The Effectiveness of an Intervention Combination of Error Word Drill and Repeated Reading Using iPad Technology

By

Kaitlin M. O’Shea

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

Educational Specialist

In

School Psychology

At

The University of Wisconsin- Eau Claire

April, 2013
Graduate Studies

The members of the Committee approve the thesis of
Kaitlin M. O’Shea presented on April 26, 2013.

Michael Axelrod, Ph.D., LP, NCSP, Chair

Melissa Coolong-Chaffin, Ph.D., NCSP, Member

Anne Papalia, Ph.D., Member

APPROVED: Michael R. Mori
University Dean of Graduate Students
The Effectiveness of an Intervention Combination of Error Word Drill and Repeated Reading Using iPad Technology

By

Kaitlin M. O’Shea

The University Of Wisconsin—Eau Claire, 2013
Under the Supervision of Michael Axelrod, Ph.D., LP, NCSP

As schools adopt a Response to Intervention (RtI) framework, research in education and school psychology has increased its focus on exploring interventions to help struggling readers remediate their skills. At the same time, schools are becoming increasingly interested in investigating ways in which technology can be incorporated into their service delivery through curriculum, instruction, and intervention. The present study set out to explore these two areas of interest in education.

The current study investigated whether combining the evidence-based interventions of Repeated Reading, which emphasizes practice, and Error Word Drill, which emphasizes feedback, produced greater gains in oral reading fluency when compared to the effects of the individual interventions for four elementary-aged students. The results suggested that the combination of the interventions did not significantly increase students’ oral reading fluency when compared to using each intervention alone. In addition, the researcher was interested in exploring the students’ perceptions of using iPads as part of intervention implementation. The results were mixed; two of the students found the iPad to be an acceptable component of the intervention, while the other two
students did not prefer to use the iPad during the intervention. Limitations and
suggestions for future research are discussed.

Michael Axelrod, Ph.D., LP, NCSP, Thesis Advisor

Date

4-26-13

iv
ACKNOWLEDGMENTS

I would like to thank Dr. Michael Axelrod, my thesis advisor, for his contributions to this project. I am truly appreciative of his support, his feedback, and his willingness to set high expectations to help me to achieve my goals through this project. I am forever grateful for this rich learning experience. I would also like to thank Dr. Melissa Coolong-Chaffin and Dr. Anne Papalia for serving on my thesis committee and for their guidance throughout this process.

In addition to my faculty members, I would like to thank my undergraduate research assistant, Jessica Hofer and my fellow Academic Intervention Clinic Coordinator, Karissa Danes. Thank you for the assistance with intervention implementation and the willingness to listen to the audiotapes to evaluate treatment fidelity. I would also like to thank the four awesome elementary students who participated in my study. It was a blessing to see the growth that each of them made throughout the summer. Thank you for working hard in reading.

I would also like to thank the University of Wisconsin—Eau Claire Office of Research and Sponsored Programs (ORSP) for the Research Travel Grant, which allowed me to present my research at the 2013 National Association of School Psychologists (NASP) Conference in Seattle, Washington. It was a rewarding experience that I will never forget.

Finally, I would like to thank my husband and my family for their endless support of my thesis endeavors. I am incredibly grateful for their feedback and advice. Thank you for being willing to listen and encourage me throughout this process.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Statement of the Problem</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Purpose of the Study/Research Questions</td>
<td>4</td>
</tr>
<tr>
<td>II.</td>
<td>REVIEW OF LITERATURE</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Importance of Reading</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Challenges Facing At-Risk Readers</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Multi-Tiered Service Delivery Model</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>The Instructional Hierarchy Applied to Reading Interventions</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Oral Reading Fluency</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Strategies to Improve Reading Fluency</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Error Correction</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Error Word Drill</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Repeated Reading</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Intervention Combinations</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Intervention Combination of Error Word Drill plus Repeated Reading</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Incorporating Technology into Reading</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>iPad Technology</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Student Acceptability</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Gaps in Research and the Present Study</td>
<td>25</td>
</tr>
<tr>
<td>III.</td>
<td>METHOD</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Participants and Setting</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Materials</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Dependent Measures</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Procedure</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Survey Level Assessment</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Baseline</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Error Word Drill</td>
<td>33</td>
</tr>
</tbody>
</table>
IV. RESULTS ................................................................. 38
   Visual Analysis of Results ........................................ 38
   Student Acceptability ............................................. 44
   Parent Acceptability ............................................... 46

V. DISCUSSION ............................................................... 48
   LIMITATIONS AND FUTURE RESEARCH ...................... 54
   SUMMARY .............................................................. 56

REFERENCES ............................................................... 59

APPENDICES ................................................................. 67
   A. Protocol Checklists for Reading Interventions .............. 67
   B. Sample Student and Assessor Form of Reading Passages ...... 72
   C. Sample Student and Assessor Form of High-Content Overlap Reading Passages
   D. Participant Acceptability Survey ................................ 78
   E. Parent Feedback Survey .......................................... 82
   F. Informational Parent Letter ...................................... 84
   G. Parental Consent Form ........................................... 87
LIST OF TABLES

1. Participant Demographics .......................................................... 27
2. Fidelity Data—Procedural Integrity ............................................. 36
3. Fidelity Data—Inter-rater Reliability ......................................... 37
4. Mean Correct Words Per Minute for Each Condition and Each Participant ...... 43
5. Mean Number of Errors for Each Condition and Each Participant ................. 44
6. Mean Correct Words Per Minute on High-Content Overlap ......................... 44
   Passages for Interventions
7. Student Acceptability Survey Data for Error Word Drill ........................... 45
8. Student Acceptability Survey Data for Repeated Reading ........................... 45
9. Student Acceptability Survey Data for Error Word Drill plus Repeated Reading .......... 46
10. Parent Acceptability Survey Data ..................................................... 47
LIST OF FIGURES

1. Line graph depicting Brody’s gains in oral reading fluency for the interventions of Error Word Drill (EWD), Repeated Reading (RR) and Error Word Drill plus Repeated Reading (EWD+RR).

2. Line graph depicting Kyler’s gains in oral reading fluency for the interventions of Error Word Drill (EWD), Repeated Reading (RR) and Error Word Drill plus Repeated Reading (EWD+RR).

3. Line graph depicting Jasmine’s gains in oral reading fluency for the interventions of Error Word Drill (EWD), Repeated Reading (RR) and Error Word Drill plus Repeated Reading (EWD+RR).

4. Line graph depicting Mason’s gains in oral reading fluency for the interventions of Error Word Drill (EWD), Repeated Reading (RR) and Error Word Drill plus Repeated Reading (EWD+RR).
CHAPTER I
Introduction

Statement of the Problem

Reading is considered to be one of the most fundamental skills needed for an individual to thrive academically, socially, emotionally, and financially (Joseph, 2010). Despite the importance of reading skills, not all students find success when learning to read. In fact, according to the National Assessment Education Progress Report in 2009, 33% of fourth graders were reading below basic levels (National Center for Education Statistics, 2009). Similarly, a study by the National Reading Panel (2000) indicated that over 17.5% of students in America will experience reading problems within the first three years of school, suggesting that over 10 million children will be susceptible to reading difficulties. Without intervention to remediate skills, reading problems tend to be stable over time for many children. For example, Shapiro (2011) reported that 75% of students considered to have reading problems by third grade were identified to still be struggling in reading at ninth grade.

Because of the prevalence of reading problems, a multitude of research has explored how to remediate students’ reading skills. As students learn to read, they progress through a skill hierarchy, beginning with pre-reading skills such as phonemic awareness (i.e., ability to hear and manipulate sounds in oral language) and alphabetic principle (i.e., ability to link sounds and letters together to form words in print). Next, students acquire skills related to decoding (i.e., ability to sound out words), fluency (i.e., ability to read text accurately and quickly), vocabulary (i.e., the knowledge of word meanings) and comprehension (i.e., ability to understand written text) (Shapiro, 2011).
One critical skill when learning to read is reading fluency. Before being able to consistently comprehend the meaning of text, students must learn to read quickly and accurately. To improve reading fluency, students receive interventions targeted to increase their speed and accuracy of reading text. One of the most popular interventions designed to improve oral reading fluency is Repeated Reading (Samuels, 1979). Many studies have demonstrated empirical support for this intervention’s impact on oral reading fluency (Herman, 1985; Therrien, 2004; Sindelair, Monda, & O’Shea, 1990; Samuels, 1979). In addition to Repeated Reading, many researchers have explored the effects of an error correction intervention called Error Word Drill. When learning how to read, supplying students with feedback on errors is critical to helping them learn from their mistakes (Begeny, Daly, & Valleley, 2006). Previous research has demonstrated that the Error Word Drill intervention can be used to foster reading accuracy and increase overall rates of reading fluency (Jenkins & Larson, 1979; Jenkins, Larson, & Fleisher, 1983; Rosenberg, 1986).

Based on the literature, both Repeated Reading and Error Word Drill have positive effects on oral reading fluency. While both interventions can help remediate deficits in oral reading fluency, the two interventions focus on different principles related to learning to read. Repeated Reading focuses on improving oral reading fluency through practice, while Error Word Drill improves oral reading fluency through corrective feedback (Samuels, 1979; Jenkins & Larson, 1979). Although both of these interventions have been suggested to improve oral reading fluency, there is limited research exploring the impact of combining both Repeated Reading and Error Word Drill as a specific error correction procedure. Some researchers have suggested that combining interventions
produces greater gains when compared to the individual interventions alone (Eckert, Ardoin, Daly & Martens, 2002; Nelson, Alber, & Grody, 2004; Glazer, 2007).

Specifically, many researchers, especially in the medical field, have provided evidence to support the notion that increasing the dosage or intensity of the intervention results in greater outcomes. For example, Eckert, Ardoin, Daly and Martens (2002) explored the effect of combining consequence-based interventions with antecedent-based interventions. The results suggested that the intervention combination yielded greater increases in oral reading fluency when compared to the antecedent intervention alone. Based on this notion that more is better, further research is needed to investigate how combining the interventions of Repeated Reading and Error Word Drill impacts rates of oral reading fluency.

Similarly, there has been a limited amount of research regarding the use of technology, specifically iPads, to implement interventions. Moreover, within the iPad intervention literature, the results have been mixed. For example, Cameron and Bush (2012) reported that iPads positively contributed to learning in a college setting. Hessman (2012) indicated that using Kindles, a tablet similar to the iPad, was effective at increasing sixth graders’ reading skills measured on statewide tests. However, Sheppard (2011) found that iPads in a sixth grade reading class served as a distractor. Murray and Olcese (2011) suggested that iPad technology is limited in schools because it has yet to be adopted by the software development community.

As an increasing number of schools allocate resources to incorporate iPad technology into their classrooms, researchers must explore the ways in which using iPads can contribute to or hinder the learning process. Currently, the research community
simply does not know enough about the use of iPad technology in schools. Without this research, it is difficult to conclude whether or not this technology is an appropriate use of resources within the educational setting.

**Purpose of the Study/Research Question**

Based on the current body of empirical research, there is a great need to explore the two main variables associated with the present study. Only one study to date has explored the effectiveness of an intervention package consisting of Repeated Reading and Error Word Drill (i.e., Glazer, 2007). Through Repeated Reading, students receive practice by reading and re-reading the same passage several times. Through Error Word Drill, students receive corrective feedback to learn how to read unfamiliar words. Each of these interventions focus on different principles within the learning process. Individually, these two interventions have been supported in the literature. However, more research is needed to explore how combining the principles of practice and feedback in an intervention combination of Repeated Reading and Error Word Drill influences oral reading fluency. Based on the limited amount of research, the first goal of the present study was to extend the literature by exploring whether combining Repeated Reading and Error Word Drill resulted in greater gains in oral reading fluency when compared to each intervention alone for struggling readers.

As suggested, the current literature surrounding the use of iPads in the educational setting is limited. Therefore, more research is needed to explore how iPads can be incorporated into intervention implementation, specifically in relation to students’ perceptions of using the iPad as part of an intervention. Kazdin (1981) suggested that practitioners must explore clients’ perceptions of aspects of treatment. In relation to this
study, if students do not find using the iPad to be acceptable, then perhaps the intervention, even though it has an evidence-base in the literature, will not be successful. Therefore, because of the gaps in the literature related to using iPad technology and because of the significance of social acceptability in intervention design, the second goal of the study was to investigate students’ perceptions of using iPad technology during the interventions.

Based on the goals of the present study, the following research questions were explored:

1. Does an intervention combination of Repeated Reading and Error Word Drill have a greater effect on oral reading fluency for struggling readers than either intervention alone?

2. Do students perceive using iPad technology as an acceptable way to implement reading interventions?

Based on the previous research regarding Repeated Reading and Error Word Drill, it was hypothesized that the gains in oral reading fluency would be greatest for the intervention combination condition. Additionally, it was expected that the students’ would perceive the use of iPads as an acceptable component of the intervention.
CHAPTER II

Review of the Literature

Importance of Reading

The acquisition of reading skills is essential for students to achieve success within the educational system and into their adult lives. In today’s ever-changing world, reading is considered to be one of the most fundamental skills needed for an individual to thrive academically, socially, emotionally, and financially (Joseph, 2010). Reading development is a cumulative process that starts in early childhood and continues through the high school years. As students first begin to read, they are expected to recognize the sound structure of spoken words and then translate that recognition into an understanding of the written language. Eventually, as students master the basic reading skills, they transition from “learning to read” to “reading to learn” (Chall, 1983).

Challenges Facing At-Risk Readers

Despite the importance of developing reading skills, not all students find success when learning to read. According to the National Assessment Education Progress Report in 2009, 33% of fourth graders were reading below basic levels, suggesting that when reading fourth grade level material, these students could not understand the general meaning or draw conclusions based on the text. In essence, they could not understand what they had read. Even more alarming, longitudinal research has suggested that many children who demonstrate reading difficulties early on are at significant risk for remaining poor readers if they do not receive additional supports (Juel, 1988). Juel (1988) explored the development of literacy in elementary aged students as they progressed from first grade to fourth grade. The results of the study indicated that there was a high probability that children identified as poor readers in first grade would remain poor
readers at the end of fourth grade. Children who were poor readers in first grade had little phonemic awareness or the ability to hear and manipulate individual sounds in oral language. At the end of the fourth grade, these readers still did not demonstrate sufficient decoding skills.

Students who do not develop adequate reading skills are likely to be identified as having a learning disability. Specifically, 80% of students identified with a learning disability have a disability related to reading (Lyon, 1995). Despite receiving services through special education, students with learning disabilities are at-risk for negative educational outcomes. In particular, 45% of students with learning disabilities perform more than three grade levels below their enrolled grade in reading (Wagner et al., 2003). Furthermore, according to the National Center for Education Statistics (2010), 20% of students with learning disabilities drop out of high school, compared to 8% of students in the general education population. Besides students with learning disabilities, in general, poor readers are susceptible to negative outcomes as well. Children who experience reading problems early in life are more likely to be involved with juvenile delinquency and require welfare assistance later in life (Hart & Risley, 1995).

Children with reading problems typically have difficulties with one or more of the following: phonemic awareness, alphabetic principle, fluency, vocabulary, and comprehension. Before a child can learn to read, he or she must develop pre-reading skills such as phonemic awareness (i.e., ability to hear and manipulate sounds in oral language) and alphabetic principle (i.e., ability to link sounds and letters together to form words in print). Children who do not demonstrate the pre-reading skills are more likely to face challenges with higher-order reading processes such as fluency (i.e., ability to read
text accurately and quickly), vocabulary (i.e., the knowledge of word meanings) and comprehension (i.e., ability to understand written text) (Shapiro, 2011).

**Multi-tiered Service Delivery Model**

For students who are identified as having reading problems, additional reading support within the educational setting is critical. In 2004, the Individuals with Disabilities Education Improvement Act (IDEIA, 2004) was revised to include a three tiered service delivery model to identify and support children who have academic difficulties, including reading problems. Before the reauthorization of the Individuals with Disabilities Education Act (IDEA) in 2004, educators had been using an IQ-achievement discrepancy model, which identified students as having a learning disability only when there was a significant gap between the student’s academic achievement abilities and his or her cognitive abilities, both of which are measured by a standardized assessment batteries such as the *Woodcock Johnson Tests of Achievement—Third Edition* and the *Wechsler Intelligence Scale for Children—Fourth Edition*.

The reauthorization of IDEA in 2004 permitted educators to use a multi-tiered service delivery model to respond to learners’ needs by providing early intervention to those experiencing difficulty in learning to read, rather than relying on a discrepancy between academic and cognitive abilities to identify a learning disability. The multi-tiered service delivery model or Response to Intervention (RtI) approach strives to provide universal screenings to all students to identify those who may not have the academic skills (i.e., reading, mathematics, and writing) to achieve grade-level expectations. Early identification of academic problems is critical as research on the development of reading skills suggests that reading abilities tend to remain relatively
stable after second grade (Wagner et al., 1997). By providing a universal screening of academic skills for all students starting in kindergarten, students' academic deficits are identified early on and are targeted for remediation to help students achieve success in school. The new paradigm is a multi-tiered framework that focuses on providing interventions to students who continually exhibit a low level of performance and insufficient progress even with high-quality, evidence-based instruction (Fuchs & Fuchs, 2006).

The multi-tiered service delivery model consists of three to four stages, or tiers, which address assessment, instruction, and intervention. In regards to reading, in Tier 1, all students receive quality instruction and curriculum. Additionally, all students are screened to detect those who are at-risk for developing reading problems or are already experiencing reading delays. Students who are not making sufficient progress and are not responding to the instruction in general education are eligible to receive intervention services in Tiers 2. If students fail to demonstrate progress in Tier 2, they are moved to Tier 3 in which they receive even more intensive intervention services, more individualized instruction, and even more frequent progress monitoring (Berkeley, Bender, Peaster, & Saunders, 2009).

The Instructional Hierarchy Applied to Reading Interventions

Within a multi-tiered system, students who struggle with reading problems receive additional reading interventions to address their academic deficits (Fuchs & Fuchs, 2006). Reading interventions target a wide range of academic skills, depending on the student's stage of reading development (i.e., phonemic awareness, alphabetic principle, oral reading fluency, comprehension, vocabulary). Before implementing a
reading intervention, the area of deficit must be identified to know which skill must be remediated through intervention. After the reading skill in need of remediation is determined, Daly, Chafouleas, and Skinner (2005) suggest that educators should explore where the student is experiencing problems within that specific skill based upon the principles of the instructional hierarchy. Originally introduced by Haring, Lovitt, Eaton and Hansen (1978), the instructional hierarchy proposes that within each area of reading development (i.e., phonemic awareness, alphabetic principle, oral reading fluency, comprehension, vocabulary) students transition through a series of stages when developing the skills necessary to read.

The instructional hierarchy includes four phases of teaching and learning: acquisition, fluency, generalization, and adaptation (Haring et al., 1978). When in the acquisition stage, readers begin to acquire new skills through assistance from their teachers who model, demonstrate, prompt, correct errors, and offer feedback to facilitate student learning. For a student acquiring oral reading fluency, the teacher may read aloud to the student, modeling speed, and correct pronunciation. In the fluency stage, students demonstrate basic knowledge, but at first are unable to demonstrate the skill or behavior quickly. During this stage, students engage in frequent practice to help increase their ability to quickly and accurately demonstrate the skill. For a student developing oral reading fluency, in the fluency stage, the reader may read and re-read the same passage several times to practice the text. Following the fluency stage is generalization, in which students are taught to apply their skill set to different settings or contexts. During generalization, a teacher may help the student to learn how to demonstrate the skill in the broadest possible range of settings and situations. For a student learning to generalize the
skill of oral reading fluency, he or she may practice reading from a variety of texts such as textbooks, cookbooks, newspapers, magazines, etc. The final stage is adaptation. During this stage, students practice adapting their skills and transferring them to novel content. For example, a student in this stage may demonstrate the skill of oral reading fluency by reading fluently from a new set of reading materials that he or she has not read before. By taking into account the students’ current stage within the instructional hierarchy, educators are able to target a specific skill deficit and provide direct intervention to promote the development of that skill (Haring et al., 1978).

**Oral Reading Fluency**

Dysfluent reading is one of the most common problems for struggling readers (Mathes, Simmons, & Davis, 1992) and, as a result, oral reading fluency, which refers to both accuracy of word recognition and reading speed, is frequently targeted through intervention (Samuels, 1979). For students who have poor fluency, a primary goal of reading intervention is to increase oral reading fluency by providing students with direct practice of text to help them learn to read words accurately, quickly, and with expression (LaBerge & Samuels, 1974; Samuels, 1979).

Before students are proficient at comprehending or understanding the text, they must first become fluent readers. According to the theory of automatic information processing in reading, a reader must decode words automatically to be fluent (LaBerge & Samuels, 1974). When this occurs, readers are then able to devote their attention to comprehension or understanding what was read. On the other hand, dysfluent readers must devote all of their attention to simply decoding the words. Because they spend so much time reading the individual words, these readers do not have as much capacity to
remember the information and draw meaning from the text. As reading fluency skills improve, reading comprehension skills also improve, as students are able to read the words more quickly and accurately, allowing them to spend more time focusing on understanding the passage. Because of the perceived link between oral reading fluency and comprehension, researchers have explored the relationship between these two variables. The results yielded correlation coefficients between .50 and .70, suggesting a strong positive relationship between fluency and comprehension (Berninger, Abbot, Vermeulen, & Fulton, 2006; Burns et al., 2002; Jenkins, Fuchs, van de Broek, Espin & Deno, 2003; Samuels, 1979; Burns et al., 2011).

**Strategies to Improve Reading Fluency**

To improve students’ oral reading fluency, Joseph (2010) suggests common components of interventions that have been demonstrated to be effective. Techniques such as modeling and demonstration, prompting, correcting errors, providing opportunities to respond, encouraging repeated practice, and reinforcing responses help students to improve their reading skills. These components have been supported empirically in the literature and are incorporated into most reading interventions to help struggling readers develop reading skills (Joseph, 2010). For example, the Great Leaps Reading Program includes all of these components to help increase oral reading fluency in struggling readers (Mercer, Campbell, Miller, Mercer, & Lane, 2010).

In addition to including these components in reading interventions, educators are encouraged to explore the reading deficit relative to the instructional hierarchy (Daly, Chafouleas, & Skinner, 2005). Many students struggling with oral reading fluency fall within the acquisition stage or the fluency stage. A reader in the acquisition stage needs
to acquire the skill through a combination of modeling and feedback. For this reader, an intervention such as Error Word Drill (i.e., interventionist presents error words, providing feedback to improve the reader’s accuracy) or Listening Passage Preview (i.e., interventionist reads aloud, modeling how to read fluently for the reader) might help improve oral reading fluency (Rose & Sherry, 1984; Jenkins & Larson, 1979). A reader in the fluency stage needs practice to help him or her read quickly and accurately. For this reader, an intervention such as Repeated Reading (i.e., interventionist has the student read the passage several times) or Paired Reading (i.e., interventionist and student read together, and student taps hand when he or she wants to read alone) might help increase oral reading fluency (Samuels, 1979; Topping, 1987).

Once educators have targeted the area of reading skill deficit (i.e., phonemic awareness, alphabetic principle, oral reading fluency, vocabulary, or comprehension) and have explored the student’s learning stage relative to the instructional hierarchy (i.e., acquisition, fluency, generalization, or adaptation), an intervention can be selected to help remediate the skill. In educational research, there are a variety of resources available to aid the process of intervention selection. For example, websites such as What Works Clearing House (www.whatworks.ed.gov) and Intervention Central (www.interventioncentral.org) provide educators with lots of resources and information regarding intervention protocol.

**Error Correction**

Students often make mistakes when beginning to acquire the skill of oral reading fluency (i.e., acquisition stage), requiring educators to provide feedback about correct performance to help reduce errors. Without error correction, students may repeatedly
practice words incorrectly. In these instances, it is important to provide error correction to help the student learn from his or her mistakes (Begeny, Daly, & Valleley, 2006). Through error correction, educators correct a student’s errors when the student does not self-correct, which fosters reading accuracy (Jenkins & Larson, 1979). By providing regular feedback regarding accuracy, educators can help promote students’ reading competence and fluency (Heubusch & Lloyd, 1998).

The literature offers many approaches to error correction. Jenkins and Larson (1979) explored the effectiveness of five different error correction procedures (Word Supply, Sentence Repeat, End of Page Review, Word Meaning, and Phase Drill) for five adolescent boys who had been identified as having specific learning disabilities. Word Supply required the teacher to provide the correct word after the student made a mistake and prompt the student to repeat the word again. Sentence Repeat required the student to repeat the error word and complete the sentence after the teacher supplied the correct word. Then, he or she was asked to read the entire sentence again. End of Page Review involved the teacher identifying the error word as it occurred, and then, when the student finished the page, the teacher and the student reviewed all of the error words for that page. Word Meaning required the teacher to correct the error word as the reading occurred, ask the student to repeat the word, and then propose the question of “What does this word mean?” If the student was unable to identify the meaning, the teacher provided the definition. When the student finished reading the page, the student re-read the error words and explained the definitions. For the Drill method, the teacher recorded the error words, wrote them on index cards, and reviewed the error words with the student (Jenkins & Larson, 1979).
The results of Jenkins and Larson's (1979) study suggested that many of the error correction procedures (i.e., Sentence Repeat, End of Page Review, and Word Meaning) did not produce greater gains in word recognition when compared to Word Supply or no correction. When compared to one another, many of the strategies had little differences in effect on word recognition, expect for the Drill method. This procedure of error correction was suggested to be more beneficial and yielded higher levels of word recognition when compared to the other error correction methods, indicating that the Drill method may be superior to other error correction procedures (Jenkins & Larson, 1979).

**Error Word Drill**

To provide feedback to inaccurate readers in the acquisition stage, Jenkins and Larson (1979) developed the intervention Error Word Drill based upon the principles of the Drill method. During Error Word Drill, the student reads the passage, and the interventionist supplies the correct word when errors are made. As the student reads, the interventionist also records the word when the student makes an error. Following the completion of the passage, the error words are printed on flash cards and then are reviewed with the student. The flashcards serve as a technique that provides students with multiple opportunities to practice as well as consistent feedback on error words. The flashcards are randomly presented to the student. When the student correctly pronounces a word, the error word is removed from the deck. When the student mispronounces a word, the interventionist supplies the word, has the student repeat the word, asks “What Word?” and asks the student to repeat the word again. The index card with the error word is then placed in the back of the deck. Then, the interventionist shuffles the deck and repeats the process until the student correctly reads all of the error words with no errors.
on two consecutive trials (Jenkins and Larson, 1979). Jenkins, Larson and Fleisher (1983) explored the effects of Error Word Drill and Word Supply on word recognition and reading comprehension for 17 students with learning disabilities related to reading. The results suggested that Error Word Drill significantly increased word recognition, oral reading fluency, and comprehension of sentences that contained the original error words when compared to the Word Supply method.

Likewise, Rosenberg (1986) explored the effectiveness of three error-correction procedures (Error Word Drill, Word Supply, and Phonic-Drill Rehearsal) for four students with learning disabilities and reading problems. For the Phonic-Drill Rehearsal method, the teacher supplied the word, had the student repeat the word, and then wrote the error words on index cards. The teacher presented each error word card by sounding out the word while the student watched. Then, the teacher and the student read the word together. Next, the student was asked to read the card in a whisper, read it aloud, sound out the word to him or herself, and then read the word aloud at a normal speed. Like the Drill method, the error words were presented until all words were read without mistakes at least two times. The results suggested that the Drill method (Error Word Drill) had a greater effect on a measure of isolated error-word identification and oral reading fluency when compared to the Word Supply method. Similarly, the Drill method had a greater effect on oral reading fluency than the Phonic Drill Rehearsal method. Together, these three studies provide evidence that Error Word Drill is an effective error correction procedure to help students read with greater accuracy and improve their oral reading fluency. Furthermore, the combined results of these studies propose that Error Word Drill
may be more effective in increasing oral reading fluency than other error correction techniques designed to improve accuracy.

**Repeated Reading**

As readers transition from the acquisition stage to the fluency stage, their accuracy improves, but they may still read slowly, requiring an intervention to improve their reading rate. Repeated Reading is an example of one reading intervention that has been shown to be effective for non-fluent readers (Samuels, 1979). Repeated Reading targets oral reading fluency by building fluency through practice. For Repeated Reading, the student is instructed to read the passage multiple times during the intervention session. The multiple readings provide the reader with several opportunities to practice reading the text. This is critical because as the practice continues, he or she is often able to read at a faster pace, while correcting earlier errors. Repeated Reading targets rate of reading more than accuracy. Samuels (1979) suggested that when implementing Repeated Reading, a student’s speed should be emphasized over their word recognition accuracy, arguing that if the student must read every single word correctly, then the student is likely to slow down his or her pace because he or she wants to ensure that no mistakes are made.

Some components essential to Repeated Reading have been heavily explored in the literature. Samuels (1979) suggested that students should re-read instructional level passages (i.e., passages that are not too easy, yet not too difficult) multiple times until a pre-determined criterion is met. Researchers differ in regards to what the pre-determined criterion should be. Some researchers suggest that the passage should be re-read until the student fluently reads the passage at a desired rate (Samuels, 1979). For example, a
student may be required to read a passage multiple times until he or she can read 100 correct words per minute. Others suggest that the student should read the passage a total of four times to demonstrate fluency (Rashotte & Torgesen, 1985). A meta-analysis by Therrien (2004) considered the number of reads required to produce satisfactory gains in oral reading fluency. The results revealed that interventions requiring the student to read the passage four times yielded the greatest effect size ($ES = .95$), followed by reading the passage three times ($ES = .85$) and reading the passage two times ($ES = .57$).

Other components of Repeated Reading that have been investigated include whether students should read aloud or silently, and whether students should read to adults or peers. Joseph (2010) recommended that educators have students read aloud. This provides opportunities for interventionists to provide feedback, as well as measure a student’s oral reading fluency by computing the number of correct words in one minute. In his meta-analysis, Therrien (2004) explored whether students should read aloud to adults or peers during Repeated Reading. The results indicated that Repeated Reading was more effective at improving oral reading fluency when the reader read aloud to an adult ($ES = 1.37$), rather than a peer ($ES = .36$). Perhaps this difference in effect size could be explained by the fact that students were more engaged when reading to an adult rather than a peer, or perhaps adults were better able to recognize and correct errors than peers which helped to increase oral reading fluency.

Many empirical studies have provided support for Repeated Reading as an intervention for dysfluent readers. For example, Herman (1985) found that as students continued to re-read the passage, their rate and comprehension increased significantly. Likewise, the students’ total number of errors decreased substantially. Sindelar, Monda,
and O’Shea (1990) found that students with learning disabilities between third and fifth grade demonstrated an increase in fluency after reading the same passage three times. Students without learning disabilities also experienced an improvement in fluency as a result of the multiple practice opportunities. Therrien’s (2004) meta-analysis concluded that repeated reading was an effective intervention for both students with and without learning disabilities to increase reading fluency on a specific passage as well as to improve overall reading skills related to fluency and comprehension. Samuels (1979) reported that repeated reading can be used to help students with special needs, young children, and adults to become better readers and has even been used world-wide to teach students how to read in other languages.

**Intervention Combinations**

As a society, the notion of “more is better” is often embraced. Based on this, researchers have begun to explore the effects of combining interventions. Much of this literature has explored the implications of combining an intervention with a medication. For example, the Multimodal Treatment Study of Children with ADHD in 1999 (MTA) explored the effects of combining a behavioral intervention with a medication for children with Attention-Deficit Hyperactivity Disorder (ADHD). The results suggested that medication alone was far more effective than the behavioral intervention alone. Combining the behavioral intervention with the medication led to only modest additional benefits when compared to the medication alone. However, when children received intensive behavioral intervention, they demonstrated fewer symptoms related to ADHD and were able to take a smaller dose of the medication (Schroeder & Gordon, 2002). Another study by Bernstein et al. (2000) compared the effects of combining cognitive-
behavioral therapy (CBT) with a medication to the effects of cognitive-behavioral therapy alone to treat school refusal behavior for adolescents with comorbid depression and anxiety. The results suggested that the youth who received the combination of medication and CBT exhibited a significantly greater return-to-school rate and than the adolescents who received the CBT alone. Together these studies provide support that combining interventions may result in greater increases in children’s level of functioning when compared to the effects of one intervention alone.

While there has been research surrounding the impact of combining treatments such as therapy and medication, less research has investigated the effects of combining reading interventions. One study by Eckert, Ardoin, Daly and Martens (2002) explored the effect of combining consequence-based interventions (i.e., Contingent Reinforcement, Performance Feedback) with antecedent-based interventions (i.e., Listening Passage Preview, Repeated Reading) to increase oral reading fluency for six elementary students. The results suggested the antecedent intervention resulted in increases in oral reading fluency for all six of the students. However, for four of the six students, combining the antecedent intervention with a consequence intervention yielded greater increases in oral reading fluency when compared to the antecedent intervention alone, suggesting that combining interventions may be of value when attempting to promote greater reading skill development.

**Intervention Combination of Error Word Drill and Repeated Reading**

Previous research has suggested that sometimes individuals experience greater gains when interventions are combined. However, only a few studies have explored the effects of combining an intervention that emphasizes practice with an intervention that
emphasizes error correction. Nelson, Albert and Grody (2004) investigated using an error correction procedure and Repeated Reading together to target reading accuracy and fluency. When a student read the word incorrectly the teacher supplied the correct word and asked the student to repeat the correct word and re-read the sentence. At the end of the five-minute reading session, the teacher reviewed the error words with the student. For the condition that included both error correction and repeated readings, the student participated in the error correction procedure for three minutes and then read the passage three times for one minute each. The results suggested that the error correction procedure alone did not have a significant effect on fluency, but it did decrease the number of errors in one minute. However, when the error correction procedure was combined with Repeated Reading, the students demonstrated substantial gains in reading fluency, indicating that combining Repeated Reading and an error correction procedure may have a positive impact on the development of students’ reading skills.

Although Jenkins and Larson (1979) found Error Word Drill to be superior to other word correction procedures, to date, only one study has explored the effectiveness of combining Repeated Reading with Error Word Drill. Glazer (2007) investigated the effect of Repeated Reading compared to the effect of an intervention combination of Repeated Reading and Error Word Drill on elementary-aged students’ oral reading fluency. The results suggested that both interventions increased students’ oral reading fluency. However, the intervention combination had a greater effect on oral reading fluency. Specifically, three out of the four participants made greater gains in oral reading fluency when participating in the intervention combination of Repeated Reading and Error Word Drill when compared to the effects of Repeated Reading alone.
Incorporating Technology into Reading

As the world is becoming increasingly enraptured with technology, more and more researchers have begun to explore ways to incorporate technology in education. Researchers in educational technology development have suggested that educators must understand how computer-based technology, theories of learning, and educational practices interact to effectively use technology in the classroom. Teachers must reflect on their goal for a lesson and consider if and how computer-based technology can facilitate achievement of that goal (Alexander, 2006).

Several studies have explored the use of computer-assisted instruction (CAI). Historically, the most common form of CAI has been through drill and practice exercises on the computer (i.e., electronic worksheets). Although this type of technology can be relatively simple to develop and easy to use, research has suggested that when compared to traditional instruction, the gains when using CAI tend to be low or modest (Alexander, 2006).

Currently, only a few studies have explored how computer-based technology has been used to enhance implementation of reading instruction and intervention. For example, Blachowicz and colleagues (2009) explored 18 first-grade teachers’ opinions and use of computer-assisted technology in their classroom for literacy. The computer program consisted of a phonics-based curriculum targeting students’ instructional levels that was administered via computers or hand-held devices. The results suggested that the use of computer-assisted technology for reading literacy had positive impacts on the classroom instruction and student reading achievement. Additionally, reports from
students and teachers suggested that they found the technology to be engaging and effective in the classroom setting.

Similarly, Jones, Torgesen, and Sexton (1987) explored the effects of computer-assisted practice on reading fluency using the Hint and Hunt program. Through this computer program, students practiced identifying vowels and vowel combinations in words. Embedded in the program was a game-like activity targeting reading speed. The results suggested that after ten weeks, students who received the computer-assisted practice demonstrated an increase in reading fluency. Despite these studies, more research is needed to explore how computer-based technology facilitates both acquisition and proficiency of skill development in reading.

**iPad Technology**

In addition to computer technology, many have begun to investigate how iPads or tablets can be incorporated in the academic setting. Cameron and Bush (2012) explored how the use of iPads facilitated students’ learning in the college setting. The results revealed that students found the electronic course material on the iPad to be just as useful as printed class materials. Additionally, iPad use was linked to increased personal study and classroom learning. In another study, Hessman (2012) found that using Kindles, a tablet similar to the iPad, was effective for increasing reading skills measured on statewide tests. He compared a treatment group consisting of sixth graders who used Kindles in daily reading instruction to a control group of sixth graders who did not use electronic devices as part of their reading instruction. Reading skill growth was measured by comparing the two group’s scores on the North Carolina End-Of-Grade State Reading Test and the Accelerated Reader’s STAR Reading Assessments. The results suggested
that the group of students who used the Kindles scored 15 percentage points higher in proficiency than the control group on the North Carolina End-Of-Grade State Reading Test. Similarly, the results from the STAR Reading Assessments suggested that students who used the Kindles demonstrated a 1.3 grade equivalency increase, which was almost twice the increase compared to the control group.

While some studies within the literature have asserted that iPads positively contribute to the learning process, others have reported contrary results. Sheppard (2011) examined the use of iPads for sixth grade reading classes. One group of students read from traditional books, while the other group read the same story using the iPad. Although the iPads were engaging for the students, they sometimes served as a distractor. For example, the students often became preoccupied with changing the settings on the iPad. Additionally, almost two-thirds of the students demonstrated negative or no growth on measures of comprehension and knowledge (i.e., a fifteen question test based on the first three levels of Bloom’s Taxonomy) when using the iPad. However, the students who had the lowest reading abilities experienced the greatest amount of growth on measures of analysis when using the iPads, suggesting that perhaps this tool can be used to foster reading skills in struggling readers. Lastly, Sheppard (2011) reported issues with finding appropriate content for the books and indicated that this will most likely continue to be a challenge for schools who desire to use iPads for reading.

Murray and Olcese (2011) agreed with Sheppard (2011), arguing that the iPad technology has not been widely adopted by the software development community, which limits its use in the schools. Furthermore, the authors suggest that current applications on the iPads have yet to capitalize on how people learn to promote the development of skills.
There simply is not enough research yet to determine whether iPad applications support the process of skill acquisition or if they merely serve as a way to engage and motivate students. Within the limited body of research surrounding the use of iPads in the educational setting, the results have been mixed. Because of this, the literature must be expanded to how iPads contribute to the learning process and students’ perceptions of iPad use in the academic environment.

**Student Acceptability**

One critical aspect of intervention research is exploring students’ perception of whether the intervention components are acceptable. Kazdin (1981) suggested that practitioners need to explore clients’ perceptions of aspects of treatment. Even if the treatment alleviates a problem, the client may not necessarily find the treatment to be an acceptable way to solve the problem, which can influence the treatment’s overall success. Kazdin (1981) explained that if the client finds the treatment to be inappropriate, unfair, unreasonable, or too intrusive, the treatment itself may not be effective. Considering iPad technology, besides Cameron and Bush’s (2012) study, few researchers have explored students’ acceptability of using iPad technology as part of the intervention. Although one might assume that students would find this type of technology to be engaging, more research is needed to explore this variable.

**Gaps in Research and the Present Study**

Based on the current body of research, there is a limited amount of literature that has explored combining the interventions of Error Word Drill and Repeated Reading to increase gains in oral reading fluency. Similarly, there has been a limited amount of research regarding the use of technology, specifically with iPads, to implement
interventions. Moreover, within the limited literature on using iPads, the results have been mixed, and few studies have explored the social acceptability of using iPads for academics.

Based on these gaps in the literature, the purpose of the present study was to investigate the impact of combining both Error Word Drill and Repeated Reading to implement an intervention that emphasizes practice as well as feedback to increase students’ oral reading fluency. The three interventions (Error Word Drill, Repeated Reading, and Error Word Drill plus Repeated Reading) were compared to one another to examine gains in oral reading fluency. Additionally, students’ perceptions of using iPads to present error words during the interventions were explored to determine if the iPads were deemed to be an acceptable component of the intervention.
CHAPTER III

Method

Participants and Setting

Four elementary-aged students, Brody, Kyler, Jasmine, and Mason (pseudonyms are used to protect the confidentiality of the participants) served as participants for the study. The participants were referred to a reading intervention program at a medium-sized Midwestern comprehensive state university by their parents because of concerns related to reading fluency. The participant information related to gender, grade, age, ethnicity, last grade completed, current reading level (as determined by a Survey Level Assessment), and participation in Title I Services are reported in Table 1. None of the participants received services through special education at the time of the study. In addition, none of the participants were diagnosed with a mental health disorder. Finally, none of the participants were English language learners.

Table 1.
Participant Demographics

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Brody</th>
<th>Kyler</th>
<th>Jasmine</th>
<th>Mason</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Age</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>White</td>
<td>White</td>
<td>Hispanic</td>
<td>White</td>
</tr>
<tr>
<td>Last Grade Completed</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Reading Level Determined by SLA</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Receiving Title I Services</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
The principle researcher and a research assistant, an undergraduate student majoring in education, served as interventionists. The principle researcher provided a two-hour training session to the research assistant regarding each intervention’s procedures, the importance of treatment integrity, and the measurement of oral reading fluency.

The reading intervention sessions were conducted at the university over five weeks during the summer of 2012. The intervention sessions took place within the university’s on-campus training clinic. Each room contained a table, two chairs, and the necessary intervention materials. The sessions were scheduled in the morning and lasted approximately 50-min.

Materials

Protocol checklists (see Appendix A) were created for each intervention: Error Word Drill (EWD), Repeated Reading (RR) and Error Word Drill plus Repeated Reading (EWD+RR). Each protocol checklist contained the steps of the intervention procedure and served as a script that the interventionists could refer to during implementation. The intervention protocols were developed based on procedures from the Intervention Central website (www.interventioncentral.org).

The reading passages used during the survey level assessment, baseline phase, intervention phase, and follow-up phase were taken from EasyCBM.com, which is a district assessment system that provides curriculum-based measurement reading probes (i.e., passages) that are used to monitor the progress of students toward achievement of academic goals. EasyCBM.com is available to school districts, administrators, and
teachers and offers many resources for assessment, data management, and score reporting. The EasyCBM.com program can be accessed at www.easycbm.com.

At the time of this study, EasyCBM.com offered over 100 leveled reading probes, ranging from grade one (level one) to grade eight (level eight) that can be used to measure oral reading fluency. EasyCBM.com provided 17 passages per level for grades one through five, and nine reading passages per level for grades six through eight. All passages included both an assessor copy and a student copy (see example in Appendix B). The specific level of EasyCBM.com passages were selected based on the participants’ instructional level as determined by a survey level assessment. According to the National Center on Response to Intervention (www.rti4success.org), which reviews the reliability and validity of progress monitoring tools, there is sufficient reliability of the performance level score and alternate-forms, as well as sufficient validity of the performance level score and the slope of improvement. The National Center on Response to Intervention reported that the data was unavailable or inadequate in regards to whether the measures are sensitive to student improvement.

High Content Overlap (HCO) passages were also developed to assess passage generalization following each intervention session. The EasyCBM.com passages were rewritten to create a passage that included approximately 85% of the same content as the original instructional passages. This resulted in a passage that could be used to measure near-transfer generalization because the students have not been trained on that specific text (see example in Appendix C).

iPads were used as part of the Error Word Drill intervention. The error words identified after the student read the passage were typed into the PowerPoint application
on the iPad. To facilitate the ease of presenting error words on the iPad, the iPad application SlideShark was also used. SlideShark is a free iPad application that displays PowerPoint presentations quickly and without formatting errors, while preserving animations, fonts, graphics, and colors. After typing the participant’s error words into the PowerPoint application, the interventionist uploaded the document and presented the error words via SlideShark.

**Dependent Measures**

The primary dependent variable for analysis was oral reading fluency (i.e., speed and accuracy when reading aloud). During baseline and follow-up phases and after completing each intervention procedure, oral reading fluency was measured by having the participant read the passage for 1-min. During the 1-min read, errors were not corrected. Oral reading fluency was determined by subtracting the number of errors from the total words read to calculate the number of correct words per minute (Rashotte & Torgesen, 1985). To be considered a correct word, the participant had to pronounce the word correctly or self-correct within three seconds. Mispronunciations, non-pronunciations (i.e., long pauses that did not result in a response), omissions (i.e., skipping or not reading a word), insertions (i.e., adding a word that was not in the passage), line skipping, and substitutions were all marked as errors (Rashotte & Torgesen, 1985).

Participant social acceptability was also assessed. On the last day of the reading intervention program the participants completed three surveys regarding their perceptions of the interventions. The survey questions were developed based on questionnaires used as part of previous intervention research (i.e., Axelrod & Zank, 2012). The participants
were informed that there were no correct or incorrect answers when filling out the surveys and encouraged the students to be honest. Participants were also instructed not to include their name on the survey. To ensure anonymity, while the participants completed the surveys, the interventionists waited in a separate room. The surveys used child-friendly language. For example, to describe the Repeated Reading intervention, the survey included questions about “reading the story four times.” The Error Word Drill intervention included questions about “reviewing the words on the iPad,” and the Error Word Drill plus Repeated Reading intervention included questions about “reading the story four times AND reviewing the words on the iPad.” Each survey included seven questions and assessed the following domains: favorite and least favorite parts of the intervention, willingness to recommend the intervention to a friend, perceived effectiveness, and level of engagement with the intervention. Some of the questions were based on a three-point Likert Scale (Agree, Unsure, Disagree), while others used an open-response format (see Appendix D).

In addition to participant social acceptability, parent acceptability was also evaluated. Four weeks following participation in the reading intervention program, parents of the participants received a survey asking for their feedback that they could anonymously mail back to the researcher. The survey included nine questions and evaluated the following domains: child’s reading improvement related to fluency, comprehension, interest and motivation, perceptions of the interventionist, and willingness to recommend the program. The questions were based on a six-point Likert Scale ranging from “highly agree” to “highly disagree,” where “0” indicated “I don’t
know” or “I don’t have an opinion” (see Appendix E). Three out of the four parents of the participants completed the survey (75% return rate).

**Procedures**

Before the study began, the parents of the participants received an informational parent letter (see Appendix F) and parental consent form (see Appendix G) that outlined the purpose of the study and the benefits for participating. On the first day of the intervention, all parents consented to have their child participate in the intervention, and all four participants verbally assented to participation in the study.

**Survey level assessment.** On the first day of the reading intervention program, a survey level assessment (SLA) using EasyCBM.com passages was used to identify each participant’s instructional reading level. For the SLA, the participants first read three different passages in their assigned grade level for 1-min each, and correct words per minute (CWPM) were computed. The median score was then compared to the EasyCBM.com norms provided on the website. When the scores indicated below grade level performance according to the EasyCBM.com norms, the participants read three different passages from the next lower grade level. This process continued until the participants demonstrated a reading level at the 25th percentile based on the EasyCBM.com norms, which was indicative of their instructional reading level. The SLA results suggested that Brody was reading at an instructional level 1. Kyler and Jasmine were reading at an instructional level 2. Mason was reading at an instructional level 3. Table 1 reports each participant’s reading level as determined by the Survey Level Assessment.
The present study used three different interventions: (a) Error Word Drill, (b) Repeated Reading and (c) intervention combination of Error Word Drill plus Repeated Reading. The participants completed two interventions per day. After competing each intervention, the participants were asked to read a high-content overlap (HCO) passage for 1-min, and the interventionists calculated the CWPM. Participants’ errors were not corrected during the 1-min read of the intervention passage and the HCO passage.

**Baseline.** After completing the SLA, during the next reading session, baseline data were gathered. Each participant read three different passages for 1-min each. The examiner recorded errors and computed the CWPM.

**Error Word Drill.** For the Error Word Drill intervention, each participant read the passage from start to finish. As the participant read, the interventionist recorded the participant’s errors. When the participant finished reading the passage, the interventionist typed the participant’s error words into PowerPoint application and uploaded the file to SlideShark. One error word was presented per slide using 24 point Times New Roman font. Upon reading the word, the participant was asked to say the word correctly. If the participant read the word correctly, the interventionist said, “Yes. <Repeat Word>. Now, say it again.” If the participant read the word incorrectly, the interventionist said, “No. <Repeat Word>. Now, try it again.” After correctly reading the error word, the interventionist presented the next error word on the PowerPoint slide. This procedure was continued until the participant correctly read each error word at least two times (Jenkins & Larson, 1979).

**Repeated Reading.** For the Repeated Reading intervention, the participant read the passage three times and proceeded to read it a fourth time during the 1-min read to obtain
a measure of oral reading fluency. When the participant read a word incorrectly, hesitated for longer than three seconds, or asked for help with a word, the interventionist read the word aloud and had the student say the word correctly before continuing to read. If the participant asked for the definition of the word, the interventionist supplied the word definition. When the participant completed the first reading of the passage, the interventionist had the participant read the passage two more times. During the 1-min read, the interventionist recorded CWPM (Rashotte & Torgesen, 1985).

**Error Word Drill plus Repeated Reading Intervention Combination.** For the intervention combination condition, Error Word Drill and Repeated Reading were combined. First, the participant read the passage one time and then completed the Error Word Drill procedure. After correctly reading each error word twice, the participant read the passage again. As the participant read, the interventionist identified the new error words and completed the Error Word Drill procedure with the participant again. Then, the participant read the passage one more time. After reading the passage for the third time, the participant read the passage for the fourth time for 1-min. During this final reading, the interventionist marked the errors and calculated CWPM.

**Follow-Up.** On the last day of the reading intervention program, follow-up data were collected. Each participant read five different instructional level passages for 1-min each. The interventionists recorded errors and computed CWPM.

**Experimental Design and Data Analysis**

A multielement design was used in the present study to compare treatment conditions (Barlow & Hayes, 1979). Since reading is an irreversible skill, it was expected that oral reading fluency would increase over time. Therefore, this design was selected
because it allowed the intervention conditions to be compared to one another more frequently. After gathering baseline data, the interventions were administered in a rotating sequence over the course of the five-week reading program, starting with Error Word Drill, then Repeated Reading, followed by Error Word Drill plus Repeated Reading. Error Word Drill was administered first because it was the simplest intervention to implement. Within the rotating sequence, the participants completed Error Word Drill and Repeated Reading on the second day of the reading intervention program, completed Error Word Drill plus Repeated Reading and Error Word Drill on the third day, completed Repeated Reading and Error Word Drill plus Repeated Reading on the fourth day, etc.

By using a multielement design, the three interventions were compared to one another using a single subject design to determine relative effectiveness of each condition (Sindelar, Rosenberg, & Wilson, 1985). The number of sessions for each intervention condition varied based on participant attendance. Brody received each intervention eight times over the course of the study. Kyler received Error Word Drill a total of nine times and Repeated Reading and Error Word Drill plus Repeated Reading eight times each. Jasmine received each intervention six times, while Mason received each intervention nine times over the course of the study. Visual analysis was used to evaluate the data. Through visual analysis, the principle researcher visually examined each participant’s graph and analyzed the magnitude (i.e., difference between the conditions), the consistency of separation (i.e., the lack overlap between the conditions), the variability between conditions, and the overall trend of the data.
Procedural Integrity

Procedural integrity was assessed for 92.6% of all intervention sessions. A graduate student trained in reading interventions listened to audio tape recordings of the intervention sessions. Using the protocol checklists (see Appendix A), the graduate student listened to determine if each step of the intervention was implemented correctly and then computed a procedural integrity percentage (i.e., dividing the number of steps correctly implemented by the total number of steps on the protocol checklist and multiplying by 100%). Procedural integrity during the sessions observed was 98.6%. Table 2 provides procedural integrity summary data for each participant.

Table 2.
Fidelity Data—Procedural Integrity

<table>
<thead>
<tr>
<th>Participant</th>
<th>Procedural Integrity Percentage</th>
<th>Percentage of Sessions Reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brody</td>
<td>98.9%</td>
<td>77.8%</td>
</tr>
<tr>
<td>Kyler</td>
<td>98.0%</td>
<td>92.6%</td>
</tr>
<tr>
<td>Jasmine</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Mason</td>
<td>97.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>98.6%</td>
<td>92.6%</td>
</tr>
</tbody>
</table>

Inter-rater Reliability

Inter-rater reliability was assessed for 92.6% of sessions. A graduate student trained in reading interventions evaluated inter-rater reliability by listening to the audiotapes. Using the Assessor Copy (See Appendix B) from the intervention session, the graduate student followed along word-by-word to ensure that the correct words per minute (CWPM) and errors were correctly computed. Inter-rater reliability was computed by dividing the number of agreements between the interventionist and the graduate
student listening to the audiotape divided by the total number of agreements and disagreements and multiplying by 100%. Inter-rater reliability during the sessions recorded was 99.3%. Table 3 provides inter-rater reliability summary data for each participant.

Table 3.  
Fidelity Data—Inter-rater Reliability

<table>
<thead>
<tr>
<th>Participant</th>
<th>Inter-rater Reliability Percentage</th>
<th>Percentage of Sessions Reviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brody</td>
<td>98.8%</td>
<td>77.8%</td>
</tr>
<tr>
<td>Kyler</td>
<td>99.0%</td>
<td>92.6%</td>
</tr>
<tr>
<td>Jasmine</td>
<td>99.8%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Mason</td>
<td>99.5%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>99.3%</td>
<td>92.6%</td>
</tr>
</tbody>
</table>
CHAPTER IV

Results

Visual Analysis of Results

The data points for each intervention were graphed and connected to allow the principle researcher to visually analyze the data to determine the effectiveness of the intervention conditions of Error Word Drill, Repeated Reading, and Error Word Drill plus Repeated Reading. Through visual analysis, the magnitude of separation (i.e., difference between the conditions) and the consistency of separation (i.e., the lack overlap between the conditions) were considered.

The first research question investigated whether the intervention combination of Repeated Reading and Error Word Drill had a greater effect on oral reading fluency for struggling readers than either intervention alone. Visual analysis of each participant’s graph (see Figure 1, Figure 2, Figure 3, Figure 4) did not suggest that the intervention combination of Error Word Drill plus Repeated Reading led to greater gains in oral reading fluency, when compared to Error Word Drill alone and Repeated Reading alone. There was a limited degree of separation between the intervention lines for each condition (i.e., Error Word Drill plus Repeated Reading, Error Word Drill and Repeated Reading). Likewise, there was a lack of consistency of separation between the intervention lines. If the intervention combination of Error Word Drill plus Repeated Reading was more effective than either Error Word Drill alone or Repeated Reading alone, one would expect to see the intervention line for Error Word Drill plus Repeated Reading to be consistently above and separated from the intervention lines for Error Word Drill and Repeated Reading.
In addition to visual analysis, the mean correct words per minute for each condition for each participant did not suggest that Error Word Drill plus Repeated Reading was more effective than Error Word Drill alone or Repeated Reading alone. Specifically, Brody read an average of 48.9 CWPM during Error Word Drill, an average of 59.5 CWPM during Repeated Reading, and an average of 60.1 CWPM during Error Word Drill plus Repeated Reading. Kyler read an average of 76.3 CWPM during Error Word Drill, an average of 79.4 CWPM during Repeated Reading, and an average of 75.3 CWPM during Error Word Drill plus Repeated Reading. Jasmine read an average of 76.5 CWPM during Error Word Drill, an average of 94.3 CWPM during Repeated Reading, and an average of 92.3 CWPM during Error Word Drill plus Repeated Reading. Mason read an average of 131.1 CWPM during Error Word Drill, an average of 147.0 CWPM during Repeated Reading, and an average of 149.9 CWPM during Error Word Drill plus Repeated Reading. The mean CWPM for each condition and each participant is summarized in Table 4.

While the intervention combination of Error Word Drill plus Repeated Reading did not produce significant gains when compared to the interventions alone, all of the participants demonstrated increases in oral reading fluency over time. At baseline, Brody read an average of 24.3 CWPM. Following the intervention period, he read an average of 49.2 CWPM, indicating an increase of 24.9 words. Regarding errors, at baseline, Brody made an average of 9.0 errors. During the intervention conditions, he made an average of 3.9 errors. Following the intervention conditions, he made an average of 9.4 errors. On the High-Content Overlap (HCO) passages during the intervention conditions, Brody read an average of 46.3 CWPM. This was similar to the average CWPM read on the
intervention passages ($M = 56.2$), suggesting that Brody generalized his reading skills to a similar passage (i.e., HCO passage).

Kyler also made gains over the course of the five-week intervention period. At baseline, Kyler read an average 65.0 CWPM. Following the intervention conditions, he read an average of 77.4 CWPM, suggesting an increase of 12.4 words. When analyzing errors, at baseline, Kyler made an average of 2.0 errors. During the intervention conditions, he made an average of 1.1 errors. Following the intervention conditions, he made an average of 0.8 errors. On the High-Content Overlap (HCO) passages during the intervention conditions, Kyler read an average of 70.1 CWPM. This was similar to the average CWPM read on the intervention passages ($M = 77.0$), suggesting that Kyler generalized his reading skills to a similar passage (i.e., HCO passage).

Jasmine demonstrated improvements as well. At baseline, Jasmine read an average of 58 CWPM. Following the intervention conditions, she read an average of 89.0 CWPM, suggesting an increase of 31 words. Regarding errors, at baseline, Jasmine made an average of 2.7 errors. During the intervention conditions, she made an average of 3.1 errors. Following the intervention conditions, she made an average of 2.8 errors. On the High-Content Overlap (HCO) passages during the intervention conditions, Jasmine read an average of 80.3 CWPM. This was similar to the average CWPM read on the intervention passages ($M = 86.7$), suggesting that Jasmine generalized her reading skills to a similar passage (i.e., HCO passage).

Mason’s reading rate did not increase significantly during the intervention conditions. At baseline, Mason read approximately 139 correct words in a minute, which was fast for a child of his age. Following the intervention conditions, he read an average
of 140.2 CWPM, suggesting an increase of 1.2 words. Although he read quickly, an analysis of his errors suggested that he was not consistently accurate when reading. At baseline, Mason made an average of 13.3 errors. During the intervention conditions, his errors dropped to an average of 6.1. At follow-up, Mason made an average of 5.6 errors, suggesting a decrease in errors over the course of the interventions. On the High-Content Overlap (HCO) passages during the intervention conditions, Mason read an average of 139.5 CWPM. This was similar to the average CWPM on the intervention passages ($M = 143.7$), suggesting that Mason generalized his reading skills to a similar passage (i.e., HCO passage). The mean number of errors for each condition and each participant is summarized in Table 5. The data from the HCO passages is summarized in Table 6.

![Figure 1](image-url)

Figure 1. Line graph depicting Brody’s gains in oral reading fluency for the interventions of Error Word Drill (EWD), Repeated Reading (RR) and Error Word Drill plus Repeated Reading (EWD+RR).
**Figure 2.** Line graph depicting Kyler’s gains in oral reading fluency for the interventions of Error Word Drill (EWD), Repeated Reading (RR) and Error Word Drill plus Repeated Reading (EWD+RR).

**Figure 3.** Line graph depicting Jasmine’s gains in oral reading fluency for the interventions of Error Word Drill (EWD), Repeated Reading (RR) and Error Word Drill plus Repeated Reading (EWD+RR).
Figure 4. Line graph depicting Mason’s gains in oral reading fluency for the interventions of Error Word Drill (EWD), Repeated Reading (RR) and Error Word Drill plus Repeated Reading (EWD+RR).

Table 4.
Mean Correct Words Per Minute for Each Condition and Each Participant

<table>
<thead>
<tr>
<th>Participant</th>
<th>Baseline (Range)</th>
<th>EWD (Range)</th>
<th>RR (Range)</th>
<th>EWD+RR (Range)</th>
<th>Follow-Up (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brody</td>
<td>24.3 (51-70)</td>
<td>48.9 (35-66)</td>
<td>59.5 (41-80)</td>
<td>60.1 (35-75)</td>
<td>49.2 (38-60)</td>
</tr>
<tr>
<td>Kyler</td>
<td>65.0 (58-69)</td>
<td>76.3 (69-90)</td>
<td>79.4 (62-100)</td>
<td>75.3 (56-85)</td>
<td>77.4 (65-90)</td>
</tr>
<tr>
<td>Jasmine</td>
<td>58.0 (51-70)</td>
<td>76.5 (62-98)</td>
<td>94.3 (83-119)</td>
<td>92.3 (79-116)</td>
<td>89.0 (74-104)</td>
</tr>
<tr>
<td>Mason</td>
<td>139.3 (129-156)</td>
<td>134.1 (117-164)</td>
<td>147.0 (125-172)</td>
<td>149.9 (132-164)</td>
<td>140.2 (132-156)</td>
</tr>
</tbody>
</table>
Table 5. 
*Mean Number of Errors for Each Condition and Each Participant*

<table>
<thead>
<tr>
<th>Participant</th>
<th>Baseline (Range)</th>
<th>EWD (Range)</th>
<th>Condition RR (Range)</th>
<th>EWD+RR (Range)</th>
<th>Follow-Up (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brody</td>
<td>9.0 (7-12)</td>
<td>4.0 (2-6)</td>
<td>4.8 (2-7)</td>
<td>3.0 (0-6)</td>
<td>9.4 (6-15)</td>
</tr>
<tr>
<td>Kyler</td>
<td>2.0 (2-2)</td>
<td>1.0 (0-2)</td>
<td>1.2 (0-4)</td>
<td>1.1 (0-4)</td>
<td>0.8 (0-2)</td>
</tr>
<tr>
<td>Jasmine</td>
<td>2.7 (1-4)</td>
<td>2.5 (1-3)</td>
<td>2.5 (1-8)</td>
<td>4.2 (1-12)</td>
<td>2.8 (1-6)</td>
</tr>
<tr>
<td>Mason</td>
<td>13.3 (1-9)</td>
<td>6.3 (2-17)</td>
<td>6.2 (2-10)</td>
<td>5.9 (3-10)</td>
<td>5.6 (3-8)</td>
</tr>
</tbody>
</table>

Table 6. 
*Mean Correct Words Per Minute on High-Content Overlap Passages for Interventions and Participants*

<table>
<thead>
<tr>
<th>Participant</th>
<th>EWD (Range)</th>
<th>Condition RR (Range)</th>
<th>EWD+RR (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brody</td>
<td>42.8 (33-51)</td>
<td>45.3 (20-72)</td>
<td>50.9 (39-65)</td>
</tr>
<tr>
<td>Kyler</td>
<td>67.2 (54-81)</td>
<td>68.9 (50-90)</td>
<td>74.4 (50-91)</td>
</tr>
<tr>
<td>Jasmine</td>
<td>73.2 (42-85)</td>
<td>80.8 (68-98)</td>
<td>87.0 (60-116)</td>
</tr>
<tr>
<td>Mason</td>
<td>133.3 (98-176)</td>
<td>143.6 (102-161)</td>
<td>141.6 (113-161)</td>
</tr>
</tbody>
</table>

**Student Acceptability**

Following the intervention condition, on the last day on the reading intervention program when follow-up data were gathered, the participants completed three surveys (one with questions about Error Word Drill, one with questions about Repeated Reading, one with questions about Error Word Drill plus Repeated Reading) regarding their perceptions of the interventions. Results of the surveys are summarized in Tables 7, 8, and 9. The responses suggested that the participants agreed that all three of the interventions were helpful ($M = 3.0$) and helped them to become better readers ($M = 3.0$). In general, participants indicated they would recommend any of the three interventions to
a friend ($M = 2.3$). Overall, the participants did not find the interventions to be boring ($M = 1.3$). However, one participant reported that Error Word Drill and Error Word Drill plus Repeated Reading were boring. The results from the surveys suggested that the participants perceived all three interventions to be acceptable ways to help children learn to read.

Table 7.
*Student Acceptability Survey Data for Error Word Drill—Scores based on a three-point Likert scale ranging from disagree (1) to unsure (2) to agree (3).*

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reviewing the words on the iPad helpful for me.</td>
<td>3.0 (3)</td>
</tr>
<tr>
<td>Reviewing the words on the iPad was boring.</td>
<td>1.5 (1-3)</td>
</tr>
<tr>
<td>I like to practice reading by reviewing words on the iPad.</td>
<td>2.5 (1-3)</td>
</tr>
<tr>
<td>I think that reviewing the words on the iPad helped me to become a better reader.</td>
<td>3.0 (3)</td>
</tr>
<tr>
<td>I would recommend this activity to a friend.</td>
<td>2.0 (1-3)</td>
</tr>
</tbody>
</table>

Table 8.
*Student Acceptability Survey Data for Repeated Reading—Scores based on a three-point Likert scale ranging from disagree (1) to unsure (2) to agree (3).*

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading the story four times was helpful for me.</td>
<td>3.0 (3)</td>
</tr>
<tr>
<td>Reading the story four times was boring.</td>
<td>1.0 (1)</td>
</tr>
<tr>
<td>I like to practice reading by reading the story four times.</td>
<td>2.0 (1-3)</td>
</tr>
<tr>
<td>I think that reading the story four times helped me to become a better reader.</td>
<td>3.0 (3)</td>
</tr>
<tr>
<td>I would recommend this activity to a friend.</td>
<td>2.5 (1-3)</td>
</tr>
</tbody>
</table>
Table 9.  
*Student Acceptability Survey Data for Error Word Drill plus Repeated Reading—Scores based on a three-point Likert scale ranging from disagree (1) to unsure (2) to agree (3).*

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading the story four times AND reviewing the words on the iPad was helpful for me.</td>
<td>3.0 (3)</td>
</tr>
<tr>
<td>Reading the story four times AND reviewing the words on the iPad was boring.</td>
<td>1.5 (1-3)</td>
</tr>
<tr>
<td>I like to practice reading by reading the story four times AND reviewing the words on the iPad.</td>
<td>3.0 (3)</td>
</tr>
<tr>
<td>I think that reading the story four times AND reviewing the words on the iPad helped Me to become a better reader.</td>
<td>3.0 (3)</td>
</tr>
<tr>
<td>I would recommend this activity to a friend.</td>
<td>2.3 (1-3)</td>
</tr>
</tbody>
</table>

In addition to the Likert-scale questions, participants were asked to recall their favorite part and least favorite part of the interventions through open-ended questions. In doing so, the participants reported their perception of using the iPad as part of the intervention. The qualitative results were mixed. Two of the participants thought that using the iPad as part of Error Word Drill and Error Word Drill plus Repeated Reading was “fun” and “easy,” while the other two participants reported “it would be better on paper” and “I didn’t like reading on it.”

**Parent Acceptability**

Four weeks after the conclusion of the reading intervention program, a parent acceptability survey (see Appendix E) was sent home and parents were asked to anonymously complete the survey and send it back via mail. Overall, the results suggested that the parents were pleased with the reading intervention program and believed their child’s reading skills improved through participation in the program ($M = 4.7$). Parents were satisfied with the amount of feedback regarding their child’s progress
($M = 4.7$) and perceived that the interventionist worked well with their child ($M = 5.0$).

Some of the parents noted that they did not see an increase in their child’s interest in reading ($M = 2.7$). The results suggested that parents found the reading intervention program to be acceptable when targeting their child’s reading skills. Parent acceptability survey data is summarized in Table 10.

Table 10.  
*Parent Acceptability Survey Data—Scores based on a six-point Likert scale ranging from no opinion/don’t know (0) to highly disagree (1) to highly agree (5).*

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean (Range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall, my child’s reading improved as a result of participation in the program.</td>
<td>4.7 (4-5)</td>
</tr>
<tr>
<td>The reading interventionist working with my child was prepared to provide reading interventions.</td>
<td>5.0 (5)</td>
</tr>
<tr>
<td>I noticed improvements in my child’s reading fluency during and after the program.</td>
<td>5.0 (5)</td>
</tr>
<tr>
<td>I noticed improvements in my child’s reading comprehension during and after the program.</td>
<td>4.5 (4-5)</td>
</tr>
<tr>
<td>I noticed improvements in my child’s motivation to read during and after the program.</td>
<td>4.0 (3-5)</td>
</tr>
<tr>
<td>I noticed my child was more interested in reading during and after the program.</td>
<td>2.7 (2-3)</td>
</tr>
<tr>
<td>The reading interventionist interacted well with my child.</td>
<td>5.0 (5)</td>
</tr>
<tr>
<td>I received appropriate amounts of feedback about my child’s reading performance in the program.</td>
<td>4.7 (4-5)</td>
</tr>
<tr>
<td>I would recommend the reading program to other parents.</td>
<td>5.0 (5)</td>
</tr>
</tbody>
</table>
CHAPTER V

Discussion

The primary goal of the present study was to extend the reading intervention literature by exploring whether combining Error Word Drill and Repeated Reading would result in greater gains in oral reading fluency compared to each intervention alone. The three conditions (i.e., Error Word Drill, Repeated Reading, and Error Word Drill plus Repeated Reading) were compared to one another in an experimental design to investigate each intervention’s effect on four participants’ oral reading fluency. The results suggested that all three of the interventions produced gains in oral reading fluency. However, when compared to one another, the gains associated with the intervention combination (i.e., Error Word Drill plus Repeated Reading) were not greater than the gains associated with the two interventions alone (i.e., Error Word Drill, Repeated Reading).

Improvements in participants’ oral reading fluency for the individual intervention conditions (i.e., Error Word Drill and Repeated Reading) were not surprising given these interventions have strong empirical support in the literature. Furthermore, each was founded upon key learning principles of providing students with the opportunity to practice skills and receive feedback on performance. However, the current study found that the intervention combination of Error Word Drill plus Repeated Reading did not produce greater gains in oral reading fluency when compared to the individual interventions alone. This finding is contrary to the results of Glazer’s (2007) study, which suggested that the intervention combination of Error Word Drill and Repeated Reading did have a greater effect on oral reading fluency when compared Repeated Reading
alone. Perhaps the discrepancy in Glazer’s (2007) and the present study could be explained by the difference in experimental designs. Glazer (2007) employed a multiple-baseline design, while the present study used a multielement design. Perhaps by using a multiple-baseline design, Glazer (2007) was better able to evaluate whether the different intervention conditions resulted in changes in oral reading fluency. Additionally, Glazer’s study implemented Error Word Drill via pencil-and-paper, while the present study implemented the intervention using iPad technology. Perhaps the additional iPad component influenced the findings of the present study and limited the ability to see differentiation between the intervention conditions.

When comparing the three interventions (i.e., Error Word Drill, Repeated Reading, and Error Word Drill plus Repeated Reading) to one another, the participants demonstrated increases in oral reading fluency across all three of the conditions. However, three of the four participants (i.e., Brody, Jasmine and Mason) demonstrated greater increases when participating in either Repeated Reading or Error Word Drill plus Repeated Reading, suggesting that the feedback provided through Error Word Drill was not as beneficial as the practice they received through Repeated Reading to increase their oral reading fluency. These results may highlight the importance of considering the instructional hierarchy relative to the skill deficit (Haring, Lovitt, Eaton, & Hansen, 1978). At the beginning of the study, these three participants demonstrated the ability to decode and read text, but struggled to read with both speed and accuracy, suggesting that they were in the fluency stage within the instructional hierarchy. Perhaps the intervention of Repeated Reading, which provides readers with practice through reading and re-reading text, matched both their skill deficit (i.e., oral reading fluency) and their stage
within the instructional hierarchy (i.e., fluency stage). Through regular practice, by the end of the study, these participants were able to increase their ability to quickly and accurately read the material.

Another hypothesis that could account for the greater increases in oral reading fluency when participating in an intervention that included the re-reading of text could be in relation to the timing of the feedback on error words. During Repeated Reading, when the student read a word incorrectly, the interventionist supplied the correct word immediately following the error. In Error Word Drill, the student received the feedback during the iPad presentation of error words after they had read the passage, resulting in a delay between making the error and receiving the feedback. When teaching new skills, research has suggested that feedback should be timely, meaning that it should be provided as soon as possible to shape the desired behavior (McTighe & O’Connor, 2005). Perhaps the immediacy of the feedback influenced the present results.

As suggested, over the course of the study, three of the four participants’ oral reading fluency and near-transfer generalization improved significantly. While some growth was expected, the rapid rate of improvement for Brody, Kyler, and Jasmine was not anticipated. Perhaps the participants made significant growth because of the intensity of the interventions of the course of five weeks. Additionally, each participant worked one-to-one with an interventionist. The one-to-one instruction might have contributed to the rapid increase in oral reading fluency given the individualized attention and feedback that was provided. Based on this notion, educators are encouraged to consider how allowing interventionists and students to work one-to-one may influence the effectiveness of an intervention.
The present study adds to the research on combining reading interventions. While there has been a plethora of research in the medical field suggesting support for combining interventions, fewer studies have explored the effects of combining academic interventions including those targeting reading. The results from this study support the notion that more does not always equate to better. Increasing the intervention’s time and intensity by combining strategies (i.e., Repeated Reading, Error Word Drill) did not necessarily produce greater gains in oral reading fluency when compared with each strategy implemented alone. These results may be of significance to educators interested in determining how to select and implement interventions. As schools are faced with limited time and resources, there is more pressure to appropriately allocate intervention time and materials. Perhaps educators should consider employing one evidence-based intervention to start such as Repeated Reading or Error Word Drill, rather than immediately implementing a combination of interventions in hopes of producing greater gains. By first implementing just one evidence-based intervention, schools are able to save student and interventionist time as well as preserve intervention resources.

One method that educators may consider to facilitate intervention selection and conserve resources is brief experimental analysis (BEA). The purpose of BEA is to experimentally “test drive” the effects of two or more interventions on a behavior or skill area (i.e., oral reading fluency). Through the process of BEA, a series of evidence-based interventions are implemented, and each intervention’s gains over baseline are measured and compared to one another. Educators are able to visually inspect the data to determine which intervention will be most effective for improving the student’s targeted skill or behavior (Burns & Wagner, 2008).
BEA can specifically be used to select interventions that target oral reading fluency. For example, O’Shea, Danes, Maczko, Coolong-Chaffin, and Axelrod (2013) trained twenty undergraduate students to use BEA to empirically select an intervention for students struggling with oral reading fluency as part of an after school reading program. The effects of the different interventions (i.e., Repeated Reading, Listening Passage Preview, and Sight Words) were compared to one another to determine which intervention would be most effective for the individual students. The results suggested that the BEA was able to identify a promising intervention for all students, as evidenced by growth in oral reading fluency for all participants.

The second goal of the present study was to expand the literature regarding participant social acceptability of using iPad technology during intervention implementation. Participants were asked to report their perception of using the iPad during the Error Word Drill component of the intervention. The results were mixed; two of the participants found the iPad to be an acceptable component of the intervention, noting that using the iPad was “fun” and “easy.” The other two participants did not prefer to use the iPad during the intervention, reporting that they “didn’t like reading on it” and “paper would be better.”

Exploring students’ perceptions of using iPads as part of the intervention contributes to the literature as few studies have explored the social acceptability of using this type of technology within the context of an intervention. Perhaps most surprising was that not all of the participants found the iPad to be an acceptable intervention component. Educators are often quick to assume that technology will enhance student interest and engagement. Because of this, school districts have begun to allocate resources to
purchasing iPads, despite the lack of research suggesting these devices’ effectiveness. One school district in particular purchased 7,500 tablet devices last year. While some staff members acknowledged that the students appeared to be more engaged, others questioned whether students were actually gaining a deeper understanding of class material through the use of the tablets (Heaton, 2013). More research is needed to explore both the effectiveness and the social acceptability of using iPads in the educational setting.

One hypothesis that could account for the mixed social acceptability results (i.e., two students reported that using the iPad was “fun” and “easy,” and the other two reported that they “didn’t like reading on it [the iPad]” and “paper would be better”) is the fact that students’ amount of exposure to technology may be related to their perception of using technology to enhance academic skills. According to a recent report, children between the ages of eight and ten-years-old spend approximately five and a half hours each day using media (Gutnick, Robb, Takeuchi, & Kotler, 2010). In the home, many children have access to a variety to technological devices including smart phones, high speed Internet, televisions, video game consoles, and iPads. As children become more engulfed in technology, perhaps using iPads for educational purposes loses its novelty when students have unlimited access to technology at home that does not require them to practice a difficult skill. Simply put, although technology may be engaging for recreational purposes, children may not perceive using technology to develop academic skills as “fun.”

Another hypothesis that may explain the participants’ mixed perceptions of using the iPad as part of the reading interventions is the fact that practicing reading, even if on
an iPad, still requires the student to read. For struggling readers, perhaps the iPad itself is not aversive, but rather the activity of practicing reading is undesirable. The mixed social acceptability results further highlight the need for school districts to explore students’ perceptions of using technology in school for educational purposes before purchasing the devices.

**Limitations and Future Research**

Although this study highlighted some important findings, the results must be considered in light of several limitations. First, the present study employed a single-case design consisting of four participants. The small sample size limits the external validity, including the generalizability of the results. Simply put, it is difficult to generalize the results beyond the participants, settings, and interventions in the present study. Only in cases in which a larger population has similar characteristics as the participants in the study can the results be generalized. Future research could expand upon the present study to enhance external validity by increasing the number of participants. Additionally, future research should strive to replicate the results of the present study. In doing so, it may be important to explore the study’s research questions by gathering data from different populations of learners such as students with specific learning disabilities and students learning English as a second language.

Additionally, although near-transfer generalization was explored using the High Content Overlap (HCO) passages, far-transfer generalization of skills (i.e., reading ability on novel material) was not explored. Future studies should explore this variable by investigating students’ oral reading fluency growth over time by periodically administering progress-monitoring passages that the student has never read before. This
may be an important variable to investigate because in the school setting, especially on standardized tests, students are required to read text that they have not practiced before. To be successful with reading, students must be able to generalize their reading skills to unfamiliar material.

Furthermore, the present study only targeted skill-deficits and did not explore how interventions could include motivational components to increase student performance. Previous research by Eckert, Ardoin, Daisey, and Scarola (2000) suggested that it was beneficial to combine skill-based interventions with a performance incentive. The results of their study suggested that combining a skill-based and performance-based intervention (i.e., offering goal setting or providing a contingent reward based on performance) resulted in greater gains in oral reading fluency when compared to a skill-based intervention alone. Perhaps future research could explore how the skill-based interventions of Error Word Drill and Repeated Reading could be combined with potential reinforcers (i.e., praise, tangible reinforcers, goal setting) to increase oral reading fluency.

Another limitation was that the present study did not explore how interventionists’ teaching behaviors could have influenced the present results. For example, although the interventionist used the protocol checklist as a script, the instruction was presented at a brisk pace with enthusiasm to encourage student engagement. In addition to exploring the impact of teaching behaviors, future research could also explore interventionists’ perceptions of working with students during intervention implementation. Brophy and Good (1974) suggested that teachers develop beliefs and expectations about students based on the students’ personal or group
characteristics, which in turn can lead to differences in the way in which instruction is provided. Future research could explore how these beliefs could influence the service delivery of the intervention implementation.

Lastly, although students’ perceptions were explored, the study did not investigate the actual effectiveness of using the iPad as a component of the intervention. Continued examination of iPad technology use in the school setting is encouraged. Specifically, further research is needed to determine the effectiveness of using technology during reading interventions. Relative to the present study, the procedure of Error Word Drill was modified to present the error words on the iPad, rather than the traditional method of presenting the error words with paper-and-pencil flash cards. This modification had not been previously supported in the literature. Therefore, future studies could specifically explore whether presenting error words on the iPad produced greater gains in oral reading fluency when compared to presenting error words through the traditional method of paper-and-pencil.

In general, more research is necessary to explore whether the use of iPad technology can foster not only student engagement but also skill development by providing learners with practice and feedback. Simply put, the research on using iPads in the educational setting is in its infancy. Because of the popularity of these tablets and school districts’ desires to incorporate this technology into the classroom, it is critical that future research explores how iPad technology contributes to the learning process.

**Summary**

While previous research has established the effectiveness of implementing Error Word Drill and Repeated Reading to increase oral reading fluency, there has been a lack
of research exploring the effect of combining these two interventions to help improve oral reading fluency in struggling readers. The first purpose of the study was to extend the literature to explore whether combining Error Word Drill and Repeated Reading resulted in greater gains in oral reading fluency compared to each intervention alone. The three conditions of Error Word Drill, Repeated Reading, and Error Word Drill plus Repeated Reading were compared to one another in an experimental design to explore whether the intervention combination resulted in increased gains in oral reading fluency.

The results reported in this study indicated that the intervention combination of Error Word Drill plus Repeated Reading did not produce greater gains in oral reading fluency when compared to the individual interventions (i.e., Error Word Drill, Repeated Reading), suggesting that more does not always equate to better. These findings are important for educators, including school psychologists, who are in search of interventions to support the development of students’ oral reading fluency skills. As schools are faced with limited time and financial resources, there is increased pressure to appropriately allocate intervention time and materials. The empirical evidence reported in this study suggests that perhaps educators should consider employing one evidence-based intervention such as Repeated Reading or Error Word Drill, rather than assuming a combination of these interventions would produce greater results, which in turn saves time for both the student and the interventionist as well as preserves school resources.

The second purpose of the study was to expand the literature regarding participant social acceptability of using iPad technology during intervention implementation. Although the use of technology has increased substantially in the educational setting, few studies have explored participants’ perceptions of using iPad technology as part of the
intervention. In the study, participants were asked to report their opinions of using the iPad during the Error Word Drill components of the intervention. The results suggested mixed perceptions. Two of the students thought that using the iPads as part of the intervention was beneficial, while the other two students found the iPad to be a hindrance. Because social acceptability can have a direct influence on student outcomes (Kazdin, 1981), educators are encouraged to explore the students' perceptions of using technology, especially iPad technology, in the classroom. Further research is needed to determine the effectiveness of reading interventions using technology and to evaluate the social acceptability of using iPads to implement interventions.
References


Appendix A

Protocol Checklists for Reading Interventions
Repeated Reading

☐ Sit with the student in a quiet location without too many distractions.

☐ Have two copies of the passage. "Assessor Copy" with the total number of words is for you, the interventionist. "Student Copy" is for the child.

☐ Have the student read the entire passage (FIRST READ).
  • If the student reads a word incorrectly, hesitates for longer than five seconds, or asks for help with a word, read the word aloud and have the student say the word correctly before continuing to read.
  • If the student asks for help with any word, read the word aloud. If the student requests a word definition, give the definition.

☐ When the student has completed the passage, have him or her read the entire passage again (SECOND READ).

☐ Have the student read the entire passage again (THIRD READ).

☐ Now, have the student read the passage for ONE minute (FOURTH READ).
  • As he or she reads, follow along and mark incorrect words on your form.
  • Do not correct any errors as the child reads.

☐ When the time is up, record the number of correct words per minute at the end of the passage.

☐ Grab the two copies of the High Content Overlap (HCO) passages.

☐ Have the student read the HCO passage for ONE minute. While the student is reading, record the errors on your copy of the story.
  • Do not correct any errors as the child reads.

☐ When the time is up, record the number of correct words per minute at the end of the HCO passage.
Error Word Drill

- Sit with the student in a quiet location without too many distractions.

- Have two copies of the passage. “Assessor Copy” with the total number of words is for you, the interventionist. “Student Copy” is for the child.

- Have the student read the entire passage.
  - While the student is reading, record the errors on your copy of the story.
  - If the student commits a reading error or hesitates for longer than 3 – 5 seconds, tell the student the correct word and have the student continue reading.

- Type the error words into the iPad application.

- Review the error words with the student using the iPad application.
  - If the student says the word correctly, say “Yes. <Repeat Word>. Now say it again.” Have the student repeat the word again.
  - If the student says the word incorrectly, say “No. This word is <Repeat Word>. Now, try it again.” Have the student repeat the word again.
  - Continue until the student correctly pronounces each error word at least two times.

- Have the student read the passage for ONE minute.
  - While the student is reading, record the errors on your copy of the story.
  - Do not correct any errors as the child reads.

- When the time is up, record the number of correct words per minute at the end of the passage.

- Grab the two copies of the High Content Overlap (HCO) passages.

- Have the student read the HCO passage for ONE minute. While the student is reading, record the errors on your copy of the story.
  - Do not correct any errors as the child reads.

- When the time is up, record the number of correct words per minute at the end of the HCO passage.
Error Word Drill plus Repeated Reading

Sit with the student in a quiet location without too many distractions.

Have two copies of the passage. “Assessor Copy” with the total number of words is for you, the interventionist. “Student Copy” is for the child.

Have the student read the entire passage (FIRST READ).

- While the student is reading, record the errors on your copy of the story.
- If the student commits a reading error or hesitates for longer than 3 – 5 seconds, tell the student the correct word and have the student continue reading.

Type the error words into the iPad application.

Review the error words with the student using the iPad application.

- If the student says the word correctly, say “Yes. <Repeat Word>. Now say it again.” Have the student repeat the word again.
- If the student says the word incorrectly, say “No. This word is <Repeat Word>. Now, try it again.” Have the student repeat the word again.
- Continue until the student correctly pronounces each error word at least two times.

Have the student read the entire passage again (SECOND READ).

- While the student is reading, record the errors on your copy of the story.
- If the student commits a reading error or hesitates for longer than 3 – 5 seconds, tell the student the correct word and have the student continue reading.

Type the error words into the iPad application.

Review the error words with the student using the iPad application.

- If the student says the word correctly, say “Yes. <Repeat Word>. Now say it again.” Have the student repeat the word again.
- If the student says the word incorrectly, say “No. This word is <Repeat Word>. Now, try it again.” Have the student repeat the word again.
- Continue until the student correctly pronounces each error word at least two times.
Now, have the student read the entire passage again (THIRD READ).
- While the student is reading, record the errors on your copy of the story.
- If the student commits a reading error or hesitates for longer than 3 – 5 seconds, tell the student the correct word and have the student continue reading.

Have the student read the passage for ONE minute (FOURTH READ).
- While the student is reading, record the errors on your copy of the story.
- Do not correct any errors as the child reads.

When the time is up, record the number of correct words per minute at the end of the passage.

Grab the two copies of the High Content Overlap (HCO) passages.

Have the student read the HCO passage for ONE minute. While the student is reading, record the errors on your copy of the story.
- Do not correct any errors as the child reads.

When the time is up, record the number of correct words per minute at the end of the HCO passage.
Appendix B

Sample Student and Assessor Form of Reading Passages
Student Copy

Jessie was a rabbit. She was small and very, very quiet. She had soft grey fur and a snow white tail. She lived in a big field with many other animals. There were lizards and snakes. She saw them mostly in the summer when it was hot. There were tiny mice. They liked to run really fast. The mice got nervous if they were out in the open for very long, so Jessie did not see them too often. Many birds lived in the field too. Some were small. Others were big. Jessie was not afraid of these birds. But there was one type of bird that Jessie was afraid of. Her mom told her to be careful when this type of bird was around. So Jessie always looked carefully before she went into the field to play. She wanted to know if there was a hawk around!

One day Jessie was hopping around the field. She stopped now and then to eat bits of grass. She also stopped to check to make sure there were no hawks in the sky. Then, she found a patch of extra tasty grass. It was sweet and moist. It tasted better than anything Jessie had ever eaten before. After a little while, Jessie remembered what her mother had said. She checked the sky for danger. She saw a hawk flying far up in the sky. She turned and ran back to the bushes where her home was hidden. She was lucky the hawk had not seen her.
Assessor Copy

Student Name: ____________________ Date: __________

1. Place the Student Copy in front of the student. Point to the names on the Student Copy as you read them:

   "This is a story about Jessie. I want you to read this story to me. You'll have 1 minute to read as much as you can. When I say "begin," start reading aloud at the top of the page. Do your best reading. If you have trouble with a word, I'll tell it to you. Do you have any questions? Begin."

2. Start the timer.
3. While the student is reading, mark errors with a slash (/).
4. At 1 minute, mark the last word read with a bracket (]).
5. When the student gets to a logical stopping place, say "Stop."

Jessie was a rabbit. She was small and very, very quiet. She had soft grey fur and a snow white tail. She lived in a big field with many other animals. There were lizards and snakes. She saw them mostly in the summer when it was hot. There were tiny mice. They liked to run really fast. The mice got nervous if they were out in the open for very long, so Jessie did not see them too often. Many birds lived in the field too. Some were small. Others were big. Jessie was not afraid of these birds. But there was one type of bird that Jessie was afraid of. Her mom told her to be careful when this type of bird was around. So Jessie always looked carefully before she went into the field to play.

She wanted to know if there was a hawk around!

One day Jessie was hopping around the field. She stopped now and then to eat bits of grass. She also stopped to check to make sure there were no hawks in the sky. Then, she found a patch of extra tasty grass. It was sweet and moist. It tasted better than anything Jessie had ever eaten before. After a little while, Jessie remembered what her mother had said. She checked the sky for danger. She saw a hawk flying far up in the sky. She turned and ran back to the bushes where her home was hidden. She was lucky the hawk had not seen her.

Total Words Read: _______ - # of Errors: _______ = CWPM: _______

© 2006 University of Oregon
Appendix C

Sample Student and Assessor Form of High-Content Overlap Reading Passages
Student Copy

Jackie was a rabbit. She was tiny and very, very quiet. She had soft white fur and a snow white tail. She lived in a large field with many different animals. There were lizards and snakes. She saw them mostly in the summer when it was hot. There were little mice. They liked to run very fast. The mice got scared if they were out in the open for too long, so Jackie did not see them very often. Many birds lived in the field too. Some were small. Others were large. Jackie was not afraid of many birds. But there was one type of bird that Jackie was scared of. Her mom told her to be careful when this type of bird was near. So Jackie always looked carefully before she went into the field to play. She wanted to know if there was a hawk around!

One day Jackie was hopping around the field. She stopped now and then to eat some grass. She stopped to check to make sure there were no hawks in the sky. Then, she found a patch of extra tasty grass. It was fresh and moist. It tasted better than anything Jackie had ever eaten before. After a little while, Jackie remembered what her mother had said. She looked to the sky for danger. She saw a hawk flying far up in the sky. She turned and quickly ran back to the bushes where her home was hidden. She was lucky the hawk had not found her.
Assessor Copy

Student Name: __________________ Date: ______________

Jackie was a rabbit. She was tiny and very, very quiet. She had soft white fur and a snow white tail. She lived in a large field with many different animals. There were lizards and snakes. She saw them mostly in the summer when it was hot. There were little mice. They liked to run very fast. The mice got scared if they were out in the open for too long, so Jackie did not see them very often. Many birds lived in the field too. Some were small. Others were large. Jackie was not afraid of many birds. But there was one type of bird that Jackie was scared of. Her mom told her to be careful when this type of bird was near. So Jackie always looked carefully before she went into the field to play. She wanted to know if there was a hawk around!

One day Jackie was hopping around the field. She stopped now and then to eat some grass. She stopped to check to make sure there were no hawks in the sky. Then, she found a patch of extra tasty grass. It was fresh and moist. It tasted better than anything Jackie had ever eaten before. After a little while, Jackie remembered what her mother had said. She looked to the sky for danger. She saw a hawk flying far up in the sky. She turned and quickly ran back to the bushes where her home was hidden. She was lucky the hawk had not found her.

Total Words Read:_______ - # of Errors:_______ = CWPM:_______
Appendix D

Participant Acceptability Surveys
Participant Acceptability Survey: Repeated Reading

Please circle your response or fill in the blank. Please be honest. There are no right or wrong answers. 😊

1. Reading the story four times was helpful for me.
   Agree  Unsure  Disagree

2. Reading the story four times was boring.
   Agree  Unsure  Disagree

3. I like to practice reading by reading the story four times again.
   Agree  Unsure  Disagree

4. I think that reading the story four times helped me to become a better reader.
   Agree  Unsure  Disagree

5. I would recommend this reading activity to a friend.
   Agree  Unsure  Disagree

6. My favorite part of reading the story four times was:
   __________________________________________
   __________________________________________
   __________________________________________

7. My least favorite part of reading the story four times was:
   __________________________________________
   __________________________________________
   __________________________________________
Participant Acceptability Survey: Error Word Drill

Please circle your response or fill in the blank. Please be honest. There are no right or wrong answers. 😊

1. Reviewing the words on the iPad was helpful for me.
   Agree   Unsure   Disagree

2. Reviewing the words on the iPad was boring.
   Agree   Unsure   Disagree

3. I like to practice reading using by reviewing the words on the iPad.
   Agree   Unsure   Disagree

4. I think that reviewing the words on the iPad helped me to become a better reader.
   Agree   Unsure   Disagree

5. I would recommend this reading activity to a friend.
   Agree   Unsure   Disagree

6. My favorite part of reviewing the words on the iPad was:
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

7. My least favorite part of reviewing the words on the iPad was:
   __________________________________________________________
   __________________________________________________________
Participant Acceptability Survey: Error Word Drill plus Repeated Reading

Please circle your response or fill in the blank. Please be honest. There are no right or wrong answers.

1. Reading the story four times AND reviewing the word on the iPad was helpful for me.
   Agree       Unsure       Disagree

2. Reading the story four times AND reviewing the words on the iPad was boring.
   Agree       Unsure       Disagree

3. I like to practice reading by reading the story four times AND reviewing the words on the iPad.
   Agree       Unsure       Disagree

4. I think that reading the story four times AND reviewing the words on the iPad helped me to become a better reader.
   Agree       Unsure       Disagree

5. I would recommend this reading activity to a friend.
   Agree       Unsure       Disagree

6. My favorite part of reading the story four times AND reviewing the words on the iPad was:

   ______________________________________________________
   ______________________________________________________
   ______________________________________________________

7. My least favorite part of reading the story four times AND reviewing the words on the iPad was:

   ______________________________________________________
Appendix E

Parent Feedback Survey
Human Development Center  
University of Wisconsin-Eau Claire  
Summer Reading Program, 2012  
Parent Survey

Please complete the following survey. Also, feel free to include comments below.

<table>
<thead>
<tr>
<th>Item</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
<th>Don’t Know or Have No Opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Overall, my child’s reading improved as a result of their participation in the program.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2. The Reading Interventionist working with my child was prepared to provide reading interventions.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>3. I noticed improvements in my child’s reading fluency (i.e., accuracy, speed) during and after the program.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4. I noticed improvements in my child’s reading comprehension during and after the program.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>5. I noticed improvements in my child’s motivation to read during and after the program.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6. I noticed my child was more interested in reading during and after the program.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>7. The Reading Interventionist interacted well with my child.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8. My child enjoyed participating in the Reading Program.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>9. I received appropriate amounts of feedback about my child’s reading performance in the program.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>10. I would recommend the reading program to other parents.</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

My child participated in:

- [ ] Error Word Drill, Repeated Reading, and Combination Interventions (Kaitlin and Jessica)
- [ ] Repeated Reading, and Choice with Repeated Reading Interventions (Karissa)
- [ ] Not sure

Comments:
Appendix F

Informational Parent Letter
Interventions Targeting Oral Reading Fluency

Summer Reading Program 2012

June 5, 2012

Dear Parents,

Your child is invited to participate in a study conducted by Kaitlin O’Shea, Karissa Danes, and Dr. Michael Axelrod at the University of Wisconsin-Eau Claire. Kaitlin and Karissa are School Psychology graduate students at the University of Wisconsin-Eau Claire, and Dr. Axelrod is an Associate Professor and Director of the Human Development Center at the University of Wisconsin-Eau Claire. Your child is being recruited for participation in this study because of his/her involvement in the Academic Intervention Clinic’s Summer Reading Program. The length of the study will be the duration of the Summer Reading Program: July 2nd-August 2nd, 2012.

The purpose of this study is to investigate the effectiveness of two specific reading interventions on oral reading fluency (i.e. reading accuracy and speed) and reading comprehension. If you consent to having your child participate in this study, he or she will be assigned to one of two interventions.

Intervention 1:
Participants will read reading passages three times in order to build fluency and comprehension. However, participants in this intervention will be provided with choices regarding which reading passages they want to read.

Intervention 2:
Participants will read passages four times in order to build fluency and comprehension. However, participants in this intervention will also review words which were read incorrectly with the researcher.

Data will be collected on your child’s oral reading fluency, or correct words read per minute. Data will also be collected on your child’s scores on reading comprehension measures during each reading session. In addition, your child will be asked to complete an acceptability survey that asks your child to report his/her perception of the reading interventions.

Risks involved with this study are minimal and unlikely. Your child may experience mild levels of frustration, particularly if he/she has significant difficulties in reading. To minimize frustration, your child will be reading passages at his/her instructional level. Should your child experience frustration, the researchers will respond to your child with
breaks and encouragement. Your child will benefit from additional practice in reading, and possibly increase his/her reading rate and accuracy by the completion of the study.

The records of this study will be kept confidential by the researchers. If a report is published with your child’s data, we will not include any information that will make it possible to identify him or her. Once collected, the data will be stored in a locked room at the University, and only first names will be written on any data sheets. Names will be changed on all information submitted for publication or presentation. Upon request, we would be willing to provide an electronic document with a summary of the research results when the study is completed. Results can be obtained by contacting Kaitlin O’Shea at andreakm@uwec.edu or Karissa Danes at daneske@uwec.edu.

Please understand that your child’s participation in this study is completely voluntary and you may withdraw your child at any time during the study. Your decision whether or not to allow your child to participate will not affect your or your child’s current or future status with the Academic Intervention Clinic or the University of Wisconsin-Eau Claire.

Please contact Kaitlin O’Shea, Karissa Danes, or Dr. Axelrod should you have any questions about participation in this study. Kaitlin O’Shea can be contacted at andreakm@uwec.edu, Karissa Danes at daneske@uwec.edu, and Dr. Axelrod at axelromi@uwec.edu. You may also contact Dr. Don Bredle, Chair of the University of Wisconsin-Eau Claire’s Institutional Review Board, should you have questions regarding your child’s participation in this study. Dr. Bredle can be contacted at bredledl@uwec.edu or at 715-836-2373. You will be given a copy of this form to keep for your records.

Sincerely,

Karissa Danes  
School Psychology Graduate Student  
University of Wisconsin-Eau Claire  
daneske@uwec.edu

Kaitlin O’Shea  
School Psychology Graduate Student  
University of Wisconsin-Eau Claire  
andreakm@uwec.edu
Appendix G

Parental Consent Form
Parental Consent Form
Interventions Targeting Oral Reading Fluency

Kaitlin O'Shea, University of Wisconsin—Eau Claire School Psychology Graduate Student, Karissa Danes, University of Wisconsin—Eau Claire School Psychology Graduate Student and Michael Axelrod, Ph.D., Director of the Human Development Center and Associate Professor in the Psychology Department, are conducting a study investigating the effectiveness of two interventions targeting oral reading fluency. The purpose of this study is to investigate the link between various reading interventions and oral reading fluency. Your child will participate in one of two intervention groups. Group 1 will participate in a Repeated Reading and Repeated Reading/Choice interventions. Group 2 will participate in a combination of reading interventions of Repeated Reading and Error Word Drill. In addition, your child will be asked to complete a consumer satisfaction survey. The survey will ask your child to report his or her perception of the reading interventions.

This document is to certify that I, _______________________________, hereby freely agree to give my consent to allow my child to participate in the described study as part of the research program at the University of Wisconsin—Eau Claire.

- The research study and my child’s role in the research study has been fully explained to me by Kaitlin O'Shea and Karissa Danes, and I understand the explanation as well as what will be expected of my child through participation in the study. An informational letter including the procedures of this study and description of any risks, discomforts, and benefits associated with participation has been provide and discussed in detail with me.
- I have been given an opportunity to ask questions, and all such questions have been answered to my satisfaction.
- I understand that I am free to withdraw my consent and discontinue my participation at any time.
- I understand that participation in this study is voluntary and not a requirement for being a part of the Summer Reading Clinic through the Human Development Center at the University of Wisconsin- Eau Claire.
- I understand that the length of the study will be the duration of the Summer Reading Clinic (July 2nd-August 2nd).
- I understand that this study has minimal risks. However, there is a risk of frustration that my child may experience, particularly if he or she has significant difficulties in reading. To minimize frustration, my child will be reading passages at his or her instructional reading level. In cases in which frustration is evident, the researchers will promptly respond to my child with encouragement and breaks when necessary.
- I understand that all data from this study will be stored in a locked office. I also understand that all data will be de-identified when transferring my child’s reading records to the research database.
• I understand that I have the right to request an electronic document with a summary of the research results when the study is completed by contacting the researchers via email.

• I understand that if I have any questions or concerns about the treatment of the children in this study, I may contact the Chair of the Institutional Review Board at the University of Wisconsin-Eau Claire at the address below. Although this person will ask my name, I understand that all inquiries will remain confidential.

Dr. Don Bredle
Chair, Institutional Review Board for the Protection of Human Subjects
University of Wisconsin-Eau Claire
Schofield 17
105 Garfield Avenue
Eau Claire, WI 54701-4004
715.836.2373

• I understand that I may also contact the primary researchers at the address below should I have any questions about the purposes of procedures associated with the study.

Kaitlin O'Shea
School Psychology Graduate Student
University of Wisconsin-Eau Claire
andreakm@uwec.edu
612.816.6617

Karissa Danes
School Psychology Graduate Student
University of Wisconsin-Eau Claire
daneske@uwec.edu
651.270.6990

STATEMENT OF CONSENT
I have read the above information. I give my consent to allow my child to participate in the research.

Signature __________________________________________ Date ________________

Printed name __________________________________________