Table 4.7

Ways of Initiating Solving on Words in Isolation Between Three Groups of Readers

<table>
<thead>
<tr>
<th></th>
<th>D-RR M (SD)</th>
<th>ND-RR M (SD)</th>
<th>A-NRR M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using Onsets</td>
<td>.76 (.33)</td>
<td>.33 (.41)</td>
<td>.11 (.19)</td>
</tr>
<tr>
<td>Using Onsets plus a Vowel</td>
<td>.24 (32)</td>
<td>.57 (.44)</td>
<td>.55 (.44)</td>
</tr>
<tr>
<td>No solving Attempts</td>
<td>.00 (.00)</td>
<td>.10 (.31)</td>
<td>.30 (.48)</td>
</tr>
</tbody>
</table>

Note. D-RR – students who discontinued from Reading Recovery; ND-RR = students who did not discontinue from Reading Recovery; A-NRR = students who did not need Reading Recovery.

As can be seen in Table 4.7, not all students made solving attempts on words in isolation. One student in the ND-RR group made no solving attempts on words in isolation and three A-NRR students made no solving attempts on words in isolation. A chi-square test was performed to determine if there were differences among students who made solving attempts in their use of onsets versus onsets plus a vowel. There was a difference in the way these students initiated solving words ($\chi^2 (3, N = 30) = 12.75, p = .047$). Specifically, D-RR used onsets almost exclusively while the other two groups showed no decided preference. D-RR was the only group where all students attempted to solve words and about a third of A-NRR made no solving attempts on words in isolation (i.e., they were more likely to be non-respondents when they did not recognize words).
A Summary of the Findings

Three groups of students read several texts and some words in isolation. Their reading was examined in order to answer the question guiding this study: How do the reading behaviors differ between three groups of first grade students, D-RR, ND-R and A-NRR? Students read continuous text from three instruments: SFTP, QRI-4 and ORF, and they read words in isolation from one instrument, BWT.

Similarities Between All Three Groups

During this study, students were given many opportunities to read continuous texts and many reading behaviors were observed. The behaviors that these students displayed fell into four major categories: (a) substitutions, (b) solving, (c) repetitions, and (d) other behaviors. An examination of types of reading behaviors revealed no
significant between group differences in the prevalence of each of the four types of behavior. When students were asked to read words in isolation, the types of reading behaviors they displayed fell into three categories: (a) substitutions, (b) solving, and (c) skipping or omitting a word. As on continuous text, there were no significant between group differences in the prevalence of the three categories of reading behaviors when reading words in isolation.

While correct reading was the most frequently observed behavior, the next most prevalent behavior for all groups was substituting one word for another. Almost all of the substitutions that were made were real words. More than nine times out of ten, students substituted a real word for the word in the text and no statistically significant differences were found between the groups.

Solving behaviors were defined as one-step and multi-step actions students used to problem-solve unknown words in the text. All groups were successful on about half of their solving attempts on continuous text and there were no statistically significant differences in the proportion of successful solving attempts between the three groups.

**Similarities Between D-RR and A-NRR**

Students who have successfully discontinued from their Reading Recovery lessons (D-RR) have been identified as reading at or above the average level of their class and were expected to display the same reading behaviors as their peers who did not need supplemental help (A-NRR). Students who did not successfully discontinue from their Reading Recovery levels (ND-RR) were identified as needing further referral and long term interventions and were not expected to display the same reading behaviors as their
peers who did not need supplemental help. This was true for the students in this study most of the time.

As expected, results showed that almost all of the students in the D-RR and A-NRR groups achieved grade level expectations on one or more of the measures while none of the ND-RR students achieved grade level expectations. When mean score differences were examined, the assessment results showed no statistically significant differences between D-RR and A-NRR on any of the instruments used but there were statistically significant differences between the ND-RR group and the other two groups on all four reading instruments.

Substitutions were examined to see if they were visually similar (i.e., made use of graphophonic cues) and were categorized as visually similar if the child’s attempt to pronounce the word included two or more parts (beginning, middle, and end) of the target word. There were statistically significant differences between ND-RR and the other two groups. D-RR and A-NRR made visually similar substitutions on almost three out of every four errors while ND-RR made visually similar substitutions on only one out of two errors.

Three out of four of the substitutions made by D-RR and A-NRR made sense within the text but less than half of ND-RR substitutions made sense. The differences between ND-RR and the other two groups were statistically significant.

When students solved words in continuous text, they initiated their solutions with either (a) onsets - a single letter or cluster, (b) an onset and a vowel or vowel and consonant syllable, or (c) a whole word. While D-RR and A-NRR used onsets and onsets
plus a vowel almost equally, ND-RR used onsets more than twice as often as onsets plus a vowel and this difference was statistically significant.

**Other Differences Between Groups**

On continuous text, comparisons of the success rates of reading behaviors revealed that A-NRR had the highest overall success rate and there was a statistically significant difference between A-NRR and ND-RR in the percentage of attempts that resulted in a successful reading. A-NRR was successful on about one out of two attempts while ND-RR was successful on only about one out of three attempts. An examination of the number of self-corrections showed that ND-RR had the highest self-correction rate, about one in three, and there was a statistically significant difference between ND-RR and the other two groups.

While the reading behaviors of D-RR and A-NRR looked very similar on continuous text, there were a variety of differences between the groups when reading words in isolation. On words in isolation, while most substitutions were real words D-RR was significantly more likely than A-NRR to substitute real words. As with substitutions on continuous text, D-RR and A-NRR made more visually similar substitutions on words in isolation but the only statistically significant difference was between ND-RR and A-NRR. When solving words in isolation, ND-RR used onsets almost exclusively while the other two groups showed no decided preference and this difference was statistically significant. D-RR was the only group where all students attempted to solve words in isolation and almost a third of A-NRR made no solving attempts on isolated words.

These results, what they may mean, and their implications are discussed in more detail in the next chapter.
Chapter 5
DISCUSSION
The purpose of this study was to compare the variety, complexity, and frequency of the reading behaviors of three groups of first grade students: students who successfully discontinued from a Reading Recovery intervention (D-RR), students who did not discontinue from their Reading Recovery lessons (ND-RR), and students who were making average progress and never needed a Reading Recovery intervention (A-NRR).

The specific question that guided this study was:

How do the reading behaviors differ between three groups of first grade students: D-RR, ND-RR, and A-NRR?

This chapter discusses major findings, implications of the results, and recommendations for further research. In the first section, the major findings of the study are examined. The second section considers implications, and the third section discusses limitations of the study and questions for further research.

Major Findings and Conclusion

This study explored the variety, complexity, and frequency of reading behaviors of a group of first graders. It also examined the differences between three groups of readers: D-RR, ND-RR, and A-NRR. Many theorists (Adams, 2004; Ashby & Rayner, 2006; Clay, 2005a; Rummelhart, 2004; Smith, 1994;) have described the complexity of the reading process, and an examination of the data in the present study revealed the complexity of these students’ reading behaviors. Five trends emerged from analyses of the data:
1. Students’ achievement fell into the expected range for all three groups.

2. All students controlled a wide range of reading behaviors.

3. ND-RR’s behaviors differed significantly from the other two groups – D-RR and A-NRR. ND-RR were less likely than D-RR and A-NRR to make more meaningful and visually (graphophonically) similar substitutions, and they used smaller word parts as they solved. They also read more slowly.

4. The approach to reading words in continuous text differed from reading words in isolation.

5. The first grade students observed in this study displayed somewhat different reading behaviors than the second grade students observed in a similar study conducted by Kaye (2002).

**Achievement**

At the end of their series of lessons, students are either discontinued from Reading Recovery or recommended for further, long-term specialist assistance. The Reading Recovery team that includes Reading Recovery teachers, classroom teachers, administrators, and other school personnel makes this decision. Students who are ready to discontinue are reading at or above the average of the class and are developing a self-extending system. In her guide for teachers, Clay (2005a) stated, “Teachers aim to produce more independent readers so that reading and writing improve whenever children read and write. The reader who problem-solves independently has continual access to new learning” (p. 40).

As stated in earlier chapters, there is a large body of research documenting the effectiveness of Reading Recovery (D’Agostino & Murphy, 2004; Hiebert, 1994; Pinnell,
Lyons, DeFord, Bryk, & Seltzer, 1994; Schwartz, 2005; Shanahan & Barr, 1995). Consistent with this research, data from the present study provided further evidence that students who successfully discontinue from their Reading Recovery lessons achieve at comparable levels to peers working at the average of their class. These are students who "have learned how to work effectively at problem-solving texts" (Clay, 2005a, p. 51). In contrast, students who do not discontinue from their Reading Recovery lesson may have made progress but are still in need of further help.

Specifically, it was predicted that D-RR and A-NRR would achieve similar scores, and ND-RR would score significantly lower than the other two groups on four commonly used assessments: Scott-Foresman Testing Packet (SFTP), Qualitative Reading Inventory-4 (QRI-4), Burt Word Reading Test (BWT), and Oral Reading Fluency (ORF). The grade level benchmarks for each of the assessments were determined and, using these benchmarks, the number of students from each group that met or exceeded the benchmark was identified. All three groups performed as predicted based on how groups were identified. Specifically, their classroom teachers identified students in A-NRR as achieving average reading levels, and so, it was expected that they would meet or exceed the grade level benchmarks. Consistent with this prediction, six out of ten students met or exceeded the standard on all four assessments, and nine out of ten students met or exceeded the standard on at least one assessment.

Clay (2005a) observed that students who discontinued from a Reading Recovery series of lessons should be performing at the average level of their class and be developing a self-extending system. Therefore, I expected D-RR to perform similarly to A-NRR- and, to meet grade level benchmarks on all four assessments. Similar to the
performance of A-NRR, half met or exceeded the grade level expectation on all four assessments, and nine of the ten students met or exceeded grade level expectations on at least one assessment. Because ND-RR failed to successfully discontinue from their Reading Recovery series of lessons, it was expected that they would be working below grade level. Consistent with this prediction, none of these students met the standards on any of the assessments.

An examination of mean score differences produced similar results. Mean scores on all four assessments were comparable for D-RR and A-NRR, and there were no statistically significant differences between these two groups. ND-RR’s mean scores were considerably lower on all four instruments. Statistically significant differences were found between ND-RR and each of the other two groups. ND-RR scored more than two standard deviations lower than the other two groups on every assessment, confirming their need for further intervention.

**Reading Behaviors**

One of the purposes of this study was to identify the variety and frequency of reading behaviors displayed by first grade readers. The reading behaviors identified and analyzed in this study were determined through running records. The procedures for taking running records were described in Chapter 3, and a critique of the strengths and criticisms of running records was included in Chapter 2. Some researchers have expressed concern that oral reading may or may not reflect the same behaviors used in silent reading (Beebe, 1980; Leslie and Caldwell, 2005; Leu, 1982; Weber, 1968). On the other hand, others have concluded that analyzing oral reading errors “seems particularly promising” as an indicator of strategic processing (Leu, 1982, p.421).
Although observations of oral reading behaviors can only provide what Clay (2005b) called “a misty window on the perceptual and cognitive working of the brains of young readers” (p. 117), in the present study, running records were analyzed to identify these oral reading behaviors. These behaviors were used to generate hypotheses about strategic processing that might be happening.

Accurate reading was by far the most common reading behavior exhibited. Additional behaviors fell into four categories: (a) substitutions, (b) word solving, (c) repetitions, and (d) other behaviors (i.e., behaviors that did not fit into the other three categories such as additions, omissions, appeals and tolds). After identifying these behaviors, I compared the frequencies of behaviors among the three groups.

Clay (2005b) viewed reading as a message-getting, problem-solving activity that is a complex process. “Young readers search for links between the items (words, letters and sounds), they begin to thread the items together, putting letters into words, words into sentences, and they make new discoveries” (p. 101). As they make these new discoveries, they must be infinitely flexible as they discover how text works. As expected, the three groups of first grade students demonstrated all of the varied reading behaviors that have been described in earlier research.

Kaye (2002) found that the most common behavior was accurate reading and she looked at additional reading behaviors over six main categories: substitutions, solving, repetitions, omissions, insertions, and other behaviors including responses that were unintelligible and instances when a child appealed for help from the teacher and was told the word. In this study, first grade readers fell into the same categories, although omissions, insertions, and other behaviors were so rare that they were all combined into
one category called “other behaviors”. There were no significant between-group differences in the frequency of behaviors. Substitutions were the most common behavior for all three groups after correct reading, and about half the observed behaviors were substitutions. Another large category of behaviors was word-solving strategy. Students worked at the sub-word and word level to solve unknown words. When solving words, they may have taken one, two or more steps to work out words. The 30 students in this study displayed a wide range of behaviors as they attempted to solve unknown words. I observed 110 different word solving patterns that ranged from one single step to as many as five steps to solve or attempt to solve a word. A third large category of reading behaviors was repetitions. Students repeated single words, phrases and whole sentences while they were reading. The last category of behaviors was referred to as other and included additions and omissions to the text as well as appeals for help or times when the reader waited to be told what was in the text. For all three groups, this was the smallest set of behaviors.

In summary, first grade students displayed a variety of reading behaviors that were consistent with Clay’s (2005a) view that literacy acquisition is a complex process where young readers learn to be flexible as they try out a variety of approaches to discover how texts work. The first grade students in this study displayed many different reading behaviors and that reflected the complexity of the reading process. All students attempted to work out words using a wide range of reading strategies rather than a single approach that was used every time an unknown word was encountered.
Between-Group Differences in Behaviors

In addition to examining the frequency, variety, and complexity of reading behaviors, this study also examined the similarities and differences in the reading behaviors of three groups of readers: D-RR, ND-RR, and A-NRR. Given that students who discontinued from their Reading Recovery lessons are independent readers who are working at the average level of their class, I expected this group and A-NRR to achieve at comparable levels and display similar types of reading behaviors. I hypothesized, however, that the third group, ND-RR, would achieve at lower levels and display different behaviors than their more proficient peers. As reported earlier in this chapter, D-RR and A-NRR significantly outperformed ND-RR on every measure. In addition to differences in achievement, an examination of the reading actions displayed by the three groups showed statistically significant differences between ND-RR and the other two groups in the types of substitutions they made. Their substitutions were less likely to be meaningful and less visually (grapho-phonically) similar to the target words than D-RR and A-NRR. They also used smaller word parts when they solved words and were able to read fewer words per minute than the higher achieving groups.

An examination of the mean accuracy on texts that were read indicated that there was no significant difference between the three groups in mean accuracy in their reading, so this cannot account for differences in reading behaviors between the groups. While all three groups displayed a variety of reading behaviors (i.e., substitutions, solving, repetitions, other behaviors) an examination of the ratios of these types of reading behaviors showed no significant differences between the three groups. There were, however, between-group differences in the proportion of successful attempts. ND-RR
displayed the lowest proportion of successful attempts. This difference was statistically significant when compared to A-NRR. The attempts ND-RR exhibited were less likely to result in successful reading.

**Substitutions.** After accurate reading, substitutions were the most common reading behavior observed in all three groups. While there were no significant differences between the three groups in the number of substitutions, there were differences in the kinds of substitutions they made. Seventy-two percent of the substitutions of A-NRR and D-RR were visually (graphophonically) similar, but this was true for only half (53%) of the substitutions made by ND-RR. Substitutions were characterized as visual if the child’s attempt to pronounce the word included two or more graphemes (beginning, middle, and end) of the target word. An examination of the number of meaningful substitutions revealed similar results. A-NRR and D-RR made about three out of four meaningful substitutions, but less than half of the substitutions (44%) were meaningful for ND-RR. That is, A-NRR and D-RR were more likely than ND-RR to be successful in their use of graphophononic cues and also more likely to be successful in their use of meaning-based cues.

What may account for observed differences between ND-RR and the other two groups in frequency of use of graphophononic and meaning-based cues? In the next section, I discuss several explanations for my results, beginning first with the research on changes in the use of graphophononic cues as students learn to read, and continuing with the consideration of two factors that may have contributed to differences in use of meaning based cues, text level, and fluency.
Word-Solving

The first grade students in my study displayed many ways to read unknown words, including making substitutions and word-solving. An examination of Ehri and McCormick’s (2004) theory of word learning contributes to understanding how these students read unknown words. Ehri and McCormick identified five phases of word learning: (1) pre-alphabetic, (2) partial-alphabetic, (3) full-alphabetic, (4) consolidated-alphabetic, and (5) automatic-alphabetic. According to Ehri and McCormick, most first grade students are working in the partial and full alphabetic phases. Readers at the partial-alphabetic phase have some understanding of the alphabetic system but lack full understanding, particularly vowel knowledge. Readers working at the full-alphabetic phase have an understanding of the major grapheme-phoneme units in English.

The reading behaviors observed suggested that D-RR and A-NRR were more likely that ND-RR to be working at the full-alphabetic phase. According to Ehri and McCormick (2004), students at this stage are reading widely and their sight word vocabulary, the words they recognize automatically, is growing rapidly. Readers at the full-alphabetic phase use their understanding of major grapheme-phoneme correspondences including vowels and are able to match up phonemes in the pronunciation of words to graphemes seen in the conventional spellings of words. Early in this phase, decoding is slow but becomes more rapid as they practice decoding leading to growth in their knowledge of fully analyzed sight words grows. Once this occurs, they are then able to use analogy to recognize the similarities and differences between words they know and new words.
Most of the substitutions the readers in my study made were visually (graphophonically) similar, meaning that the child’s attempt to pronounce the word reflected attention to two or more graphemes (beginning, middle, and end) of the target word. For these two groups, this happened about three-quarters of the time, possibly indicating that they are learning to carefully look at and listen to words as they match up graphemes and phonemes and become more rapid as they decode words.

An examination of the word-solving patterns showed many different approaches to solving. However, most of these patterns could be grouped into larger categories according to how the student began to solve the word. Students used three different methods to solve words. The first way was to start with the smallest part possible, such as an initial letter or cluster (e.g. s- or sh-), and when they did that, it was coded as an onset. The second way to start solving a word was to begin with a prefix, a root word or a chunk that included a vowel (e.g. re-or look) which was coded as onset with vowel. A third and less frequent way was to start with a whole word and then go back and solve (e.g. like-l-l-i-v-live). D-RR and A-NRR used onsets and onsets with vowels almost equally, indicating that they were learning to use larger parts of words to decode words. Being able to select larger units of words suggests that these students are beginning to use words and word parts that they knew in order to figure out unknown words.

In contrast, ND-RR appeared to be working at the partial-alphabetic stage. Ehri and McCormick’s (2004) research indicates that because readers at this stage have limited knowledge of the alphabetic system, they lack full phonemic segmentation ability. Consequently, they process only some letter-sound cues, focus on initial and final letters in a word, and often misread words having similar letters (e.g., man for men or this
for *that*). When solving words, their decoding strategies are less effective and they may have difficulty using analogies to solve unknown words. Sight words are not represented in memory in sufficient detail to recognize new words that have similar spelling patterns to known words. As a result, new words are often misread as known words because of a partial resemblance between them.

This limited alphabetic knowledge was evidenced when substitutions were examined for visual similarity. Barely half of the substitutions ND-RR made were visually similar (had a letter-sound match in two or more graphemes of the word. Many of their substitutions had one visually similar word component that was often the first letter (e.g., *some* for *sweet* or *person* for *place*). With some substitutions, the reader appeared to look at a letter in the middle or at the end of the word and substitute a word that started with that letter (e.g., *then* for *now* or *rain* for *door*). Other substitutions shared one word component (e.g., *back* for *park*) while some other substitutions shared no similarity (*she* for *I* or *my* for *a*). When solving words, these readers showed a decided preference for initiating their solving with the onset, the smallest unit possible, indicating that they may have been unable to use larger units of words as they decoded.

Ehri and McCormick's (2004) theory of word learning provides guidance about what children know about word learning and the order in which they are likely to learn about words. Knowing this can guide teaching, but differences in their word learning phases may not fully explain the discrepancies between the first grade readers in my study. Other considerations, including text levels and reading rate, are discussed below.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Levels 8 to 12</th>
<th>Levels 16 to 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text structure</td>
<td>Focused on a single idea with a straightforward structure</td>
<td>Narratives with more elaborated episodes.</td>
</tr>
<tr>
<td></td>
<td>(beginning, series of episodes, ending).</td>
<td></td>
</tr>
<tr>
<td>Sentence complexity</td>
<td>Some long sentences with prepositional phrases, adjectives, and clauses.</td>
<td>Longer, more complex sentences including many compound sentences.</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>Most words are familiar to children and likely to be used in their oral language.</td>
<td>Some new vocabulary and content-specific words introduced and explained in the text.</td>
</tr>
<tr>
<td>Words</td>
<td>Mostly 1-2 syllable words with some 3 syllable words. Wide variety of easy spelling patterns.</td>
<td>Many 2-3 syllable words and multi-syllable words that are easily taken apart. Some complex spelling patterns.</td>
</tr>
<tr>
<td>Illustrations</td>
<td>Illustrations extend and support the meaning.</td>
<td>Illustrations support interpretation and set the mood but are not necessary for understanding.</td>
</tr>
</tbody>
</table>
Text Level. Clay (2005) considered text reading that was below 90% accuracy to be at the frustration level, and so would not adequately reflect the reader’s strategic processing. Therefore, only reading behaviors from texts that students read at the instructional level (90% to 94%) or the easy level (95% to 100%) were included in the error pool and analyzed. For the Scott-Foresman Testing Packet, the mean score for ND-RR was 11.6. Most of the texts they read were between levels 8 through 12, while D-RR’s and A-NRR’s mean scores were 18.6 and 19.4 respectively, and most of the texts they read were between levels 16 through 20. Fountas and Pinnell’s (2006) descriptions of these text levels is summarized in Table 5.1. A comparison of texts read on the QRI-4 (Leslie and Caldwell, 2005) showed that the differences between these text levels were similar. In the present study, students read from a variety of text levels. It remains possible that the characteristics of the texts contributed to the differences in reading behaviors that were observed. For example, lower level texts are simpler in structure and story content, so they may not induce readers to use advanced reading behaviors. Higher level texts, in contrast, are longer and more complex and, may provide additional opportunities to apply sophisticated reading behaviors and meaning-based cues.

Reading Rate. Reading rates were measured using the ORF assessment. D-RR and A-NRR read similar numbers of words correct per minute, reading almost twice as many correct words per minute as ND-RR. More than half of D-RR and A-NRR met the grade level benchmark, while none of ND-RR met it. Reading rate is an indicator of fluency. There is a large body of research supporting a strong link between fluency and comprehension (Cunningham, & Allington, 2011; Block, & Pressley, 2007; National Reading Panel, 2000). Additionally, students who are reading at a faster rate are using
less effort to read the words on the page and have increased capacity to attend to meaning. As Samuels (2006) hypothesized, with experience, students read words quickly and automatically without having to decode each word, freeing their cognitive resources to attend to comprehension. One possible explanation for the greater use of meaning among A-NRR and D-RR is that with greater fluency and faster reading rates, students are able to maintain meaning more easily. The more meaningful substitutions displayed by D-RR and A-NRR provide tentative evidence that this may be the case.

In conclusion, when the reading behaviors of these first grade students were examined, it was hypothesized that D-RR and A-NRR would display similar reading behaviors, while ND-RR would display a different set of reading behaviors. The students' reading behaviors exhibited more successful solving strategies and more meaningful substitutions for D-RR and A-NRR. Their substitutions were visually (graphophonically) similar more of the time and they used larger word parts when they solved words. D-RR and A-NRR were also able to read more quickly as evidenced by the correct words per minute they read on the ORF. Overall, D-RR and A-NRR used reading behaviors that were consistent with their higher achievement levels.

**Reading Words in Isolation**

Although most of the reading that the students in this study were asked to do was on continuous text, they also had the opportunity to read words in isolation on the BWT. Clay’s (2005a) theory of early literacy acquisition:

[Assumes] that a theory of reading continuous texts cannot arise from a theory of word reading. It involves problem-solving and the integration of behaviors not studied in a theory about analyzing words. It must, however, explain the role of word reading and letter recognition with the theory of reading continuous text. (p. 19)
Because students read words in isolation on the BWT, their reading behaviors on continuous text and words in isolation were compared. The results showed differences between reading words in isolation and continuous text. When reading words in isolation, students' reading behaviors fell into three categories: (a) substitutions, (b) solving, and (c) skipping or omitting the word.

An examination of substitutions showed that for all three groups, most substitutions were real words whether they were reading words in isolation or continuous text. There were no significant between-group differences in the proportion of real word versus non-word substitutions made on continuous text. However, when reading words in isolation, D-RR and ND-RR made more real word substitutions than A-NRR. The difference was statistically significant between D-RR and A-NRR and showed a large effect size. Because this was the only time that D-RR differed significantly from A-NRR, it was notable. One possible explanation for this result is that in their Reading Recovery lessons, teachers place heavy emphasis on the meaning-getting process and rarely ask students to read unknown words in isolation. As a result, these students may have felt a need to "read" a real word reflecting their instruction emphasizing meaning. A-NRR, in contrast might not have received instruction with this emphasis and were more likely to "read" a word with visual (graphophonic) similarity even though it may have been a nonsense word.

The groups also differed in word solving. On continuous text, ND-RR used onsets as their primary means of initiating solving, while the other two groups were more likely to use larger parts of words. However, on words in isolation, D-RR approached their solving differently and was twice as likely to initiate solving using onsets as the other two
groups. This group’s approach to solving words in isolation was different than their word-solving on continuous text. In their Reading Recovery lessons, D-RR almost always read continuous text. Based on Clay’s (2005b) theory that reading is a complex process these readers were taught to rely on (a) meaning (semantic acceptability), (b) structure (syntactic acceptability), and (c) visual information (graphophonic similarity). When reading words in isolation, without information from meaning and structure, these readers appeared to find reading more difficult and needed to use smaller pieces of visual (graphophonic) information as they solved. It is notable that these readers changed the way they approached their word solving when reading words in isolation. When D-RR solved words in continuous text, they used onsets and onsets with a vowel almost equally, and they were able to use larger word components to solve unknown words. When working on words in isolation, their attempts to use of onsets with a vowel dropped to less than one in four, using smaller parts of a word in their attempts. While this difficulty may be due to the corpus of words presented on the BWT that became successively more difficult, it also may be that their word-solving abilities were not as secure as they appeared when reading continuous text.

Another notable difference between word-solving in isolation and in context was the number of attempts made to solve words. Every D-RR student attempted to solve unknown words in isolation with nine out of ten ND-RR students attempting to solve unknown words. However, only seven out of ten A-NRR made attempts to solve unknown words in isolation. Three of these students made no response when they did not recognize these words. One possible explanation may be that because these students were considered average, they did not receive as much explicit instruction about what to do
when they encountered an unknown word. Another possibility may be that these students were able to make good guesses based on context but have not learned as many strategies for solving unfamiliar words. In spite of their average achievement in first grade, some of these readers may still have had much to learn about solving unknown words. Given the small numbers in each group, the difference between groups in solving attempts may have been a chance finding; however, it is a finding that may be worth exploring further in subsequent research.

**Reading Behaviors in First Versus Second Grade Students**

Several studies have examined the reading behaviors of beginning readers (Biemiller, 1970; Blaxall & Willows, 1984; Clay, 1982; Weber, 1970; Williams & Clay, 1982) and Kaye (2002) examined the reading behaviors of older readers. Using a similar methodology used in the present study, Kaye examined the oral reading behaviors of proficient second grade students and found that they controlled a wide range of processing behaviors and had a large repertoire of ways to problem-solve unknown words. To what extent are these processing and reading behaviors evident in first grade students? Studying the oral reading behaviors of Reading Recovery students provided an opportunity to address this question by comparing the reading behaviors of first grade students to those reported by Kaye in her study of more proficient and slightly older readers. It was anticipated that end-of-year first grade students would be similar in most respects to second grade students. However, my results were not always consistent with the results of Kaye’s study. The similarities and differences are detailed below.

Kaye (2002) found that the most common behavior was accurate reading. Additional reading behaviors fell into six main categories: substitutions, solving,
repetitions, omissions, insertions, and other behaviors including responses that were unintelligible. In my examination of three groups of first grade readers: D-RR, ND-RR, and A-NRR, I found the same categories although omissions, insertions, and other behaviors were so rare that I combined them into one category called “other behaviors”. Like Kaye, I found that substitutions were the most frequently exhibited behavior after accurate reading. Kaye determined that the second grade students almost always substituted real words rather than nonsense words, and the first grade students in my study did the same. Kaye also found that the second grade students in her study used multiple sources of information with an emphasis on meaning and structure. In this study, most of the substitutions made by D-RR and A-NRR were meaningful, but ND-RR’s substitutions were meaningful less than half the time. Like Kaye’s proficient second grade students, D-RR and A-NRR were more likely to be reading for meaning, while the less proficient ND-RR were still struggling to make sense of the words in the text.

Second grade students in Kaye’s (2002) study made numerous solving attempts, producing more than 60 different solving behaviors, and often engaging in multi-step problem-solving. Above level second grade readers were more likely to engage in solving behaviors than on-level readers. The first grade students in my study displayed numerous problem-solving attempts. As a group, they produced more than 100 different solving behaviors, and all three groups were likely to attempt to solve unknown words.

Both the second grade students in Kaye’s (2002) study and the first grade students in this study made few omissions or insertions. Appeals for help or waits to be told a word were also rare, so I collapsed these behaviors into one category called “other behaviors”. The “other category” was small for the three groups in my study. None of
Kaye’s second graders appealed for help or waited for the examiner to tell them the word. She attributed this to their independent problem-solving abilities and concluded that these proficient second-grade readers “always took the initiative to problem-solve” (p. 200) when reading continuous text. However, 80% of the first grade students appealed for help or stopped and waited for the examiner to tell them a word and this occurred across all three groups. This finding may indicate that these younger students were problem-solving less independently and that their self-extending system was less well-developed than the older readers. These differences could be due to age and maturation but may be attributed to other factors, such as classroom instruction, school culture, or the expectations for these students and should be explored further.

In summary, in both Kaye’s (2002) study and this one, the most common behavior beyond correct reading was substituting one word for another. The second grade students and two groups of first grade students, D-RR and A-NRR, used meaning and visual (grapho-phonetic) information most of the time as they read. All readers made multiple attempts at solving words. The most profound difference between the first grade students and the second grade students was the level of independence they displayed. Kaye reported that the second grade students never appealed for help or waited to be told a word, while almost all of the first grade students appealed for help or stopped and waited for assistance at some point. This difference merits further exploration by future researchers.

**Implications**

It is important to use research in education to extend our knowledge and to improve educational practice. This study explored the variety, complexity, and frequency
of the reading behaviors of three groups of first grade readers. There is a tendency to want to extrapolate specific implications for classroom practice. However, it was difficult to do that given my research question and the small sample size. The research question was limited to describing the differences between three groups of first grade students, D-RR, ND-RR, and A-NRR, and did not include a study of the instructional practices that contributed to the success of these readers. Again, the sample size was small, and the behaviors of these three groups of students may not be representative of the general population.

The results of this study do, however, support the view that reading is a complex process; first grade students exhibited many and varied reading behaviors rather than a single approach to reading and solving unknown words. This study might contribute to classroom teachers’ understanding and appreciation of the complexity of the reading process. It may also contribute to the understanding of the reading process among Reading Recovery teachers and other interventionists who work with at-risk readers at the early acquisition stage. This contribution will be discussed further below.

**Understanding the Complexity of the Reading Process**

Every student who participated in this study displayed many and varied reading behaviors. Not one used a single approach to reading, but used differing approaches to read. The results of this study support the description of reading as a complex process (Adams, 2004; Ashby & Rayner, 2006; Clay, 2005a; Rummelhart, 2004; Smith, 1994; ). It is important for teachers of beginning readers to understand the complexity of the reading process and the need to teach students to use a variety of strategies as they read. It is unclear whether teachers of young readers understand how complex the literacy
process is. The beliefs of teachers and how those beliefs match their classroom practices is an area that should be explored further and may be an area for further research.

Providing powerful professional development opportunities that combine theoretical learning with observation and coaching could support the development of teachers’ theoretical and practical knowledge (Bean & Morewood, 2007; Lyons & Pinnell, 2001).

**Teaching for Meaning**

It is important to teach beginning readers that reading is a meaning-making process. Average readers (the D-RR and A-NRR groups) made meaningful substitutions about three out of four times while the substitutions made by the lower performing readers, (the ND-RR group) made sense about half the time. Based on their observations of readers, Keene and Zimmerman (2007) pointed out that proficient readers are flexible and adaptive and “listen to their inner voices as they read, make ongoing corrections and adjustments, and are aware of how meaning evolves. (The) goal is to make this process similarly subconscious and natural for all students” (p. 49). Helping students reach the point where they can do this subconsciously, and therefore, automatically may be the most important teaching we can do if readers are to be successful. In order to do this, teachers need to help students understand that reading is a “meaning-getting process” (Clay, 2005b), and that they need to continually make sense, at the text and word level, as they read. Johnson and Keier (2010) explained that struggling readers have not built an efficient reading processing system to make meaning from texts or solve problems when they are stuck. According to Johnson and Keier, “These children desperately need teachers who understand that a reading process system must be constructed by each
individual” (p. 12), and teachers need to support these students as they learn to make sense of the text they are reading.

**Teaching for Word Learning**

When considering instruction for ND-RR, site data (Greaney, 2009) indicated that most of these students receive further literacy instruction after they complete their Reading Recovery lessons, and most of this instruction (79%) is provided by Reading Recovery teachers. Given their training, these teachers will use Reading Recovery procedures as they teach these students. Therefore, Reading Recovery procedures designed to address these word learning needs are listed. However, it is likely that these students may need additional procedures.

As noted earlier in this chapter, ND-RR students appear to be working in what Ehri and McCormick (2004) called the partial-alphabetic phase. At this stage, “direct instruction is necessary because the grapho-phonic system is too complicated for most readers” (p. 374). Readers tend to focus on initial and final letters rather than all the letters, and therefore, need to learn to process letters more quickly and efficiently. There was evidence of this in the substitutions observed in this study. Less than half of the substitutions made by ND-RR were visually similar but many of these substitutions had slight visual similarity. The substitution may have started like the word in the text or with a letter within the word. However, these students did not appear to be processing words in a left-to-right sequence. Too often, teachers assume that because students are looking across the page from left-to-right, they are processing all of the graphophonc cues within words.
To counter this, in Clay’s (2005b) guide to teaching young readers, there is an emphasis on teaching students to look left-to-right across words. According to Clay, attending in a left-to-right sequence is not already programmed in the brain at birth but must be learned, “control over directional things can be taught by demonstration and with few words” (p. 7). She encouraged teachers to use magnetic letters and text to demonstrate where to look in words and how to move across print. Clay also noted the importance of being consistent in our demands that children use a left-to-right sequence as they work with words in reading and writing until we are sure they are using this sequence automatically with little conscious attention. It is important for Reading Recovery teachers, interventionists, and classroom teachers to demand that young readers consistently look left-to-right across words and ensure that they correct any deviations.

When solving words, ND-RR initiated word solving by using onsets – the smallest unit possible. D-RR and A-NRR used onsets and onsets plus vowels almost equally indicating that they are learning to use larger word units to solve words more efficiently. However, when reading words in isolation, D-RR was less able to use larger word units. This may indicate that they needed continued instruction in how to analyze words quickly and efficiently. One way to help students become more efficient and better readers is to teach them to identify and use larger parts of the word as they solve words. In Reading Recovery, teachers demonstrate how to break words flexibly into letters, onsets, inflections, and syllables. They do this on words in isolation, in the child’s writing, and on text as they are reading. Classroom teachers can use these same demonstrations to help students understand how to break words in the largest useful unit
as they solve. Clay also recommended demonstrating to students how to use analogy to use words and word parts they know to identify unknown words.

Additional experiences with these Reading Recovery procedures can help students become more capable word-solvers but additional procedures may be needed. Ehri and McCormick (2004) instructed teachers to provide explicit instruction in letter-sound correspondence in a way that links the correspondences to their occurrence in specific words. They also suggested specific teaching on how to look carefully at all the letters in a word and how to blend all the sounds in a word. Cunningham and Cunningham (2002) recommended that students need to learn sequential decoding by using meaning and the consonant plane, the consonants in a word, to begin to decode words. Beginning readers who learn more about words, patterns in words, and vowels, can decode more words. Cunningham and Cunningham also suggested teaching students to use the word pattern and analogy as they gain knowledge about the onset and rime, and use that knowledge to decode more complex words.

Ehri and McCormick (2004) recommended that students who are working in the partial-alphabetic phase engage in writing activities to help “use conventional grapheme-phoneme relationships to produce phonetically complete spellings… [and make] students aware that each word has a unique, prescribed sequence of letters that constitute the word’s identity and that distinguishes it from similarly spelled words” (p. 376). Writing is an important part of the Reading Recovery lesson. Clay (2005b) included several procedures to help students learn to spell words automatically, to hear and record the sounds of words, as well as learn the orthography of words through analogy and teacher instruction. One of the most useful Reading Recovery procedures for this purpose is
hearing and recording sounds. After students have been taught to articulate words slowly and hear the individual sounds within words, Elkonin boxes are used to help students identify where they hear the sounds and then record them in the appropriate place within the word’s sequence. When students are able to hear and record sounds in sequence, teachers use the boxes to help students attend to orthographic patterns in words. This procedure and others from *Literacy Lessons Designed For Individuals: Part Two Teaching Procedures* (Clay, 2005b) will guide teachers as they make decisions about how to help students move to the next level of understanding about how to read and write words. These procedures can and should be used by classroom teachers as well as Reading Recovery teachers.

Ehri and McCormick (2004) also recommended that explicit spelling instruction assists students in their reading and writing. They advised that this instruction included teaching mnemonics that link the shapes of vowels to their sounds, engaging in game like activities, and providing opportunities to practice their spelling with magnetic letters and chalkboards.

**Use of Varied Assessments and Multiple Measures**

The students in this study were administered four assessments. The variety of assessments provided rich data to examine and analyze. Nine D-RR and nine A-NRR met or exceeded the grade level benchmark on at least one of the assessments, while only about half (five and six, respectively) met or exceeded the grade level expectation on all instruments. The variety of data provided a richness to examine and analyze. Two instruments, the SFTP and QRI-4, examined accuracy and strategies on continuous text,
while the BWT examined how students read words in isolation. Finally, ORF measured
the number of correct words each child read in one minute.

All of these data provided a comprehensive profile of what students were able to
do when they read and illustrates the need for multiple measures to provide information
to adequately guide teaching. For example, a student who met the benchmarks on the
continuous text reading instruments, SFTP and QRI-4, but was unable to read fast enough
to meet the ORF benchmark, may need further instruction in word recognition and
fluency in order to read faster and more automatically. A child who was able to
successfully read continuous text, but was unable to read words on the BWT may need
instruction on more efficient word-solving strategies.

**Using Running Records Effectively**

As explained earlier, some researchers have identified weaknesses in oral error
analysis and believe it provides ambiguous information about what a reader does during
reading (Leu, 1982; McKenna & Picard, 2006; McKenna & Walpole, 2006). However,
the running record is a valuable observational and recording tool to identify and analyze
errors, allowing teachers to generate tentative hypotheses regarding a student’s
processing of print. Running records are widely used by Reading Recovery teachers and
classroom teachers and as Clay (2001) noted, “A running record, expertly used by a
trained teacher and carefully interpreted, provides a valid view of change over time in
children’s reading” (p. 45).

Ross (2004) found that when teachers were trained to administer running records
and used the information to focus instruction on the individual needs of their children,
they outperformed students in schools that did not use running records but employed
similar teaching methods. Ross concluded that the use of running records could inform and guide teachers' instruction and may serve as an effective component of intervention assessment leading to improvements in reading instruction.

Although many teachers routinely administer running records, the level of analysis is not always as deep or thorough as needed. Analyzing running records at this level allows teachers to attend to and reflect upon their students' reading behaviors. Johnson (2007) emphasized how important it is "to analyze running records, to look for patterns in the way the child solves problems, and to hypothesize about a child's processing" (p. 157). Johnson recommended that as teachers analyze running records, they reflect on the following questions.

• At difficulty, does the child stop and wait for help or work to solve the problem?
• Does this child control a variety of problem-solving strategies?
• Does the child work quickly? Is he using multiple sources of information?
• Does the child make multiple problem-solving attempts?

These questions can help teachers focus and clarify their thinking as they consider the reader's strengths, weaknesses, and instructional needs.

This study used running records to identify the variety of reading behaviors and problem-solving strategies that students used. Similarly, teachers can use running records to identify the strategies and behaviors their own students use, and by doing so, may be able to make better teaching decisions.
Recommendations for Further Research

Many studies lead teachers to pose questions pertinent for further inquiry. This study was no exception. Some of my questions relate to limitations in the study’s design and methodology, while other questions emerged through examining the results. These questions are discussed in the sections that follow.

Study Design

First, due to the small sample size, results may not be generalized to the broader population of first grade readers. Each group included only ten students, so there was a total of thirty studied. A larger sample may have resulted in more robust findings from a statistical perspective. Replication of the study with a larger group is recommended to validate and generalize from these findings.

Second, research supports the influence of teacher’s instruction on the reading progress of students. While the classroom teachers of participants in this study all used a framework that included literature based reading with guided reading instruction, the researcher did not attempt to control for differences in instructional methods. Therefore, classroom instruction may have influenced student behaviors.

Third, as a Reading Recovery Teacher Leader, my view of reading is aligned with a Reading Recovery conceptual framework and clearly influences my interpretation of the data. Miscue analysis, as used in running records, can be a subjective process and may have chosen a different method to analyze the data. In the present study strong inter-rater reliability was established with 95% agreement for the coding of reading behaviors thus reducing the likelihood that the results were not simply the result of my own biases in coding the running records.
Fourth, I had no information about students’ skills in listening comprehension or oral vocabulary, and yet we know these contribute to literacy learning (Biemiller, 2006; Watson, 2001). Therefore, some of the differences between the three groups may have been caused by weaknesses in one or both of these areas. For example, some of the students may have had some skill in identifying unfamiliar words by analyzing letter-sound correspondences. Yet they may have been unable to retrieve the word when they were only able to decode limited portions of the print due to their less well-developed and less well-organized oral vocabularies. It is also possible that the difficulty in using meaning that some students experienced could have been the result of more general oral language comprehension difficulties. Future studies could include a measure of vocabulary and listening comprehension to explore this possibility.

Finally, it may be that the differences between ND-RR and the other two groups were due to differences in text levels. In order to ensure that these first grade students were not reading at the frustration level, the text levels they read varied. A study designed to observe readers and analyze their reading at particular text levels could be designed. Readers working with the same levels of text, some of whom are older students not reading at grade level, and others who are younger students who are reading at grade level but at the same text levels as the older students (i.e., a reading-matched level design) could be asked to read texts at the same level. The reading behaviors could then be examined, analyzed, and compared to see if readers typically display the same reading behaviors at a level regardless of when they reached that text level. In this way, it could be determined whether the differences noted in this study were due to book levels or the abilities of the readers.
Other Questions for Future Research

This study found many differences between the D-RR and ND-RR groups in their reading behavior. Clay (2005a), however, views reading and writing as reciprocal processes. An examination of writing behaviors between the three groups might reveal additional differences. Reading and writing do seem to be reciprocal and reading development often parallels writing development and vice versa. Therefore, it seems logical to expect differences in the writing behaviors of D-RR and ND-RR. Future research identifying differences in writing could result in additional teaching implications. Combined with the teaching implications from this study, these findings could inform teaching.

This study served in part, to extend Kaye’s (2002) study of second grade students. Although many of the conclusions were similar to Kaye’s, differences were noted between the first grade students in this study and the second grade students in Kaye’s sample. One difference suggested that younger students were less independent. A major conclusion from Kaye’s (2002) study was that these proficient second grade readers “always took the initiative to problem-solve” (p. 200) when reading continuous text. While it was not a frequent behavior, almost all of the first grade students in this study either asked for help or stopped and waited to be told at some point in their reading. This difference between the first graders in this study and the second graders in Kaye’s study might be due to age and maturation, coincidence, school culture, or sampling variations. Further research might distinguish among these possibilities.
REFERENCES


APPENDICES
Appendix A

CONVENTIONS OF RUNNING RECORDS

1. Mark every word read correctly with a check.

   Bill is asleep  \(\checkmark\ \checkmark\ \checkmark\)
   "Wake up, Bill,"  \(\checkmark\ \checkmark\ \checkmark\)
   Said Peter.  \(\checkmark\ \checkmark\)

2. Record a wrong response with the text under it.

   Child:  *home*
   Text:  *house*

3. If a child tries several times to read a word, record all his trials.

   Child:  *here – h- home*
   Text:  *house*  [One error]

   Child:  *h- ho—\(\checkmark\)*
   Text:  *home*  [No error]

4. If a child succeeds in correcting a previous error this is recorded as a "self-correction" (written SC).

   Child:  *where – when –SC*
   Text:  *were*  [No error]

5. If no response is given to a word, it is recorded with a dash. Insertion of a word is recorded over a dash.

   Child:  \(------\)  Child:  *here*
   Text:  *house*  Text:  \(----\)  [In each case one error]

6. If the child baulks, unable to proceed because he is aware he has made an error and cannot correct it, or because he cannot attempts the next word, he is told the word (written T).

   Child:  *home*
   Text:  *house – T*  [One error]
7. An appeal for help (A) from the child is turned back to the child for further effort before using a T as in 6 above. Say “You try it.”

Child: _______ A – here
Text: house - T

8. Sometimes the child gets in a state of confusion and it is necessary to extricate him. The most detached method of doing this is to say “try that again”, marking TTA on the record. This would not involve any teaching but the teacher may indicate where the child should begin again. It is a good idea to put square brackets around the first set of muddled behaviors, enter TTA, remember to count that as one error only, and then begin a fresh records of the problem text.

[√ look said √]                     TTA
Susan went with the headmaster

9. Repetition (R) is not counted as error behavior. Sometimes it is used to confirm and previous attempt. Often it results in self-correction. It is useful to record it as it often indicates how much sorting out the child is doing. “R”, standing for repetition, is used to indicate repetition of a word, with R₂ or R₃ indicating the number of repetitions. If the child goes back over a groups of words, or returns to the beginning of the line or sentence in his repetition, the point to which he returns is shown by an arrow.

Child: Here is the home  R  SC
Text: Here is the house

10. Other behaviors. The conventions for recording and scoring relate only to correct responses, errors, and self-correction. Other behaviors include pausing, sounding out the letters, and splitting words into parts. Research evidence has shown that teachers’ records of such behaviors are much less reliable and cannot be included in the Count or Analysis scoring.

(Clay, 2000, pp. 11-13)
Appendix B

PERMISSION LETTERS

Letter to administrators

(principals and superintendents)

Some of your first grade students are invited to participate in a research study being conducted by Sharon Greaney, a doctoral candidate in the College of Education and Human Development at the University of Maine. She is also employed as a Reading Recovery teacher leader at the Old Town Elementary School. The purpose of this study is to gain a better understanding of the variety and complexity of reading behaviors of first graders.

What Will the Student Be Asked to Do?
If you decide to allow your students to participate, he/she will be asked to read once in May. The session will last about an hour. These children will be asked to read from the Qualitative Reading Inventory – 4, the Scott-Foresman Testing Packet, the Burt Word Reading test and the Oral Reading Fluency test from DIBELS. The children’s reading will be audio taped so that it can be analyzed to examine the variety and complexity of the problem-solving behaviors children demonstrates while reading these materials.

Risks
• Except for the time and inconvenience, there are no foreseeable risks to the student in participating in this study outside those encountered in the course of any school day.

Benefits
• There are no immediate benefits to participate. However, the study provides the opportunity to contribute to the educational knowledge base. A description of problem –solving behaviors can guide Reading Recovery teachers, interventionists and classroom teachers in their instruction as they help their students develop a range of complex reading behaviors that they can use in their reading.

Confidentiality
Student names will never be used in the study. His/her records will be identified by a code number. The name of the schools will not be used in the study. All audio tapes and records of children reading will be kept locked in my home. All items will be destroyed when no longer needed.
Voluntary
Participation in this study is voluntary and there will be no consequences should you decide not to participate. If you agree, I will contact the parents of these students and obtain their consent. Students may be withdrawn from the study at any time with no consequences. I will also obtain the children’s assent to participate and audio tape every assessment session.

Contact Information
If you have any questions about the study you can call me at 825-4821 or sgreaney@aol.com. You can also call the chair of my Dissertation Committee, Dr. Janice Kristo, Professor of Literacy Education at 581-2454 or jan_kristo@umit.maine.edu. If you have any questions about your child’s rights as a research participant, you can contact Gayle Anderson, Assistant to the University of Maine’s Protection of Human Subjects Review Board, at 581-1498 (gayle.anderson@umit.maine.edu).

If you agree to have your students participate in this study of teaching, please sign below and return it to me in the enclosed self-addressed, stamped envelope. A second copy of this letter is enclosed for you to keep.

Administrator’s Signature

Date
Letter to parents

Your child is invited to participate in a research study being conducted by Sharon Greaney, a doctoral candidate in the College of Education and Human Development at the University of Maine. She is also an experienced Reading Recovery teacher. The purpose of this study is to gain a better understanding of the variety and complexity of reading behaviors of first graders. The study will examine a group of first graders who received Reading Recovery lessons and a group of students who are progressing typically in their reading without Reading Recovery lessons.

What Will Your Child Be Asked to Do?

If you decide to allow your child to participate, he/she will be asked to read once in May. The session will last about an hour and will be at school during the regular school day. Your child will be asked to read from several commonly used reading instruments -- the Qualitative Reading Inventory - 4, the Scott-Foresman Testing Pack, the Burt Word Reading test and the Oral Reading Fluency test. Your child’s reading will be audio taped so that it can be analyzed to examine the variety and complexity of the problem-solving behaviors your child demonstrates while reading these materials.

Risks

- Except for the time and inconvenience, there are no foreseeable risks to the student in participating in this study outside those encountered in the course of any school day.

Benefits

- There are no immediate benefits to participate. However, the study provides the opportunity to contribute to the educational knowledge base. A description of problem-solving behaviors can guide Reading Recovery teachers, interventionists and classroom teachers in their instruction as they help their students develop a range of complex reading behaviors that they can use in their reading.

Confidentiality

Your child’s name will never be used in the study. His/her records will be identified by a code number. The name of the school will not be used in the study. All audio tapes and records of your child’s reading will be kept locked in my home. All items will be destroyed within five years.
Voluntary
Participation in this study is voluntary and there will be no consequences should you decide not to allow your child to participate. Students may be withdrawn from the study at any time with no consequences. I will also ask your child if he/she wishes to participate.

Contact Information
If you have any questions about the study you can call me at 825-4821 or sgreaney@aol.com. You can also call the chair of my Dissertation Committee, Dr. Janice Kristo, Professor of Literacy Education at 581-2454 or jan_kristo@umit.maine.edu. If you have any questions about your child’s rights as a research participant, you can contact Gayle Anderson, Assistant to the University of Maine’s Protection of Human Subjects Review Board, at 581-1498 (gayle.anderson@umit.maine.edu).

If you agree to have your child participate in this study of teaching, please sign below and return it to me in the enclosed self-addressed, stamped envelope. A second copy of this letter is enclosed for you to keep.

Parent’s/Guardian’s Signature   Date
Appendix C

GUIDE TO READING BEHAVIORS

Reading behaviors were defined as overt actions that can be observed and recorded. In this study, I observed, recorded and analyzed any deviations from the text. This guide examines the observed behaviors on continuous text and can be classified into four broad categories: Solving Behaviors, Substitutions, Repetitions, and Other behaviors that did not fit into any of the other three categories. The solving category was divided into two sub-categories: one-step and multi-step, the substitution category was divided into two categories: real words and non-words, and repetitions were divided into two categories: with error and without error.

Below is a detailed description of each category of reading behaviors. Abbreviations are listed in parentheses after each term and examples are coded to show how these behaviors were analyzed on the Reading Behavior Log. An example of this log is shown in Chapter 3.

Word-Solving Behaviors

Solving Behavior (S)

The Solving Behavior category identified one-step and multi-step actions students took to solve words in text. Solving behavior occurred in three ways:

1. students worked at the sub-word level

2. students combined sub-word level work with reading whole words (real words or nonwords)

3. students made multiple substitutions of whole words.
The Solving Behavior category includes students’ successful and unsuccessful attempts. Two subcategories, One-Step Solving and Multi-Step Solving, are delineated below.

**One-Step Solving** (S-O) was defined as an action in which the student worked out the word in sequence by elongating or dividing the word into sounds or parts without starting the word over again. One-step solving included student production of real words and non-words. Solving may have resulted in:

a. successful solving – student ultimately said the correct word

b. unsuccessful solving – the final word or word part that the student said is a word or non-word that is incorrect

c. self-correction – the one-step solving act is followed by a student-initiated correction.

Students attempted to solve words in a variety of ways that included saying the first sound or cluster (cs) such as, “th-, thought”, the root portion of the word (rp) such as, “was-, wasn’t, or a word first (w) such as, “cam-, came”. They completed their attempts with a word or portion of a word.

**Multi-Step Solving** (S-M) was defined as a behavior that described the students’ multiple attempts to read a word. Multi-step solving included real words and non-words and may have resulted in

a. successful solving – student ultimately said the correct word

b. unsuccessful solving – the final word or word part that the student said is a word or nonword that is incorrect

c. self-correction – the one-step solving act is followed by a student-initiated correction.
Readers attempted to solve words in many, many ways. Patterns were similar to the one-step solving but readers often broke words in many ways and parts and their solving may have included more than one attempt to solve the word. Some examples include:

s-, st-, stone for stone
s-, sh-, shouted, shared for shared
ton-, ton-, goo for tongue
w-, wiv-, wife, wives for wives
s-, sounded, shouded, soundown for shadows

The figure on the next page lists all of the solving behaviors the readers in this study used. Collectively, the readers in this study used many different patterns as they attempted to solve words. Many of these word-solving patterns were similar and the differences may have been as slight as repeating the initial letter two or three times. Even so, 103 different word-solving patterns emerged. They are listed according to the initial solving strategy rather than in order of frequency. Some patterns occurred only once with a single student while other word-solving patterns were used several times by several different students. However, this list demonstrates the variety of word-solving patterns these first grade students as used they attempted to solve words in their reading.
### Solving patterns starting with a cluster

<table>
<thead>
<tr>
<th>Solving patterns starting with a word part</th>
<th>Solving patterns starting with the root part</th>
<th>Solving patterns starting with a word</th>
</tr>
</thead>
<tbody>
<tr>
<td>cs-cs-p</td>
<td>p-ask</td>
<td>rp-cs-w</td>
</tr>
<tr>
<td>cs-cs-ask</td>
<td>p-cs-cs</td>
<td>rp-e</td>
</tr>
<tr>
<td>cs-cs-cs</td>
<td>p-cs-p-w</td>
<td>rp-fin</td>
</tr>
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</tr>
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<td>cs-cs-cs-stop</td>
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<td>p-p-w</td>
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<td>rp-r-cs-w</td>
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<td>p-r-cs-w-p-cs-w-p-stop</td>
<td>rp-r-cs-w</td>
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<td>rp-r-p-p-p</td>
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<td>rp-r-p-p-p</td>
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<td>rp-r-p-p-p-p</td>
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</tbody>
</table>

**Key:**  
- **cs** = cluster or initial letter;  
- **p** = word part with a vowel;  
- **r** = repeat;  
- **rp** = root part;  
- **w** = word  

### Substitution Categories and Behaviors

**Substitution Behavior (Sub)**

The Substitution Behavior category identified one-step actions in which the student said an incorrect word for the word in the text. The incorrect word was
pronounced as a whole unit, not in parts of syllables. Two subcategories, Substituted Real Word and Substituted Non-Word, are described and delineated next.

**Substituted Real Word – (Sub-RW)** – a one step action in which the student replaced the word in text with a different word in the English language. In some cases, the student self-corrected and read the actual words but in most cases the student moved on. Substitutions of real words included:

- Adding an ending (AE) - called for call
- Changing an ending (CE) - jumped for jumping
- Omitting an ending (OE) - lesson for lessons
- Transposing letters or words (T) - I am for am I
- Substituting visually similar words (vs) - crawled for coiled, workman for woman
- Substituting words that were unrelated (u) - she for and, read for started

**Substituted Non-Word (Sub-NW)** – a one-step action in which the student replaced the word in text with a response that is not a word in the English language. Usually the non-word represented an attempt to sound out the word and had visual similarity such as, “greeded” for greedy and “thood” for thud.

**Repetition Categories and Behaviors**

**Repetition Behavior (R)**

The category of Repetition Behavior represented students’ rereading of one or more words. This category excluded the repetitions that occurred during the solving process. Repetition during the solving process occurred when students reread a portion of text after articulating at least a portion of the word they were working on. Such behaviors are delineated in the Solving Behavior category.
The repetition behaviors were categorized in two ways: with an error or without an error. When repetitions occurred in sentences with errors, the student initiated the repetition either at the point of error or beyond the point of error. This behavior may or may not have resulted in a self-correction. In sentences without errors, repetitions were categorized by the amount of text that was repeated. Sometimes students repeated their error, such as, reading “two, two” for three (E-W), other times they repeated a part of the sentence, such as, “When he – one day” for one day (E-PS) and other times they read on and then went back, such as, “Every school”- for after school (E-BS). Rereading may or may not have resulted in a self-correction. Sometimes, readers repeated correct words (CW), phrases (CP) or whole sentences (CS).

Other Behaviors

Other Behaviors (Oth)

The Other Behavior category included behaviors that did not fit into the other categories. These behaviors included insertions (I), omissions (O), instances where students asked for help (A), or paused and were told the word (T). At times, students commented on their reading ("no, that’s not went"), made no attempt, and in one case, read the correct word, made a substitution and then read the correct word as noted on the Reading Behavior Log.

When a child inserted a word or a series of words while reading, the behavior was categorized as an insertion (I). The number of words the student inserted was indicated (1w or 3w), and if the insertion affected the meaning and/or structure of the complete sentence the insertion was coded (ms).
When a child omitted a word or a series of words while reading, the behavior was categorized as an omission (O). The number of words the student omitted was indicated (1w or 2 w). If the omission affected the meaning and/or structure of the complete sentence the omission was coded (ms).

A sample of the Reading Behavior Log showing how the examples were coded is shown next.
<table>
<thead>
<tr>
<th>Behavior</th>
<th>Word-Solving Behaviors</th>
<th>Substitution Categories and Behaviors</th>
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<td>Th-thought</td>
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<tr>
<td>Was wasn’t</td>
<td>S-O – rp-w</td>
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<tr>
<td>Can – come</td>
<td>S-O – w-w-</td>
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<td>Come</td>
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<td>S – M – cs – cs- w</td>
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<td>S-M -rp-rp-rp</td>
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Appendix D

ANALYSIS GRID

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<th>SC</th>
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Key: U = Unsuccessful attempt; S = Successful attempt; SC = Self-correction
## Analysis Grid

**Student:** D-RR-1

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Appendix E

BURT WORD CATEGORIES AND BEHAVIOR GUIDE

(Please note: The information found in this guide is similar to the Guided to Reading Behaviors for Text Reading. However, in order to analyze the reading behaviors on words in isolation, changes were made. Most notably, repetitions were not included as a behavior for words in isolation but omissions were. Therefore the three categories of reading behaviors for words in isolation were solving behaviors, substitutions and omissions.)

Reading behaviors were defined as overt actions that can be observed and recorded. In this study, I observed, recorded and analyzed any deviations from the text. This guide examines the observed behaviors on words in isolation and can be classified into three broad categories: Solving Behaviors, Substitutions, and Omissions. The solving category was divided in two sub-categories: one-step and multi-step, and the substitution category was divided into two categories: real words and nonwords.

Below is a detailed description of each category of reading behaviors. Abbreviations are listed in parentheses after each term and examples are coded to show how these behaviors were analyzed on the Reading Behavior Log.

Solving Behaviors

Solving Behavior (S)

The Solving Behavior category identified one-step and multi-step actions students took to solve words in text. Solving behavior occurred in three ways:

1. students worked at the sub-word level
2. students combined sub-word level work with reading whole words (real words or...
3. students made multiple substitutions of whole words.

The Solving Behavior category includes students’ successful and unsuccessful attempts. Two subcategories, One-Step Solving and Multi-Step Solving, are delineated below.

One-Step Solving (S-O) – an action in which the student worked out the word in sequence by elongating or dividing the word into sounds or parts without starting the word over again. One-step solving included student production of real words and nonwords. Solving may have resulted in:

a. successful solving – student ultimately said the correct word

b. unsuccessful solving – the final word that the student said is a word or nonword that is incorrect

c. self-correction – the one-step solving act is followed by a student-initiated correction.

Students attempted to solve words in a variety of ways that included saying the first sound or cluster (cs) like “th-, thought”, the root portion of the word (rp) like “was-, wasn’t, or a word first (w) like “can-, come”. They completed their attempt with a word or portion of a word and these attempts were recorded.

Multi-Step Solving (S-M) – A behavior that described the students multiple attempts to read a word. Multi-step solving included real words and nonwords and may have resulted in

a. successful solving -- student ultimately said the correct word

b. unsuccessful solving -- the final word that the student said is a word or nonword that is incorrect
c. self-correction – the one-step solving act is followed by a student-initiated correction.

Readers attempted to solve words in many, many ways. Patterns were similar to the one-step solving but readers often broke words in many ways and parts and their solving may have included more than one attempt to solve the word. Some examples include:

- s-, st-, stone for stone
- s-, sh-, shouted, shared for shared
- ton-, ton-, goo for tongue
- w-, wiv-, wife, wives for wives
- s-, sounded, shouded, soundown for shadows

Substitution Categories and Behaviors

Substitution Behaviors (Sub)

The substitution Behavior category identified one-step actions in which the student said an incorrect word for the word in the text. The incorrect word was pronounced as a whole unit, not in parts of syllables. Two subcategories, Substituted Real Word and Substituted Nonword, are described and delineated below.

Substituted Real Word – (Sub-RW) – a one step action in which the student replaced the word in text with a different word in the English language. In some cases, the student self-corrected and read the actual word but in most cases the student moved on. Substitutions of real words included:

- Adding an ending (AE) - called for call
- Changing and ending (CE) - jumped for jumping
Omitting an ending (OE) - lesson for lessons

Transposing letters or words (T) - I am for am I

Substituting visually similar words (vs)-crawled for coiled, workman for woman

Substituting words that were unrelated (u) -she for and, read for started

**Substituted Nonword (Sub-NW)** – a one-step action in which the student replaced the word in text with a response that is not a word in the English language. Usually the nonword represented an attempt to sound out the word and was had visual similarity, such as, “greeded” for greedy and “thood” for thud.

**Omission Categories and Behaviors**

**Omission Action (O)**

The Omission Behavior category identified instances in which students skipped or omitted a word in the list.
BIOGRAPHY OF THE AUTHOR

Sharon Greaney was born in Wurzburg, Germany, on July 27, 1959. She was raised in Houlton, Maine and graduated from Houlton High School in 1977. She attended the University of Maine at Presque Isle and graduated in 1980 with a Bachelor’s degree in Elementary Education. She taught fourth grade and middle school for four years at St. Mary’s School in Houlton. She received her Master’s of Education in Reading from the University of Maine in 1986 and worked as a Literacy Specialist at the Orland Consolidated School from 1986 to 2000. In 1993, she trained as a Reading Recovery Teacher. She received her Certificate of Advanced Study in Literacy Education from the University of Maine in 2001. She went to work for the Old Town School Department in 2001 as a Reading Recovery Teacher Leader. Sharon is a candidate for the Doctor of Education degree in Literacy Education from The University of Maine in May, 2010.