2016

Wilson Reading System's Impact on Third-Grade DIBELS Scores

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2016

Abstract

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MA, Florida International University, 2011

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Doctoral Study Submitted in Partial Fulfillment

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Doctor of Education

Walden University

January 2016

Abstract

Many schools throughout the United States are struggling to address student deficiencies in reading. Empirical evidence demonstrating the efficacy of reading intervention programs is often lacking. This study examined the effectiveness of an 8-week reading intervention program, the Wilson Reading System (WRS), that was implemented in a local elementary school in Washington D.C. to address the reading deficiencies of 75 third-grade students. Guided by Vygotsky's Zone of Proximal Development (ZPD), a quasi-experimental pre/post research design was used to examine differences in reading proficiencies following the completion of the WRS program, as measured by the Dynamic Indicator of Basic Literacy Skills (DIBELS) assessment instrument. A multivariate analysis of variance was used to test the differences in DIBELS posttest composite scores and individual subscale scores. A multivariate analysis of covariance was used to examine pre/post differences while controlling for gender and days absent. While there was a statistically significant difference in the DIBELS composite score ($p < .05$), the individual subscales lacked statistical significance when controlling for gender and days absent. The descriptive and bivariate analysis of test scores with respect to gender and days absent were not of practical nor statistical significance. These findings suggest that the results of this study were due to the duration of the reading intervention program. This study contributes to positive social change as it brings to light the limited value of short-term intervention programs and highlights the extensive and integral efforts needed to address academic deficiencies in reading literacy.

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Dedication

This project is dedicated to my daughter Alyra Bowe and my mother Debra Moss. They are the reason that I decided to achieve this honor. They continuously remind me that it is not where you start, but where you finish that matters the most. To this day, it is this philosophy that inspires me to pursue my goals.

Acknowledgments

I would like to thank the many people in my life that supported me from the very beginning. First, I would like to thank my amazing, supportive husband Gabriel who has been my rock throughout this process. I fell apart and had many meltdowns, but my husband was always there to pick up the pieces and put me back together. In the times I wanted to quit, his kind words always reminded me of the reason I was pursuing this degree. Without his encouragement, love, and unwavering belief in me, this task would have been impossible.

I would also like to thank my good friend LaTonya Eaford for being my support system. We embarked on this journey together, and have been each other's cheerleader from the very beginning. We paired up during our Master's program and knowing that we were in it together relieved loads of stress. I appreciate you for being a good listener, giving me advice on assignments, and sharing your time with me. I would like to acknowledge the following people: Richard Campbell, Anita Benson, Debbie Bennett, Debbie Robles, William Washington, Anne Marie Harley, Sabrina Kight Tanner, and Sabrina Kight Tanner for their willingness to help.

A very special thanks goes to my doctoral chair, Dr. Jennifer Keeley. She made herself easily accessible to assist with my concerns and questions. Dr. Keeley has been patient; and has provided excellent guidance throughout this process. I appreciate the time and effort she put forth to help me get through this process. I am so thankful and grateful for Dr. Keeley's support, I could not have done it without her.

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Section 1: The Problem

Introduction

Reading is a fundamental skill necessary for students to become successful productive adults (Hernandez, 2011). Inadequate reading skills can adversely influence a student's affect, behavior, and performance in other content areas. The lack of reading skills affects student opportunities for success in adulthood (Fiester, 2011; Hernandez, 2011; Hines, 2009; Reschly, 2010). This has caused educators, parents, and school districts to seek ways to increase the literacy levels of students.

According to Fiester (2011), many districts now focus on students reading proficiently by the end of third-grade because it is the last year in grade school when foundational reading skills are taught. The majority of third-grade textbooks allow students to practice previously learned reading skills. However, by the time students enter fourth grade, they are expected to employ their literacy skills to learn content, access information, and become critical thinkers (Scruggs & Mastropieri, 2007). If students are struggling to read at this time, they will be unable to access key grade level content and will remain at risk for reading failure.

A report by the National Reading Panel (2000) identified the following five critical elements of reading instruction: (a) phonics, (b) phonemic awareness, (c) fluency, (d) vocabulary, and (e) comprehension. Subsequently, a variety of reading interventions and enrichment programs are available to school districts (e.g., Fundations, Read Naturally, and SpellRead); but, their effectiveness differs (e.g., What Works Clearinghouse Intervention Report: SpellRead, 2007; What Works Clearinghouse

Intervention Report: Fundations, 2010; and What Works Clearinghouse Intervention Report: Read Naturally, 2013).

The students who struggle with reading are often provided with intensive reading intervention. The Wilson Reading System (WRS) is one program used to help struggling readers reach grade level proficiency. WRS is a reading intervention program that systematically teaches the structure of language using a sound tapping method. Its intended purpose is to improve the reading skills of students who have not been successful with other methods of learning (Wilson Language Training, 2010). In this study, I examined the impact of WRS on struggling third-grade students' DIBELS scores.

Definition of the Problem

Third-grade students at a school located in Washington, D.C. were not meeting the District's reading expectations in the areas of reading comprehension, phonics, phonemic awareness, fluency, and vocabulary as measured by composite scores on the Dynamic Indicator of Basic Literacy Skills (DIBELS) assessment (Table 1). The DIBELS composite score is a combination of scores from DIBELS Oral Fluency (DORF) fluency, DORF accuracy, DORF retell, and DAZE measures of the assessment. During the DORF measure of the assessment, the student reads a passage aloud for 1 minute. Student accuracy of reading is tracked and used toward the score. Following oral reading, the student is asked to retell what was read. The retell score is calculated based on the quality and amount of details the student includes in the retell. The DORF fluency score, retell score, and DORF accuracy score are derived from this section of the assessment. DORF is aligned with the word study, and fluency and comprehension sections of WRS.

During the DAZE measure of the assessment, the student receives a reading passage in which words are omitted. The student must select the correct word from a multiple choice box that best fits the meaning of the sentence.

Results of the DIBELS assessment are used by the district to determine the reading progress of its students. The students within this particular school setting had a history of low reading scores on both the district's standardized assessment and the DIBELS dating back to 2010 (Table 1).

Table 1

Study Site Grade 3 Reading Test Scores

Year	District of Columbia Comprehensive Assessment % at risk for reading failure	DIBELS (DORF/DAZE) % at risk for reading failure
2010-2011	70.0%	53.0%
2011-2012	78.0%	61.0%
2012-2013	78.0%	55.3%

Rationale

Evidence of the Problem at the Local Level

Third-grade reading scores have been a cause for concern at the study site as well as in the district for several years. The National Assessment of Educational Progress (NAEP) reported that from 2009-2011, at least 50% of third-grade students in Washington, D.C. were at risk for reading failure as indicated by the district's comprehensive assessment (Table 2; National Center for Education Statistics, 2012). The DIBELS assessment scores from 2009-2013 indicated that more than 50% of third-grade students in Washington, D.C. were below proficiency in reading in both the DIBELS Oral Reading Fluency (DORF) and DAZE measures (Measure Class database, 2014).

Similarly, these students did not meet the district's expectations for the state's comprehensive assessment (DC Public Schools, 2013).

Table 2

District of Columbia Grade 3 Reading Data 2009-2013

Year	District of Columbia Comprehensive Assessment % at risk for reading failure	DIBELS (DORF/DAZE) % at risk for reading failure
2009-2010	50.0%	57.0%
2010-2011	50.5%	70.0%
2011-2012	57.2%	60.0%
2012-2013	55.3%	53.0%
2013-2014	50.1%	50.0%

The Fall 2013-2014 DIBELS assessment scores indicated that 75 of 150 third-grade students within this particular school setting were reading below proficiency and therefore, the school administrators adopted WRS. The reading specialist implemented WRS as a specialized component of the reading curriculum for the 75 third-grade students identified as below proficient for 45 minutes per day, 3 days per week, for a total of 8 weeks. The reading specialist determined the 8 week time frame, in accordance with WRS. At this time, the extent of which WRS achieved its intended goal of increasing student reading proficiency had not been assessed.

Evidence of the Problem from the Professional Literature

Reading proficiency has been a national concern for years. A high percentage of students struggle to read in both elementary and high school. In 2012, the United States ranked 17th in reading, out of 37 countries participating in the Program for International Student Assessment (OECD, 2012). The report indicated that United States' student performance in reading had not changed since 2003. While students in other countries

have made significant progress in reading, students in the United States have made little to no progress in reading. In 2013, 62% of high school students were reading below proficiency levels (National Center for Education Statistics, 2013).

Over 60% of third-graders in the United States perform below proficiency in reading (National Center for Education Statistics, 2013). Researchers concluded that reading proficiency by the end of third-grade to success in society (e.g., Fiester, 2011; Hernandez, 2011; Hines, 2009; Lesnick et al., 2010; Reschly, 2010). Students who struggle to read by the end of third-grade often continue to struggle for the remainder of their academic careers.

School leaders were concerned with third-grade performance on the DIBELS assessment prompting them to implement WRS on the basis that students who receive engaging and explicit supplemental literacy instruction often become successfully proficient readers (e.g., Amendum, Vernon-Feagans, & Ginsberg, 2011; Bingham, Hall-Kenyon, & Culatta, 2010, Case et al., 2010; Connor et al., 2013; Coyne et al., 2013; Fawcett, Lee, & Nicolson, 2014; Fien et al., 2014; Fricke et al., 2013; Vaughn, Denton, & Fletcher, 2010; Vernon-Feagans et al., 2013). Interventions that are widely used in school districts are Fundations, Read Naturally, Reading Mastery, SpellRead, and Corrective Reading. I investigated WRS, which uses a multisensory approach to teach the structure of words to struggling readers. The purpose of this study was to determine the extent of which students experienced statistically significant differences in DIBELS composite scores and the individual subscale scores that determine the composite score after the completion of 8 weeks of WRS.

Definition of Terms

At Risk: Students identified by DIBELS as at risk for reading failure (DIBELS Data System, 2011).

DAZE: A measurement in the DIBELS assessment which focuses on vocabulary (DIBELS Data System, 2011).

Dynamic Indicators of Basic Early Literacy Skills (DIBELS): An instrument that measures the acquisition of early literacy skills from kindergarten through sixth grade The DIBELS assessment provides a composite score indicating a student's need for support in literacy Specifically for third-grade, DIBELS measures reading comprehension, phonics, phonemic awareness, fluency, and vocabulary. DIBELS composite score is comprised of DORF fluency, DORF accuracy, Retell, and DAZE scores (DIBELS Data System, 2011).

DIBELS Oral Reading Fluency (DORF): A measurement in the DIBELS assessment which focuses on phonics, word attack skills, accurate and fluent reading of text, and reading comprehension (DIBELS Data System, 2011).

Response to Intervention (RTI): A three-tier approach to the early identification and prevention methods for students with learning and behavior needs (Denton, 2012).

Wilson Reading System (WRS): A comprehensive reading intervention with a systematic multisensory approach to reading instruction for struggling readers (Wilson Language Training, 2010).

Significance of the Study

District and school leaders could find the results of this study useful in making informed decisions regarding the continued implementation of the intervention at the study site. The results of this study may provide the developers of WRS with empirical data indicating the extent of which this program fosters reading proficiency in the critical areas of reading at the third-grade level. The findings of the research could provide information about the intensity needed for students to make significant progress in reading intervention.

Research Questions and Hypotheses

WRS was the focus of this study as school leaders did not know the extent of which WRS improved the DIBELS composite scores and constituent DORF and DAZE measures of students after using the intervention for 8 weeks. This study was guided by the following research questions:

Research Question 1: Do third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DIBELS composite scores after participating for 8 weeks in the WRS program?

$H1_0$: Third-grade students who performed below proficient on the DIBELS assessment do not demonstrate a statistically significant difference in DIBELS composite scores after participating for 8 weeks in the WRS program.

$H1_a$: Third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DIBELS composite scores after participating for 8 weeks in the WRS program.

Research Question 2: Do third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DIBELS composite scores after participating for 8 weeks in the WRS program when controlling for gender and number of days absent?

$H2_0$: Third-grade students who performed below proficient on the DIBELS assessment do not demonstrate a statistically significant difference in DIBELS composite scores after participating for 8 weeks in the WRS program when controlling for gender and number of days absent.

$H2_a$: Third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DIBELS composite scores after participating for 8 weeks in the WRS program when controlling for gender and number of days absent.

Research Question 3: Do third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DORF fluency, DORF accuracy, reading comprehension (i.e. retell), and vocabulary (as measured by DAZE) after participating for 8 weeks in the WRS program?

$H3_0$: Third-grade students who performed below proficient on the DIBELS assessment do not demonstrate a statistically significant difference in DORF fluency, DORF accuracy, reading comprehension (i.e. retell), and vocabulary (as measured by DAZE) after participating for 8 weeks in the WRS program.

*H*3a: Third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DORF fluency, DORF accuracy, reading comprehension (i.e. retell), and vocabulary (as measured by DAZE) after participating for 8 weeks in the WRS program.

Research Question 4: Do third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DORF and DAZE scores when controlling for gender and number of days absent after participating for 8 weeks of the WRS program?

$H4_0$: Third-grade students who performed below proficient on the DIBELS assessment do not demonstrate a statistically significant difference in DORF and DAZE scores, when controlling for gender and number of days absent after participating for 8 weeks in the WRS program.

$H4_a$: Third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DORF and DAZE scores, when controlling for gender and number of days absent after participating for 8 weeks in WRS.

Review of Literature

Theoretical Foundation

The theoretical framework that guides this study is Vygotsky's (1978) theory of the zone of proximal development (ZPD). According to Vygotsky (1935), the ZPD is defined as the "functions that have not matured yet, but are in the process of maturing, that will mature tomorrow, that are currently in an embryonic state" (p. 42). In terms of education, Vygotsky (1935) summarized a child's ZPD as:

> The distance between the level of his actual development, determined with the help of a learning task performed independently, and the level of a child's potential development, determined with the help of learning tasks performed by the child under the guidance of adults an in collaboration with his smarter classmates. (p. 42)

The ZPD reflects the mechanisms of cognitive development and helps researchers understand features of mental development, in both theory and practice (Kravtsova, 2009). It is a simple and powerful tool for understanding pedagogy that posits teachers should teach skills at a level that is beyond the students' ability to achieve on their own, but simple enough to accomplish with targeted assistance (Wass & Golding, 2014). According to Vygotsky (1978), the level of teaching is critical to student success. The intensity of instruction must align with student skill levels, and build on their existing repertoire of knowledge. Instruction that is too advanced or too basic will result in suboptimal progress (Vygotsky, 1978). In relation to WRS, students are instructed within

their ZPD. The program incorporates scaffolding with the gradual release of responsibility.

Antonacci (2000) employed the ZPD to demonstrate the fundamental benefits of guided reading over grouped and scripted approaches to reading skill development. According to Antonacci, guided reading enables children to develop and use literacy strategies in independent and creative ways. In this way, they learn how print works and develop the skills necessary to become fluent readers. "At all times during instruction, meaning is central to reading which becomes internalized by the students" (p. 21). The activities and strategies selected by a teacher during a guided reading approach are determined by the individual needs of students (Antonacci, 2000).

To connect the guided reading approach to Vygotsky's ZPD, Antonacci (2000) elucidated three essential themes to support the framework: (a) learning occurs in social contexts, (b) learning is mediated by language, and (c) learning takes place within a student's ZPD. According to Antonacci, there are four essential components of a Vygotskyian approach to guided reading: (a) the book introduction, (b) individual reading of text by children, (c) the selection of appropriately difficult texts for students by instructors, and (d) dynamic grouping of readers based on their literacy levels. Through these steps, Antonacci argued that students receive instruction within their ZPD.

Salomon and Guterman (1989) also employed the ZPD to investigate the effects of guided, technology-driven interaction in the development of literacy skills. The researchers designed a computer reading tool that mimicked the requirements of a reading instructor. Their goal was to determine "whether the metacognitivelike guidance

of ‘more capable peers’ could be internalized and used” (p. 621) after the guidance of the computer program was no longer available. At the study’s end, Salomon and Guterman (1989) found that the computer could serve as a more capable peer in a student’s ZPD, challenging learners and providing them with opportunities to extend more mental effort than when working alone. However, they also found that not all students benefitted from the computer tool because it gave students too much freedom in choosing whether to engage with it. Findings from the study suggested that supervised reciprocal teaching may be more effective because engaging with the practice is less voluntary. It is also possible that the technology was too primitive to challenge students to the degree that Vygotsky’s ZPD requires for the production of literacy gains. Nonetheless, this study provides an interesting exploration on the connection between reading instruction and the ZPD.

Review of the Broader Problem

In accordance with the focus of the study, a comprehensive review of the literature was conducted. A variety of online databases were searched to locate literature for this literature review, including ERIC, EBSCO, Gale, FirstSearch, online publications, Walden Dissertations, and ProQuest. The search terms included the following: *reading achievement, reading intervention, supplemental reading intervention, effectiveness of reading programs, struggling reader, phonics, phonemic awareness, fluency, vocabulary, reading comprehension,* and *Wilson Reading System.*

This section begins with a review of the history of reading instructional methods and interventions over the past century, followed by an analysis of each of the major

components of reading instruction. Current reading intervention strategies, including differentiated instruction, oral repetition, and individual and small group learning are considered. The framework of response to intervention (RTI) is presented, including fundamental research and keys to intervention success. A discussion of common intervention programs follows. Finally, recent studies on RTI reading intervention programs, including WRS, are considered. Because evaluation is a critical factor in reading intervention success, prevailing literacy assessment strategies are also examined. The section concludes with implications for the study and a summary of the existing research.

Significant emphasis is placed on standardized test scores in the United States' public school systems. Subject-area scholastic performance is often indicated by the achievement of acceptable standardized test scores and successful completion of key educational benchmarks. Reading is one of the most commonly assessed core subjects in the United States. This is due in part to large-scale literacy issues, which have led to growing educational concerns and prompted the implementation of a host of intervention strategies across grade levels.

Numerous studies on the positive effects of reading interventions have been conducted, especially on students identified as at risk for reading failure (e.g., Bailet et al., 2009; Berkeley et al., 2011; Case et al., 2010; Daly, Johnson, & LeClair, 2009; Downing, Williams, & Holden, 2009; Duff, Haylou-Thomas, & Hulme, 2011; Filippini, Gerber, & Leafstedt, 2012; Gibson, Cartledge, & Keyes, 2011; Giess et al., 2012; Goss & Brown-Chidsey, 2012; Gunn, Smolkowski, & Vadasy, 2011; Kim, Capotosto, Hartry, &

Fitzgerald, 2011; Kirk & Gillon, 2009; Lovett, Lacerenza, De Palma, & Frijters, 2011; Ritchey, Silverman, Montanaro, Speece, & Schatschneider, 2012; Savage, Abrami, Hipps, & Deault, 2009; Schiller et al., 2010; Vaughn, Denton, & Fletcher, 2010). To reduce the disparity between those who can read and those who cannot, teachers must implement strategies and tools that employ best practices for teaching literacy skills to struggling readers. To maximize success rates, it is vital that struggling readers are identified and interventions set in place as early as possible.

Literacy can be difficult to teach because it involves the development of a set of skills, rather than just the comprehension of content. To address each skill needed, the fundamental components of a complete reading curriculum should include the following: (a) phonics: the correlation of sounds and letters, (b) phonemic awareness: the ability to sound out words, (c) vocabulary: the body of words in a language, (d) fluency: the ability to speak and write accurately, and (e) reading comprehension: the understanding of a text (National Reading Panel, 2000). Most reading intervention programs which are designed to improve the reading skills of struggling readers, build upon these skills.

Many factors can affect the success of a reading intervention program, including educators' skills, implementation fidelity, and long-term student development. Although these variables can affect the delivery and duration of such programs, targeted reading interventions for struggling readers can significantly improve standardized test scores (e.g., Apthorp et al., 2012; Filippini et al., 2012; Gibson et al., 2011; Kim et al., 2011; Shelley-Tremblay & Eyer, 2009). While there are many reading intervention programs to

choose from, several of which will be discussed in this section, WRS is the focus of this study.

The key components of WRS are in accordance with other reading programs; however, it is important to assess the effectiveness of any learning intervention at regular intervals to ensure students' needs are met. WRS was the intervention used at the study site for third-grade students who did not meet proficiency on the DIBELS pretest. Yet, school leaders had not evaluated whether or not participation in WRS increased student DIBELS scores. I examined the effects of 8 weeks of WRS intervention on participating students by assessing progress made on DIBELS composite scores and the individual subscale scores. The reading specialist determined the 8 week time frame, in accordance with WRS. A significant amount of research has been conducted on reading interventions for elementary learners; but, less is known about WRS for struggling third-grade readers. This section is a review of the current research related to reading interventions.

History of Reading Instruction and Interventions

Reading interventions are now examined with explicit emphasis on reading instruction. In the past, reading was combined with English language arts instruction and considered a skill required for the appreciation of English literature, rather than a fundamental component of educational, social, and financial success. Historically, reading had been synonymous with literature appreciation until Kirkpatrick, Huey, and Bronner (as cited in Smith, 2002) began to perform independent research on reading. During this period, educational psychologist Judd (1939) urged that the distinction be made between oral reading fluency and reading comprehension. Attention to reading

began to receive nationwide support during World War I, especially as war revealed that many U.S. soldiers could not read training manuals (Nelms, 1997). A shift in emphasis from oral reading fluency to silent reading comprehension occurred, which was largely pioneered by Thorndike (1914). Thorndike also led the way for school wide reading assessments, which would later become a critical component of the public school system.

In the 1920s, an awareness of reading disabilities emerged and classroom remedial reading interventions were provided to struggling readers. Reading awareness became apparent outside of the classrooms and literacy skills were practiced during the study of other subjects. Teachers were equipped with a plethora of teaching materials and education manuals based on the latest reading research.

Several new reading and learning concepts emerged in the 1930s, and disagreements over the importance of individual reading skills, such as spelling, occurred. During the 1940s, emphasis on silent reading continued, along with a substantial slowdown in reading research for children. However, remedial reading experienced a revival during this time (Smith, 2002).

In the 1950s, the term *developmental reading* was born and attention shifted to the reading development of older students. Reading skills were acknowledged as those which required continued practice and growth, a practice which should not stop once a student exited elementary school. More attention was given to standardized testing, and criticisms over assessments of reading speed occurred (Traxler, 1958).

Traxler (1958) recommended the reevaluation of standardized test measures for students, especially in the areas of comprehension. He claimed that many of the

comprehension assessments were thinly veiled tests of intelligence (Traxler, 1958). The launch of Sputnik in 1957 breathed new life into education research, as Americans realized the important role that education played in maintaining a global economic stronghold.

In the 1970s, interest in the psychology of reading grew, with the production of texts from a variety of experts, including Freire (1970), Durkin (1978), and Clay (1979). Devotion to reading comprehension occurred, and many states implemented exit exams with reading components that students were required to pass in order to graduate from high school (Koretz, 2002). During the 1980s, the reliance on commercially produced reading materials and programs was criticized by opponents who claimed that packaged curriculum only taught basal skills and did not emphasize comprehension. High-stakes testing was observed across all education levels, and reading research was joined by other fields, including linguistics, cognitive psychology, sociolinguistics, and reader's response (Pearson, 2002).

Standards-based assessments reigned throughout the 1990s, and curriculum was yet to consider individualized student attention. Assessments were largely fueled by concerns over U.S. competitiveness and public perceptions of education (Tierney, 2000). The belief was that high-stakes tests would hold students and teachers accountable for reading success, not that such measures would end up leaving a vast number of learners behind (Tierney, 2000). Adolescent literacy, phonics (Harris & Hodges, 1995), and diversity also became topics of interest in reading education during this decade.

As the century turned, emphasis on high-stakes testing grew. The passing of the No Child Left Behind Act in 2001 left teachers with fewer opportunities to implement new teaching strategies as the focus shifted to producing high student test scores. Teachers and schools that did not produce acceptable standardized test scores risked losing their jobs and funding, respectively. Greater emphasis was placed on reading comprehension in the classroom, but in a way that produced effective test takers, not necessarily proficient readers (Meier & Wood, 2004).

Fundamental Reading Components

Effective reading intervention and instruction emphasizes phonics, phonemic awareness, fluency, vocabulary, and reading comprehension (National Reading Panel, 2000). Melby-Lervåg, Lyster, and Hulme (2012) have shown that struggling readers benefit from consistent reading interventions in these critical areas. Though fluency and vocabulary are directly related to the development of reading comprehension skills, phonics and phonemic awareness are the initial building blocks of literacy. These critical components are often dependent on one another. A shortfall in one component can cause deficiencies in another. Students' abilities to grasp the fundamental components of reading instruction can vary greatly. These varied learning rates can make reading skills difficult for students with reading disabilities to grasp, especially in traditional classroom settings (Stebbins et al., 2012). Consequently, intervention programs that develop each of the vital reading skills are critical to long-term educational development. In addition, other variables such as classroom size, student interests and attitudes, and educator skill levels can also affect students' literacy development.

Phonics. The term *phonics* is used to describe the relationship between letters and sounds. Phonics includes two skills: decoding, which is the sounding out of words; and encoding, which is the spelling aspect of language. Phonics allows students to use sounds to create words in print (Reutzel & Cooter, 2011). Phonics instruction can help students convert printed words into spoken words (National Reading Panel, 2000), and researchers have demonstrated the important role that phonics plays in literacy skill development (e.g., Burnham, Luksaneeyanawin, Kantamphan, & Reid, 2013; Duff, Haylou-Thomas, & Hulme, 2011; Giess, Rivers, Kennedy, & Lombardino, 2012).

In terms of teaching methods, the development of phonics skills is inherently related to oral repetition. However, there may be differences between gains achieved during classroom instruction and individual instruction. Vadasy and Sanders (2010) tested the efficacy of phonics instruction on kindergarteners who were either low-skilled language minorities or nonlanguage minorities. The kindergartners were randomly assigned to individual or classroom instruction. The researchers found students who received individual instruction outperformed those who received classroom instruction.

Though the role of phonics is vital to the development of language skills, there are limitations to its effectiveness, regardless of the instructional group size. Noltemeyer et al. examined the development of phonics skills of a group of kindergarten students by implementing small-group flashcard drills during two, 10-minute sessions each week. Though researchers discovered that phonics instruction was effective at improving word recognition, most of the gains were lost within 1 week. Phonics skills were only retained with additional practice and skill reinforcement, which can clash with the time constraints

present in many schools. The time limitations of interventions during the study may have lacked the intensity required for lasting skill development, though, the limited attention spans of kindergarteners could make longer interventions difficult (Noltemeyer et al., 2013).

Phonemic awareness. While phonics describes the actual relationship between sounds and letters, phonemic awareness refers to the understanding that all words are made up of individual sounds. This skill represents the ability to isolate and manipulate sounds in spoken words (Reutzel & Cooter, 2011). When children develop phonemic awareness, they can use letter-sound knowledge to decode words (Isakson, Marchand-Martella, & Martella, 2011). This creates a strong correlation between phonemic awareness and reading development (Melby-Lervag, Lyster & Hulme, 2012) because the ability to isolate individual sounds is the basis for literacy development.

To study the effects of phonemic awareness on a group of struggling readers from low-income households, Isakson et al. employed the McGraw-Hill Phonemic Awareness Intervention. All participants had developmental and/or communication disabilities. The McGraw-Hill Phonemic Awareness program was implemented over the course of 5 months, and teaching objectives focused on the hierarchy of initial sound identification. Based on results of DIBELS subtests, the phonemic awareness of all participants improved after participating in the program. The results indicated that explicit and systematic phonemic awareness instruction of McGraw-Hill Phonemic Awareness may have positive effects on the literacy skills of struggling readers (Isakson et al., 2011, p. 382). The researchers also noted that the younger children may experience difficulties

learning in a traditional large-classroom context; however, additional practice in small groups may improve the acquisition of literacy skills.

Although researchers have indicated phonemic awareness is vital to literacy, educators often have limited phonemic awareness skills (Spencer, Schuele, Guillot, & Lee, 2008). Spencer et al. compared the phonemic awareness skills of teachers from a variety of grade levels and subjects, including kindergarten, first-grade, special education, reading, and speech language pathologists. Though the phonemic awareness skills of speech language pathologists were significantly superior to those of the other professionals, they were still unable to demonstrate expert phonemic awareness. Kindergarten, first-grade, special education, and reading teachers scored well below the maximum points possible (Spencer et al., 2008). According to the researchers, this finding was particularly troubling because phonemic awareness skills are critical for reading and special education teachers who provide targeted interventions to struggling readers. Spencer et al. added that "we might expect these teachers to have skill and content knowledge that surpass those of classroom teachers" (p. 517). It is possible that the introduction of specific language learning programs and computer-based software in classrooms, educators have become less reliant on their own skills and training.

Vocabulary. Vocabulary refers to the knowledge of words and their meanings (Jacobs & Farrell, 2012). Students who score high in vocabulary are likely to score high in reading comprehension sections of standardized reading assessments (National Center for Education Statistics, 2012). For example, Yildirim, Mustafa, and Ates (2011) evaluated the reading comprehension and vocabulary levels of elementary English

language learners and reported significant correlations between vocabulary and comprehension of both expository and narrative texts. Yildirim et al. revealed that vocabulary was a stronger predictor of comprehension for expository texts than it was for narrative texts. Researchers assumed that readers' vocabularies were affected by their life experiences, which helped them to form the background knowledge required to maximize comprehension. The results of this study indicated a strong correlation between vocabulary levels and cognitive textual comprehension.

While vocabulary is integral to the ability to comprehend a text, it should be noted that unfamiliarity with some words does not always significantly impede understanding. Schmitt, Jiang, and Grabe (2011) studied English language learners (ELLs) in eight countries, focusing on the relationship between the percentage of vocabulary known in a text and reading comprehension levels for the same text. Schmitt et al. found that larger vocabularies generally led to greater reading comprehension, but the relationship was dependent on the depth of textual comprehension required. The ELLS in the study were able to comprehend a considerable amount of information in a text, even with relatively low vocabulary coverage. Results from the study indicated that limitations of a few unknown words in a text may not substantially hinder reading comprehension if students are able to use context clues to uncover meanings.

Fluency. Fluency is the act of reading with expression, prosody, automaticity, and appropriate reading rate (Ruetzel & Cooter, 2011). The ability to read accurately and with appropriate pace may improve reading comprehension skills (Hudson et al., 2009). Reading competence can be assessed by the interrelated measures of comprehension and

fluency (Nunes, Bryant, & Barros, 2012; Wise et al., 2010). Wise et al. examined whether different measures of oral reading fluency related to reading comprehension performance of second-grade students who evidenced difficulties with nonsense-word, real-word reading fluency, and oral reading fluency of connected texts. Of the three categories, researchers found that real-word oral fluency was most strongly related to reading comprehension performance; a correlation they suggested may have been related to readers' background knowledge and life experiences. This finding is particularly vital to the literacy skills of students who have problems with fluency because reading comprehension is a benchmark for most standardized tests. Processes that relate oral and silent fluency could be critical to overcoming difficulties in language development.

Though most reading is done silently, it is difficult to test a student's silent reading fluency. Large discrepancies between oral and silent reading rates often occur because students may pretend to be engaged in reading while reading silently. Silent reading fluency is vital to the development of reading comprehension because by the end of first-grade, standardized state tests analyze reading comprehension skills in silent reading mode (Kim et al., 2011). Much like Wise et al., Kim et al. reported that oral reading fluency was a better predictor of reading comprehension than silent reading fluency. Kim et al. also discovered that decoding fluency was a stronger predictor of reading fluency and comprehension than listening comprehension was for average readers, which was the exact opposite of what was observed in skilled readers. This finding suggests that the development of comprehension and fluency skills is interdependent.

Reading comprehension. Reading comprehension, which refers to the ability to understand and think about a text, is the ultimate goal of reading. The National Reading Panel (2000) suggested that reading comprehension instruction should emphasize a variety of strategies, such as answering and asking questions, monitoring understanding, summarizing, and visualizing. Reading comprehension can be influenced by many factors, including student attitudes, the use of cognitive strategies, and student performance in other critical areas of reading.

Another factor that may significantly influence reading comprehension is gender. Logan and Johnston (2009) investigated reading frequency, attitudes toward reading, attitudes toward school, competency beliefs, and perceived academic support of a group of 239 10-year-old children. Although it may seem that students with more positive attitudes would demonstrate higher reading achievement, gender appeared to be an important variable. While female participants displayed better attitudes and higher levels of reading achievement, researchers could find no direct correlation between attitude and comprehension. However, boys with stronger reading comprehension skills did demonstrate positive attitudes toward reading (Logan & Johnston, 2009). Though it has proven valuable to reading comprehension, attitude is often dependent on skill level, which makes strategic approaches to reading comprehension and interventions even more critical for long-term literacy.

The awareness and employment of effective reading strategies is another important component of reading comprehension. In order to explore the relationship between reading strategy awareness and reading comprehension, Anastasiou and Griva

(2009) studied two groups of sixth-grade students: those identified as good readers, and those identified as poor readers. Researchers noted that the strategy of *skipping the difficult parts* was most popular among poor readers who lacked comprehension and concentration strategies. Though poor readers could identify and describe a number of cognitive strategies, they employed those strategies less frequently and less efficiently than stronger readers. Poor readers were also less likely to use more demanding reading strategies (Anastasiou & Griva, 2009). Findings from this study on poor readers correlated with those from Hollenbeck's (2013) research on struggling readers. Both studies illustrated that unlike good readers who apply cognitive strategies to strengthen textual comprehension, poor readers spend more time discerning individual words and connecting meanings. In turn, this can detract from overall comprehension (Anastasiou & Griva, 2009; Hollenbeck, 2013).

Reading Strategies

Reading intervention is crucial for the literacy success of struggling readers. However, methods of reading enrichment are subject to scrutiny (Case et al., 2010). The RTI model, which is a method of intervention used to assess students' intervention needs, is separated into the following three tiers: (a) Tier 1, which includes universal instruction assessment; (b) Tier 2, which includes additional instruction and assessment; and (c) Tier 3, which includes individualized, intensive instruction (Goss & Brown-Chidsey, 2012). Though the RTI model is generally accepted, some psychologists argue that moving through the tiers may not be the most effective approach for students with severe reading challenges (Vaughn, Denton, & Fletcher, 2010). Students who struggle with reading, fail

to meet standardized test benchmarks, and/or have learning disabilities related to language development skills, are at risk for reading failure and often benefit from more intensive instructional strategies, including differentiated instruction, oral repetition, and individual and/or small-group lessons.

Differentiated instruction. Differentiated instruction is a responsive teaching technique that gives students multiple options for taking in information, making sense of ideas, and expressing what they learn (Tomlinson, 2013). Vaughn et al. claimed that accelerated progress is needed for struggling readers, which means, that the RTI tiered model is not beneficial to those who have more severe reading difficulties because it can take too much time to move from one tier to the next. Struggling readers must be identified quickly and accurately so they can move straight into the more intensive interventions typically seen in the third RTI tier.

Literacy skills can be developed by incorporating effective instruction and creating extended opportunities for practice (Vaughn et al., 2010). If struggling readers do not benefit from the initial tiers of the RTI model, the overall effectiveness of whole-group instruction for struggling readers can be questioned. Reis et al. observed that differentiated instruction focused on individual engagement could lead to positive gains in reading comprehension and fluency. The researchers' differentiated instruction replaced whole-group instruction for 1 hour each day and was accompanied by 5 minute, one-on-one teacher conferences. Together, these steps resulted in reading fluency and comprehension scores that were equal to or better than those of the control group (Reis et al., 2011).

Oral repetition. Oral repetition has long been identified with rote recall (Levin, Bender, & Lesgold, 1976). When working with traditional, first-grade students, Levin et al. found that simple oral repetition did not facilitate recall; however, irrelevant and interpolated activity did not interfere with it. The practice of oral repetition could add value to a reading intervention designed for poor readers. Similarly, Denton et al. reported that poor readers at the first-grade level did not experience an increase in comprehension with specific skill-based practice. However, the practice of having students read sections of unfamiliar text aloud each day did increase word reading, phonemic awareness, and reading comprehension skills.

Lo, Cooke, and Starling (2011) echoed these sentiments when they studied the relevance of oral repetition in the reading skill development of poor readers. The researchers focused on repeated reading interventions on three second-grade struggling readers. The small-group program focused on isolated word reading practice, unison reading, error correction, and performance cueing and feedback procedures. All students experienced gains in oral reading fluency, supporting findings by Denton et al., which indicated that fluency gains are related to oral reading of unfamiliar texts. Reading unfamiliar texts aloud not only unifies students in the classroom through reading comprehension, fluency, and vocabulary, but it also allows them to receive individual phonics and phonemic awareness instruction. This may extend to the individual development of other students in the classroom who have similar language learning barriers.

Individual and small group learning. Though the benefits of oral reading fluency are well established, the positive results of individual and small-group reading interventions are also integral components of literacy development. Individual and small-group reading are identified in Tier 1 of the RTI model (Goss & Brown-Chidsey, 2012), but may have a greater value to poor readers if implemented sooner (Vaughn et al., 2010). Amendum, Vernon-Feagans, and Ginsberg (2011) studied the effects of fast-paced, one-on-one targeted reading interventions on kindergarten and first-grade students. Teachers administered individual and small-group coaching with the assistance of a virtual a literacy coach. Amendum et al. reported that the intervention helped students improve skills across numerous reading domains, including word attack, fluency, and comprehension.

Response to Intervention. Most RTI systems are based on a three-tiered model. The first tier represents primary prevention and involves implementation of evidence-based classroom instruction designed to help all learners read, while providing instructors with screening measures to identify students at risk for reading difficulties. Tier 2, also referred to as secondary intervention or prevention, involves supplemental interventions for students identified as at risk. Finally, Tier 3, referred to as tertiary intervention or prevention, involves the implementation of more intense reading interventions for students who have not adequately responded to Tiers 1 and 2. The keys to successful use of the RTI tiers are consistent monitoring through summative assessments and measures of student outcomes (Denton, 2012).

Assessment and implementation of RTI tiers enables educators to more accurately identify struggling readers and respond with targeted interventions. According to Simmons et al., RTI tiers acknowledge the "window of opportunity wherein reading difficulty is more easily altered by instruction and risk of later reading difficulty is minimized" (p. 159). For example, in Wanzek and Vaughn's (2007) study on reading interventions, researchers reported significantly greater effects for interventions provided to students in kindergarten and first grade than for those provided to second through fifth graders. Key characteristics for teaching students with reading difficulties have been identified, and include: interventions, extended opportunities for guided practice, corrective and positive feedback, engaged practice, and instructional formats that promote student involvement and provide ample opportunities for learners to respond to instruction (Denton, 2012).

Considerable research has been conducted on the effectiveness of interventions and instructional strategies of each RTI tier. In Tier 1, evidence-based core instructional programs (Al Otaiba, Kosanovich-Grek, Torgesen, Hassler, & Wahl, 2005) and differentiated instruction (Connor et al., 2009) have demonstrated effectiveness for providing reading instruction to poor readers.

Keys to RTI success. Often, schools are faced with intervention needs that exceed their resources; RTI success is contingent upon factors to maximize those resources, especially in terms of teaching personnel. "For many schools, this may require a new way of thinking and action about how to meet the needs of students" (Abbott & Wills, 2012, p. 37). Abbott and Wills (2012) presented a case study on a school that

effectively expanded and transformed its RTI strategies to meet student needs. The school created a reading team that was responsible for the following: (a) accountability to school's academic results, (b) assessment decisions, (c) choosing instructional interventions to be implemented, (d) determining which personnel would conduct interventions, (e) determining student progression through interventions, and (f) making improvements to general classroom instructional strategies. Within 3 years of implementing the new reading team, students showed substantial improvement in their reading abilities, and teachers improved their implementation fidelity to over 90%. Based on the case study results, the researchers made the following recommendations to schools with over 20% of students performing below benchmarks:

1. Organize an RTI team that can create and implement a comprehensive change plan across all grade levels.
2. Implement data collection strategies that fit the school's environment and guide practice and interventions.
3. Maximize small-group and general curriculum by encouraging mastery, error correction, read aloud time, and providing learners with ample opportunities to respond to learning.
4. Involve as many school staff members in the intervention as possible.
5. Encourage the RTI team to act as a problem-solving panel for the school by providing them with the opportunities to strategize and implement interventions based on identified deficiencies and clearly defined goals.

Hoover and Love (2011) provided a similar analysis of successful RTI implementation strategies with a case study of three elementary schools located in the Western U.S. Each school in the study was in the initial stages of their RTI implementation strategies. At each location, a team leader, an outside expert, and the RTI team worked collaboratively to address school-based RTI issues and to come up with effective solutions. The successful response strategies included guides and checklists to help team members clarify needs and record intervention efforts; opportunities to demonstrate and test suggested solutions; and continuing team discussions of potential solutions, issues, and the expected and actual outcomes of various strategies.

Reading Intervention Research

Goss and Brown-Chidsey (2012) conducted a case study to investigate differences in two second-tier reading interventions among a sample of 12 first-grade students at risk for reading failure. At risk status was determined by initial DIBELS scores, which were also used to measure student reading progress over the course of the 16-week study. Students were divided into two groups, each receiving one of two interventions: Fundations Double Dose or Reading Mastery. Each student participated in four 30-minute small group sessions per week. Two students completed the DIBELS subtest each week. Data from teacher observations and self-reports were also gathered to assess the accuracy with which programs were administered.

Goss and Brown-Chidsey's study (2012) indicated that four students exceeded the initial benchmark goal in the Reading Mastery program, and three exceeded the second benchmark goal. Of the Fundations Double Dose group, two students met the initial

benchmark, and none met the second benchmark. Goss and Brown-Chidsey reported that the Reading Mastery group generally scored better on reading measures than the Fundations Double Dose group, which they believed may have been due to more explicit instruction provided by the Reading Mastery program. This result indicated that students with significant reading challenges may be better served by more intensive programs. Alternatively, students with fewer reading deficits may be able to catch up to their peers by participating in less intensive programs, such as Fundations Double Dose. Goss and Brown-Chidsey concluded that "although Fundations Double Dose offers a variety of engaging games and activities that are appealing to teachers and students, the level of repetition and opportunities to practice new skills appears to be less than that required in Reading Mastery" (p. 72).

The characteristics of reading interventions are integral to program success, but proper implementation of factors of such programs is also fundamental to student success. Waznek and Cavanaugh (2012) surveyed elementary school teachers to determine what characteristics of reading interventions were being provided in early elementary grades, prior to state mandated RTI implementation. The sample consisted of 1,042 kindergarten through third-grade teachers in 42 districts throughout the State of Florida. The researcher-developed survey included 24 closed questions to assess the time spent in intervention, instructional group sizes, locations and implementers of interventions, intervention materials, and intervention decision making.

Teachers spent an average of 21 to 30 minutes in intervention sessions (Waznek & Cavanaugh, 2012). While this is in line with recommendations that interventions be

implemented for 20 to 40 minutes, 3 to 5 days per week (Gersten et al., 2008), Waznek and Cavanaugh (2012) suggested that teachers consider boosting the intensity of interventions by either increasing instructional time or decreasing instructional group size. 73% of the participants indicated that they were solely responsible for providing the interventions, which can be problematic because it means that teachers are simultaneously responsible for managing a significant number of interventions while also tending to the instructional needs of other students.

Overall, Waznek and Cavanaugh (2012) reported that the schools under study seemed prepared to provide the necessary RTI to qualified students. They noted that because of the high number of required interventions, schools should be careful to follow intervention scheduling, maintain intervention fidelity, and assess student progress to "ensure that student learning in the general classroom is not interrupted by the implementation of these reading interventions" (p. 200).

A variety of reading intervention programs is available to educators and students. Case et al. conducted an empirical assessment on the effectiveness of many short-term, supplemental reading interventions on the market. Participants included 60 first-grade students from a large, mid-Atlantic school district. Students who were reading in the bottom half of the class or received low reading assessment scores were chosen by teachers to participate. Teachers dedicated at least 2 hours of instructional time to reading and language arts instruction daily, which consisted of 20 to 30 minutes of phonics instruction, 20 minutes of small group reading, and other activities focused on spelling, word study, and writing.

Researchers created a supplemental reading intervention by adapting published programs and research-based methods. Program focuses included "phonemic awareness, word attack skills, spelling, sight-word recognition, vocabulary, oral reading fluency, and comprehension" (Case et al., 2010, p. 6). Development of program phonemic awareness, phonics skills, sight-word recognition, and vocabulary program components were similar to the guidelines in two established intervention programs: Fundations and Responsive Reading Instruction. Reading fluency, monitoring, and comprehension components were adapted from guidelines for Read Naturally (Ihnot, 2002).

Students participated in three, 40-minute intervention sessions for 11 weeks. Before the start of the study, they were assessed with the following instruments: CTOPP, WRMT, Decodable Word Fluency, Spelling, and Math Calculation Fluency. All tests were administered again at the study's conclusion. ANOVA and growth curve analysis were used to detect differences between intervention and control groups. Study results indicated that decodable word fluency and spelling were significantly improved by the research interventions. Overall, however, no significant effects for norm-referenced measures of reading were found. The study's findings suggested that the reasons for this may be that short-term interventions are not intense enough to produce significant effects required for detection on norm-referenced tests.

Much of the research on elementary reading interventions focuses on kindergarten through second grade students; but, some researchers have recognized the need for studies aimed at older elementary-aged children. Accordingly, Waznek, Wexler, Vaughn, and Ciullo (2010) conducted a meta-analysis of research published over the course of 20

years to investigate the effects of various reading interventions on fourth and fifth grade elementary school students. The researchers chose to examine this age group because a lack of research existed on the effectiveness of reading interventions for upper-elementary students. A synthesis of reading intervention research on fourth- and fifth-grade students had not yet been conducted. Waznek et al. posited that "with the decreased emphasis of learning to read in upper elementary grades, students who do not read proficiently by the end of the early elementary grades may face serious consequences" (p. 891).

To conduct the analysis, Waznek et al. evaluated 24 studies published between 1988 and 2007. The selection criteria included the following: over 50% of participants had to be fourth- or fifth- grade students; participants had to be struggling readers; interventions had to be published in English; at least 15 interventions sessions were documented; research designs were treatment-comparison, single-group, or single-subject; and reading-related outcomes were measured. Waznek et al. analyzed and coded the studies according to the following factors: participants, methodology, intervention and comparison information, clarity of causal inference, measures, and findings. Based on the synthesis, Waznek et al. reported the following findings for reading intervention strategies targeted at upper-elementary students:

> (a) instruction in comprehension outcomes on researcher-developed measures, (b) mixed results for fluency interventions, (c) limited evidence (one study) for the effects of vocabulary instruction, and (d) multi-component interventions

demonstrate promise for increasing student outcomes on a variety of measures. (p. 910)

Since their search criteria returned limited studies, Waznek et al. called for further studies examining reading interventions for upper-elementary students, specifically focusing on researchers who will investigate comprehension- and vocabulary-related interventions.

Waznek and Roberts (2012) conducted another study on the effectiveness of upper-elementary reading interventions. Waznek and Roberts compared the effects of three different reading interventions on fourth-grade students from two elementary schools in a Southwestern school district. Students with reading difficulties were identified through a two-step process in which teachers indicated which students had at risk characteristics (those who were dyslexic, received supplemental reading instruction, or were reading below grade level), followed by a screening of nominated students using the Gates-MacGinitie Reading Test (MacGinitie, MacGinitie, Maria, Dreyer, & Hughes, 2006). Those who scored in the lowest 25th percentile were included in the study, which had a final total of 87 participants. Each student was randomly assigned to one of four possible study conditions: word recognition emphasis, comprehension emphasis, responsive emphasis, or comparison. Students in the word recognition group received treatment via WRS (Wilson, 2002); those in the comprehension group followed the Collaborative Strategic Reading (Klingner, Vaughn, Dimino, Schumm, & Bryant, 2001) program; those in the responsive group received a word-recognition emphasis

intervention; and participants in the comparison group received various combinations of the interventions.

Students participated in 85 to 114 interventions over the course of the 28-week study (Wanzek & Roberts, 2012). Participants were assessed again upon the conclusion of the interventions. Wanzek and Roberts (2012) were unable to detect any reliable differences between student gains and study conditions. They reported that "students receiving the researcher-implemented interventions demonstrated statistically similar reading outcomes to students who continued to receive the school-implemented interventions" (p. 96). Wanzek and Roberts (2012) concluded that the reason for the lack of significant improvements from reading interventions may have been because strong classroom instruction already existed at the schools where the study was conducted. Wanzek and Roberts (2012) also suggested that upper-level elementary students may require more intensive interventions to experience significant gains, so the duration and frequency of the intervention sessions conducted during the study may have been insufficient.

Another reading intervention that has been highly studied across different age groups is known as "shared reading" (Schickedanz & McGee, 2010). Shared reading is a strategy used to "describe a variety of read-aloud methods and other engagements with books, many of which focused primarily on supporting children's vocabulary and grammatical development or print skills acquisition" (Schickedanz & McGee, 2010, p. 323). A 2008 report by the National Early Literacy Panel (NELP; 2008) analyzed 19 studies on shared reading as an intervention strategy. Schickedanz and McGee (2010)

provided a comprehensive review of these findings, bringing attention to details and important nuances that were left out of NELP's review. Specifically, the researchers extended findings from the NELP study, which reported no differences in each of the following: shared story reading for older versus younger children; gains in simple vocabulary versus composite language; and dialogic versus nondialogic reading styles. They argued that assessment bias and other validity issues may have skewed the findings, reporting that study results actually indicate that shared reading can be a beneficial reading intervention, especially for younger preschool children. The authors concluded that:

> Different styles of shared reading produce different results, and combining styles may produce different results, and combining styles may produce a wider range of outcomes than a narrowly focused approach does, for both comprehension and vocabulary and for comprehension and print awareness. (p. 327)

RTI Reading Intervention Programs

Education professionals and institutions have many choices when it comes to RTI programs. A brief description of some of the most popular RTI literacy programs, including WRS, follows.

Fundations. Fundations is an early-intervention and prevention program designed to help K-3 students improve reading and spelling through daily, 30-minute interventions focused on alphabetics, phonological awareness, phonemic awareness, decoding, spelling, and vocabulary. The program can be used in conjunction with other literature-based reading curriculum in general education classes, or as a small-group intervention.

Fundations is based on principles from WRS. Because no studies fell within the scope of review protocol for the What Works Clearinghouse (WWC), no research-based evaluations of the program have been performed by the Institute of Education Sciences (What Works Clearinghouse Intervention Report: Fundations, 2010).

Read Naturally. Included in the Read Naturally reading intervention program are four separate products that aim to improve oral reading fluency. The strategies implemented by the Read Naturally program include "modeling of story reading, repeated reading of text for developing oral reading fluency, and systematic monitoring of student progress by teachers and the students themselves" (What Works Clearinghouse Intervention Report: Read Naturally, 2013, p. 1). The WWC evaluated five studies on Read Naturally, which were reported in the 2013 WWC Intervention Report for the program. According to the Clearinghouse's (2013) analysis, the program had potentially positive effects on general reading achievement, mixed effects on fluency, and no discernible effects on alphabetics and comprehension.

Reading Mastery. This is a direct instruction program available in two versions: for grades K-3 and grades K-6. Reading Mastery teaches phonemic awareness, sound-letter correspondence, passage reading, vocabulary development, comprehension, and oral reading fluency. The WWC review of this intervention found that Reading Mastery demonstrated benefits in the areas of oral reading fluency, letter/word identification, reading vocabulary, and word attack; however, no effects were detected for passage comprehension (What Works Clearinghouse Intervention Report: Reading Mastery, 2006).

SpellRead. SpellRead is a program designed for struggling readers in second grade and above. It integrates auditory and visual aspects of reading, emphasizing specific instruction and systematic skill mastery over the course of 140 lessons. Lessons are broken down into three distinct phases, which focus on the auditory functions of the brain, secondary spelling of vowels and consonant blends, syllabication, and word decoding (WWC Intervention Report: SpellRead, 2007). According to a 2007 review of the program by the WWC, SpellRead may positively impact alphabetic acquisition, fluency, and comprehension in struggling readers.

Corrective Reading. According to a 2007 report by the Institute of Education Sciences, "Corrective Reading is an intervention program that involves the use of scripted lessons designed to improve the efficiency of instruction and to maximize opportunities for students to respond and receive feedback" (p. 23). Explicit and systematic instruction is designed to help students focus on elements of word identification. The WWC report on the intervention (2007) found the program to have potential benefits on alphabetics and fluency, but detected no effects on comprehension.

Failure Free Reading. This intervention program aims to improve vocabulary, fluency, reading comprehension, and word comprehension for K-12 students. The program's key characteristics include repeated textual exposure, predictable sentence structures, and story concepts (WWC Intervention Report: Failure Free Reading, 2007). The program is designed so students can read material that is interesting and relevant to their age group while challenging their independent and instructional reading levels (U.S. Department of Education, 2007). The WWC (2007) review of the program "found no

discernible effects on alphabetic and fluency and potentially positive effects on comprehension" (p. 4).

Wilson Reading System. WRS is a reading intervention program that was originally developed in 1988, by a former special education teacher (U.S. Department of Education, 2007). The program was designed to teach the structure of words in a systematic and cumulative manner to kindergarten through 12th-grade students with word-level deficits (Wilson Language Training, 2010). The program takes a multisensory approach based on the principles and theories of Orton and Gillingham (Wilson Language Training, 2010). Essential components of WRS include: (a) systematic and cumulative approach to teaching word structure, (b) multisensory and interactive instruction, (c) sound tapping method, and (d) vocabulary instruction (Wilson Language Training, 2010).

The fundamental components of WRS (phonics, phonemic awareness, vocabulary, fluency and reading comprehension) mirror the major components of literacy success, as described by the National Reading Panel (2000). WRS contains three sections, which emphasize phonics, phonemic awareness, vocabulary, sight word instruction, fluency, oral language development, and reading comprehension (Wilson Language Training, 2010). Section 1 focuses on word study, which includes phonics instruction, phonemic awareness instruction, vocabulary instruction, accuracy and automaticity, phrasing, and prosody (Wilson Language Training, 2010). Section 2 focuses on spelling, including spelling instruction, proofreading, vocabulary instruction, and high frequency/sight word instruction (Wilson Language Training, 2010). Finally,

Section 3 focuses on fluency and comprehension, which includes guided reading, fluency instruction, vocabulary instruction, comprehension instruction, visualization, and oral language skills (Wilson Language Training, 2010).

WRS follows a 12-step system: Steps one through six establish foundational skills in word reading, while steps seven through 12 present more complex rules of language, including sound options, spelling rules, and morphological principles (Torgesen et al., 2006). In relation to the RTI model, WRS's intervention model includes 45- to 90-minute daily lessons, which can be implemented in reading classes, small groups, or tutorials in general or special education classrooms. The intensive model is 60 to 90 minutes, and is designed to be utilized in small groups or individually (U.S. Department of Education, 2007).

WRS Research. WRS intervention is used in many schools throughout the United States. However, limited research supporting the program spans only from 1995 to 2006. Most recently, Torgesen et al. evaluated the extent to which four interventions (Spell Read P.A.T., Corrective Reading, WRS, and Failure Free Reading) affected the reading and comprehension skills of struggling readers, relative to the normal reading instruction levels provided by schools. Participants included 208 third-grade and 228 fifth-grade students identified as struggling readers by word-level reading performance. The interventions were implemented from November 2003 to May 2004, and were delivered in small group sessions, 5 days per week.

Seven measures of reading skills were assessed at the start of the study, including word attack, word identification comprehension, phonemic decoding efficiency and sight

word efficiency, oral reading fluency, and passage comprehension (Torgenson et al., 2006) Torgenson et al. noted that students who received WRS demonstrated significant improvements in word reading skills and student reading achievement when compared to the other interventions. However, researchers also noted a difference in success between the two age groups: the word attack skills of struggling third-grade readers were reduced by about two-thirds, whereas the fifth-graders showed no significant improvements.

Although Torgenson et al. only observed notable improvements in third-graders who used WRS, Wilson and O'Connor (1995) indicated significant improvements in third through 12th-grade students who were given the intervention. Wilson and O'Connor included 92 grade three and four students, and 128 fifth through 12th graders. All participants were at least 2 years behind grade level in reading mastery scores and had not shown progress in other reading programs. Participating students received WRS 2 to 3 times per week throughout the school year.

Data collected using pretest/posttest scores on the Woodcock Reading Mastery Test indicated substantial improvements in literacy skills (Wilson & O'Connor, 1995). The word attack skills of participants improved an average of 4.6 grade levels, passage comprehension improved by 1.6 grade levels, and improvements were also observed in comprehension and spelling skills. Wilson and O'Connor (1995) concluded that students "can develop their basic reading and spelling skills if taught systematically by teachers trained in WRS even after remedial approaches have failed" (p. 250). Because remedial reading intervention appeared significantly effective, Wilson and O'Connor (1995) stated that the "trend toward placing special education students in modified regular education

settings without specific remedial instruction should be questioned" (p. 250). It appeared integral for students to receive additional remedial instruction instead of simply being removed from regular reading classes.

Like Wilson and O'Connor (1995) and Torgenson et al., most researchers of reading interventions have assessed reading skill improvements with a variety of skill inventories. For example, Meyer et al. investigated the effects of remedial reading on the neural brain activation of struggling readers. Specifically, in their longitudinal study, the researchers explored the neural changes of poor fifth-grade readers by assessing neural activation at three points in time: prior to the intervention, after 100 hours of intervention, and 1 year following the intervention's conclusion. Brain scans were used to detect neural activation, and four separate intervention programs were included in the study: Corrective Reading, WRS, SpellRead PAT, and Failure Free Reading. While researchers were not able to note significant differences in the behavioral or neurophysiological outcomes for the four interventions, they did report that the interventions in general led to significant changes in brain function and gains in the reading skills of poor readers. Another important finding was that remedial interventions may alter neural circuitry of poor readers, regardless of impairment levels or reading abilities (Meyer et al., 2008).

Measures of Reading Ability

A key to any effective reading intervention program is ongoing assessment. Just as there are many intervention programs available, there are also many assessment tools for educators to choose. Some of the most common tests are described as follows.

DIBELS. The DIBELS instrument measures the acquisition of early literacy skills from kindergarten through sixth grade, providing a composite score that indicates literacy support needs (DIBELS Data System, 2011). For third-grade students, the DIBELS composite score is a combination of the scores in the following areas: (a) DORF fluency, (b) DORF retell score, (c) DAZE score, and (d) DORF accuracy score (DIBELS Data System, 2011).

Phonemic decoding. Phonemic decoding refers to a student's ability to determine the meanings of words by translating groups of letters into sounds and linking them to vocabulary to access meaning. The Word Attack assessment, which is a subtest of the Woodcock Reading Mastery Test-Revised (WRMT-R), is often used to measure phonemic decoding skills. A subtest from the Test of Word Reading Efficiency (TOWRE), called Phonemic Decoding Efficiency (PDE) is another common measure (U.S. Department of Education, 2007).

Reading comprehension. Reading comprehension is the ability to make meaning of a text and to reflect on its message. Some measures for reading comprehension include the Passage Comprehension subtest of the WRMT-R and the Passage Comprehension assessment from the Group Reading Assessment and Diagnostic Evaluation (GRADE; U.S. Department of Education, 2007).

Word reading accuracy and fluency. Word reading accuracy refers to the ability to identify words accurately, and fluency is the ability to read with enough ease and accuracy to enable attention to focus on making meaning of the text. These factors are often assessed with the following measures: the Word Identification (WI) subtest of the WRMT-R; the Sight Word Efficiency (SWE) subtest of the TOWRE; and the Oral Reading Fluency subtest from Edformation (U.S. Department of Education, 2007).

Implications

The implications for the project were based on the study's findings. The findings indicated the extent of which the DIBELS scores of third-grade students demonstrated a statistically significant difference after receiving 8 weeks of WRS. A position paper was appropriate for disseminating the study's findings to school leaders. The position paper provides readers with a description of the study, the study's findings, and program recommendations, and is effective in communicating a study's findings in a way that is easy to understand.

Summary

This section was a review of the current literature related to the study, including the history of reading interventions, components of reading instruction and interventions, and recent studies on a variety of popular interventions. A common theme throughout the literature was an emphasis on the necessity for regular evaluation of intervention program effectiveness to ensure that learners' literacy requirements are met. This theme supports the purpose of the study, which was to assess the extent of which WRS led to a statistically significant difference in DIBELS scores for struggling third-grade readers.

Section 2 is a description of the research questions, design and approach, setting and sample, variables and instruments, data collection and analysis procedures, results, assumptions, limitations, scope, delimitations, and ethical protections associated with this study.

Section 2: The Methodology

Research Design and Approach

A quasi-experimental pretest/posttest design was used to explore the impact of WRS on a single group of third-grade participants' DIBELS composite scores and the individual subscale scores that determine the composite score after participating for 8 weeks in WRS. A control or comparison group was not available because I could not, in good conscience, select students that would not receive any additional help with their reading. Rather, pretest/posttest scores were used to measure the impact of the program on one group of students. According to Lodico, Spaulding, and Voegtle (2010), if a study requires pretest/posttest scores, then a quasi-experimental design is appropriate. I analyzed existing numerical data (DIBELS data collected on all third-grade students) before and after students received WRS.

A qualitative study of WRS would provide useful information regarding students' and teachers' perceptions and experiences with the intervention. However, this type of research design would provide in-depth information that might be useful after a more generic view of the overall effectiveness of the program has been established.

Reading proficiency levels were measured via student composite scores, which are a combination of scores on the DORF and DAZE measures of the DIBELS reading assessment instrument. Test scores reflected student reading proficiency levels in DORF and DAZE measures prior to the implementation of WRS and after the implementation of this reading intervention program. Differences in student test scores were examined for

statistically significant differences. WRS and assessments would have been implemented regardless of the study. The assessment was administered by the general education teachers using a DIBELS testing device in which student reading responses are recorded.

Setting and Sample

The study site was a small urban elementary school located in Washington, D.C. with a population of approximately 500 students in pre-k through eighth grade. The target population consisted of 75 third-grade students who performed below proficient on the DIBELS assessment during the 2013-2014 school year. At the time, the student demographics of the school consisted of 72% African American, 14% Hispanic, 10% European American and 4% other (DC School Profiles, 2013). Within this student population, 22% were English language learners, 18% were students with learning disabilities, and 99% of students received free and reduced lunch (DC School Profiles, 2013).

The study's participants included 75 of the lowest performing third-grade students who were placed in WRS based on their DIBELS composite scores and the individual subscale scores. Four participants were removed from the analyses as outliers (Students 50, 63, 67, 69); a total of 71 participants were used in the final analyses. Slightly more than half of the students were females (40 students, or 56%). Most participants were of African American ethnicity (59 students, or 83%) and were absent between 0 and 4 days (44 students, or 62%). Every participant received free and reduced meals (71 students, or 100%). A summary of the demographic characteristics of the study's sample are shown in Table 3.

Table 3

Frequencies and Percentages for Sample Demographics

Demographic	*N*	%
Gender		
Male	31	44
Female	40	56
Ethnicity		
Hispanic	12	17
African American	59	83
Socioeconomic		
Free / reduced meals	71	100
Days Absent		
0	14	20
1-4	30	42
5-9	21	30
10-13	6	8

Note. Due to rounding error percentages may not sum to 100%.

A power analysis was conducted to determine whether or not the sample size of 75 (*N*=75) would be sufficient to test each null hypothesis with alpha set at .05, and an effect size of .50 (medium effect size). This analysis indicated that a minimum sample size of 71 participants would be needed to achieve the power of .95. This indicated that 71 pretest/posttest scores were sufficient.

Instrumentation and Materials

I examined the extent of which the 8 week WRS intervention (independent variable) impacted the DIBELS composite scores and the individual subscale scores (dependent variable) of third-grade students who struggle to read.

Dependent Variable

The dependent variable is reading proficiency as measured by the pretest/posttest and posttest scores. The individual student scores for the 75 students participating in

WRS were automatically recorded using the DIBELS testing device, and stored electronically in the Measure Class database where I retrieved the archival student data. Pretest/posttest scores in (a) DORF fluency, (b) DORF accuracy, (c) reading comprehension (i.e., retell), and (e) vocabulary (i.e., DAZE) were included in the data file. Gender and days absent from WRS were also included in the data file.

As described by the DIBELS Data System (2011), each measure has been shown to be reliable and valid indicators of early literacy development and predictive of later reading proficiency (DIBELS Data Systems, 2011). Many efforts have been made to ensure reliability and validity of DIBELS. The validity of the DIBELS assessment as a predictor of reading outcomes has been validated as early as 2002 (Good & Kaminski, 2002). DIBELS is valid and reliable at screening students and predicting how students will perform on other reading assessments (Chard et al., 2008; Elliott, Lee, & Tollefson, 2001; Goffreda et al., 2009; Hagans, 2008; Hintze et al., 2003; Roehrig et al., 2008; Rouse & Fantuzzo, 2006). The split-half reliability coefficient ranges from .89 to .94 (DIBELS Data System, 2011). Specifically for third grade, DIBELS measures reading comprehension, phonics, phonemic awareness, fluency, and vocabulary. Fluency and accuracy are measured with DORF which focuses on phonics, word attack skills, accurate and fluent reading of text, and reading comprehension. Vocabulary is measured with DAZE.

The assessments in DIBELS are aligned with WRS. DORF measures phonics, word attack skills, accurate and fluent reading of text, and reading comprehension. Phonics, word attack skills, accurate and fluent reading of text, and reading

comprehension are instructed in the word study section of WRS. Students use sound cards to practice sounds and phonics skills, word cards to practice word attack skills and accurate/fluent reading, conduct wordlist readings to practice accurate and fluent reading, sentence reading to practice accurate and fluent reading of text and reading comprehension. Reading comprehension is revisited in the fluency and comprehension section of WRS where students read controlled passages, answer comprehension questions, and retell the story. This section includes a listening comprehension component for continued comprehension practice.

DAZE measures vocabulary knowledge. Vocabulary is instructed in the word study, the spelling, and the fluency/comprehension sections of WRS. New vocabulary words are introduced throughout the program. Students add new words to the vocabulary sections of their student notebooks and create nonlinguistic representations of vocabulary words.

DIBELS test scores. The DIBELS assessment provides a composite score indicating a student's need for support in literacy (DIBELS Data System, 2011). For third-grade students, the DIBELS composite score is a combination of the scores in the following areas: (a) DORF fluency, (b) DORF accuracy, (c) reading comprehension (i.e., retell), and (e) vocabulary (i.e., DAZE; DIBELS Data System, 2011). The composite score places students into three levels of support which are color coded: (a) red indicates that the student is well below benchmark and needs intensive support, (b) yellow indicates that the student is below the benchmark and needs strategic support, and (c) green indicates that the student is at or above benchmark and needs core support

(DIBELS Data Systems, 2011). Students needing intensive support (red) received WRS. Each individual reading skill area is measured along a scale of 0-100. As such, reading proficiency levels in these areas will be measured along an interval scale. See Appendix A for raw test scores.

DORF. The student reads a passage aloud for 1 minute. Student accuracy of reading is tracked and used toward the score. Following oral reading, the student is asked to retell what was read. The retell score is calculated based upon the quality and amount of details the student includes in the retell. The DORF fluency score retell score, and DORF accuracy score are derived from this section of the assessment. DORF is aligned with the word study, and fluency and comprehension sections of WRS.

DAZE. The student receives a reading passage in which words are omitted. The student must select the correct word from a multiple choice box that best fits the meaning of the sentence. The DAZE score is derived from this section of the assessment. DAZE is aligned with all three sections of WRS where vocabulary is taught ubiquitously.

Independent Variable

The independent variable of this study is WRS (categorical) and the scale is nominal. Along with addressing these critical components of reading as confirmed by the National Reading Panel (2000), WRS includes (a) systematic approach to teach decoding and encoding, (b) multisensory and interactive instruction, (c) uses a "sound tapping" system, and (d) vocabulary instruction (Wilson Language Training, 2013). The program was implemented within a small group setting for 8 weeks during the 2013-2014 school year. WRS follows a sequenced 10 part lesson that is divided into three sections: word

study, spelling, and fluency/comprehension. The program is designed for students in grades second through 12th who are struggling in reading, and follows a 10- step system. According to Wilson Language Training (2010), the following steps are included in WRS.

Section 1: Word Study focuses on phonemic awareness, decoding, vocabulary, accuracy and automaticity, phrasing and prosody.

1. Sound Cards Quick Drill: The student learns phonemes with the teacher showing sound cards and the students echoing sounds and letters.
2. Teach/Review Concepts for Reading: Segmentation and blending are taught using a finger tapping method. Syllables and suffixes are taught during this step as the students are further along in the program.
3. Word Cards: Students apply the skills they learned in step 2 to single word reading using flashcards.
4. Wordlist Reading: Students apply the skills learned in previous steps to read controlled wordlists.
5. Sentence Reading: Students apply skills learned in previous steps to sentence reading.

Section 2: Spelling focuses on spelling, proofreading, vocabulary, and high frequency/sight words.

6. Quick Drill in Reverse: The teacher says a sound and the student identifies the corresponding letters.

7. Teach/Review Concepts for Spelling: The students use phoneme cards to spell words.
8. Written Work Dictation: The teacher dictates controlled sounds, sentences, and words that are the focus of the lesson and students write them.

Section 3: Fluency/Comprehension focuses on guided reading, fluency, vocabulary, comprehension, visualization, and oral language skills.

9. Controlled Passage Reading: The student applies all skills taught in previous steps to orally read a controlled passage. After orally reading the passage, the student does a retell.
10. Listening Comprehension/Applied Skills: The teacher reads a story/passage of choice. Students retell after the read aloud.

The creators of the program suggested that it is administered in 45-60 minute increments 3 to 5 times per week. For this reason, students were exposed to WRS by the reading specialist 45 minutes a day, 3 times a week, for 8 weeks. Students were divided into nine groups of eight to nine students.

Covariates

I examined the impact of WRS on struggling third-grade readers while controlling for (a) gender, and (b) days absent from the program. The central tendencies are presented per ethnicity; however, due to the lack of variation, ethnicity was not tested for statistically significant differences. All students in the sample are from low-socioeconomic. This lack of variation precluded examination as a covariate. The study's sample comprised 40 females and 31 males. This is a dichotomous nominal variable. The

ethnic makeup of sample consisted of 12 Hispanic students and 63 African American students. Days absent from the program are measured by counting how many WRS intervention days each student missed. Accordingly, this covariate is a nominal measure.

Data Collection and Analysis

Data Collection

I started data collection after receiving IRB approval and permission from my school district (IRB approval number10-13-14-0315434). Data collection consisted of retrieving archival DIBELS composite scores and the individual subscale scores for third-grade students who participated in the intervention. General education teachers administered the DIBELS pretest to all third-grade students the week of August 26, 2013, prior to the implementation of WRS. General education teachers administered the DIBELS assessment to the study's participants 1 week following the completion of 8 weeks of WRS the week of October 28, 2013.

Individual student scores were recorded electronically in the Measure Class database. I retrieved the test scores by using an administrative login to access the Measure Class database. I replaced student identifying information and added two columns for (a) gender, and (b) days absent from the program.

Data Analyses

The test scores and corresponding demographic information and attendance record data for each student in the initial study sample were entered into SPSS. The specific test scores consisted of the DIBELS composite score in addition to the individual scores in each area of the DIBELS assessment: (a) DORF fluency, (b) DORF accuracy,

(c) reading comprehension (i.e., retell), and (e) vocabulary (i.e., DAZE). The student gender and the number of days absent from the 8 week intervention time frame were entered along with the corresponding test scores.

Prior to testing each hypothesis, a descriptive analysis of the data was conducted to assess the central tendencies of the test scores across the study sample with respect to student gender and days absent from the intervention program. With the study sample comprised entirely of students recognized as students of poverty and African American and Hispanic in ethnic background, this cross-tabs descriptive analysis was limited to student gender. In addition to the preliminary descriptive analysis of the data, exploratory bivariate analysis were conducted to assess differences in test scores with respect to student gender. Specifically, *t*-test analysis was conducted to assess both the pretest DIBELS composite score and the posttest DIBELS composite score for statistically significant differences with respect to student gender.

Following the preliminary descriptive and bivariate analysis of the data, a MANOVA was conducted to answer the research questions. With the MANOVA, I could determine the extent of which student achievement in reading differs after completion of the 8 week WRS reading intervention program. To answer Research Question 2, MANCOVA procedures were used to determine the extent of which differences in DIBELS pretest/posttest composite scores statistically significantly varied based on (a) gender, or (b) the number of days absent during the 8 week WRS intervention. To answer Research Question 3, MANOVA procedures were further analyzed to examine the

changes in reading achievement as measured by the individual constituent DORF and DAZE measures.

To answer Research Question 4, MANCOVA procedures were used to determine the extent of which the differences in the pretest/posttest scores of the constituent DORF and DAZE assessment areas varied based on gender and number of days absent during the 8 week intervention program. MANCOVA procedures were used to examine differences in pretest/posttest DORF and DAZE assessment areas while controlling for gender and number of days absent. The main effect of WRS on the aggregate outcome variable of reading achievement was assessed at the $p < .05$ level of statistical significance. The interactions of gender and days absent from the program were also examined at the $p < .05$ level of significance.

Assumptions, Limitations, Scope and Delimitations

The scope of this study extended to 75 third-grade students who were selected to participate in the reading intervention for 8 weeks. One assumption is that the reading specialist implemented the treatment with fidelity and followed the guidelines for the program. It is imperative that WRS is followed exactly how it is written in the manual. The next assumption is that the students who received the intervention put forth maximum effort and demonstrated a willingness to learn. A related assumption is that the students attended each intervention session and stayed the entire time. Another assumption is that test scores reflect their reading skills and are not hindered by anxiety. Finally, an assumption is that the teacher accurately recorded student reading on the DIBELS device.

Delimitations

The delimitations of this study included 75 of the third-grade students over an 8 week intervention period. A total of 75 students participated in the reading intervention program. This study is limited by the socioeconomic and ethnic diversity within this sample. Due to the site based nature of the student participants, the results of this study do not generalize to other school settings. Due to the relatively small sample size, the results do not generalize to larger school settings.

Limitations

The most pronounced limitation is the 8 week time frame of the intervention program. Students with severe reading difficulties make progress when provided with extended intervention, more intensive instruction, and more opportunities for practice to meet grade level expectations (Begeny, 2011; Ross & Begeny, 2015; Vaughn, Denton, & Fletcher, 2010; Wanzek & Roberts, 2012). As students took the same test twice, they already knew the test and could have remembered the stories they read. In the 8 weeks, they could have improved their reading regardless of WRS. The teachers may have inaccurately recorded student scores on the DIBELS testing device and may not accurately represent student reading proficiency. The reading specialist could have implemented WRS different from how the creators of the program intended.

Protection of Participants' Rights

This study was conducted in accordance with all human subjects requirements and protocols set forth by the District of Columbia Public School System. Accordingly, student anonymity was maintained throughout the data collection and analysis process. All necessary permissions needed to retrieve the archival data for the purpose of this study were obtained. All human subjects requirements were adhered to in accordance with school district protocols and Walden University IRB procedures.

Data Analysis Results

The data were examined by standardized values, or *z* scores, where values below -3.29 or above 3.29 are considered outliers (Tabachnick & Fidell, 2012). Two participants were removed because of their outlying DORF retell posttest composite scores. An additional two participants were removed because of outlying scores to DAZE posttest composite scores.

Descriptive Analysis

Demographics of the Study Sample

Descriptive statistics were conducted on participant demographic data. There were more females (40, or 56%) than males (31, or 44%). The study sample was predominantly African American (59, or 83%). The remaining students were Hispanic (12, or 17%). All participants in the sample received free or reduced lunch (71, or 100%).

There was a total of 24 days of WRS sessions. The number of days absent from the intervention spanned from 0 to 13 days. There were 14 students (20%) who attended each session throughout the 8 week period. There were 30 students (42%) who were

absent from one to four sessions throughout these 8 weeks, and 21 students (30%) who were absent from five to nine sessions. There were six students (8%) who were absent from 10 to 13 sessions. Frequencies and percentages for the sample demographics are presented in Table 3.

Descriptive Analysis of DIBELS Assessment

The DIBELS assessment instrument measures reading achievement along a scale of 0 to 100. The DIBELS composite scores of the third-grade students ranged from 0.50 to 44.00 with $M = 27.92$ and $SD = 9.76$ for the DIBELS pretest, and ranged from 0.25 to 56.75 with $M = 31.58$ and $SD = 10.42$ for the DIBELS posttest composite scores. There were mean gains of 3.66 from the DIBELS pretest composite scores and DIBELS posttest composite scores, suggesting that third-grade DIBELS composite posttest scores were higher than DIBELS composite pretest scores.

The individual tests used in this study corresponded to the DORF fluency, DORF accuracy, DORF retell, and DAZE assessments of the DIBELS test. DORF fluency pretest scores of the third-grade students in this study ranged from 0.00 to 67.00 ($M = 32.96$, $SD = 18.97$). DORF fluency posttest scores ranged from 0.00 to 75.00 ($M = 39.68$, $SD = 21.54$). There were mean gains of 6.72 between the DORF fluency pretest/posttest scores.

DORF accuracy pretest scores of the third-grade students in this study ranged from 0.00 to 92.00 ($M = 63.86$, $SD = 23.02$). DORF accuracy posttest scores ranged from 0.00 to 100.00 ($M = 69.24$, $SD = 22.15$). There were mean gains of 5.38 between the DORF accuracy pretest/posttest scores.

DORF retell pretest scores of the third-grade students in this study ranged from 0.00 to 19.00 (M = 12.08, SD = 5.71) DORF retell posttest scores ranged from 0.00 to 45.00 (M = 14.27, SD = 7.60). There were mean gains of 2.19 between the DORF retell pretest/posttest scores.

DAZE pretest scores of the third-grade students in this study ranged from 0.00 to 7.00 (M = 2.77, SD = 2.26. DAZE posttest scores ranged from 0.00 to 17.00 (M = 3.15, SD = 3.52). There were mean gains of 0.38 between the DAZE pretest/posttest scores. Means and standard deviations of the DIBELS composite scores and the individual subscale scores are presented in Table 4.

Table 4

Mean and Standard Deviations for Continuous Variables

Scales	*Min.*	*Max.*	*M*	*SD*
Days Absent	0.00	13.00	3.90	3.67
DIBELS Composite Pretest	0.50	44.00	27.92	9.76
DIBELS Composite Posttest	0.25	56.75	31.58	10.42
DORF Fluency Pretest	0.00	67.00	32.96	18.97
DORF Fluency Posttest	0.00	75.00	39.68	21.54
DORF Accuracy Pretest	0.00	92.00	63.86	23.02
DORF Accuracy Posttest	0.00	100.00	69.24	22.15
DORF Retell Pretest	0.00	19.00	12.08	5.71
DORF Retell Posttest	0.00	45.00	14.27	7.60
DAZE Pretest	0.00	7.00	2.77	2.26
DAZE Posttest	0.00	17.00	3.15	3.52

Preliminary Bivariate Analysis – Independent Sample *t* test

Following the descriptive analysis of the data, a series of independent samples *t* tests were conducted to examine differences in DIBELS composite scores, and the constituent DORF and DAZE measures; with respect to gender. The Levene's statistic of

equal variances was nonsignificant for each analysis; the assumption of equal variances was met.

DIBELS composite scores and gender. The results of the independent *t* tests indicated that there was not a statistically significant difference in DIBELS pretest scores between gender ($t(69) = 0.10$, $p = .992$). Males scored an average of 27.82 and females scored an average of 28.05. DIBELS composite posttest scores did not statistically significantly differ with respect to gender ($t(69) = -0.20$, $p = .840$); Males scored an average of 31.81 and females scored an average of 31.30. The female students seemed to have higher in composite scores on the DIBELS pretest whereas, the male students showed higher improvement on the DIBELS posttest composite scores. Nevertheless, the results were not significant. Results are presented in Table 5.

DORF fluency scores and gender. Results for DORF fluency pretest scores did not indicate statistically significant differences by gender ($t(69) = 0.54$, $p = .588$) Males scored an average of 31.88 and females scored an average of 34.35. Results for DORF fluency posttest scores did not indicate statistically significant differences by gender ($t(69) = 1.05$, $p = .300$) Males scored an average of 37.33 and females scored an average of 42.71. The female students seemed to have been stronger in fluency on the DIBELS pretest and showed higher improvement on the posttest whereas, the male students performed slightly lower. Nevertheless, the results were not significant. Results are presented in Table 5.

DORF accuracy scores and gender. Results for DORF accuracy pretest scores did not indicate statistically significant differences by gender ($t(69) = -0.17$, $p = .864$); Males scored an average of 64.28 and females scored an average of 63.32. Results for DORF accuracy posttest scores did not indicate statistically significant differences by gender, ($t(69) = -1.13$, $p = .262$); Males scored an average of 71.85 and females scored an average of 65.87. The male students seemed to have been stronger in accuracy on the DIBELS pretest and showed higher improvement on the posttest whereas, the female students performed slightly lower. Nevertheless, the results were not significant. Results are presented in Table 5.

DORF retell scores and gender. Results for DORF retell pretest scores did not indicate statistically significant differences by gender, ($t(69) = 0.06$, $p = .954$); Males scored an average of 12.05 and females scored an average of 12.13. Results for DORF retell posttest scores did not indicate statistically significant differences by gender ($t(69) = -1.05$, $p = .297$); Males scored an average of 15.10 and females scored an average of 13.19. The female students seemed to have been stronger in retell on the DIBELS pretest but showed lower improvement on the posttest whereas, the male students performed slightly higher on the posttest. Nevertheless, the results were not significant. Results are presented in Table 5.

DAZE scores and gender. Results for DAZE pretest scores did not indicate statistically significant differences due to gender ($t(69) = -1.28$, $p = .206$); Males scored an average of 3.08 and females scored an average of 2.29. Results for DAZE posttest scores did not indicate statistically significant differences due to gender ($t(69) = 0.56$, $p =$

.581); Males scored an average of 2.95 and females scored an average of 3.42. The male students seemed to have been stronger in DAZE on the DIBELS pretest but showed lower improvement on the posttest whereas, the female students performed slightly higher. Nevertheless, the results were not significant. Results are presented in Table 5.

Table 5

Independent Sample t tests for DIBELS Test Scores and Gender

	Male			Female			
Composite Test Score	*N*	*M*	*SD*	*N*	*M*	*SD*	*t*(69)
DIBELS Composite Pretest	40	27.82	9.65	31	28.05	10.05	0.10
DIBELS Composite Posttest	40	31.81	9.59	31	31.30	11.56	-0.20
DORF Fluency Pretest	40	31.88	19.02	31	34.35	19.12	0.54
DORF Fluency Posttest	40	37.33	19.92	31	42.71	23.45	1.05
DORF Accuracy Pretest	40	64.28	22.29	31	63.32	24.28	-0.17
DORF Accuracy Posttest	40	71.85	19.73	31	65.87	24.85	-1.13
DORF Retell Pretest	40	12.05	5.67	31	12.13	5.87	0.06
DORF Retell Posttest	40	15.10	7.02	31	13.19	8.27	-1.05
DAZE Pretest	40	3.08	2.35	31	2.29	2.12	-1.28
DAZE Posttest	40	2.95	3.64	31	3.42	3.38	0.56

Note. * $p < .05$. Otherwise $p > .05$.

Multivariate Analysis

Following the bivariate analysis of differences in DIBELS composite scores and DORF and DAZE assessment area scores per gender, MANOVA and Multivariate Analysis of Covariance (MANCOVA) procedures were used to answer each research question. In accordance with MANOVA procedures, student achievement in reading was first measured and assessed with DIBELS pretest/posttest composite test scores (Research Question 1 and Research Question 2), then with the individual constituent DORF and DAZE measures (Research Question 3 and Research Question 4). Research Question 2 and Research Question 4 examined changes in DIBELS composite scores and constituent DAZE and DORF measures (respectively) while controlling for (a) student gender, and (b) number of days absent during the 8 week intervention program.

Preliminary Assessment of Assumptions

Prior to testing each research hypothesis, the MANOVA and MANCOVA assumptions of normality and homogeneity of variance were assessed. The assumption of normality of the data was assessed via the Kolmogorov Smirnov (KS) test statistic. The KS test statistic was not statistically significant for DORF fluency pretest ($p = .200$) or the DORF fluency posttest ($p = .054$) and therefore, the assumption of normality was met. The KS tests indicated statistical significance for DORF accuracy pretest ($p < .001$), DORF accuracy posttest ($p = .050$), DORF retell pretest ($p < .001$), DORF retell posttest ($p = .001$), DAZE pretest ($p < .001$), and DAZE posttest ($p < .001$); Although the assumption of normality was not met for these individual DAZE and DORF test score variables, MANOVA procedures are said to be robust for normality when the sample size

is moderately large, defined as greater than 50 (Stevens, 2009). Adjustments were not made to the data analysis.

Homogeneity of variance was assessed with Levene's test of equal variances which showed nonsignificant results, meaning that the assumption of equal variances was met for each analysis. Homogeneity of the covariance was assessed through a Box's M test statistic. With a nonsignificant test statistic at $\alpha = .001$ for each test score variable, this assumption was met as well (Pallant, 2010). With all necessary assumptions tested and sufficiently met, MANOVA and MANCOVA procedures were used to address each research question accordingly.

Research Question 1: Do third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DIBELS composite scores after participating for 8 weeks in the WRS program?

$H1_0$: Third-grade students who performed below proficient on the DIBELS assessment do not demonstrate a statistically significant difference in DIBELS composite scores after participating for 8 weeks in the WRS program.

$H1_a$: Third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DIBELS composite scores after participating for 8 weeks in the WRS program.

In accordance with MANOVA procedures, differences in DIBELS composite scores were examined in this first research question with the DIBELS pretest/posttest composite scores. The results of this analysis are presented in Table 6

As shown in Table 6, the MANOVA indicated that there was a statistically significant difference in DIBELS composite scores after the completion of the 8 week WRS reading intervention program between pretest/posttest ($F(1, 70) = 22.56$, $p < .001$). The effect size indicated that WRS had a small to moderate effect on student test scores ($\eta^2 = .244$). Average DIBELS composite scores were 27.92 on the pretest and 31.58 on the posttest. The null hypothesis for research question one can be rejected in favor of the alternative. There was sufficient evidence to suggest that third-grade DIBELS composite scores statistically significantly differed after the completion of WRS.

Table 6

Multivariate Analysis of Variance for DIBELS Composite Pretest/Posttest Scores

Source	Pretest		Posttest		$F(1, 70)$	p	η^2
	M	*SD*	*M*	*SD*			
DIBELS Composite Scores	27.92	9.76	31.58	10.42	22.56	<.001	.244

Research Question 2: Do third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DIBELS composite scores after participating for 8 weeks in the WRS program when controlling for gender and number of days absent?

$H2_0$: Third-grade students who performed below proficient on the DIBELS assessment do not demonstrate a statistically significant difference in DIBELS composite scores after participating for 8 weeks in the WRS program when controlling for gender and number of days absent.

$H2_a$: Third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DIBELS composite scores after participating for 8 weeks in the WRS program when controlling for gender and number of days absent.

MANCOVA procedures were used to test differences in DIBELS pretest/posttest composite scores while controlling for gender and number of days absent during the 8 week WRS intervention. The results of this analysis are presented in Table 7.

As shown in Table 7, student achievement in reading as measured by DIBELS composite scores did statistically significantly differ after completion of WRS while controlling for gender and days absent.

Results of the DIBELS composite scores indicated a statistically significant difference between pretest/posttest while controlling for gender and days absent ($F(1,68) = 6.07$, $p = .016$). The effect size indicated that WRS had a small to moderate effect on student test scores ($\eta^2 = .082$). Individually, gender and days absent did not have significant effects on the DIBELS composite scores. For males, average composite scores on the DIBELS pretest were 27.82. For females, average composite scores on the DIBELS pretest were 28.05.

Table 7

MANCOVA for Differences on DIBELS Composite Pretest/Posttest Scores by Gender and Days Absent

Source	*F*(1, 68)	*P*	η^2
WRS Reading Intervention	6.07	.016	.082
Gender (covariate)	0.02	.900	<.001
Days Absent (covariate)	0.32	.571	.005

The null hypothesis for Research Question 2 can be rejected. The MANCOVA analysis indicated a statistically significant difference between pretest/posttest composite scores of the DIBELS while controlling for gender and number of days absent during the 8 week intervention program. Means and standard deviations of the DIBELS composite test scores by gender are presented in Table 8.

Table 8

Means and Standard Deviations of DIBELS Composite Pretest/Posttest Scores Between Genders

Source	DIBELS Composite Pretest				DIBELS Composite Posttest			
	Males		Females		Males		Females	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Gender	27.82	9.65	28.05	10.05	31.81	9.59	31.30	11.56

Research Question 3: Do third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DORF fluency, DORF accuracy, reading comprehension (i.e. retell), and vocabulary (as measured by DAZE) after participating for 8 weeks in the WRS program?

$H3_0$: Third-grade students who performed below proficient on the DIBELS assessment do not demonstrate a statistically significant difference in DORF fluency, DORF accuracy, reading comprehension (i.e. retell), and vocabulary (as measured by DAZE) after participating for 8 weeks in the WRS program.

*H*3a: Third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DORF fluency, DORF accuracy, reading comprehension (i.e. retell), and vocabulary (as measured by DAZE) after participating for 8 weeks in the WRS program.

MANOVA analysis was used to examine changes in reading achievement as measured by the individual constituent DORF and DAZE assessment areas. The results of this analysis are presented in Table 9.

As shown in Table 9, differences in student test scores on the individual subscales of DORF fluency, DORF accuracy and DORF retell after participating in reading intervention program were statistically significant. Scores on the DAZE subscale, however, did not statistically significantly increase following the 8-week intervention program.

Results of the DORF fluency test scores indicated statistically significant differences between pretest/posttest ($F(1,70) = 32.33$, $p < .001$). The effect size indicated that WRS had a moderate to large effect on DORF fluency test scores ($\eta^2 = .316$). Average scores on the DORF fluency test were 32.96 on the pretest and 39.68 on the posttest. Results of the DORF accuracy test scores indicated statistically significant differences between pretest/posttest ($F(1, 70) = 6.21$, $p = .015$).The effect size indicated

that WRS had a small to moderate effect on DORF accuracy test scores ($\eta^2 = .081$). Average scores on the DORF accuracy test were 63.86 on the pretest and 69.24 on the posttest. Results of the DORF retell test scores indicated statistically significant differences between pretest/posttest ($F(1, 70) = 7.32$, $p = .009$).

The effect size indicated that WRS had a small to moderate effect on DORF retell test scores ($\eta^2 = .095$). Average scores on the DORF retell test were 12.08 on the pretest and 8.54 on the posttest. Results of the DAZE scores did not indicate statistically significant differences between pretest/posttest ($F(1, 68) = 0.69$, $p = .410$). The effect size indicated that WRS had a small to moderate effect on DORF retell test scores ($\eta^2 = .010$). Average scores on the DAZE test were 2.77 on the pretest and 3.15 on the posttest.

The null hypothesis for Research Question 3 can be rejected in favor of the alternative. There was sufficient evidence to suggest that third-grade students demonstrated a statistically significant difference in DORF fluency, DORF accuracy, and DORF retell after the completion of WRS. It should be noted that DAZE test scores did not suggest a statistically significantly difference after participating in WRS.

Table 9

Multivariate Analysis of Variance for the Individual Reading Assessments (DORF Fluency, DORF Accuracy, DORF Retell, and DAZE)

	Pretest		Posttest		$F(1, 68)$	P	η^2
Scales	*M*	*SD*	*M*	*SD*			
DORF Fluency	32.96	18.97	39.68	21.54	32.33	<.001	.316
DORF Accuracy	63.86	23.02	69.24	22.15	6.21	.015	.081
DORF Retell	12.08	5.71	14.27	7.60	7.32	.009	.095
DAZE	2.77	2.26	3.15	.532	0.69	.410	.010

Research Question 4: Do third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DORF and DAZE scores when controlling for gender and number of days absent after participating for 8 weeks of the WRS program?

$H4_0$: Third-grade students who performed below proficient on the DIBELS assessment do not demonstrate a statistically significant difference in DORF and DAZE scores, when controlling for gender and number of days absent after participating for 8 weeks in the WRS program.

$H4_a$: Third-grade students who performed below proficient on the DIBELS assessment demonstrate a statistically significant difference in DORF and DAZE scores, when controlling for gender and number of days absent after participating for 8 weeks in the WRS program.

MANCOVA procedures were used to examine differences in pretest/posttest DORF and DAZE assessment areas while controlling for gender and number of days absent. The results of this analysis are presented in Table 10.

As shown in Table 10, student achievement in reading as measured by the DORF fluency did statistically significantly differ after participating in WRS while controlling for gender and days absent during the 8 week WRS intervention. Student achievement in reading as measured by the DORF accuracy, DORF retell, DAZE test scores did not statistically significantly differ after participating in WRS while controlling for gender and days absent during the 8 week WRS intervention.

Results of the DORF fluency test scores indicated statistically significant differences between pretest/posttest while controlling for gender and days absent ($F(1,68) = 23.98$, $p < .001$). The effect size indicated that WRS had a moderate to large effect on DORF fluency scores ($\eta^2 = .261$). Individually, gender and days absent did not have significant effects on the DORF fluency scores. For males, average scores on the DORF fluency pretest were 31.88 and average scores on the DORF fluency posttest were 37.33. For females, average scores on the DORF fluency pretest were 34.35 and average scores on the DORF fluency posttest were 42.71.

Results of the DORF accuracy test scores did not indicate statistically significant differences between pretest/posttest while controlling for gender and days absent ($F(1,68) = 0.21$, $p = .650$). The effect size indicated that WRS had a small effect on DORF accuracy scores ($\eta^2 = .003$). Individually, gender and days absent did not have significant effects on the DORF accuracy scores. Without the covariates present in the model, there was a significant difference in DORF accuracy test scores after WRS. The variation in test scores was the result of gender and number of days absent. For males, average scores on the DORF accuracy pretest were 64.28 and average scores on the DORF accuracy posttest were 71.85. For females, average scores on the DORF accuracy pretest were 63.32 and average scores on the DORF accuracy posttest were 65.87.

Results of the DORF retell test scores did not indicate statistically significant differences between pretest/posttest while controlling for gender and days absent ($F(1,68) = 0.00$, $p = .993$). The effect size indicated that WRS had a small effect on DORF retell scores ($\eta^2 < .001$). Individually, gender and days absent did not have significant effects

on the DORF retell scores. Without the covariates present in the model, there was a significant difference in DORF retell test scores after WRS. The variation in DORF retell scores was the result of gender and number of days absent. For males, average scores on the DORF retell pretest were 12.05 and average scores on the DORF retell posttest were 15.10. For females, average scores on the DORF retell pretest were 12.13 and average scores on the DORF retell posttest were 13.19.

Results of the DAZE test scores did not indicate statistically significant differences between pretest/posttest while controlling for gender and days absent ($F(1,68) = 2.46$, $p = .121$). The effect size indicated that WRS had a small effect on DAZE scores ($\eta^2 = .035$). Individually, gender and days absent did not have significant effects on the DAZE accuracy scores. Without the covariates present in the model, there was not a significant difference in DAZE test scores. Adding the covariates to the model did not affect the findings of the MANCOVA. For males, average scores on the DAZE pretest were 3.08 and average scores on the DAZE posttest were 2.95. For females, average scores on the DAZE pretest were 2.39 and average scores on the DAZE posttest were 3.42.

Table 10

MANCOVA for Differences on DIBELS Composite Pretest/Posttest Scores by Gender and Days Absent

Variable	Source	$F(1, 68)$	p	η^2
DORF Fluency	WRS Intervention	23.98	<.001	.261
	Gender (covariate)	0.48	.490	.007
	Days Absent (covariate)	1.36	.248	.002
DORF Accuracy	WRS Intervention	0.21	.650	.003
	Gender (covariate)	0.43	.516	.006
	Days Absent (covariate)	0.09	.761	.001
DORF Retell	WRS Intervention	0.00	.993	<.001
	Gender (covariate)	0.51	.479	.007
	Days Absent (covariate)	0.30	.589	.004
DAZE	WRS Intervention	2.46	.121	.035
	Gender (covariate)	0.10	.750	.002
	Days Absent (covariate)	1.04	.312	.015

The null hypothesis for Research Question 4 cannot be rejected. There were significant differences in DORF fluency scores after WRS while controlling for gender and days absent. However, there was not sufficient evidence to suggest that third-grade students who participated in WRS demonstrated a statistically significant difference in DORF accuracy, DORF retell, and DAZE areas of the DIBELS assessment taken before and after program participation while controlling for gender and number of days absent during the 8 week WRS intervention. Means and standard deviations of the individual tests are presented by gender in Table 11.

Table 11

Means and Standard Deviations of Individual Pretest/Posttest Scores Between Genders

Source	Pretest				Posttest			
	Males		Females		Males		Females	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Fluency	31.88	19.02	34.35	19.12	37.33	19.92	42.71	23.45
Accuracy	64.28	22.29	63.32	24.28	71.85	19.73	65.87	24.85
Retell	12.05	5.67	12.13	5.87	15.10	7.02	13.19	8.27
DAZE	3.08	2.35	2.39	2.12	2.95	3.64	3.42	3.38

Conclusion

Findings from this study indicated that there was a statistically significant difference in DIBELS pretest/posttest composite, DORF fluency, DORF accuracy, and DORF retell scores; however, the effect sizes were minimal. WRS was implemented for 8 weeks, descriptive and bivariate findings suggest that the duration of the program may have contributed to these findings. Students who do not make significant gains in reading intervention may require more intensive intervention. The duration and frequency of WRS may have been insufficient for students to demonstrate significant growth in DAZE (Wanzek & Roberts, 2012).

The ideal frequency and duration of reading intervention programs to maximize success has been investigated. Ross and Begeny (2015) conducted a small study on four second-grade students who struggled with reading. Each participant received a different combination of intervention duration and teacher/student ratios. The groups were as follows: (a) small group with a 14-minute intervention, (b) small group with a 7-minute intervention, (c) one-on-one with a 14-minute intervention, and (d) one-on-one with a 7-

minute intervention. Interventions took place 3 days per week for a total of 8 weeks. Researchers compared reading improvements among students in the intervention groups with that of a control group that received no intervention. Upon analysis, researchers found that all intervention groups benefitted from treatment, and there were no statistical differences between the treatment conditions. However, patterns of effectiveness differed per student. Generally, the longer interventions led to increased reading gains.

Begeny (2011) explored the frequency of reading interventions among a group of second grade students using the HELPS program. Students were given interventions either 1.5 times per week or three times per week throughout the school year. The average length of each intervention was 8-10 minutes. Begeny (2011) found that while all intervention group participants outperformed the control group, students who had an increased duration of intervention outperformed the rest on measures of fluency and comprehension. Section 3 includes a discussion of the project for the study. This section includes the project's goals, rationale, a review of the literature, implementation and evaluation, and implications for social change.

Section 3: The Project

Introduction

This section is a discussion of the position paper that materialized from the study's findings. The goal of the paper was to summarize the study, including the problem that prompted the study and provide school leaders with recommendations regarding the use of the program. Section 3 includes a discussion of the project's goals, rationale, a review of the literature, implementation and evaluation, and implications for social change.

Goals

The goal of the position paper is to provide school leaders with information regarding the extent of which WRS achieved its intended goal of increasing student reading proficiency. Prior to this investigation, school leaders had tried many reading programs to improve student literacy, including the introduction of new interventions when students' reading proficiency failed to meet district expectations. The aim of the position paper is to provide school leaders with evidence that indicates WRS intervention could be more effective if the intensity, duration, and/or frequency are increased. The position paper provides readers with a description of the study, the study's findings, and program recommendations.

Rationale

A position paper was chosen as the project for the study because of its effectiveness in communicating study findings in a way that is easy to understand. This position paper describes the problem of reading proficiency within the school, provides

an analysis of DIBELS data, and offers recommendations for ongoing program improvements. The paper includes a summary of the study (Appendix A) and recommendations for school leaders and the literacy team. It also provides descriptions of pretest/posttest reading achievement data. Data analysis of student reading achievement after participating in the intervention is described, and recommendations are provided to assist school leaders and literacy team members with improving their existing intervention model.

Review of the Literature

This review of the literature included an exploration of the structure and use of white papers in educational policy development. A position paper, which is a type of white paper, was chosen to communicate study findings and provide school leaders with recommendations related to WRS. In this review, a definition of white papers and explanations of their structure and advantages were given. The use of white papers as a tool for policy development, influence, and marketing is also discussed. The review concludes with comments on the appropriateness of white papers for communicating results from this study.

A variety of online databases were searched to locate literature for this literature review, including ERIC, EBSCO, Gale, and FirstSearch, online publications, Walden Dissertations, and ProQuest. The following terms were included in the literature search: *white paper, position paper, purpose of white papers, educational policy, policy development, literacy, literacy research, curriculum interventions, teaching strategies,*

educational reform, education politics, use of white papers, influence of white papers, and *educational research.*

The goal of the search was to locate studies and information about how white papers have shaped the development and implementation of past educational policies, a task that proved difficult. I was able to locate a variety of white papers related to educational research, some of which had goals of influencing policy, however, little literature was available on the direct influence that white papers have had on policy development. Most of the available research that corroborated the influence of white papers on educational policies was conducted in the United Kingdom, and research on position papers did not generate any useful results. Saturation could not be met due to lack of literature on white papers related to educational research, and white papers related to educational policy. Consequently, the literature review is focused on white papers using available research, and a comprehensive review of white paper use within the education sector was crafted.

The use of white papers to influence policy has been met with much criticism (Allington & Woodside-Jiron, 1999; Morris, 2012; Phillips, 2006; Winstanley, 2012), as it is sometimes viewed as agenda-setting. White papers are often written to persuade or, set political agendas; they have also been used as marketing tools, and are not always purely informational. Because of this, the positions taken in white papers and the way in which research is selected and represented can skew the presentation of data. In contrast, the aim of scholarly research is to present information as objectively and unbiased as possible (Birley & Moreland, 2013). The drawback to scholarly articles is that the

language in which they are written is not always accessible to those who may benefit most from the information (Culler & Lamb, 2003). Keeping that in mind, this review of the literature includes a description of the structure and intended uses of white papers, their benefits and drawbacks, and provide examples of how white papers have been used to set educational policies.

The White Paper: Purpose and Structure

The term *white paper* was once used to describe reports that provided information on government policies. In more recent years, white papers have been used to initiate education reform. Stelzner (2007) explained that white papers are persuasive documents that describe problems and offer corresponding solutions. In an education policy white paper, Wilson (2010) demonstrated the utility of white papers for initiating education reform by presenting the problem of poor educational quality for students with low socioeconomic statuses and providing the district with four recommendations for improving teacher quality.

The content of a white paper may vary depending on its intended purpose and audience (Willerton, 2012). For example, Gish, Beaven, and Malloch (2007) created a white paper to synthesize and present a vast amount of data on enhancing patient quality at a hospital. Gish et al. used the white paper as a tool to communicate with health care practitioners and help leaders make evidence-based decisions.

Most white papers include a formulaic structure that includes an introduction, a definition of the problem, recommendations for solutions, and a conclusion (Business Writing Tips, 2013). The introduction section includes an overview of the topic, the

purpose, and summarizes the conclusions. Next, the problem is defined using terminology familiar to the audience, solutions to the problems are presented along with recommendations and supporting data. Charts, diagrams, and graphs are effective in this section. Finally, the key points are reiterated in the conclusion (Business Writing Tips, 2013).

Advantages of White Papers

In an information-driven world, many vehicles are available for disseminating information; but, some distinct advantages exist for white papers. The white paper originated as an educational document designed to enlighten readers about topics. Information presented in these documents "were supported with impartial, unbiased facts to aid in the decision-making process" (Joshi, 2006, p. 83). In the beginning, white papers had no agenda other than to inform. This style of white paper is currently used by government think-tanks and university researchers (Joshi, 2006) as a credible way to share information. The language is usually straightforward and more accessible to the average person than academic research or government documents are.

Because white papers can also be used as powerful sales and marketing tools, and are commonly written for conference materials, promotional drives, publicity, or to share information about new products or technologies, their educational aims are not always altruistic (Joshi, 2006). In sales- and marketing-oriented white papers, the following are often included: market analysis, quotes from clients about product or service implementation, product analysis, and unique selling points that differentiate the product or service from the competition (Joshi, 2006). These biased features may be included in

the white paper to generate interest in a new product, demonstrate market dominance, or gain business (Joshi, 2006). For these reasons, white papers should be read closely to detect persuasion, if the reader's intent is to obtain objective information.

Education-Focused White Papers

Education has been the focus of many white papers. Universities, nonprofits, government organizations, and corporations may use white papers. The strategic use of white papers may include informing the public, as with those produced by nonprofits or research institutes. However, individuals also commonly use white papers as a subtle way to market educational products or services. A few of the recent, education-related white papers on a variety of topics are discussed.

The Nellie Mae Education Foundation (2014) partnered with the American Institutes of Research to study highly regarded secondary math teachers and expand the research on best practices in mathematics education. The research was conducted in response to calls for improvements within STEM education and to explore ways to increase student engagement with math content. The Nellie Mae Education Foundation investigated the effectiveness of student-centered learning by constructing a case study that incorporated several classrooms, teachers' philosophies, and schools' instructional contexts (Nellie Mae Education Foundation, 2014). Highlights from the study design and findings were presented in the white paper. The paper concluded with the following four suggested implications: the presentation of abstract mathematical concepts can have positive outcomes when presented in student-centered ways, a more specific definition of student-centered learning may assist math teachers, and instructional context and

teachers' philosophies can affect the strength and consistency of student-centered approaches (Nellie Mae Education Foundation, 2014).

The State Educational Technology Directors Association (SETDA) published another education-focused white paper in 2012. The authors discussed the importance of broadband access in K-12 schools and provided a research-based argument for improving educational infrastructure to better support broadband access for primary and secondary students. Fox, Waters, Fletcher, and Levin (2012) provided a series of recommendations for school leaders and policy makers to chart "a course for the future of K-12 education enabled by broadband" (p. 25). These recommendations included addressing the broadband infrastructure needs in K-12 schools, ensuring universal broadband access, building state leadership, and advocating for federal funding. Fox et al. called for increased federal funding for the outlined infrastructure initiatives. Fox et al. also concluded that their recommendations "focus on supporting an educational ecosystem that sparks innovation, prepares students for college and careers, and allows our teachers and students to exploit the full spectrum of online educational content and evolving best practices" (p. 26) available through the Internet.

In a white paper produced by the educational measurement and technology company, Metametrics, Turner, Smith, and Lattanzio (2014) discussed the plummeting levels of public confidence in public schools. Turner et al. addressed Gallup public opinion polls and data from a variety of sources, including TIMSS data and results from the Progress in International Reading Literacy Study. Turner et al. discussed the backlash against the Common Core State Standards (CCSS), to where much controversy has arisen

regarding third-grade reading measures and assessments. Turner et al. provided educational leaders with recommendations for increasing receptiveness of the CCSS and restoring public confidence in public education. As a company that produces standardized test materials, Metametrics has a vested interest in protecting the CCSS and standardized testing practices.

Many of the education-related white papers retrieved for this review were more akin to marketing materials produced by educational companies. For example, the educational program company, Ready, partnered with Curriculum Associates to develop a white paper authored by Cunningham (2014) on the new Common Core State Standards, as well as college and career readiness standards that emphasized writing instruction. The white paper included a synthesis of findings from multiple studies on writing instruction. Based on the research, Cunningham provided a suggested framework for teaching writing, including planning, revising, and editing, as well as advice to administrators on how to support educators. The final page of the paper included a blurb on the Ready Writing program, which is based on a framework that correlates with the research findings presented in the document. Although the paper was research-based, it was, nonetheless, marketing material for Ready's writing program. This is an example of the selective use of research to support the marketing of an educational product.

A recent white paper produced by the wireless communications company, Ruckus (2014) provided another example of white paper educational marketing. Unlike most white papers, the Ruckus white paper is virtually void of research-backed claims. Instead, it provides recommendations for setting up wireless classrooms using Google

Chromebooks and Chromecase, illustrating the benefits of using those products rather than those from competitors (including Cisco, Aruba, Dell, & Apple) and stating that tests indicated that "Ruckus is indeed the highest-capacity Wi-Fi solution available with the fastest file transfer times" (Ruckus, 2014, p. 7).

White Papers and Educational Policies

Education-focused white papers are often more than organizations' presentations of research or marketing tactics by companies that produce educational materials; these papers may also be used to sway educational policy. Allington and Woodside-Jiron (1999) investigated educational policy in California, New York, Texas, and Wisconsin to "understand policy development and implementation," (p. 4) as well as "the process of agenda-setting advocacy" (p. 4). During their investigation Allington and Woodside-Jiron, (1999) honed in on reading interventions supported by the National Institute of Child Health and Human Development (NICHD), because of increases in the visibility of NICHD-supported research in policymaking forums, the widespread dissemination of said research, and "the use of a particular policy tool – a white paper" (Allington & Woodside-Jiron, 1999, p. 4). Because this paper appeared so frequently during Allington and Woodside-Jiron's search, they traced the document's origin, availability, and influence in California and Texas (Grossen, 1997).

Allington and Woodside-Jiron noted a few troubling issues with the paper, including variations in titles, authorship issues, and recommendations not based on research. They discovered that none of the white paper's recommendations were supported by the NICHD research it cited. According to Allington and Woodside-Jiron's

summary "overstates the research and exaggerates the actual findings of the NICHD-supported studies" (p. 8). The problem with the paper was that it exploited and twisted NICHD research, and then became an influential tool in shaping curriculum reform and teacher education in California and Texas. "What concerns us is (a) the extent to which the NICHD-supported research has been used as a policy lever to advocate for particular and specific curricular emphases in general education reform and (b) the widespread acceptance of the Grossen (1997) white paper as a reliable synthesis of research" (Allington & Woodside-Jiron, 1999, p. 10).

The paper presented by Allington and Woodside-Jiron (1999) provided an example of how white papers can be misused to influence development and changes in educational policies. White papers have the potential to affect educational policies significantly; but, the onus is on policymakers and leaders to thoroughly investigate any materials before using them to guide policy. According to Benveniste (1977), white papers can be developed by like-minded researchers to produce documents that can influence policy and provide advocates with the lead time needed to institute policy changes. "In other words, the selected expert(s) produces a friendly interpretation of the research that can be widely distributed but that cannot be easily disputed in a short period of time" (Allington & Woodside-Jiron, 1999, p. 11).

The misguided use of information presented in white papers is often fueled by good intentions. Much of the interest in research and empirical data that white papers present in easy-to-understand language is facilitated by growing interest in "what works" (Winstanley, 2012, p. 518). Winstanley reported on the phenomenon of policy borrowing

in education, in which leaders travel to countries with top-ranking educational systems, such as Sweden, to discover ideas to incorporate in their home countries. Much of this policy-borrowing activity was sparked by the *2010 Schools White Paper*, which, according to Morris (2012), is a report that lacks rigor and that the "specific policy actions proposed are not congruent with the findings of the report" (p. 99).

Project Description

The project component of my project study involved developing and presenting a position paper, a type of white paper based on study findings. The process of developing the white paper was complicated. There was a lack of literature that explained how to compose the paper. There were no guidelines on the structure and content of a white paper on the Walden website and there were no templates available to use as a guide.

The position paper will be presented to the school leaders and literacy team members at a collaborative team meeting. The position paper will be provided to these members as both a hard and soft copy. Resources that will be needed to present the position paper are copy paper, copy machine, stapler, and staples for the hard copies. For the soft copies of the position paper, I will need a computer, Internet, and the e-mail addresses of literacy team members and administration. Existing supports could consist of assistance from the school secretary with making the copies and stapling them.

I do not foresee any potential barriers. All supplies needed to facilitate the distribution of the position paper are readily available. Administration has agreed to the dissemination of the position paper. A specific date for the meeting will be determined upon approval of the completed study.

Proposal for Implementation

The position paper will be presented to school leaders and literacy team members after the study is approved. Administration has agreed that the position paper may be presented at a morning collaborative meeting once the project is approved by Walden University. Collaborative meetings are held every morning in the media center at the study site from 8:00 am to 8:45 am. Upon approval of the study by Walden University, a date for the presentation will be selected. The meeting will include a discussion of the study, the study's findings, and recommendations regarding the use of WRS. The position paper will be distributed to members, and key elements of the paper will be conveyed. Recommendations provided in the position paper will be thoroughly reviewed. Members will have the opportunity to review the position paper and ask any questions that arise. My role was to develop and present the position paper. If necessary, the researcher will be available to assist with the application of recommendations.

Project Evaluation Plan

The position paper will present the findings of the impact of WRS intervention on third-grade DIBELS composite scores and the individual subscale scores. The goal of the position paper is to provide school leaders and literacy team members with evidence to support the increase of the duration of WRS. An outcomes based evaluation will be used to determine if the implementation of the project led to school leaders making an informed decision regarding the implementation of WRS. The program will be considered effective if outcomes include administration and literacy team members decide to extend the 8 week time from for the use of WRS intervention.

I will use a goal-based questionnaire to measure if the project met its intended goal. Goal based questionnaires are appropriate because they are effective in determining the extent of which a program met its goals. The purpose of a questionnaire is to gather opinions about the issue presented in the project (Lodico et al., 2010). I will collect questionnaires following the presentation of the position paper. Once these data are collected and analyzed, I will be able to determine whether or not the project met its intended goal. The questionnaire will consist of five questions centered on the project's goal. The key stakeholders are the school leaders and the literacy team members who make the decisions regarding reading intervention at the school.

Project Implications

The position paper will communicate the study's findings and offer recommendations for improving the reading intervention model. The school serves a population where more than 50% of its third-grade students are at risk for reading failure. If school leaders make necessary changes to fortify the reading intervention model, they may increase the reading proficiency of these struggling readers. Third-grade reading proficiency is correlated with future academic success and improved socioeconomic status (Fiester, 2011).

The school can better prepare students to succeed by delivering a sound, valid, and targeted reading intervention model. By enhancing the reading intervention model, the school may address the specific needs of its learners. Increased reading scores could result in additional funding and incentives for the school. Moreover, the school will be in

a position to serve as a model for other schools with similar issues, which may lead to increased reading proficiency among students throughout the district.

Implications for Social Change

Local Community

The position paper provides the findings of the study and offers recommendations to improve the reading intervention model. If school leaders make the necessary changes to strengthen their reading intervention model, they will be able to increase the reading proficiency of struggling readers. By enhancing the reading intervention model, the school can address specific needs of its learners. Increased reading scores could result in additional funding and incentives for the school. The school will be in a position to serve as a model for schools with similar issues. This will result in an increase in reading proficiency among students within the district.

The school's effort to address the reading needs of third-grade students will benefit the community. Social change will occur when third-grade students are proficient in reading leading to success in other academic courses. These students are more likely to graduate from high school than students in the third-grade who are not proficient readers, resulting in more opportunities for success in employment and future education (Fiester, 2011). Social change will occur within the community when these students are become productive citizens and contribute to society. The position paper may lead to social change as it demonstrates how the evaluation of school programs could help schools better meet the needs of students, preparing them to become positive stewards of their communities.

Far-Reaching

There is a lack of research about WRS and its effect on third-grade DIBELS composite scores and the individual subscale scores. This study could contribute to the minimal existing literature about the reading intervention. If the school monitors and evaluates its reading intervention programs and makes necessary adjustments, improvement in third-grade reading scores is inevitable. Not only can this effort benefit third-grade students, but the school can apply the study's findings to the school-wide reading intervention model resulting in increased reading scores in all grades. The position paper may instigate a change at the school and district level by improving how reading interventions are selected or discontinued. The position paper demonstrates the importance of evaluating such programs.

Conclusion

Section 3 included a discussion of the project, project goals, rationale, review of the literature, implementation, evaluation, and implications for social change. The selected school had already implemented WRS to address the reading needs of third-grade students; however, leaders did not have a system in place to measure the program's effectiveness. This project study will provide the school leaders and literacy team with information needed to improve the existing reading intervention model. A position paper will be used to communicate study findings and recommendations to school leaders and literacy team members. The content of the position paper is based on information from the literature review on white papers.

This section also included a description of implications for social change, which may include increased reading proficiency levels of third-grade students, implementation of an effective reading intervention model, and future success of third-grade students. Section 4 includes researcher reflection, conclusions, and future research.

Section 4: Reflections and Conclusions

Introduction

Section 4 includes a discussion of my reflections and conclusions for this quasi-experimental study that examined the impact of WRS on third-grade readers' DIBELS composite scores and the individual subscale scores. Leaders at the study site were concerned with the reading scores of third-grade students, which made the study relevant to the school. Included in this section are a discussion of the project's strengths and remediation of limitations. It also includes a discussion of my role as a scholar, practitioner, and project developer. This section closes with my reflection on the project's impact on social change and implications for future research.

Project Strengths and Limitations

The most significant strength of the position paper project is that it provides a transparent and efficient method for equipping school leaders with information regarding the study. According to Stelzner (2010), the position paper is an effective platform to present the study's findings, and relevant feedback about the existing reading intervention model. The paper is a description of the problem of third-grade reading proficiency within a local school setting, and offers recommendations to improve reading intervention. By employing this approach, I am providing the school with the data needed to enrich their reading intervention model and meet school leaders' ultimate goal: increase DIBELS scores and reading proficiency of third-grade students. This paper will encourage school leaders to use logic and facts about the continued use of selected

reading intervention programs (Graham, 2013). There were no limitations associated with the project.

Recommendations for Alternative Approaches

While a quasi-experimental approach based on quantitative data was selected as the design of the study, a case study could have been an alternative approach. Rather than relying solely on quantitative data, a case study would provide an in-depth understanding of the structure of WRS using interviews and observation data. Focusing on the effectiveness of WRS through the experiences of one or two students would allow the researcher to truly delve into insights and artifacts related to WRS, thus providing further information regarding the program.

Scholarship

The doctoral process taught me that scholarship involves complex, profound, and rigorous learning. I encountered a variety of challenges through this process including scholarly writing, thinking like a scholar, and organizing my time. I learned the importance of using research to inform practices within the field of education.

Scholarly writing was perplexing. I had never heard the term *scholarly writing* until I began the program at Walden. Early in the program, my writing was verbose and suffered from exhaustive descriptions and adjectives. After several returned drafts and assistance from the writing center, I came to understand that scholarly writing is concise, direct, and states facts evidenced by research. American Psychological Association (APA) formatting was another obstacle that remains a challenge for me, though I have learned how to cite sources correctly and appropriately format the content of a document.

In addition to the assistance of the writing center, the APA Publication Manual was a valuable resource.

I learned that scholarly thinking is about using a wider lens for interpreting, analyzing, and making connections. As I wrote this study, I had to take a few days to decompress so that I could return to writing with a fresh mind and fresh eyes. I learned that consistently writing without taking breaks made it almost impossible to see beyond my own perspective. I had to learn to be analytical as I incorporated different resources in my writing, incorporating graphs and charts to help me understand study findings. Making connections within my review of the literature was arduous—at first, I thought the review of the literature was the same as an annotated bibliography. As I worked, I learned that just reporting the literature was not enough, and I was forced to find common themes and topics, and arrange my literature in a logical manner.

Organizing my time was another challenge. In the beginning, I spent an exorbitant amount of time on my school work. I worked every day of the week for hours which left me feeling exhausted and unmotivated. In response, I developed a realistic schedule that kept me focused for the entire process.

I also learned the value of using research to inform educator practices. The school where the study took place has used many reading intervention programs to increase reading proficiency. Often, these programs would be used for one school year and then switched to another program the following school year. Conducting my study made me realize the value in evaluating programs prior to implementation, because such

evaluations save time and money, and could be beneficial in helping leaders select useful programs.

Project Development and Evaluation

This project was developed as a result of the study's findings. The findings showed differences in DIBELS composite scores and the individual subscale scores had statistical significance; however, the effect sizes were minimal. The descriptive and bivariate findings suggest that the duration of the program may have contributed to these findings.

After reviewing these findings, I determined that a position paper would be the most suitable way to communicate with school leaders and the literacy team. The position paper includes a description of the overall study and the findings using clear and concise language. In accordance with the study's findings, I have developed four recommendations that may be useful in improving the school's reading intervention model. The first recommendation is that the school should continue to use WRS for struggling readers in third-grade.

The second suggested recommendation is an increase in the duration of the intervention from 8 to 24 weeks. Students did not demonstrate statistically significant growth during the study, but may benefit from more time in which to grow their knowledge. According to (Wanzek & Roberts, 2012), intensifying an intervention requires increasing the time frame students receive the intervention or the frequency of the intervention. Intervention that occurs over an extended amount of time leads to increased gains (Ross & Begeny, 2015).

The third recommendation is that the school should engage in further research on the program that is extended to students in other grades. The study was limited to third-grade students, but extending the program to other grade levels may lead to increased reading proficiency levels on a larger scale. Because of the lack of a control group, the fourth recommendation is to repeat the study using a control group. The inclusion of a control group is good for generalizability and to determine if other factors outside of the program affected reading proficiency.

Developing and evaluating the project made me feel valued in my workplace and gave me credibility. Before, my suggestions about the reading intervention model went unheard because they were not grounded in research. Now that, my suggestions are concrete and grounded in research, my school leaders are inclined to take me seriously and value my recommendations. I am honored to see my study used as an instrument of change for the school.

Leadership and Change

I learned that it is the responsibility of school leaders to make necessary changes to maintain program effectiveness. I noticed that leaders may be aware that change is needed, but require assistance to identify where that change should occur. Leaders can become comfortable with existing programs and apprehensive about change. As leaders and advocates for students, we have a responsibility to facilitate, accept, and initiate changes to address the needs of all learners.

Analysis of Self as Scholar

While reviewing the literature about reading intervention, I saw my passion about this topic flourish. I wanted a deeper understanding of reading interventions, struggling readers, and solutions to the reading crisis. I began to interact with various studies in a way that was new to me and went beyond a simple understanding of what the text was conveying. I was able to integrate the theories and findings I was studying with my existing beliefs and practices.

My study helped me to recognize the severity of the reading crisis in the United States, especially among minorities. This realization has study transformed me into an advocate for literacy and social change; I have already applied for various literacy positions where I can be of service in this area. I want to change the way the reading crisis is being handled in my local community by developing more effective interventions with a greater influence on students' reading.

Analysis of Self as Practitioner

I am a classroom teacher and the doctoral process has caused me to re-evaluate my teaching pedagogy. My instruction has transitioned from teacher-centered pedagogy to student-centered pedagogy, in which I focus on the individual needs of my students. I believe that I am better prepared to deliver efficient reading instruction and I feel confident in my abilities. The review of literature for this study helped me to identify efficacious reading intervention programs. Should my school leaders inquire about reading intervention programs, I will be able to assist them with selecting one.

Analysis of Self as Project Developer

Developing the project for this study was challenging. To begin, I was unfamiliar with what type of project would best articulate my findings. I had to choose a project that was appropriate for my audience. The school operates on a strict professional development calendar, which is preplanned for the entire year. I found a position paper to be most appropriate to convey my findings without intruding on the busy schedules of school leaders. I am now confident in my ability to develop position papers should I need to do so for future projects.

Reflection on the Importance of the Work

This position paper will provide vital information regarding the impact of WRS on a group of third-grade struggling readers. Third-grade reading proficiency is pivotal. By improving the existing reading intervention model, the school can help struggling readers reach grade level proficiency. Students who are not proficient readers by the end of third-grade will struggle with reading for the remainder of their academic careers (Hernandez, 2011). These students are more likely than their peers to drop out of school, experience poverty, and miss opportunities for success in the workplace (Fiester, 2011; Hernandez, 2011; Hines, 2009; Lesnick et al., 2010; Reschly, 2010). This project has the potential to encourage social change at the school. The position paper will provide recommendations to assist school leaders with closing the reading achievement gap in third grade and thus preparing students for success in society.

Implications, Applications, and Directions for Future Research

The findings from the study contribute to the existing body of knowledge about reading intervention programs and reading achievement. This study expands the body of knowledge about WRS and its impact on third-grade reading. Although this study did not provide evidence that third-grade students who received WRS demonstrated statistically significant differences in all areas of DIBELS (DORF fluency, DORF accuracy, DORF retell, and DAZE) descriptive and bivariate findings suggest that the duration of the program may have contributed to these findings. Further research of a longer duration may provide additional data that can be used to make decisions regarding continued use of WRS. This research also illustrates the importance of having a system in place to measure the effectiveness of reading interventions and ensuring that interventions meet students' learning needs. This project has implications for the school where the study took place and for the school district. District leaders could use the findings of this study to improve the reading intervention model, and the selection process of such programs.

The presentation of the position paper has implications. Sharing the study's findings with school leaders and literacy team members will expand their knowledge about WRS. The position paper is written clearly so that administrators and literacy team members can make an informed decision about the continued use of WRS. The position paper will be the venue for sharing the findings of the study and highlighting areas that are in need of improvement.

The project study in its entirety has implications. The findings from this study will provide district and school leaders with information that would be useful in making

informed decisions regarding the continued implementation of the intervention at the study site. There is a lack of research regarding WRS and its impact on reading achievement. This study will add to the existing body of knowledge.

Conclusion

Section 4 included my reflections and conclusions on this quasi-experimental study that examined the impact of WRS on DIBELS composite scores and the individual subscale scores of struggling third-grade readers. In this section, I reflected on the strengths and limitations of the study. I also discussed my role as a scholar, practitioner, and project developer, and I reflected on the project's impact on social change and implications for future research.

This study provided valuable data that school leaders may use to address the reading needs of struggling third-grade students. Leaders may use this information to extend the intervention time frame. Results from this research may bolster leaders' understandings of the importance of program evaluation and serve as a model for future program assessments.

This study is a result of the decision-making processes about reading intervention in my work environment. I have witnessed my school experiment with many reading intervention programs without ever presenting a sound reason for keeping them or switching them. Continued use of legacy programs and ineffective interventions did not improve the reading scores of struggling students and assisted with widening the reading gap between fluent and struggling readers. I felt that an evaluation of these programs was necessary. My research and project were the only way I could get school leaders to

examine their existing practices and to add the evaluation component before implementing a new intervention or switching the intervention. My study has allowed me to initiate social change within the school and hopefully within the school district.

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Appendix A: Reading Intervention Position Paper

Introduction

The aim of this position paper is to present school leaders with the findings of a study conducted on the Wilson Reading System (WRS) intervention. The goal of the research was to determine the extent to which WRS achieved its intended purpose of increasing reading proficiency levels, as demonstrated by DIBELS composite scores and the individual subscale scores. Before the intervention began, student scores from DIBELS and other reading assessments indicated below grade level reading proficiency in the study population of third-grade students in a Washington, D.C. school. In response to these poor scores, school leaders implemented WRS; however, no procedures had been instituted to measure the program's effectiveness. Data were collected from the sample to determine if participating students experienced a statistically significant difference in DIBELS composite scores and the individual subscale scores after participating for 8 weeks in WRS. Findings indicate that WRS did not achieve its intended goal of raising student scores in all areas of DIBELS.

This report begins with a comprehensive overview of reading problems among U.S. students. A detailed description of WRS and study methodology is followed by a summary of the research findings. This paper also presents major evidence from the literature, outlines recommendations, and describes the goals of the project. Information in this report may be especially helpful to educational leaders and stakeholders who play a role in improving the literacy of K-12 students.

Background

Reading is a fundamental skill necessary for students to become successful and productive adults (Hernandez, 2011). Inadequate reading skills can have an adverse effect on student behavior and academic performance across content areas. Even if struggling readers manage to make it through school, deficient reading abilities can negatively affect opportunities for success into adulthood (Fiester, 2011; Hines, 2009; Reschly, 2010).

Because of its fundamental role in academic and professional success, educators, parents, and school districts have poured significant energy and resources into improving student literacy. In the U.S. public school system, academic performance is often measured by standardized assessments and students' successful completion of educational benchmarks. Because of large scale literacy issues, reading is one of the most frequently assessed subjects. Student literacy issues have led to the implementation of a variety of reading intervention strategies across all grade levels in U.S. schools.

Although literacy issues are evident across all grade levels, educational leaders are currently hyper focused on the reading skills of third-grade students. This is because third-grade is the last year that foundational reading skills are taught to all students (Fiester, 2011). The majority of third-grade textbooks allow students to practice previously learned reading skills. However, by the time students enter fourth grade, they are expected to employ existing literacy skills to learn content, access information, and become critical thinkers. For students who are still struggling to read at this time, access to grade level content can become a challenge that poses additional threats. Without the

ability to access and assimilate the information they need to excel, students can also become at risk for failure across other content areas.

A report by the National Reading Panel (2002) identified the following five critical elements of reading instruction: (a) phonics, (b) phonemic awareness, (c) fluency, (d) vocabulary, and (e) comprehension. Subsequently, a host of reading interventions and enrichment programs are now available to school districts (e.g., Fundations, Read Naturally, SpellRead, etc.). Research indicates that some of these interventions are effective (WWC Intervention Report: Fundations, 2010; WWC Intervention Report: Read Naturally, 2013; WWC Intervention Report: Reading Mastery, 2006). However, despite the implementation of research backed reading programs, many students continue to demonstrate reading deficiencies. Consequently, ongoing research into new methods and critical evaluations of existing interventions are crucial for continued improvements to student literacy (Fiester, 2011).

Many studies on the positive effects of reading interventions have been conducted on cohorts of students who have demonstrated reading deficiencies (Bailet, Repper, Piasta, & Murphy, 2009; Berkeley, Scruggs, & Mastropieri, 2010; Case et al., 2010; Daly, Johnson, & Leclair, 2009; Duff, Haylou-Thomas, & Hulme, 2011; Filippini, Gerber, & Leafstedt, 2012; Gibson, Cartledge, & Keyes, 2011; Giess, Rivers, Kennedy, & Lombardino, 2012; Goss & Brown-Chidsey, 2012; Gunn, Smolkowski, & Vadasy, 2011; Kirk & Gillon, 2009; Lovett, Lacerenza, De Palma, & Frijters, 2011; Ritchey, Silverman, Montanaro, Speece, & Schatschneider, 2012; Savage, Abrami, Hipps, & Deault, 2009; Schiller et al., 2012; Vaughn, Denton, & Fletcher, 2010). To maximize the

effectiveness of any reading intervention, it is crucial that struggling readers are identified early and that teachers are prepared to implement strategies to improve literacy among these students. Unfortunately, reading can be difficult to teach because it involves the development of multiple skills, rather than simple content comprehension. To address each of the skills needed to improve literacy, a complete reading curriculum should include the following components: (a) phonics (the correlation of sounds and letters), (b) phonemic awareness (the ability to sound out words), (c) vocabulary (the body of words in a language), (d) fluency (the ability to speak and write accurately), and (e) reading comprehension (the understanding of a text; Figure 1).

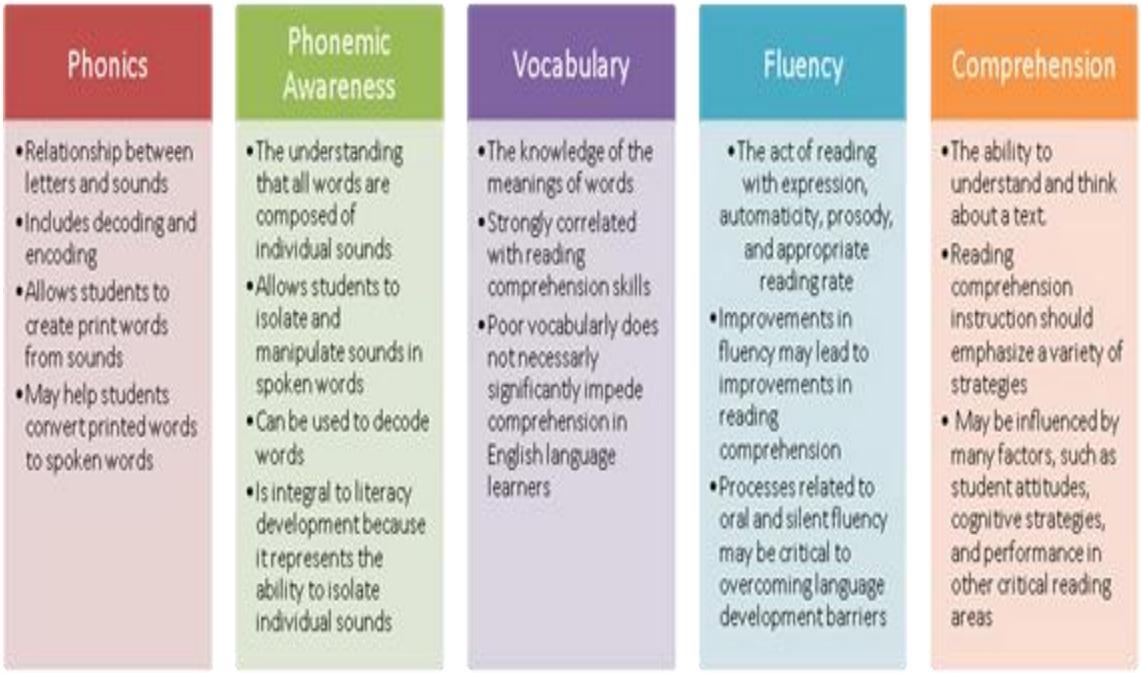

Figure 1. Components of reading instruction.

In addition to the components of a reading program, additional factors can affect the success of any reading intervention, including teachers' skills, long-term student

development, and the fidelity with which interventions are implemented. Many researchers have reported that targeted reading interventions for struggling readers can greatly improve performance on standardized tests (e.g., Apthorp et al., 2012; Filippini et al., 2012; Gibson et al., 2011). Researchers have also found that gender may affect reading comprehension (Logan & Johnston, 2009), as well as the employment of effective reading strategies (Anastasiou & Griva, 2009; Hollenbeck, 2013).

Response-to-Intervention

The response-to-intervention (RTI) model is a method of intervention that assesses students' intervention needs. The RTI model is divided into three tiers (Figure 2), with students moving up the tiers toward increased intervention intensity, as necessary. Tier 1 is based on primary prevention strategies and involves the use of evidence-based classroom instruction designed to help all learners read, while providing teachers with measures to screen for struggling readers. Tier 2 involves supplemental intervention for those readers identified as "at risk" in the first tier. Finally, the third tier involves the implementation of more intensive interventions for those who have not

Assessment and implementation of intervention strategies through the use of an RTI model help educators quickly identify struggling readers and respond with effective interventions (Simons et al., 2008). A significant body of research supports the use of the RTI intervention model (Al Otaiba, Kosanovich-Grek, Torgesen, Hassler, & Wahl, 2005; Connor et al., 2013). Struggling readers who fail to meet benchmarks or have learning disabilities related to language development skills may benefit from more intensive

instructional strategies, such as differentiated instruction, individual/small group lessons, and oral repetition.

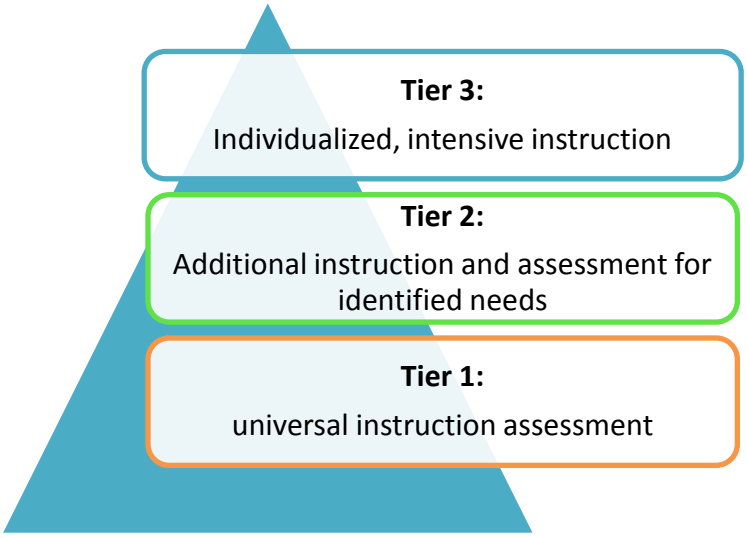

Figure 2. RTI tiers.

Differentiated Instruction is a responsive teaching technique that provides learners with a variety of options for assimilating information, making sense of ideas, and practicing what they have learned (Tomlinson, 2013). Oral repetition is often identified as rote recall and may be a valuable practice for struggling readers (Denton et al., 2010; Leven, Bender, & Lesgold, 1976; Lo, Cooke, & Starling, 2011). Individual and small group learning involve the use of one-on-one learning or small group settings that only involve a few students per instructor. Amendum, Vernon-Feagans, and Ginsberg (2011) have found that fast-paced, one-on-one targeted interventions may improve students' reading skills across a number of domains.

RTI Success

Because many schools face tight budgetary constraints, it is important to maximize the effective of any RTI intervention. Based on an in-depth study of RTI effectiveness, Abbott and Wills (2012) made the following recommendations for successful RTI implementation:

1. Organize an RTI team that can create and implement a comprehensive change plan across all grade levels.
2. Implement data collection strategies that fit the school's environment and guide practice and interventions.
3. Maximize small-group and general curriculum by encouraging mastery, error correction, read aloud time, and providing learners with ample opportunities to respond to learning.
4. Involve as many school staff members in the intervention as possible.
5. Encourage the RTI team to act as a problem-solving panel for the school by providing them with the opportunities to strategize and implement interventions based on identified deficiencies and clearly defined goals.

Measures of Reading Ability

The key to any effective reading intervention program is ongoing assessment. Just as there are many intervention programs available, there are also many assessment tools for educators to choose. Some of the most common tests are described as follows.

DIBELS. The DIBELS instrument measures the acquisition of early literacy skills from kindergarten through 6th grade, providing a composite score that indicates

literacy support needs (DIBELS Data System Description and Sample Reports, 2011). For third-grade students, the DIBELS composite score is a combination of the scores in the following areas: (a) DORF words correct, (b) retell score, (c) DAZE score, and (d) DORF accuracy score (DIBELS Data System, 2011). The validity of the DIBELS assessment as a predictor of reading outcomes has been validated as early as 2002 and has demonstrated reliability in hundreds of studies (Good & Kaminski, 2002). DIBELS has been validated for screening students and predicting test performance (Rouse & Fantuzzo, 2006).

Phonemic decoding. Phonemic decoding refers to a student's ability to determine the meanings of words by translating groups of letters into sounds and linking them to vocabulary to access meaning. The Word Attack assessment is often used to measure phonemic decoding skills. A subtest from the Test of Word Reading Efficiency (TOWRE), called Phonemic Decoding Efficiency (PDE) is another common measure (U.S. Department of Education, 2007).

Reading comprehension. Reading comprehension is the ability to make meaning of a text and to reflect on its message. Some measures for reading comprehension include the Passage Comprehension subtest of the WRMT-R and the Passage Comprehension assessment from the Group Reading Assessment and Diagnostic Evaluation (GRADE; U. S. Department of Education (U.S. Department of Education, 2007).

Word reading accuracy and fluency. Word reading accuracy refers to the ability to identify words accurately, and fluency is the ability to read with enough ease and accuracy to enable attention to focus on making meaning of the text. These factors are

often assessed with the following measures: the Word Identification (WI) subtest of the WRMT-R; the Sight Word Efficiency (SWE) subtest of the TOWRE; and the Oral Reading Fluency subtest from Edformation (U.S. Department of Education, 2007).

Reading Interventions

Education professionals and institutions have many choices when it comes to RTI programs. A brief description of some of the most popular RTI literacy programs, including WRS, follows.

Read Naturally. Included in the Read Naturally reading intervention program are four separate products that aim to improve oral reading fluency. The strategies implemented by the Read Naturally program include "modeling of story reading, repeated reading of text for developing oral reading fluency, and systematic monitoring of student progress by teachers and the students themselves" (WWC Intervention Report: Read Naturally, 2013). The What Works Clearinghouse (WWC) evaluated five studies on Read Naturally, which were reported in the 2013 WWC Intervention Report for the program. According to the Clearinghouse's 2013 analysis, the program had potentially positive effects on general reading achievement, mixed effects on fluency, and no discernible effects on alphabetics and comprehension.

Reading Mastery. This is a direct instruction program available in two versions: for grades K-3 and grades K-6. Reading Mastery teaches phonemic awareness, sound-letter correspondence, passage reading, vocabulary development, comprehension, and oral reading fluency. The WWC review of this intervention found that Reading Mastery demonstrated benefits in the areas of oral reading fluency, letter/word identification,

reading vocabulary, and word attack; however, no effects were detected for passage comprehension (WWC Intervention Report: Reading Mastery, 2006).

SpellRead. SpellRead is a program designed for struggling readers in second grade and above. It integrates auditory and visual aspects of reading, emphasizing specific instruction and systematic skill mastery over the course of 140 lessons. Lessons are broken down into three distinct phases, which focus on the auditory functions of the brain, secondary spelling of vowels and consonant blends, syllabication, and word decoding (WWC Intervention Report: SpellRead, 2007). According to a 2007 review of the program by the WWC, SpellRead may positively impact alphabetic acquisition, fluency, and comprehension in struggling readers.

Corrective Reading. According to a 2007 report by the Institute of Education Sciences, "Corrective Reading is an intervention program that involves the use of scripted lessons designed to improve the efficiency of instruction and to maximize opportunities for students to respond and receive feedback" (WWC Intervention Report: Corrective Reading, 2007). Explicit and systematic instruction is designed to help students focus on elements of word identification. The WWC report on the intervention found the program to have potential benefits on alphabetics and fluency, but detected no effects on comprehension.

Failure Free Reading. This intervention program aims to improve vocabulary, fluency, reading comprehension, and word comprehension for K-12 students. The program's key characteristics include repeated textual exposure, predictable sentence structures, and story concepts (WWC Intervention Report: Failure Free Reading, 2007).

The program is designed so students can read material that is interesting and relevant to their age group while challenging their independent and instructional reading levels. The WWC review of the program "found no discernible effects on alphabetic and fluency and potentially positive effects on comprehension" (p. 4).

Wilson Reading System. WRS is a common reading intervention used in K-12 schools throughout the United States. The program was developed by a special education teacher in 1988. WRS is a reading intervention program designed to promote reading achievement in the critical areas of reading, as described by the National Reading Panel (NAEP, 2011). Along with addressing these areas of reading, critical components of the intervention includes (a) systematic approach to teach decoding and encoding, (b) multisensory and interactive instruction, (c) uses a "sound tapping" system, and (d) vocabulary instruction (Wilson Language Training Corporation, 2010).

Components of WRS

WRS follows a sequenced 10-part lesson that is divided into the following three sections: word study, spelling, and fluency/comprehension. The program is designed for students in grades 2-12 who are struggling in reading, and follows a 10-step system as follows:

Section 1: Word Study	
Sound Cards Quick Drill	**The student learns phonemes with the teacher showing sound cards and the students echoing sounds and letters.**
Teach/Review Concepts for Reading	Segmentation and blending are taught using a finger tapping method. Syllables and suffixes are taught during this step as the students are further along in the program.
Word Cards	Students apply the skills they learned in step 2 to single word reading using flashcards.
Wordlist Reading	Students apply the skills learned in previous steps to read controlled wordlists.
Sentence Reading	Students apply skills learned in previous steps to sentence reading.

Section 2: Spelling	
Quick Drill in Reverse	**The teacher says a sound and the student identifies the corresponding letters.**
Teach/Review Concepts for Spelling	The students use phoneme cards to spell words.
Written Work Dictation	The teacher dictates controlled sounds, sentences, and words that are the focus of the lesson and students write them.

Section 3: Fluency/Comprehension	
Controlled Passage Reading	**The student applies all skills taught in previous steps to orally read a controlled passage. After orally reading the passage, the student does a retell.**
Listening Comprehension Applied Skills	The students use phoneme cards to spell words.
Written Work Dictation	The teacher reads a story/passage of choice. Students retell after the read aloud.

Figure 3. Components of WRS.

Recommendations from the program creators suggest administering it in 45-60 minute increments, 3 to 5 times per week. For this reason, study participants were exposed to WRS by the reading specialist 45 minutes a day, 3 times a week, for 8 weeks. Students were divided into nine groups of eight to nine students.

WRS Research

While numerous studies have been conducted on WRS, limited research supporting the program spans only from 1995 to 2006. Torgesen et al. evaluated the extent to which four interventions (Spell Read P.A.T., Corrective Reading, WRS, and Failure Free Reading) affected the reading and comprehension skills of struggling readers, relative to the normal reading instruction levels provided by schools. Participants included 208 third-grade and 228 fifth grade students identified as struggling readers by word-level reading performance. The interventions were implemented for 6 months and were delivered in small group sessions, 5 days per week.

Seven measures of reading skills were assessed at the start of the study, including word attack, word identification comprehension, phonemic decoding efficiency and sight word efficiency, oral reading fluency, and passage comprehension (Torgesen et al., 2006). At the study's conclusion, Torgenson et al. noted that students who received WRS demonstrated significant improvements in word reading skills and student reading achievement when compared to the other interventions. However, researchers also noted a difference in success between the two age groups— the word attack skills of struggling third-grade readers were reduced by about two-thirds, whereas the fifth-graders showed no significant improvements.

Although Torgenson et al. only observed notable improvements in third graders who used WRS, Wilson and O'Connor indicated significant improvements in third through 12th grade students who were given the intervention. Wilson and O'Connor included 92 third and fourth grade students, and 128 fifth through 12th graders. All

participants were at least 2 years behind grade level in reading mastery scores and had not shown progress in other reading programs. Participating students received WRS 2 to 3 times per week throughout the school year. Findings from the study suggested that the word attack skills of participants improved an average of 4.6 grade levels, passage comprehension improved by 1.6 grade levels, and improvements were also observed in comprehension and spelling skills.

The Current Study

Because third-grade reading scores are under such intense scrutiny by educational stakeholders, the DIBELS assessment scores of students at the study site school in Washington, D.C. were explored. On average, these students had not met assessment requirements or benchmarks. Between 2010 and 2013, the percentage of third graders at risk for reading failure at the study site increased from 70% to 78%. Further, according to the National Assessment of Educational Progress, at least half of the third-grade students in Washington, D.C. were at risk for reading failure (as indicated by district assessments).These students also consistently failed to meet benchmarks on standardized state tests (DC Public Schools, 2013).

At the start of the 2013 school year, DIBELS assessment at the study site indicated that 75 third graders were reading below grade level. To address these deficiencies, school administrators adopted WRS, with the intention of improving student reading skills. The intervention was implemented as a part of the reading curriculum for the 75 at risk readers (Table 1 for participant demographics). Students participated in WRS for 45-minute sessions, 3 days per week, for a total of 8 weeks.

Table 1

Frequencies and Percentages for Sample Demographics

Demographic	*N*	%
Gender		
Male	31	44
Female	40	56
Ethnicity		
Hispanic	12	17
African American	59	83
Socioeconomic		
Free / reduced meals	71	100
Days Absent		
0	14	20
1-4	30	42
5-9	21	30
10-13	6	8

Note. Due to rounding error percentages may not sum to 100%.

Data analysis was conducted using DIBELS pretest/posttest scores. Gender and days absent from the program were also included in the data set. Multiple statistical procedures were used to examine differences in reading achievement scores after participating in 8 weeks of WRS.

Results

Initially, 75 participants were included in the study; however, four participants were removed as outliers. Thus, a total of 71 participants were used in the final analysis. Results indicated that WRS does not meet its intended goal of increasing DIBELS scores in all areas. The findings showed that there was a statistically significant difference in DIBELS composite scores, DORF fluency scores, DORF retell scores, and DORF accuracy scores. Student DAZE scores did not statistically significantly differ after 8 weeks of WRS. After controlling for gender and days absent, DIBELS composite scores

and DORF fluency scores were still significant, suggesting that the variation in test scores was not the result of gender and number of days absent. However, after controlling for gender and days absent, significance was no longer apparent in DORF accuracy and retell scores. This suggests that the variation in test scores for DORF accuracy and retell scores can be attributed to the covariates – gender and number of days absent.

Evidence from this study was not sufficient to suggest that third-grade students who received WRS demonstrated statistically significant differences in reading achievement, as measured by DORF accuracy, DORF retell, and DAZE sections of the DIBELS assessment. While findings showed that there were statistically significant differences in scores, the effect sizes were minimal. Descriptive and bivariate findings suggest that the duration of the program may have contributed to these findings.

Studies suggest that students with severe reading difficulties make progress when provided with extended intervention, more intensive instruction, and more opportunities for practice to meet grade level expectations (Begeny, 2011; Ross & Begeny, 2015; Vaughn, Denton, & Fletcher, 2010; Wanzek & Roberts, 2012).

Recommendations

In accordance with the study's findings, there are four recommendations that may be useful in improving the school's intervention model.

The first recommendation is that the school should continue to use WRS for struggling readers in third-grade.

The second recommendation is an increase in the duration of the intervention from 8 to 24 weeks. Research indicates that students who do not make significant gains in

reading intervention may require more intensive interventions (Wanzek & Roberts, 2012). Intensifying an intervention requires increasing the time frame students receive the intervention or the frequency of the intervention. Intervention that occurs over an extended amount of time leads to increased gains (Ross & Begeny, 2015).

The third recommendation is that the school should engage in further research on the program that is extended to students in other grades. The study was limited to third-grade students; however, extending the program to other grade levels may lead to increased reading proficiency levels on a larger scale.

Because of the lack of a control group, the fourth recommendation is to repeat the study using a control group. The inclusion of a control group is good for generalizability, and to determine if other factors outside of the program affected reading proficiency.

Although much is still to be learned about student literacy and best practices for reading instruction, the results of this study support the use of WRS for struggling third-grade readers at the study site.

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Appendix B: Third-Grade Pretest Scores in the DORF and DAZE Measures of DIBELS 2013-2014

Student	DORF Fluency Goal: 70	DORF Accuracy Goal: 95%	DORF Retell Goal: 20	DAZE Goal: 8
Student 1	12	60%	13	3
Student 2	22	76%	16	1
Student 3	8	50%	12	0
Student 4	0	0%	13	0
Student 5	23	85%	17	0
Student 6	6	40%	0	1
Student 7	43	80%	1	0
Student 8	29	83%	16	0
Student 9	1	60%	0	6
Student 10	13	36%	17	7
Student 11	9	58%	19	6
Student 12	17	46%	11	3
Student 13	38	76%	14	2
Student 14	44	17%	14	2
Student 15	62	85%	9	2
Student 16	49	50%	11	2
Student 17	50	67%	1	4
Student 18	53	74%	12	5
Student 19	22	79%	18	5
Student 20	46	70%	10	5
Student 21	55	89%	16	7
Student 22	2	73%	0	1
Student 23	19	83%	15	2
Student 24	8	57%	14	7
Student 25	43	78%	19	4
Student 26	12	87%	4	5
Student 27	56	90%	17	1
Student 28	14	73%	11	4
Student 29	50	92%	19	4
Student 30	11	57%	4	2
Student 31	32	70%	18	4
Student 32	24	73%	12	3
Student 33	58	70%	16	0
Student 34	46	79%	12	0
Student 35	28	60%	13	0
Student 36	30	53%	17	0
Student 37	40	71%	16	0
Student 38	21	88%	17	1
Student 39	31	16%	19	2
Student 40	30	58%	15	1
Student 41	36	63%	8	1
Student 42	25	52%	11	2
Student 43	18	50%	17	4
Student 44	50	70%	15	4
Student 45	55	36%	1	7

Student 46	67	58%	9	6
Student 47	5	0%	0	0
Student 48	60	80%	19	6
Student 49	59	73%	14	4
Student 50	39	83%	10	5
Student 51	64	57%	15	3
Student 52	18	70%	11	6
Student 53	45	87%	13	1
Student 54	15	59%	4	1
Student 55	30	80%	11	2
Student 56	53	92%	11	5
Student 57	2	0%	0	0
Student 58	12	52%	9	6
Student 59	41	89%	16	2
Student 60	60	90%	19	7
Student 61	52	92%	18	1
Student 62	31	83%	11	2
Student 63	48	87%	16	5
Student 64	9	0%	2	0
Student 65	43	82%	15	4
Student 66	32	73%	11	4
Student 67	54	92%	13	1
Student 68	54	72%	14	2
Student 69	52	90%	17	0
Student 70	27	43%	16	0
Student 71	39	64%	18	2
Student 72	30	80%	13	4
Student 73	28	60%	7	0
Student 74	59	48%	9	3
Student 75	64	70%	18	6