

A Comparison of Targeted and Multicomponent Small-Group Reading Interventions in
Early Elementary Grades

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A COMPARISON OF SMALL-GROUP READING INTERVENTIONS

Dedication

This thesis is dedicated to my wife, Kristi, who I am incredibly lucky to be married to.

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This dissertation would not have been possible without the support and guidance I received from many.

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Abstract

Although there is a broad research base supporting effective components of reading interventions, less is known about how to implement reading interventions in small groups. The current study investigated the impact of implementing small group reading interventions targeted to student needs guided by the theoretical frameworks of the Instructional Hierarchy (Haring & Eaton, 1978) and Chall's (1983) stage theory of reading development. A between-participants randomized block design was used to assign 50 second and third grade students to either a targeted or multicomponent small group reading intervention to ensure equal students with decoding and fluency needs were in each condition. Results revealed no differences between conditions on measures of decoding, fluency and comprehension following 4-weeks of intervention. However, students with a decoding need were found to significantly improve their decoding skills compared to students with a fluency need regardless of condition. Observations of the interventions being implemented indicated that all four interventionists modified the interventions or added additional components. Implications for theory and practice are discussed.

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CHAPTER 1: INTRODUCTION

Reading and literacy issues have long been a focus of educational research resulting in a strong research base for understanding reading development. The National Reading Panel Report (National Institute of Child Health and Human Development, 2000) synthesized the available research on the development of reading skills and allowed future research to focus on the core components of effective reading instruction. While there is a large research base identifying effective instruction and interventions for students with reading difficulties, implementing these evidenced-based strategies in schools remains a concern (Abbott, Greenwood, Buzhardt, & Tapia, 2006; Fixsen, Naoom, Blase, Friedman, & Wallace, 2005) and a large percentage of students in the United States continue to read below grade level (National Assessment of Educational Progress, 2013).

Although students are not demonstrating reading proficiency, many schools across the country are also facing budget cuts that result in limited staff and resources, which make it more difficult to provide effective instruction to all students including those with high literacy needs (Fielding, Kerr, & Rosier, 2007). Providing interventions in small-groups of students is a way schools can more efficiently implement evidenced-based reading instruction. Response-to-Intervention (RTI) frameworks utilize a multi-tiered method of providing evidence-based core instruction to all students and additional more intensive instruction to students who demonstrate a need for it (Fuchs & Fuchs, 2006; Justice, 2006). One of the core features of most RTI models is small-group instruction (Burns, Hall-Lande, Lyman, Rogers, & Tan, 2006), which allows additional

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instruction to be delivered in a more targeted and efficient way. Moreover, providing intensive and systematic reading intervention to small-groups of struggling readers was the only core component of an RTI model for which there was a strong research base (Gersten et al., 2008).

Statement of the Problem

While small-group reading interventions are a common method used with struggling readers in U.S. schools (Foorman & Torgesen, 2001) the research in this area is relatively limited and many components of what makes small-group reading interventions effective are still debated or unknown (Begeny, Krouse, Ross & Mitchell, 2009; Chambers et al., 2011; Slavin, Lake, Davis & Madden, 2011). Vaughn et al. (2003) directly compared the impact of different intervention group sizes by administering the same reading intervention to students individually, in groups of 3, and in groups of 10. Although the individual intervention was more effective than the group of 10 students, the intervention delivered in groups of 3 was just as effective as the individual intervention. It may be that interventions delivered in small group sizes (i.e. around three students) can be targeted and intensive enough to be as effective as when delivered one-to-one. Additionally, small-group interventions may have other advantages over individual interventions, such as students being able to learn from the other students in the group and feel more competent when performing in front of other students (Gersten & Jimenez, 1998; Lou et al., 1996; Schunk & Hanson, 1985).

Standardized, multi-component reading interventions are the most common type of reading intervention used in schools to provide students with reading difficulties

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additional instruction (Vaughn et al., 2008). These multi-component interventions provide instruction in more than one area identified by the National Reading Panel (NRP), alphabetic (phonemic awareness and phonics), fluency, and comprehension (vocabulary and text comprehension; National Institute of Child Health and Human Development, 2000). A rationale for providing struggling readers with intervention in multiple reading areas is that proficient reading with comprehension is a complex process that involves many skills and subskills working together (Edmonds et al., 2009; Ehri, 2005; Fuchs, Fuchs, Hosp, & Jenkins, 2001) and students with low reading ability need instruction in each of these subskills. These standardized interventions typically provide students with instruction that is matched to their instructional level, but the type and method of instruction is similar for all students (Vaughn et al., 2008).

In contrast to standardized small-group reading interventions, where all students receive similar instruction, a more individualized approach can be used, where students receive instruction that is more targeted to their individual needs. Although there is a general consensus on the effective components of reading instruction (e.g. Foorman & Torgesen, 2001; Gersten et al., 2008; National Institute of Child Health and Human Development, 2000), individual students may respond differently to the instruction depending on their current reading skills. Foorman, Francis, Fletcher, Schatschneider, and Mehta (1998) found that children who had weaker phonological awareness at the beginning of the school year demonstrated greater growth in their decoding skills in classrooms that used decoding-based reading instruction than did children with stronger phonological awareness. Similarly, in a study by Juel and Minden-Cupp (2000), first

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grade students with weaker reading skills benefited more from instruction that was more explicit and focused on decoding words, whereas students with higher reading skills benefited more from meaning-based instruction. Additionally, Connor et al. (2009) found that the amount and type of reading instruction necessary for students to achieve proficient reading skills differed for individual students.

From the standpoint of a Stage Theory of reading development (Chall, 1983), children first acquire basic skills related to sounds, letters and words and progressively build upon these skills to advance in their reading proficiency. Students' differentiated responses to reading instruction may be the result of their current proficiency with basic and more advanced reading skills. Burns and colleagues (Burns & Coolong-Chaffin, 2006; Burns & Gibbons, 2012; VanDerHeyden & Burns, 2010) proposed a model that uses a standardized approach to reading intervention, but that also targets interventions based on the categories of the National Reading Panel areas (NRP; National Institute of Child Health and Human Development, 2000): phonemic awareness, phonics, fluency, and vocabulary/comprehension. Students who are struggling readers tend to develop those five skills somewhat sequentially, in that phonemic awareness is needed before the student can decode, and adequate decoding is needed before they can read fluently, all of which are prerequisites to reading comprehension (Berninger, Abbott, Vermeulen, & Fulton, 2006). Thus, assessing how well a student is progressing through those five skill areas, and at what level they begin to struggle, could provide a useful heuristic for most students who experience difficulties with reading. For example, if a student struggled with comprehension, but had adequate reading fluency, then the intervention would focus

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on comprehension; however, if a student struggled with comprehension, fluency, and decoding, then decoding would be the intervention target because it is the most fundamental of the three.

Purpose

The purpose of present study is to compare the effectiveness of a targeted small-group reading intervention to a multicomponent small-group reading intervention for struggling readers in second and third grades. The study was guided by three research questions:

1. What is the relative effect of a targeted and a multicomponent reading intervention on students' a) decoding, b) fluency and c) comprehension skills?
2. To what extent does student need (i.e. decoding or fluency) predict response to intervention?
3. What modifications to the intervention procedures occurred during the sessions?

Definition of Key Terms

Decoding need. Students who have difficulty accurately reading regular words using letter-sound correspondence rules (Gough & Tunmer, 1986). It is more specifically defined in the current study as students who read below the 25th percentile on a standardized measure of isolated pseudoword reading.

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Multicomponent reading intervention. A reading intervention that provides all students with similar instruction in multiple skill areas of reading (i.e. phonemic awareness, phonics, fluency, vocabulary and comprehension).

Fluency need. Students who have adequate decoding skills (i.e. performed at or above the 25th percentile on a standardized measure of isolated pseudoword reading), but who read below grade level expectations on a measure of Oral Reading Fluency (ORF).

Opportunities to respond (OTR). The number of times during an intervention session the interventionist asks a question or prompts for student response and allows time for students to respond.

Oral Reading Fluency (ORF). A measure of students' oral reading speed and accuracy as measured by the number of words read correct per minute (WRCM) on a curriculum based measurement of reading (CBM-R; Deno, 1985).

Targeted reading intervention. A reading intervention that provides students with focused instruction, primarily targeted to one reading skill area determined to be the most fundamental area of need for the student.

Delimitations

The following limitations were placed on the study:

Participants. Study participants were limited to second and third grade students attending a 4-week suburban Minnesota school district summer school program.

Participants were general education students who were not identified as English Language Learners.

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Reading comprehension. Reading comprehension was assessed in the current study using Maze assessment. Due to the time restraints of the study, Maze was chosen because it could be efficiently administered in large groups. Further, Maze leads to reliable decisions for multiple groups and research has supported the validity of the resulting decisions regarding overall reading achievement (Fuchs, Fuchs, Hamlett, & Ferguson, 1992; Guthrie, Siefert, Burnham, & Caplan, 1974; Hale et al., 2011; Jenkins & Jewell, 1993).

Targeted intervention. The targeted intervention used in the current study focused on either decoding skills or fluency skills. Although previous research has identified other important areas that contribute to overall reading competence such as phonemic awareness, vocabulary and comprehension (National Institute of Child Health and Human Development, 2000), Stage Theory (Chall, 1983) suggests decoding and fluency are fundamental areas to target for second and third grade students.

Organization of the document

This document is organized around four additional chapters. Chapter two provides a review of the literature on reading development and effective components of instruction, including a review of small-group reading interventions, and presents a theoretical framework for targeting reading interventions. Chapter three outlines the methods and design of the current study. Chapter four presents the results of the research questions previously defined. Chapter five discusses the results within the context of previous research and includes implications for practice, implications for theory, limitations of the study and directions for future research.

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CHAPTER 2: LITERATURE REVIEW

Learning to read and comprehend text is a skill that is essential for students to master in early elementary school. A typical student will have encountered about 25,000 words by third grade and over 80,000 different words by eighth grade (Juel & Minden-Cupp, 2000). As students enter secondary education, more emphasis is placed on reading ability due to the increasingly complex language used in the curriculum (Brozo, 2009). It is no surprise that lower reading ability has been associated with negative outcomes such as increased rates of problem behaviors in school (McIntosh, Horner, Chard, Boland, & Good, 2006), academic difficulty (Foorman & Torgesen, 2001), poor academic self-concept (Chapman, Tunmer, & Prochnow, 2000), and higher rates of unemployment in adulthood (Kutner et al., 2007). Further, a phenomenon known as the Matthew effect suggests that poor readers will continue to fall further behind their peers as skilled readers tend to read more and therefore have more opportunities to improve their reading ability (Stanovich, 1986). Without intervention, students who have difficulty acquiring the basic reading skills in early elementary school will likely continue to struggle with reading later in their education (Simmons et al., 2008). Fortunately, reading intervention research suggests that intervening with struggling readers can help these students acquire the skills needed to become proficient readers (e.g. Elbaum, Vaughn, Hughes, & Moody, 2000; Gersten et al., 2008; National Institute of Child Health and Human Development, 2000; Swanson, 1999).

A further challenge in developing reading skills of students is finding ways to effectively implement reading interventions in the many schools across the county that

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are facing budget cuts and have limited staff and resources (Fielding, Kerr, & Rosier, 2007). Response-to-Intervention (RTI) is an increasingly popular method that has been used to allocate school resources based on student need and data-based decisions in order to use resources more efficiently. RTI utilizes a multi-tiered method of instruction to provide more intensive instruction to students who demonstrate a need for it (Fuchs & Fuchs, 2006; Justice, 2006). Students who need supplemental reading support receive small-group interventions, which is one way students with greater needs can receive effective, more intensive instruction within an RTI framework (Burns, Hall-Lande, Lyman, Rogers, & Tan, 2006; Gersten et al., 2008).

The purpose of this chapter is to review the literature on reading development and effective instruction, with an emphasis on reading intervention delivered in a small-group format. First, models of reading development and the literature on components of effective instruction are reviewed. Next, research will be reviewed that examines small-group interventions. Finally, the research base on targeting instruction to student needs is discussed using the Instructional Hierarchy (Haring & Eaton, 1978) and Chall's (1983) Stage Theory of reading development as theoretical frameworks.

Development of Proficient Reading

Learning to read is a complex process involving the combination and coordination of multiple processes working together. Unlike native language acquisition, the development of reading skills is less biologically inherent, and requires more than simple exposure to become proficient (Perfetti & Marron, 1998). The following theories provide

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a framework for understanding how reading skills develop and offer insight for how students can be supported in their reading development.

Stage Theory

According to Chall's (1983) theory, reading ability first starts at a prereading stage where young children begin to acquire knowledge of language and the structure and relationship of words. Children then learn how to translate printed letters into sounds, blend the sounds together to form words and start reading simple texts. The previous knowledge is then translated into being able to decode words more quickly and read familiar texts fluently. The next stage involves children making the transition from "learning to read" to "reading to learn" as decoding the words in-text becomes more effortless and allows cognitive attention to shift from the process of reading and decoding each word to understanding the content of what is being read. In the later stages of Chall's (1983) theory, readers develop an ability to view the material from multiple viewpoints, think critically about what is being read, and are able to more efficiently use reading material to construct understanding from what others have written. Although these stages are continuous and have some overlap, the development at each stage is dependent upon acquiring the skills at the prior stages.

Empirical support for a sequential stage theory of reading development is found in studies investigating students with reading difficulties. In seeking to better understand issues related to reading comprehension in struggling readers, Berninger, Abbott, Vermeulen and Fulton (2006), conducted two studies of second grade students. Results from both studies suggested a model where reading develops in sequential stages such

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that alphabetic knowledge and phonemic awareness helps a student to decode words which in turn allows the student to read texts fluently which leads to the student being able to read with comprehension. The authors proposed that each stage included bridging links that allowed the reader to move to the next stage. Determining where students are with regard to their progression of these stages can allow interventions to be more precisely targeted to the students' area of need.

Simple View of Reading

The Simple View of Reading (Gough & Tunmer, 1986) proposes that all of the processes involved in reading can be broken down into two categories: decoding and linguistic comprehension. In this theory, decoding is defined as the ability to efficiently recognize printed words and is best assessed through reading isolated pseudowords (Gough & Tunmer, 1986). Linguistic comprehension is defined as the ability to understand spoken language and can be assessed through answering questions about the contents of a listened to narrative (Hoover & Gough, 1990). How well a student is able to read and comprehend what they are reading is the product of their decoding ability and linguistic comprehension ability.

Support for the Simple View of Reading is found in a longitudinal study by Hoover and Gough (1990) that followed kindergarten and first grade students through third and fourth grades. They found that the product of students' decoding and linguistic comprehension abilities predicted reading comprehension, and including the product of decoding and linguistic comprehension significantly improved predictions of reading comprehension over the linear combination of the two. They also found an inverse

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relationship between decoding and linguistic comprehension for less skilled readers, indicating that poor reading comprehension results when there is a weakness in decoding or linguistic comprehension. Catts, Adlof, and Weismer (2006) provided further support for the Simple View of Reading by studying eight-grade students with poor reading comprehension skills, or poor decoding skills. As predicted by the Simple View of Reading, students that were classified as having poor reading comprehension, but adequate decoding skills, scored low on measures of linguistic comprehension and students who were classified as having poor decoding skills and adequate reading comprehension, scored relatively well on measures of linguistic comprehension.

The Simple View of Reading has implications for assessment and intervention for students demonstrating poor reading comprehension skills. According to this theory, poor readers are classified into three categories: students with deficits in linguistic comprehension, students with deficits in decoding and students with deficits in both areas (Gough & Tunmer, 1986). Students would require different interventions depending on the nature of their proficiencies with decoding and linguistic comprehension. For example, students who have deficits in word recognition, but have adequate language comprehension would need an intervention focused on improving phonics and word reading skills, whereas students with adequate decoding, but poor language comprehension might receive interventions focused on language knowledge and comprehension strategies (Catts et al., 2006).

Bowyer-Cane et al. (2008) used the Simple View of Reading Theory to compare the impact of providing a word-level reading intervention and an intervention targeting

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oral language skills to students at risk for literacy difficulties. Students who received the intervention targeting word-level reading skills made larger gains in literacy and phonology measures than students receiving the oral language intervention, whereas students who received the oral language intervention demonstrated larger gains on measures of vocabulary and grammar and the effect size differences were moderate to large. These results support the effectiveness of providing interventions targeted to students' decoding and listening comprehension skills.

Instructional Hierarchy

Whereas Chall's (1983) Stage Theory of reading development can provide information about specific reading skills to target for intervention, the four phases of the Instructional Hierarchy (Haring & Eaton, 1978) provide a framework for gauging students' level of proficiency when acquiring new skills and selecting interventions that contain components relative to their level of proficiency (Burns, VanDerHeyden, & Boice, 2008; Daly & Martens, 1994). According to Haring and Eaton (1978), students who are in the acquisition phase are slow and inaccurate when acquiring a new skill and therefore would likely benefit most from instruction that uses modeling and provides immediate feedback to help increase accuracy (Ardoin & Daly, 2007). After students become accurate, they move to the proficiency phase where they respond with high accuracy, but lack speed and fluency. Interventions that allow students multiple attempts to practice and high opportunities to respond are appropriate for helping students build speed and fluency (Daly, Hintze, & Hamler, 2000). Once students can perform a skill

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with accuracy and speed, they can begin to generalize the skill to different settings (generalization phase) and apply it to new situations (adaptation phase).

The Instructional Hierarchy, in conjunction with the Stage Theory of reading development, can be used to target instruction by determining where beginning readers are at with regard to acquiring the critical reading skills identified by the National Reading Panel (NRP; National Institute of Child Health and Human Development, 2000). For example, students who are in the acquisition phase of being able to decode words would likely benefit more from instruction that includes modeling of phonics skills and immediate corrective feedback to increase accuracy (Ardoin & Daly, 2007). Students who can decode words with accuracy, but are not yet fluent would likely benefit more from instruction that provides high opportunities for them to practice to build fluency (Chafouleas, Martens, Dobson, Weinstein, and Gardner, 2004; Daly & Martens, 1994). Further, students who are reading accurately and fluently, but are still having difficulty with comprehension would likely benefit most from learning strategies that focus on comprehension (Conner et al., 2009).

Cognitive Models

One method that has consistently been studied to better understand the reading development of different student populations is to observe the relationship between cognition and reading skills, including how well students respond to intervention (Al Otaiba & Fuchs, 2002; Fletcher et al., 2011; Nelson, Benner, & Gonzalez, 2003). Fletcher et al. (2011) conducted a study of the cognitive attributes of first grade students who responded adequately and inadequately to reading intervention. Cognitive attributes

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were assessed using measures of phonological awareness, rapid naming, vocabulary, oral language skills, nonverbal problem solving, and processing speed. Although adequate and inadequate responders were not shown to have qualitatively distinct cognitive attributes, they found that measures of cognition were related to reading skill in a stepwise progression within the responders and non-responders such that students who were the poorest readers tended to have the lowest cognitive measures, students who were slightly better readers performed slightly better on the cognitive measures and so on. Further, a meta-analysis looking at how cognitive attributes influence treatment response of early literacy interventions found that rapid naming was the strongest predictor of student response to intervention with a mean Fisher z transformed correlation effect size of .51 (Nelson, Benner, & Gonzalez, 2003); and adding rapid naming to a model of the Simple View of reading accounted for a greater amount of the variance in reading comprehension than the Simple View of reading model alone (Johnston & Kirby, 2006; Joshi & Aaron, 2000).

Rapid automatized naming (RAN) was first demonstrated to be an important factor in reading when Denckla (1972) demonstrated that children with reading disabilities did not differ from average readers in how accurately they can name colors, but were significantly less proficient in how quickly they could name colors. Further research identified that alphanumeric RAN tasks (i.e. letters and numbers) are better predictors of reading than non-alphanumeric RAN tasks (i.e. colors and objects; Bowey, McGuigan, & Ruschena, 2005; Compton, 2003; Wolf & Bowers, 1999). Although colors and objects are learned before letters and numbers, once alphanumeric symbols are

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automatized they are named much faster than non-alphanumeric symbols (Denckla & Rudel, 1974; Georgiou, Parrila, & Kirby, 2006; Wolf, Bally, & Morris, 1986), which may provide an explanation for alphanumeric RAN tasks being better predictors of reading ability after kindergarten (Misra, Katzir, Wolf, and Poldrack, 2004).

Automaticity Theory

In order for students to become proficient readers, some researchers have emphasized the importance of efficient and automatic processing of words. LaBerge and Samuels (1974) presented a model of automaticity that acknowledges the multiple complex skills involved in reading. According to their model, if all of the complex skills involved in reading demanded attention, the task of reading would become too demanding and the reader would not be able to comprehend the text. However, when word identification skills become automatized, the reader can then shift their attention from sounding out letters and decoding words to focusing on the meaning of the words they are reading. Further, Perfetti's (1985) verbal efficiency model states that accurate word recognition alone is not enough to enable fluent reading comprehension. Rather, the skills needed to decode words accurately must become highly efficient and automatic to be able to devote cognitive attention to focus on the meaning and comprehension of the text.

Support for the automaticity of words freeing up cognitive resources is found in studies using dual-task interference to investigate how quickly participants respond to different types of stimuli. Herdman (1992) used a dual-task change paradigm to assess the attentional demands used in naming low and high frequency words and verifying if a

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low or high frequency word was a real word or non-word. Participants were asked to complete the naming and verifying tasks and then respond to an auditory probe following the naming or verifying task. Slower response times were found for low frequency words compared to high frequency words in both the naming and verifying tasks, and the effect of word frequency was greater for the verifying words task. The slower response times with low frequency words suggest that these words were less automatized and required more attention to name. Moreover, when the task involved using lexical information to verify if the word was a real word, response time discrepancies between low and high frequency words were even greater, suggesting even more cognitive resources were required with lexical tasks involving less automatized words. Hirst, Spelke, Reaves, Caharack, and Neisser (1980) provide further support for more attentional resources being available when tasks become automatized by demonstrating that participants were able to read and comprehend text while simultaneously writing dictated words when they were giving sufficient practice.

In a review of the literature on reading development, Ehri (2005) argued that reading words automatically from memory or sight word reading is the most efficient and unobtrusive way to read text compared to other methods of reading such as decoding parts of each word or using context to guess what the word is. According to automaticity and verbal efficiency models of reading, it takes attention and cognitive resources to decode words or use other methods to figure out what a word is and therefore having to use these strategies would hinder the reader's comprehension of the text. However, the more a reader is able to read words automatically by sight, the more cognitive resources

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will be available for comprehending the text. Samuels, LaBerge and Bremer (1978) demonstrated that beginning readers read words by processing components of the words, but as they gain more practice and increase in skill they process words more holistically and efficiently. McCormick & Samuels (1979) found that high accuracy and faster word recognition was associated with reading comprehension, a finding that has been substantiated through studies linking oral reading fluency to comprehension (e.g. Fuchs, Fuchs, and Maxwell, 1988).

Synthesis

Learning to read is a complex process that, according to Stage Theory (Chall, 1983), involves continuous stages where developing the appropriate skills at each stage is dependent on successfully acquiring the skills of the previous stages. Gough and Tunmer (1986) classified all of the complex skills involved in reading with comprehension into the two categories of decoding and linguistic comprehension, such that deficits in either of these areas will result in hindered reading comprehension. Congruent with this, students who have difficulty decoding words, such that much of their mental energy while reading is exerted in this process, will likely have difficulty comprehending what they are reading (LaBerge & Samuels, 1974; Perfetti, 1985).

Ehri and Wilce (1983) studied skilled and less skilled readers to determine how quickly they were able to read familiar words. Skilled readers were differentiated from less skilled readers in that they were able to read words as quickly as they could name digits, whereas less skilled readers read words more slowly than they named digits. Less skilled readers also made more word reading errors than the more skilled readers. The

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authors concluded that these words for the more skilled readers were consolidated or unitized in their memory and that allowed them to identify these words at the top speed they were capable. If accurate, fast, and efficient word reading contributes to overall reading ability and comprehension (Fuchs, Fuchs, and Maxwell, 1988; McCormick & Samuels, 1979), the question remains, how can teachers help struggling readers move from the slower processes of decoding, or using other strategies to figure out a word, to the more efficient process of automatically recognizing words so they can shift more of their attention to the meaning of what they are reading? The literature on the effective components of reading instruction provides some guidance to address this question.

Effective Components of Reading Intervention

The abundance of research over the past 30 years on literacy development and instruction has identified effective practices for reading instruction and intervention (e.g. Foorman & Torgesen, 2001; Gersten et al., 2008; National Institute of Child Health and Human Development, 2000; Swanson, 1999). Researchers generally agree that effective reading instruction for students in the early grades will include components of phonemic awareness, phonics, fluency, comprehension and vocabulary (National Institute of Child Health and Human Development, 2000; Snow, Burns & Griffen, 1998). Research has also identified several components of effective instruction that can be applied while working with struggling readers including: providing explicit instruction, meaning directly teaching students the information rather than requiring students to infer the new information (Gaskins, Ehri, Cress, & Donnelly, 1996; Mathes, et al., 2005; Swanson, 1999), allowing students time to practice while receiving immediate feedback (Ehri,

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2004, Pany & McCoy, 1988), providing high opportunities to respond (Burns, 2007; Daly, et al., 2000), and using instructional material that matches students' skill levels in terms of difficulty (Daly, Martens, Kilmer, & Massie, 1996; Gickling and Thompson, 1985).

Although there is a strong research base for the effective components of reading instruction, how to implement these practices to the benefit of all students has been less well researched (Abbott, Greenwood, Buzhardt, & Tapia, 2006; Burns & Ysseldyke, 2009; Fixsen, Naoom, Blase, Friedman, & Wallace, 2005). A challenge for educators is not only to understand the components of effective instruction, but also learn how to implement these components to a classroom of students who are reading with different levels of proficiency.

Small-Group Intervention

Many schools across the country are facing budget cuts that result in limited staff and resources, which makes it a challenge to provide effective instruction to all students who have varying levels of need (Fielding Kerr, & Rosier, 2007). One method for providing students with instruction based on their needs is through a Response to Intervention (RTI) framework where all students receive core instruction (tier I) and additional, more intensive interventions (tier II and tier III) are provided to students who demonstrate a need for it (Fuchs & Fuchs, 2006; Justice, 2006). One of the core features of most RTI models is small-group instruction (Burns et al., 2006), which allows additional instruction to be delivered in a more targeted and efficient way. Moreover, providing intensive and systematic reading intervention to small-groups of struggling

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readers was the only core component of an RTI model for which there was a strong research base (Gersten et al., 2008).

Although small-group reading interventions are a common method used with struggling readers in U.S. schools (Foorman & Torgesen, 2001) many components of what makes small-group reading interventions effective are still debated or unknown (Begeny, Krouse, Ross & Mitchell, 2009; Chambers et al., 2011; Slavin, Lake, Davis & Madden, 2011). Below I will discuss research regarding the age of the student, target of intervention, agent of delivery, dosage, group size and quality of research regarding small-group reading interventions.

Grade of students. Research on literacy instruction emphasizes the importance of early intervention and providing additional small-group intervention for students displaying early signs of reading difficulty (Good, Simmons, & Smith, 1998; Wanzek & Vaughn, 2007). Small group reading intervention studies with early elementary students have demonstrated effectiveness in the areas of phonological awareness (O'Shaughnessy & Swanson, 2000), vocabulary (Coyne, McCoach, & Kapp, 2007; Nielsen & Friesen, 2012; Penno, Wilkinson, & Moore, 2002) and comprehension (Glenberg, Brown & Levin, 2007). In a synthesis of research on early reading interventions, Wanzek and Vaughn (2007), found that interventions beginning in first grade tended to result in larger effects than interventions starting in second or third grade. The authors speculated that earlier interventions might be more effective because reading becomes increasingly complex as students get older and subsequently reading difficulties may become more severe and more difficult to address. However, previous research found large effects for

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adolescent readers (Scammacca et al., 2007), which suggests that there are effective reading interventions for older students. Although the research with secondary students is relatively limited compared to younger students, there is evidence to suggest implementing reading interventions in small-groups with this population can be effective (Bemboom & McMaster, 2013; Graves, Brandon, Duesbery, McIntosh & Pyle, 2011; Sporer, Brunstein, & Kieschke, 2009).

Target of intervention. Research has not clearly identified the optimal focus of small-group reading interventions. Some researchers have investigated the impact of providing small-group interventions that include instruction in multiple areas of reading. Vaughn, Cirino et al. (2010) implemented a year-long tier II reading intervention to students in sixth grade. At the beginning of the year, students received intervention with a main focus on word study and fluency, but also included components of vocabulary and comprehension. During the middle of the year, the emphasis changed to focus on vocabulary and comprehension, with supplemental instruction on how to apply fluency and word study strategies. Toward the end of the year, the emphasis shifted to applying the previous learned strategies to independent reading. The results of this study found generally small effects on standardized measures of decoding ($ES = 0.15$), comprehension ($ES = 0.18 - 0.19$), and fluency ($ES = 0.00 - 0.30$).

Other researchers have studied the impact of focusing small-group reading interventions on a single area of need. Coyne, McCoach, Kapp (2007) conducted two studies investigating the impact of a small-group intervention aimed at improving kindergarten students' vocabulary. In the first study, students received explicit

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vocabulary teaching, multiple exposures to the words in varied contexts and engaged in tasks designed to promote deeper processing of the word meanings. Compared to a control where students simply heard the target words three times during passage readings, the intervention resulted in large effect sizes on defining the target words expressively (ES = 2.27), receptively (ES = 1.00), and identifying the target words correctly in context (ES = 1.02). The second study implemented the same treatment and compared it to students receiving explicit vocabulary teaching only. Again, large effects were found for the expressive, receptive and context measures (ES = 1.70, 0.99 and 1.12 respectively).

O'Shaughnessy and Swanson (2000) compared whether second grade students with reading disabilities would respond better to a phonological intervention that provided explicit instruction using larger phonological units or an intervention providing similar instruction, but using smaller phonemes. Both interventions focused on a single skill of improving phonological awareness. Although these two interventions were not significantly different from each other, both interventions demonstrated large effects compared to a math control condition on direct measures of phonological awareness (ES range = 1.17 - 2.23), and word lists containing words taught during the intervention (ES range = 1.42 - 1.85). The treatment interventions also demonstrated moderate effects on transfer measures of word attack (ES = 0.45 and 0.47), and passage comprehension (ES = 0.36 and 0.65).

The effectiveness of targeting small group reading interventions to a single area of need provides support for Chall's (1983) proposed theory of reading development, which posits that reading ability develops in sequential stages. Although these stages are

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continuous and have some overlap, the development at each stage is dependent upon acquiring the skills at the prior stages. According to the stage theory of reading development, students need to develop adequate skills at their current level in order to learn the more advanced reading skills at the next stage; therefore, interventions targeting students' current areas of need would be more effective than interventions targeting skills from previous or later stages. One of the core elements of a multi-tiered system of support is assessing students to identify what their needs are and providing them with explicit instruction in those areas (Fuchs & Fuchs, 2006; Justice, 2006). Moreover, this finding is consistent with previous research regarding the importance of targeting reading interventions (Burns et al., 2008) and could explain why previous multicomponent small-group interventions led to small effects (Vaughn Cirino, et al., 2010). Thus, providing targeted reading interventions to students in small-groups through a multi-tiered system of support or other models appears to be an effective method for increasing students' reading skills. However, additional research is needed to identify how to best determine which interventions to target for individual students.

Intervention agent. Who delivers the intervention has important implications for the feasibility of implementing the intervention with the available resources in a school. Reviews of reading intervention research have identified that teachers achieve better outcomes than paraprofessionals (Slavin et al., 2011), and similar outcomes compared to researchers (Piasta & Wagner, 2010). Although paraprofessionals have not achieved the same outcomes as teachers, interventions administered by paraprofessionals resulted in moderate effect sizes compared to control groups (Slavin et al., 2011). Rashotte,

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MacPhee and Torgesen (2001) utilized three noncertified teachers and one certified teacher to implement a small-group reading intervention for students in first through sixth grades. All four teachers participated in an intensive 6-day training program in the reading intervention. Results indicated moderate to large effects for phonological awareness (ES range = 0.40 – 2.38), phonics (ES range = 0.38 – 2.20), and comprehension (ES range = 0.43 – 1.51) and small to large effects for fluency (ES range = -0.22 – 1.91). Moreover, no differences were found between the certified teacher and noncertified teachers. Although not systematically manipulated in the study, it could be that the intensive training provided to all four teachers enabled the noncertified teachers to deliver the interventions as well as the certified teacher. This is consistent with Elbaum and colleagues' (2000) findings that reading interventions provided by trained volunteers resulted in moderate to large effects and studies that reported training tended to produce larger effects than studies that did not provide or report training. This hypothesis would support providing adequate training to those implementing a small-group reading intervention, but it is only a hypothesis in need of additional research.

Dosage. Vaughn, Wanzek et al. (2010) provided year-long small group reading interventions to middle school students in high poverty schools that involved daily 50 minute sessions, but only found small effects across all areas of reading. The authors concluded that more intensive interventions, for a longer period of time, and that were more targeted to students' needs were required for the students in their study to achieve better outcomes. In contrast, other studies have found moderate to large effects with relatively short-term small-group reading interventions that included total implementation

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times of 1.5 hours (Coyne et al., 2007), 5 hours (Benboom & McMaster, 2013) and 9 hours (O'Shaughnessy & Swanson, 2000). In a review of early reading interventions Wanzek & Vaughn (2007) found that interventions resulted in similar effects regardless of the length of the intervention. The results from the above studies and other reviews (e.g. Elbaum et al., 2000; Swanson, 1999; Ehri et al., 2001) suggest that simply administering an intervention for long periods of time is not sufficient to produce large effects and that factors other than how long an intervention is implemented are more important for the effectiveness of the intervention.

Size of group. Given the need for schools to find more efficient ways to provide interventions to struggling learners (Fielding et al., 2007), understanding how the size of a reading intervention group impacts the effectiveness of the intervention is an important consideration. One study systematically investigated the impact of different group sizes for students receiving supplemental reading interventions. Vaughn et al. (2003) provided the same reading intervention to students in groups of 1:10, groups of 1:3 and 1:1. Students who received the intervention 1:1, outperformed students who received the intervention 1:10 in comprehension and phoneme segmentation and the 1:3 group also outperformed the 1:10 group in comprehension. Students who received the intervention 1:3 achieved similar outcomes as students who received the intervention 1:1 on all four reading outcome measures (i.e. comprehension, phoneme segmentation, fluency and word attack), indicating that there was little difference between students who received the intervention one-to-one or in a small group of three.

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Penno and colleagues (2002) assigned students to groups of 12 and provided a vocabulary intervention where students listened to a story three times and were provided multiple explanations for target words when they were encountered in the story. Although effect sizes were not reported in the article, students who received the explanation treatment demonstrated large gains in receptive and expressive measures of the target words compared to students who only listened to the story. These results indicate that reading interventions may be effective in larger groups, at least for interventions similar to the one used in the above study.

Fidelity of implementation. Monitoring the degree to which an intervention is being implemented as intended has important considerations for providing effective interventions to students. It is no surprise that evidence based interventions implemented with high fidelity tend to result in better outcomes (Al Otiba & Fuchs 2006; Durlak & DuPre, 2008; Kaderavek & Justice, 2010). In practice, however, interventionists will often modify the intervention based on their own opinions or philosophies (Durlak, 2010) or in attempt to match the intervention to the students with whom they are working (McHugo et al., 2007). Two common methods of assessing implementation of fidelity are through structural measures and process measures. Structural measures include assessing whether important components of the intervention are included in the implementation, whereas process measures are more qualitative and attempt to measure the quality with which the components are implemented (Harn, Parisi, & Stoolmiller, 2013). Although structural fidelity measures tend to be more reliable, process measures provide important insight into the effectiveness of the intervention and therefore some

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researchers recommend including both measures of fidelity (Mowbray, Holter, Teague, & Bybee, 2003; Odom et al., 2010).

Quality of research. A total 29 studies of small-group reading interventions with students in kindergarten through eight grade were reviewed with the What Works Clearinghouse Procedures and Standards (2008). Studies were classified into three categories: meets standards, meets standards with reservations, and does not meet standards. Studies that utilized randomization and had low attrition were categorized as meets standards. Studies that included randomization, but had high attrition, or did not randomly assign participants, but demonstrated equivalence between groups at baseline were categorized as meets standards with reservations. Finally, studies were categorized as not meeting standards if participants were not randomly assigned and the intervention and comparison groups were not shown to be equivalent at baseline. Of the 29 studies, 16 (55%) met standards, 7 (24%) met standards with reservations, and 6 (21%) did not meet standards.

Synthesis

While previous research found that small-group reading interventions were effective (e.g. Ehri et al., 2001; Piasta & Wagner, 2010; Vaughn et al., 2003), it is important to consider the specific components that impact the effectiveness of the intervention. Small-group reading interventions have demonstrated to be effective for younger students (Coyne, McCoach, & Kapp, 2007; Glenberg, Brown & Levin, 2007; Nielsen & Friesen, 2012; O'Shaughnessy & Swanson, 2000; Penno, Wilkinson, & Moore, 2002) as well as older students (Bemboom & McMaster, 2013; Graves, Brandon,

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Duesbery, McIntosh & Pyle, 2011; Sporer, Brunstein, & Kieschke, 2009). Effective outcomes can be achieved through shorter-term small-group interventions (Benboom & McMaster, 2013; Coyne et al., 2007; O'Shaughnessy, T. E., & Swanson, 2000) and providing adequate training to interventionists is likely an important consideration (Rashotte, MacPhee and Torgesen, 2007). Large effects have been found in studies that have focused the small-group intervention to a single reading skill (Coyne, McCoach, Kapp, 2007; O'Shaughnessy and Swanson, 2000) indicating that targeting interventions to students' fundamental area of need may be an effective strategy. Moreover, studies that utilized high quality research designs were the most common in a search of the literature. Given that higher quality research designs are less susceptible to internal and external threats to validity and increases the confidence with which causal attributions can be made (Shadish, Cook, & Campbell, 2002), this finding is encouraging and provides further support in the overall effectiveness of small-group reading interventions.

Multicomponent and Targeted Small-Group Reading Interventions

While many researchers are now advocating for the use of an RTI approach for providing more intensive supports for students who are demonstrating greater needs (e.g. Burns et al., 2006; Fuchs & Fuchs, 2006; Gersten et al., 2008; Justice, 2006), the interventions provided to these students at the tier 2 and 3 levels can vary based upon if they are more comprehensive or more targeted to student need. Multicomponent interventions provide a more standardized approach where all students receive similar instruction, whereas targeted interventions utilize further data-based problem solving to

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provide interventions that are more targeted to students' area of need (Vaughn et al., 2008).

Multicomponent reading interventions

Most commonly, standardized, multicomponent reading interventions are used at the tier II and tier III levels to provide students with reading difficulties additional instruction (Scammacca et al., 2007; Vaughn et al., 2008; Wanzek and Vaughn 2007). These multi-component interventions provide instruction in more than one area identified by the National Reading Panel (NRP): alphabetic (phonemic awareness and phonics), fluency, and comprehension (vocabulary and text comprehension; National Institute of Child Health and Human Development, 2000). A rationale for providing struggling readers with intervention in multiple reading areas is that proficient reading with comprehension is a complex process that involves many skills and subskills working together (Edmonds et al., 2009; Ehri, 2005; Fuchs, Fuchs, Hosp, & Jenkins, 2001) and students with low reading ability need instruction in each of these subskills. These standardized interventions typically provide students with instruction that is matched to their instructional level, but the type and method of instruction is similar for all students (Vaughn et al., 2008).

In a synthesis of extensive early reading interventions, Wanzek and Vaughn (2007) were unable to find any studies that utilized an individualized intervention approach, and instead classified studies as either high or low on standardization. High standardization indicated interventions that provided the same instruction to all students, with possible adjustments to student levels and low standardization indicated

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interventions that provided some opportunity for the interventionist to select different teaching strategies or materials based on student need. Similar effect sizes were found for studies using high and low standardized interventions. A potential explanation for the similar effects found between high and low standardized interventions may be that the low standardized interventions did not utilize a data-based decision making process to allow the interventions to be accurately targeted to student needs (Burns et al., 2008).

Targeted reading interventions

In contrast to standardized tier II and tier III reading interventions, where all students receive similar instruction, a more individualized approach can be used, where students receive instruction that is more targeted to their individual needs. Although there is a general consensus on the effective components of reading instruction (e.g. Foorman & Torgesen, 2001; Gersten et al., 2008; National Institute of Child Health and Human Development, 2000), struggling readers may require different types of instruction depending on their current reading skills. Chafouleas, et al. (2004) administered a Repeated Reading fluency intervention and a Repeated Reading fluency intervention with feedback to three students with low reading skills. The students who read with the highest accuracy benefitted most from the Repeated Reading only, whereas the student with the highest error rate made the most gains with the Repeated Reading with feedback intervention. Similarly, Daly and Martens (1994) found that while all students benefitted from a modeling component of a reading intervention, students with stronger reading skills benefitted more from a drill intervention than students with lower reading skills. The results of these studies suggest that students with more developed word reading skills

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may benefit more from drill and repeated practice interventions to strengthen their already acquired skills, whereas students who have lower decoding abilities may require additional instructional components to help them acquire the more fundamental word reading skills.

Further research also supports the finding that students with different reading skills respond differently to instruction. Foorman, Francis, Fletcher, Schatschneider, and Mehta (1998) found that students who were weaker in phonological awareness demonstrated greater growth in decoding skills than students with stronger phonological awareness in classrooms that focused on code-based instruction. Similarly, in a study by Juel and Minden-Cupp (2000), first grade students with weaker reading skills benefited more from instruction that was more explicit and focused on decoding words, whereas students with higher reading skills benefited more from meaning-based instruction. Additionally, Connor et al. (2009) conducted a large-scale study that included 10 schools and 464 students to investigate the impact of individualizing instruction based on students' skill levels. Data from previous studies were used to determine recommendations for the amounts of code-based and meaning-based instruction for individual students and teachers were trained in how to provide individualized interventions to these students. Teachers in the treatment condition who received training in how to individualize instruction demonstrated to more closely provide the recommended amounts of code-based or meaning-based instruction than control teachers. Moreover, students who received instruction that was closer to the recommended individualized amounts made more growth in their word reading and passage

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comprehension and although effect sizes were not reported, the authors stated that the effects were large.

Synthesis

The abundance of reading research over the last several decades has led to the development of validated frameworks for understanding how proficient reading develops and subsequently has provided valuable insight for how educators can support students in their reading development. RTI models utilize small-group interventions to provide effective instruction in an efficient manner to students who have demonstrated lagging skills despite receiving adequate classroom instruction (Burns, et al., 2006; Gersten et al., 2008). Small-group reading interventions have produced large effects when the focus of the intervention has been on a single skill targeted to students' needs (Coyne, McCoach, Kapp, 2007; Hall & Burns, 2015; O'Shaughnessy & Swanson, 2000) and findings of child by intervention interactions suggest that reading instruction is most effective when it is tailored according to students' current proficiency with reading skills (Connor et al., 2009; Foorman et al., 1998; Juel & Minden-Cupp, 2000).

Purpose of the Present Study

Although standardized reading interventions have been extensively studied in the research, there is a lack of research examining the effectiveness of individualized interventions (Vaughn et al., 2008). Further, there is limited research investigating effective components of small-group reading interventions in general (Begeny, Krouse, Ross & Mitchell, 2009; Chambers et al., 2011; Slavin, et al., 2011). Although the relationship among specific reading skills is not linear in nature, assessing how well a

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student is progressing through the skill areas identified by the NRP, and at what level they begin to struggle, could provide a useful heuristic for most students who experience difficulties with reading. For example, if a student struggled with comprehension and demonstrated adequate reading fluency, then the intervention would focus on comprehension; however, if a student struggled with comprehension, fluency, and decoding, then decoding would be the intervention target because it is the most fundamental of the three. A synthesis of previous intervention research found that interventions were more effective if they correctly targeted the student's area of challenge (Burns et al., 2008), but how to best accomplish this for small-group reading interventions has not been well researched.

The purpose of present study is to compare the effectiveness of a targeted small-group reading intervention to a multicomponent small-group reading intervention for struggling readers in second and third grade. The study was guided by three research questions:

1. What is the relative effect of a targeted and a multicomponent literacy intervention on students' a) decoding, b) fluency and c) comprehension skills?
2. To what extent does student need (i.e. decoding or fluency) predict response to intervention?
3. What modifications to the intervention procedures occurred during the sessions?

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CHAPTER 3: METHOD

Participants and Setting

This study occurred during a 4-week summer school program for students in kindergarten through fifth grade. The students attended schools from one suburban school district in Minnesota during the regular school year. All students attending the summer school were general education students who were identified as needing additional instruction in reading or math according to district and state standardized assessments, benchmark assessments, and teacher recommendations.

Participants were selected from a pool of 91 students (45 entering second grade and 46 entering third grade) attending the summer school program and who spoke English as their first language. Students were identified for the study on the basis of curriculum-based measures of oral reading fluency (CBM-R) scores collected by the school district in the spring as a screening measure. Spring CBM-R scores below 80 words read correctly per minute (WRCM) for students previously in first grade and 118 WRCM for students previously in second-grade were used as inclusion criteria for the study.

Eleven students entering second grade and 20 students entering third grade read above the spring CBM-R cut-off score or did not have spring CBM-R data and therefore were removed from consideration. The remaining 34 second grade and 26 third grade students were included in the study. Parental consent forms were sent home and collected by the students' summer program teachers. Additionally, prior to administering

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the pre-intervention assessments, student assent was obtained by the primary researcher explaining the process to the participants and having them sign the student assent form.

Of the 60 students selected to participate in the study, one second-grade student and one third-grade student were chronically absent (i.e. attended less than half of the days of intervention) and were dropped from the study. Additionally, eight third-grade students were absent during the post-testing. Therefore, a total of 50 students were included in the final analysis. Thirty-three participants (66%) were entering second grade and 17 (34%) were entering third grade. Further, 26 males (52%) and 24 females (48%) participated and 33 were Caucasian (66%), nine were Hispanic (18%), six were Asian (12%) and two were African American (4%). Attendance for the students included the final analysis was relatively high, with students attending a mean average of 10.94 days (range = 8 – 12 days) out of 12 total days.

Four interventionists conducted the intervention sessions, all of which were female licensed elementary school teachers hired to teach at the district's summer school program. Three of the four interventionists had previous experience delivering small-group reading interventions. The interventionists' previous teaching experience ranged from 2 years to 11 years.

Measures

Decoding. The Word Attack subtest of the Woodcock Johnson Tests of Achievement, Third Edition (Woodcock, McGrew, & Mather, 2001), was used to assess students' ability to decode nonsense words. During this assessment, students read aloud a list of pseudowords and the number of pseudowords read correctly was recorded. All

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students were administered the Word Attack subtest prior to the start of intervention and post intervention. Normative data for the Word Attack subtest indicate an internal reliability coefficient of .87 (Schrank, McGrew, & Woodcock, 2001). The data consisted of raw scores indicating the number of pseudowords read correctly.

Fluency. CBM-R was used for two purposes. First, it was used to screen students for inclusion in the study. For this screening, students read three grade level passages aloud for 1 minute and the median WRCM across the three passages was recorded for each student. The passages used in the screening were from the AIMSweb standard benchmark reading assessment system (Edformation, 2002). Spring CBM-R scores below 80 WRCM for students previously in first grade and 118 WRCM for students previously in second-grade were used as inclusion criteria for the study. These spring grade level target scores were associated to at least a 75% chance of achieving proficiency on the Minnesota Comprehensive Assessment (MCA-III), Minnesota's standards-based accountability statewide assessment, based on recent data from eight local school districts (Silberglitt, Muyskens, & Bollman, 2013).

Second, CBM-R data were used to monitor progress each week. Progress monitoring data were obtained with the Formative Assessment System for Teachers (FAST; Christ and Colleagues, 2014). Students orally read three grade level passage for 1 minute and the median number of words read correct per minute (WRCM) across the three passages was recorded. This assessment was administered to each student pre-intervention, on the first day of each of the remaining 3 weeks of intervention, and post-intervention. Thus, CBM-R data were collected on five occasions during the 4 weeks.

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The data were slopes using Ordinary Least Squares (OLS) linear regression generated from students' WRCM scores across the five FAST CBM-R passages.

Comprehension. AIMSweb Maze grade level passages (Edformation, 2002) were used to assess students' comprehension skills. Maze is a supported cloze assessment where students read a passage that has every seventh word after the first sentence removed and replaced by three word options: the correct word and two distractors. Students silently read the passage for 3 minutes and circle the correct word option as they are reading. Maze assessment has a mean alternate-form reliability coefficient of .81 (Shin, Deno, & Espin, 2000). Three Maze passages matching the students' grade level were group administered to all students prior to intervention. The same three grade level Maze passages were group administered to all students post-intervention. The Maze passages were scored by adding the number of correct responses. The median score across the three passages was recorded and used in the analysis.

Cognitive. Due to the potential influence of cognitive processing skills on the dependent variables, a rapid naming measure was included as a covariate measure. A meta-analysis looking at how cognitive attributes influence treatment response of early literacy interventions found that rapid naming was the strongest predictor of student response to intervention (Nelson, Benner, & Gonzalez, 2003); furthermore, adding rapid naming to a model of the Simple View of reading accounted for a greater amount of the variance in reading comprehension than the Simple View of reading model alone (Johnston & Kirby, 2006; Joshi & Aaron, 2000). Therefore, the Comprehensive Test of Phonological Processing Rapid Naming Composite (CTOPP RNC; Wagner, Torgesen, &

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Rashotte, 1999) was selected as the covariate measure for the present study. The Rapid Naming Composite consists of two subtests, Rapid Digit Naming and Rapid Letter Naming, which have internal reliability coefficients of .87 and .82 respectively (Wagner, Torgesen, & Rashotte, 1999). These subtests were administered to all students prior to intervention. The standard score ($M = 100$, $SD = 15$) for the CTOPP RNC was used as a covariate in the analysis.

Diagnostic assessments. Interventionists in both conditions were instructed to use the weekly FAST CBM-R passages to observe any consistent errors students were making to help guide instruction. These passages were also used to compare fluency and accuracy rates to ensure students were matched in the appropriate group. The FAST CBM-R passages were used in place of the running records (Fountas & Pinnell, 2009) that school personnel had been using to monitor progress of reading interventions, so as not to administer two similar assessments and take time away from instruction.

In addition to the weekly FAST CBM-R passages, students receiving the targeted PRESS decoding interventions were also administered a 1 minute word list assessment consisting of words containing the specific phonics skills taught during the lessons. Again, these assessments were used to ensure students were matched in the appropriate group and interventionists also used these assessments to determine any consistent errors students were making and adjusted their instruction accordingly.

Targeted Intervention

The Word Attack assessment administered prior to the intervention was used to identify the subskill deficits for students assigned to the PRESS targeted intervention.

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Students whose Word Attack score was at or above the 25th percentile were assumed to have adequate decoding skills, and therefore received a fluency intervention. Students whose Word Attack score was below the 25th percentile were assumed to have a decoding deficit and received a decoding intervention.

PRESS decoding interventions. Students selected to receive a decoding intervention were administered the PRESS Decoding Inventory (see Appendix A) to assess specific phonics skills to target during intervention and subsequently were assigned to groups of three students with similar decoding deficits. Interventions were implemented from the Phonics section of the PRESS Intervention Manual (PRESS Research Group, 2014; see Appendix C) based on the needs of the group of students. Specific decisions regarding which phonics intervention to administer to each group were decided by the primary researcher using the PRESS Decoding Inventory and the Order to Teach Phonics and Supporting Interventions chart in the PRESS Intervention Manual (see Appendix B). The PRESS Decoding Inventory uses word lists that increase in complexity to gauge the level of students' phonics skills. The Order to Teach Phonics chart links students' level of phonics skills to the appropriate intervention.

Three decoding interventions were administered based on student need as determined by performance on the PRESS diagnostic assessments. Students who read less than 9 out of 10 Consonant–Vowel–Consonant (CVC) words correctly on the PRESS Decoding Inventory were given a word box intervention using a white board with three sound boxes and magnetic letters. In this intervention, the interventionist chose CVC words containing one letter sound the students were not yet able to read correctly. The

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first CVC word was modeled by the interventionist placing magnetic letters from the word one at a time into the corresponding box, saying each letter sound aloud as they placed the letters into the boxes and then blending the three sounds together to say the complete word. Next, students were given opportunities to practice by following the same procedure that was modeled. The interventionist then gave explicit feedback by correcting any errors and the student repeated the process until they could read each phoneme correctly and correctly blend the sounds together. This procedure was then repeated for the remaining CVC words. At the end of the lesson students read the practiced words in a word list and then read the words in connected text, again receiving explicit feedback from the interventionist.

Students who read at least 9 out of 10 CVC words correctly on the PRESS Decoding Inventory, but read less than 9 out of 10 on the beginning digraphs or consonant blends words were given a word building intervention using a white board and dry erase markers. In this intervention, the interventionist created a list of words that differed by one phoneme and that contained digraphs or blends that students were not reading correctly. The interventionist first modeled reading each sound in the word and blended the sounds together to read the complete word. Next, one letter or phoneme was removed and replaced with a different letter or phoneme to build a new word. The interventionist again modeled reading each sound and blending the sounds together to read the new word. The students then engaged in scaffolded guided practice by repeating the modeled activity with new words and receiving explicit feedback from the interventionist. Next, the students were given time for independent practice with the

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word building activity. At the end of the session, the students were administered a flashcard assessment of the practiced words and concluded the lesson by reading connected text containing the words.

No students in the present study were identified to receive the third PRESS intervention that involved teaching students how to read words that follow a general pattern (e.g. words with a silent e, vowel teams or diphthongs) through explicit teaching and high opportunities to practice using word lists, flash cards and connected text. A more detailed explanation of the PRESS decoding interventions and procedures can be found in the Fidelity Checklists in Appendix C.

PRESS fluency interventions. Students receiving a fluency intervention were assigned to a group of three students with similar needs determined by performance on the pre-intervention FAST CBM-R assessment. Students were either assigned to a Repeated Reading intervention or a Duet Reading intervention depending on their reading accuracy. Using the instructional level criterion for reading words correctly (Gickling & Thompson, 1985), students who read at or above 93% accuracy on the pre-intervention FAST CBM-R assessment were determined to read with adequate accuracy and were assigned to the Repeated Reading intervention to provide high opportunities to practice and increase their reading speed and fluency (Daly, Hintze, & Hamler, 2000). In the Repeated Reading intervention, the interventionist read a passage to the students, modeling fluent reading. Next, the students re-read the same passage aloud. One student was selected to be the lead reader, while the other two students were instructed to read along at a slightly quieter volume. After the first reading by the students, the

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interventionist corrected errors made by the lead reader by following the script, “This word is _____. What word is this? (all students repeat the word) Yes this word is _____” and then having all the students choral read the short section of the passage that contained the missed word. This process was completed for each word missed during the reading, until all the errors were corrected. Next, the students re-read the passage two more times and followed the same error correction procedure for any further missed words. After the passage was read three times by the students, all of the procedures were repeated with a new passage and a different student chosen as the lead reader until all students in the group served as the lead reader. These procedures for administering a Repeated Reading intervention in a small group were similar to those used in previous studies by Begeny and colleagues (e.g. Begeny, Krouse, Ross, & Mitchell, 2009; Begeny & Martens, 2006; Begeny, Yeager, & Martinez, 2012).

Students who read below 93% accuracy on the pre-intervention FAST CBM-R assessment received a Duet Reading intervention to help increase fluency and accurate word reading through modeling, high opportunities to practice, and immediate feedback (Ardoin & Daly, 2007). In the Duet Reading intervention, the interventionist first modeled reading a passage to the students as the students followed along. Next, two students were selected to alternate reading every other word of the passage until the passage was complete, while the third student followed along, keeping track of errors. The interventionist then led the students in the same error correction procedure described in the Repeated Reading intervention above. After the error correction procedure, the same two students re-read the passage, but alternated who started with the first word,

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while the third student followed along. Again, errors were corrected after the passage was complete. Next, students rotated roles, and the same procedure was repeated until all students had a chance to be a reader and had a chance to be the one to follow along tracking errors.

The interventionists selected passages from the school's leveled library that were at the students' instructional level (i.e. read words in the passages with 93 to 97% accuracy; Gickling & Thompson, 1985). If the interventionists noticed the passages were too difficult or too easy for the students, new passages were selected to match the students' level. A more detailed explanation of the PRESS fluency interventions and procedures can be found in the Fidelity Checklists in Appendix C.

Multicomponent intervention

Students assigned to the multicomponent intervention condition received the Leveled Literacy Intervention (LLI; Fountas & Pinnell, 2009). LLI is a multicomponent small-group reading intervention that purportedly includes components of phonological awareness, phonics, fluency, comprehension and vocabulary for all students. The instruction provided is based on leveled texts using the Fountas and Pinnell text gradient system (Fountas & Pinnell, 2010). Students were assigned to groups of three students of similar reading ability based on their Fountas and Pinnell instructional reading level that was assessed by their school in the spring as a benchmark assessment. The LLI lessons consisted of odd and even lessons described below.

Odd lessons. During LLI odd lessons, students re-read a book from the previous lesson for the first 5 minutes. All students in the group quietly read the book aloud to

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themselves. As the students were reading, the interventionist listened to each student and provided brief feedback, including helping students use reading strategies to read with fluency and comprehension.

The next 5 minutes included phonics skills instruction with the whole group, where the interventionist taught phonics skills using visuals and an active component for students to practice the skills. The visuals and active components varied from lesson to lesson and included materials such as word, letter, phoneme and picture cards, white boards with dry erase markers, magnetic letters, sentence strips, and other tools to teach letter and word patterns and other phonics skills.

After the phonics skills lesson, students worked with a new book for the next 15 minutes. The interventionist introduced the book by having students read the title, look at pictures and predict what the book will be about. The students then read the book aloud quietly to themselves as the interventionist listened to each student and provided feedback, prompts and teaching strategies to the students. After all of the students in the group completed reading the book, the interventionist engaged students in a group discussion about what they read and discussed reading strategies to help them with decoding, fluency, and comprehension.

The last 5 minutes of the lesson were used to provide more phonics skills practice, where the interventionist used whiteboards and magnetic letters to have the students practice different letter patterns and sounds in words. At the end of each LLI odd lesson, students took home the book from the day's lesson to read with a family member at home. They were also given a phonics worksheet to complete at home.

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Even lessons. The even lessons in the LLI curriculum were similar to the odd lessons, except an additional writing component was added in place of one of the phonics components. Similar to the odd lessons, students re-read a book quietly aloud from the previous lesson for the first 5 minutes as the teacher provided feedback and taught relevant reading strategies.

The next 5 minutes were spent on phonics skills where the interventionist taught phonics skills using visuals and an active component for students to practice the skills. After the phonics lesson, students engaged in a writing activity based on the reading from the previous week. The interventionist selected a writing activity (shared, dictated, or independent) based on the perceived needs of the students in the group and taught relevant skills such as sentence structure, spelling, phonics, and word relationships.

In the final 10 minutes of the lesson, the interventionist introduced a new book and followed the same procedures for engaging with the new book as in the odd lessons. At the end of each LLI even lesson, students took home the book from the day's lesson to read with a family member at home. They were also given a phonics worksheet to complete at home.

Procedures

A randomized block design was used to assign students to the two intervention conditions to ensure equal students with decoding and fluency needs were in each condition. First, students who scored below the 25th percentile on the Word Attack subtest were assumed to have a decoding need and were randomly assigned to an intervention condition. Next, students who scored at or above the 25th percentile were

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assumed to have a fluency need and were randomly assigned to a condition. All interventions were administered in groups of three students and consisted of 12, 30 minute sessions, across 4 weeks. The four interventionists administered the intervention simultaneously and each administered the intervention to five groups throughout the school day. On the first day of each week, prior to administering the intervention, the interventionists administered three CBM-R passages to each student. While the interventionist was administering the CBM-R passages, the other two students in the group silently read a grade level passage. The pre and post intervention assessments were administered during the 2 days prior to starting intervention and 2 days post intervention. The assessment and intervention implementation schedule is presented in Table 1.

All interventionists attended a 2 hour training session with the primary researcher and a reading specialist in the school district with over 13 years of experience as a reading specialist. The first 30 minutes of the training included learning how to implement the weekly FAST CBM-R passages. Three of the four interventionists had direct experience with administering CBM-R, and the fourth interventionist was familiar with the assessment.

The remaining hour and a half of the training consisted of teaching the interventionists how to implement the interventions. The training consisted of the primary researcher and reading specialist modeling each component of the respective interventions, using the appropriate fidelity checklist (see Appendix C), and observing

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each interventionist implement each component of the intervention on the fidelity checklist until they achieved 100% accuracy.

Research Design Analysis

A randomized block design was used to compare the relative effectiveness of the interventions. Students were first categorized as having a decoding need or a fluency need based on their performance on the Word Attack pre-intervention assessment. Students who scored at or above the 25th percentile were determined to have a fluency need and those who scored below the 25th percentile were categorized as having a decoding need. Students were blocked according to need and randomly assigned to either the targeted (PRESS) or multicomponent (LLI) intervention condition. In order to control for other potential spurious variables all intervention sessions took place in a similar setting in a classroom and intervention sessions for both conditions were equal in dosage (30 minutes) and intensity (three students in a group).

Intervention Fidelity

The fidelity of intervention implementation was measured in two ways: 1) through a self-report checklist completed by the interventionists and 2) through observations by the primary researcher using the same fidelity checklist. The fidelity checklist contained between 10 to 16 items depending on the specific intervention, and was the same checklist used during the interventionist training session. The interventionists actively used the checklist as a guide during their intervention sessions. Additionally, the interventionists documented their own intervention fidelity after 33% of the sessions by recording “yes” or “no” indicating if they completed each intervention

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component. The self-report checklists were completed immediately after the intervention session. Fidelity observations by the primary researcher occurred during 14% of the sessions.

Mean implementation fidelity on the self-recorded checklists was 99.2% (range = 85% - 100%) for the PRESS interventions, and 97.8% (range 80% - 100%) for the LLI interventions. Observations by the primary researcher revealed slightly lower implementation fidelity with mean percentages of correctly implemented components of 93% (range = 55% to 100%) for the PRESS interventions, and 94% (range = 67% to 100%) for the LLI interventions. Items missed on the PRESS interventions included providing guided practice on a phonics intervention and allowing all students in the group to be the lead reader on fluency interventions. Items missed on the LLI interventions included selecting specific teaching points to teach each student, re-reading the passage from the previous day and completing the hands on phonics work at the end of the session.

Modifications to Interventions

The third research question was addressed through observations by the primary researcher. I observed 14% of all the intervention sessions to document, (a) the amount of time spent delivering the intervention, not including transitions, (b) the number of opportunities to respond that occurred during the session, (c) components of the intervention that interventionists excluded or missed, and (d) components interventionists added to the intervention.

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Opportunities to respond (OTR) were operationally defined as the interventionist asking a question or prompting for student response and allowing time for students to respond.

Data Analysis

To answer the first research question, three one-way Analyses of Covariance (ANCOVA) were conducted to compare the relative effect of the targeted and multicomponent reading intervention on students' reading skills. Students' post-test scores on the Word Attack and Maze assessments were used as outcome measures to assess decoding and comprehension respectively. Students' WRCM scores across the five FAST CBM-R passages were converted to slope using Ordinary Least Squares (OLS) linear regression and used as the outcome to assess reading fluency. The CTOPP RNC and pre-intervention assessments for Word Attack, CBM-R, and Maze were used as covariates in the analyses.

To address the second research question, three multiple regression analyses were conducted, one for each dependent variable, to determine if student need (i.e. decoding need or fluency need) predicted response to intervention. First, CTOPP RNC was entered into the regression model for each dependent variable. Next, student need was added to each model to determine the impact of student need on the dependent variables after controlling for CTOPP RNC.

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CHAPTER 4: RESULTS

The purpose of this study was to compare the relative effectiveness of two different methods for implementing a small-group reading intervention for early elementary students. The Paths to Reading Excellence in School Sites (PRESS) intervention involved determining if students had a decoding need or a fluency need and provided appropriate, targeted instruction based on student need. The Leveled Literacy Intervention (LLI) provided similar multicomponent instruction in phonological awareness, phonics, fluency, comprehension and vocabulary for all students. The study was guided by three research questions:

1. What is the relative effect of a targeted and a multicomponent literacy intervention on students' a) decoding, b) fluency and c) comprehension skills?
2. To what extent does student need (i.e. decoding or fluency) predict response to intervention?
3. What modifications to the intervention procedures occurred during the sessions?

Relative Effect of Intervention Condition on Literacy Skills

The distribution of the data was examined for normality by computing estimates of kurtosis and skewness. These results can be found in Table 2. The skewness value for the pre-intervention ORF and pre- and post-intervention Maze measures were slightly positively skewed, however the skewness values were all considerably less than 2.0. The kurtosis and skewness values for all other pre- and post-intervention variables were less

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than 2.0 and within two standard errors suggesting the data were acceptably normally distributed, therefore parametric analyses were used.

To answer the first research question, three separate Analyses of Covariance (ANCOVA) were conducted, one for each dependent variable. Post intervention scores were used as the outcome and pre-intervention scores and scores on the Comprehensive Test of Phonological Processing Rapid Naming Composite (CTOPP RNC) were used as covariates. This rapid naming measure was included as a covariate measure to control for the potential influence of cognitive processing speed on the dependent variables (Nelson, Benner, & Gonzalez, 2003; Wagner, Torgesen, & Rashotte, 1999).

The CTOPP RNC data consisted of standardized scores ($M = 100$, $SD = 15$). The mean CTOPP RNC score for the students in the LLI intervention condition ($M = 95.58$, $SD = 10.99$) was slightly higher than the mean score for the students in the PRESS intervention condition ($M = 91.88$, $SD = 6.62$).

Decoding. Descriptive statistics for the pre and post-intervention decoding scores by condition are presented in Table 3. The mean scores reflect the average number of pseudowords read correctly on the Word Attack decoding measure. Differences between post-intervention scores on Word Attack were not statistically significant between the PRESS and LLI conditions after controlling for the pre-intervention Word Attack measure and the CTOPP RNC, $F(1, 46) = 0.35$, $p = .16$ and the effect size was small, $\eta^2 = .02$ in favor of the PRESS condition.

Reading Fluency. The means and standard deviations by intervention condition for the ORF scores are presented in Table 4 and reflect the median Words Read Correct

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per Minute (WRCM) across three CBM-R passages per administration. ORF slope was calculated from five administrations of CBM-R across 4-weeks, by using Ordinary Least Squares (OLS) linear regression. After controlling for scores on the pre-intervention CBM-R administration and CTOPP RNC, there was not a statistically significant difference between the conditions for ORF slope, $F(1, 46) = 0.01, p = .94$ and the effect size was small $\eta^2 = .01$.

Comprehension. Descriptive statistics for the pre and post-intervention reading comprehension scores by condition are presented in Table 5. The mean scores reflect the average number of correct responses on the Maze reading comprehension assessment. Differences between intervention conditions on the post-intervention reading comprehension assessment were not statistically significant after controlling for the pre-intervention Maze score and CTOPP RNC, $F(1, 46) = 1.84, p = .18$ and there was a small to moderate effect $\eta^2 = .04$ in favor of the LLI condition.

Student Need Predicting Response to Intervention

To address the second research question, change scores were computed for the decoding and reading comprehension measures and ORF slope was used as the outcome for the oral reading fluency measure. Change scores and slope were used to determine the degree to which students responded to intervention. Descriptive statistics for these measures by student need are presented in Table 6.

Three multiple regression analyses were conducted to determine the degree to which student need predicted response to intervention on the reading outcome measures. A theoretical basis was used to determine the order variables were entered into the model.

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Rapid naming speed is a strong predictor of students' response to literacy interventions (Nelson, Benner, & Gonzalez, 2003), therefore for each regression analysis CTOPP RNC was first entered into the model. Next, student need was entered to determine the degree to which students having a decoding or fluency need predicted an increase in the change score for the respective reading outcome measure after controlling for CTOPP RNC.

Decoding. Results of the regression models for decoding are presented in Table 7. In Model 1, CTOPP RNC was not a significant predictor of the decoding change score, $F(1, 48) = 1.78, p = .19$ and accounted for 3.6% of the variance. In Model 2, student need was a significant predictor of decoding controlling for CTOPP RNC, $F(2, 47) = 3.00, p = .05$. Further, adding student need to the model increased the amount of variance accounted for by 7.7%.

Reading Fluency. Students with a fluency need demonstrated larger growth across the four weeks of intervention than students with a decoding need (see Table 6). However, after controlling for the CTOPP RNC, student need was not a significant predictor of ORF slope. Table 8 presents the results of the regression models for ORF slope. The CTOPP RNC entered in Model 1 was a significant predictor of ORF slope $F(1, 48) = 5.65, p = .02$ and accounted for 10.5% of the variance. Student need was added to Model 2 and was not statistically significant $F(2, 47) = 2.78, p = .07$ after controlling for CTOPP RNC. Moreover, adding student need to the model only increased the variance accounted for by 0.1%.

Comprehension. Finally, the results of the regression models for reading comprehension are presented in Table 9. In the first model, the CTOPP RNC was not a

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significant predictor of reading comprehension growth $F(1, 48) = 0.90, p = .35$. Adding student need in Model 2 did not improve the model much as student need was also not statistically significant $F(2, 47) = 0.46, p = .64$ after controlling for CTOPP RNC and the variance accounted for only increased by 0.1%.

Intervention Procedures and Modifications

To address the third research question, I observed 14% of all the intervention sessions to document, (a) the amount of time spent delivering the intervention, not including transitions, (b) the number of opportunities to respond that occurred during the session, (c) components of the intervention that interventionists excluded or missed, and (d) components interventionists added to the intervention.

Intervention implementation time. The amount of time administering the intervention, not including transitions, was recorded during the observations. The PRESS interventions were administered for a mean average time of 25 minutes (range = 22 minutes to 32 minutes), and the mean average time for the LLI interventions was 27 minutes (range = 22 minutes to 32 minutes).

Opportunities to respond. Opportunities to respond (OTR) were documented during observations by the primary researcher by recording each time the interventionist asked a student a question, or prompted for a student response and allowed time for students to respond. The average opportunities to respond for each condition and lesson type within condition are displayed in Figure 1. For PRESS interventions, the mean OTR was 35 (range = 18 to 71). There was a large difference observed in OTR within the PRESS interventions depending if the intervention was a decoding intervention or a

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fluency intervention. PRESS decoding interventions had a mean OTR of 54 (range = 35 to 71), whereas PRESS fluency interventions had a mean OTR of 26 (range = 18 to 37). The reason for the discrepancy appeared to be that during the fluency interventions, the students spent the majority of the time reading longer passages, and therefore this gave the interventionists less time to prompt for responses, whereas during the decoding interventions, students read short sounds, words, or sentences allowing the interventionists to have more opportunities to prompt for student responses. Redefining the definition of OTR to include the number of words read aloud during passage reading along with interventionist promptings would have greatly increased the OTR of the PRESS fluency interventions. In the repeated reading intervention, students typically read nine total passages for 1 minute each, which would have increased the OTR by 495 on average assuming students read at an average of 55 words per minute. In the duet reading intervention, students also typically read nine 1-minute passage readings, but because students read the passage by alternating every other word, their rate of reading was not as fast as the repeated reading condition and therefore would have included slightly less OTR than in the repeated reading condition, but still would have been much higher than was recorded by counting interventionist promptings only.

Mean OTR for the LLI interventions was 49 (range = 17 to 82). Within the LLI interventions, the mean OTR for even sessions was 47 (range = 28 to 42) and 51 (range = 17 to 82 for odd sessions). The large range in OTR observed in the LLI intervention sessions may be explained by the fact that the intervention provided guidelines for how to give student feedback and instruction during error correction, but allowed the

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interventionist to use their personal judgment for what and how much feedback to provide. The interventionists were observed to differentiate the amount of feedback given depending on the students in the group. Similar to the PRESS fluency interventions, the OTR for the LLI interventions would also have been substantially higher if words read during passage reading were included. Students in the LLI intervention typically spent about 10 minutes reading a passage during the session. Assuming students read at a rate of 55 words per minute, the LLI OTR would have increased by 550 on average.

Excluded or missed components. The most commonly observed missed components of the PRESS interventions occurred during error corrections where the interventionist either did not model the correct word for the students, or did not have the students repeat the modeled word. The most commonly missed components of the LLI interventions included failing to preview the new book with the students and not implementing the letter/word work phonics component of the intervention. For both the PRESS and LLI interventions, the lowest fidelity implementation (55% for PRESS, and 67% for LLI) occurred during the first day of intervention, where the interventionists had difficulty with the pacing and being able to implement all of the components of the intervention within the 30 minute allotted time. Following these low percentages of fidelity, the primary researcher discussed with the interventionists the importance of including all of the components of the intervention, and gave suggestions for pacing. The fidelity subsequently increased for both interventions.

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The LLI interventionists were also observed to shorten or lengthen the phonics section of the intervention with some groups. Recommended times for implementing the sections of the intervention were included on the fidelity checklist, however as long as all of the components of each section were administered, the length of time the sections were administered for did not impact the fidelity implementation percentage.

Added components. The final component recorded during the observations was components interventionists added to the intervention (i.e. components that were not a part of the intervention manual and implementation checklists). All four interventionists added motivational components to the intervention. The PRESS and LLI interventionists all provided students with a small prize (e.g. a small candy or a small plastic toy) following the intervention session. Students received this prize for attending the intervention session and it was not dependent on their performance or behavior during the session. The LLI interventionists added an additional homework completion incentive where students would earn points for returning the completed phonics homework worksheets and points could be exchanged for a larger prize (e.g. a book or larger candy). If LLI students obtained all of the possible points, they would be able to earn the larger prize twice over the four weeks. The PRESS interventions did not contain a homework component; therefore the homework completion incentive was not included in the PRESS intervention groups.

Along with the added motivational components, the interventionists were also observed to add instructional components to the interventions. Examples of added components included teaching students strategies for reading words or sounds that

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students continually read incorrectly, discussing word definitions and vocabulary, and adding comprehension components to prompt students to engage with the passage. The LLI interventionists were observed to shorten or lengthen the fluency section, or shorten or lengthen the phonics section of the intervention for different groups. The LLI interventionists were also observed to create additional phonics worksheets for students to take home. A list of all the additional instructional components observed for the PRESS and LLI interventions can be found in Figure 2.

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CHAPTER 5: DISCUSSION

The purpose of this study was to compare the relative effectiveness of two different approaches of administering reading interventions to second and third grade students in small-groups. One approach involved targeting the intervention to students' needs by first determining if the students had a decoding or fluency need. Students with a decoding need were further assessed to determine specific areas for instruction regarding phonics skills, fluency and accuracy. Similarly, students with a fluency need that received the targeted intervention were further categorized as needing to increase accuracy and fluency or fluency only and were administered the appropriate intervention. The second approach to administering a small-group reading intervention involved grouping students of similar reading ability and providing all students with similar multicomponent instruction in phonological awareness, phonics, fluency, comprehension and vocabulary.

The study was guided by three research questions:

1. What is the relative effect of a targeted and a multicomponent intervention on students' a) decoding, b) fluency and c) comprehension skills?
2. To what extent does student need (i.e. decoding or fluency) predict response to intervention?
3. What modifications to the intervention procedures occurred during the sessions?

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Relative Effect of Condition on Literacy Skills

Overall, both intervention conditions resulted in an increase on the post-intervention literacy measures. For oral reading fluency, students in the present study averaged 1.46 (PRESS intervention) and 1.91 (LLI intervention) words read correct per week growth. This is compared to typical growth from second and third grade students receiving intervention who average 1.66 and 1.18 words read correct per week growth respectively (Deno, Fuchs, Marston, & Shin, 2001), and typical growth from second and third grade students receiving regular instruction who average 1.19 and 1.13 words read correct per week growth respectively (Hasbrouck & Tindal, 2006).

The mean raw score increase on the decoding (Word Attack) measure was slightly higher for PRESS condition, the oral reading fluency slope was slightly higher in the LLI condition and the mean raw score increase on the comprehension (Maze) assessment was slightly higher for the LLI condition. However, after controlling for the pre-intervention assessments and the Comprehensive Test of Phonological Processing Rapid Naming Composite (CTOPP RNC) the differences between the conditions on all three reading measures were not statistically significant and the effect sizes were small or small to moderate, indicating that the impact of both intervention conditions was similar on students' decoding, fluency and comprehension skills.

These results are not consistent with previous research that supports the effectiveness of targeting instruction based on student need (Burns, VanDerHeyden, & Boice, 2008; Connor et al. 2009; Foorman, Francis, Fletcher, Schatschneider, & Mehta, 1998; Hall & Burns, 2015; Juel & Minden-Cupp, 2000). The similar outcomes between

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the two interventions could have occurred because both interventions contained similar components of effective reading instruction such as providing similar amounts of opportunities to respond (Burns, 2007; Daly, Hintze, & Hamler, 2000), including practice with immediate feedback (Ehri, 2004, Pany & McCoy, 1988) matching the material to students' instructional level (Daly et al., 1996; Gickling & Thompson, 1978), and containing explicit instruction (Gaskins et al., 1996; Mathes, et al., 2005; Swanson, 1999). It could be that the presence of these elements in both interventions resulted in similar effectiveness.

Although similar levels of effectiveness could have been due to both interventions containing elements of effective reading interventions, the data may also be explained by the characteristics and experiences of the interventionists, and observations to identify modifications to the intervention procedures that were conducted to address the third research question. I will expand on these points below.

Interventionists

The interventions were administered by four different interventionists whose characteristics and experience may have had an influence on the results. Three of the four interventionists had previous experience administering the LLI intervention, including the two interventionists who administered the LLI intervention in the present study. Anecdotally, these three interventionists were perceived to be very positive about the LLI intervention and believed it to be an effective intervention. In contrast, the PRESS interventions were novel to the two interventionists that implemented them. Further, the interventionists that implemented the PRESS interventions were anecdotally

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perceived to be somewhat negative about the PRESS interventions and expressed that they believed the components were too repetitive and more components should have been added to the interventions. Although fidelity of implementation was high for both interventions according to the fidelity checklists, the interventionists' attitudes toward the LLI and PRESS interventions and the previous experiences of the interventionists may have had an impact on how the interventions were implemented that was not captured in the fidelity checklists (Durlak, 2010).

Intervention Modifications

The third research question addressed modifications made to the interventions during the intervention sessions. Although in general all interventions were implemented with high fidelity according to fidelity checklists that assessed whether key components were included, interventionists in the LLI condition were observed to shorten or lengthen sections of the intervention based on the students' needs. For example, with some groups, the interventionists were observed to shorten the phonics lesson and stated they felt it was not an effective use of the intervention time for students that already developed the phonics skills being taught in the lesson. Although the LLI fidelity checklists included suggested amounts of time to implement each section, these times were used as guidelines and not counted against the implementation fidelity as long as all the components were correctly implemented. These observations suggest that the LLI interventionists provided a more targeted approach to their groups of students than was intended.

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The LLI interventions contained an additional homework component that was not present in the PRESS interventions, where students took home the book that was read during the intervention session, and were encouraged to read it with a family member at home. Students in the LLI group also took home a phonics decoding worksheet after each lesson and the LLI interventionists created additional decoding worksheets for students to work on at home. Further, a reward system was created for students in the LLI group to provide an incentive for them to complete and return the phonics homework. All of these additional components were present in the LLI intervention sessions and not in the PRESS intervention, which may explain the lack of effectiveness of the targeted intervention over the multicomponent intervention.

Extent that Student Need Predicts Response to Intervention

Student need was a statistically significant predictor of response to intervention on the decoding measure. Students with a decoding need had a larger increase on the Word Attack (decoding) measure following intervention than students with a fluency need. Further, student need accounted for more of the variability on the Word Attack change score than the CTOPP Rapid Naming Composite alone. These results are not surprising in that students with a decoding need receiving the PRESS intervention were provided with a decoding intervention, whereas students with a fluency need receiving a PRESS intervention did not receive explicit decoding instruction. Similarly, observations of intervention implementation revealed that the LLI interventionists provided students that had lower decoding skills with more phonics instruction than students that had higher decoding skills. Moreover, students with lower decoding skills likely had more room for

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improvement, than students with higher decoding skills. Nevertheless, this finding adds to the literature that suggests students with varying reading skills respond differently to intervention and may benefit most from instruction that is targeted to their area of need (Burns et al., 2008, Connor et al, 2009; Daly, Lentz, & Boyer, 1996).

Student need was not a significant predictor of response to intervention for ORF slope and only minimally increased the variability accounted for when added with the CTOPP Rapid Naming Composite. This finding is somewhat surprising in that students in the PRESS intervention with a fluency need received a fluency-based intervention and it is likely that students in the LLI intervention with higher decoding skills also received more fluency based intervention than students with a decoding need. Berninger, Abbott, Vermeulen, and Fulton (2006) found that improving decoding skills can act as a bridge to help students read more fluently. Although the present study did not directly address this, it is possible that improving the decoding skills of students with a decoding need had an impact on their oral reading fluency scores and lessened the gap between students with a fluency need that received more fluency based interventions.

There was little difference between students with a decoding and fluency need on the Maze (comprehension) change score and subsequently student need was not a significant predictor of response to intervention for students' comprehension skills. Reading with comprehension is a complex process involving the interaction of student's prior knowledge and metacognitive strategies used by the student while reading (Dole, Duffy, Roehler, & Pearson, 1991). It may be that teaching explicit metacognitive

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comprehension strategies was not a large enough component of either intervention to discriminate response to intervention for comprehension skills by student need.

Potential Implications

The results of the present study and observations of how the interventions were implemented have implications for administering small-group reading interventions within schools and for theory. I will discuss both below.

Implications for Practice

This study found that students of different reading abilities responded differently to intervention, with students with lower decoding ability increasing their decoding skills more than students with higher decoding ability. Consistent with previous research that different interventions result in differential effects for individual students (Burns, Coddling, Boice, & Lukito, 2010; Daly & Martens, 1994), interventions aimed at improving decoding, should take into account the current reading abilities of the students to help target the intervention.

All four interventionists were observed to modify their respective interventions and add intervention components. This observation is not surprising and is consistent with previous research that practitioners will adapt interventions to the current context and to meet the perceived needs of the students (Harn, Parisi, Stoolmiller, 2013). Implementing interventions with high fidelity is a key component of the efficacy of the intervention (Al Otiba & Fuchs 2006; Durlak & DuPre, 2008; Kaderavek & Justice, 2010). Therefore, it is important to understand how interventions are being modified or adapted in practice. In the present study, the interventions were initially implemented

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with somewhat low fidelity during the first sessions, as interventionists had difficulty with the pacing and including all the components of the intervention within the allotted time. After the interventionists were provided feedback on how to more efficiently implement the interventions, the fidelity of the interventions increased and remained high throughout the remainder of the study. Assessing fidelity early on allows the interventionists to receive feedback in areas that may need to be addressed and subsequently can increase the fidelity of the intervention (Harn et al., 2013). Further, continuing to assess fidelity will help maintain high fidelity throughout the administration of the intervention (Durlak, 2010).

Although implementing interventions with high fidelity is important, some researchers have suggested modifying interventions to adapt to student or practitioner needs, while maintaining the core components of the intervention, may increase the efficacy of the intervention (Blakley et al., 1987; Castro, Barrera, & Martinez, 2004; Webster-Stratton et al., 2011). Gaining an understanding of what components of interventions are core components (i.e. causal mechanisms important to the effectiveness of the intervention) can help guide the feedback that is provided to the instructors that are implementing the intervention (Webster-Stratton et al., 2011). However, understanding the core mechanisms of change in an intervention is often complex and difficult to determine (Durlak, 2010). Future research systematically observing what components of small-group reading interventions are typically modified in practice and how these modifications impact student outcomes would provide more guidance in the area.

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Three of the interventionists in the present study had previous experience administering the LLI intervention and expressed positive opinions of it, whereas the interventionists that implemented the PRESS interventions expressed somewhat negative, perceived limitations of the PRESS interventions. Practitioner characteristics, including perceived effectiveness and need for the intervention can have an impact on how the intervention is implemented (Durlak, 2010). Educating interventionists about the research supporting the core mechanisms of the program, providing adequate training in the intervention, and supporting interventionists by providing feedback throughout the intervention implementation can help to ensure the intervention is implemented appropriately (Durlak, 2010).

Implications for Theory

There is a continued need for schools to find ways to implement effective reading interventions to struggling readers with high efficiency (Fielding, Kerr, & Rosier, 2007). Implementing reading interventions in small-groups is one way to provide intensive intervention in an efficient manner. Determining the causal mechanisms of small-group reading interventions for different students can help further increase the efficacy and efficiency of these interventions. The Stage Theory of reading (Chall, 1983) provides guidance for determining how causal mechanisms vary for individual students depending where they are in their reading ability. In this study, students that had lower decoding skills were found to make more progress in their decoding ability after intervention than students with higher decoding skills. This finding provides some support for the Stage Theory of reading, where students develop their early literacy skills in progressive stages.

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Consistent with Berninger et al. (2006), students that had developed adequate decoding skills may not have improved their decoding skills as much as students with less developed skills because they had progressed further along in their reading ability where decoding was no longer as much of a concern.

According to the Simple View of Reading, improving students' decoding ability would subsequently have a positive impact on their reading comprehension as well (Gough & Tunmer, 1986). While this hypothesis was not investigated in the present study, it is possible that the increase in students' decoding skills for students categorized as having a decoding need resulted in these students increasing their reading comprehension as well such that student need was not found to be a predictor of reading comprehension, however this is only conjecture.

Limitations and Directions for Future Research

There were several limitations of the current study that need to be considered. Unfortunately there was a conflict with a third grade summer program that occurred during the final week of the summer school resulting in eight third-grade students missing the final week of intervention and post-testing sessions. Moreover, one third-grade and one second-grade student were chronically absent and removed from the analysis. Therefore, 10 students were removed from the study. It was assumed that those students were missing at random and that their skills were not significantly different than those who participated. However, the effect of not including data from those 10 students on the results is unknown.

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Difference scores were used in the regression analysis only, to address the second research question. Although there are threats and limitations associated with using change scores (e.g. Cronbach & Furby, 1970; Dimitrov & Rumrill, 2003; Linn & Slinde, 1977), change scores were used because the research question addressed students' response to intervention. Nevertheless, these findings should be interpreted with the limitations of change scores in mind.

Students were not randomly assigned to a condition by grade and therefore there may have been grade level differences that impacted the results. However, students' pretest scores were used as a covariate in the analysis to help control for any grade level effects.

Intervention only occurred for 12 total days across 4 weeks. Previous evaluations of other tier 2 reading intervention models have ranged from a minimum of 8 weeks to several years of intervention (Marston, 2005). Four weeks of intervention in the present study may not have been long enough to differentiate the effects between the two interventions.

Confounding variables not related to targeting the intervention or providing a multicomponent intervention were present in the current study. Interventionists administering the LLI intervention were observed to shorten or lengthen the phonics sections of the intervention depending on the needs of the students in the group, making the multicomponent intervention more targeted to student needs. Three of the interventionists had previous experience implementing the LLI intervention, including the two interventions that implemented LLI in the current study, whereas the PRESS

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intervention was novel to the two interventionists administering the PRESS intervention. Finally, the LLI condition contained an additional homework component and motivational component to complete the homework that was not present in the PRESS condition. Future research should add these homework and motivational components to the PRESS condition to provide more equality to between the conditions.

Implementation fidelity of the intervention was high according to interventionists' self-reports and fidelity observations; however, these fidelity measures only took into account if important components of the intervention were correctly implemented and may not have captured other relevant elements with how the interventions were administered. Previous research has found that assessing process fidelity by rating the quality with which the interventions are implemented is an important consideration, especially for literacy outcomes (Odom et al, 2010), and should be included as a fidelity component in future studies.

The operational definition of opportunities to respond in the present study was limiting and likely did not capture all of the opportunities to respond that occurred during the intervention sessions or how the opportunities to respond impacted student outcomes. Future research should consider broadening the definition of opportunities to respond to include words read aloud during passage reading, non-verbal responses, homework components and the type of feedback the interventionists provided after a student response.

There was large variability in the oral reading fluency slope for students in both the PRESS and LLI conditions and for students with a decoding and fluency need. There

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was also large variability in the change scores for students with a decoding and fluency need for the decoding and comprehension measures. Future research should investigate potential reasons for this large variability and why the interventions would be more successful for some students than others.

Finally, it would have been of interest to determine how student need interacted with the intervention conditions. However, due to the low number of students in the current study, conducting a 2x2 interaction analysis would have resulted in cells with as little as seven subjects and therefore very little power to detect any significant group differences. Previous research found that less skilled readers benefited more from interventions that contained high amounts of explicit instruction in decoding and whereas more advanced readers benefited more from meaning-based instruction (Juel and Minden-Cupp, 2000). It could be that higher skilled readers are more likely to benefit from multicomponent-based interventions than lower skilled readers who may need greater amounts of decoding-based instruction; however, future research investigating this is needed with a larger sample of participants.

Conclusion

This study sought to add to the literature investigating the effectiveness of small-group reading interventions by comparing two different methods of administering reading interventions in small-groups. While no differences were found between the targeted and multicomponent intervention conditions for all three reading outcome measures, observations of how the interventions were administered by the interventionists provided insight into how small-group reading interventions are administered in practice.

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Consistent with previous research indicating that practitioners will adapt interventions to fit their philosophies and the perceived needs of the students, in the present study interventionists were observed to modify the intervention and add components presumably to target the intervention closer to the needs of the students in their groups. Future research investigating more closely how small-group reading interventions are modified in practice, reasons for the modifications, and how they impact student outcomes would provide important information for navigating the complexities of effectively implementing small-group reading interventions in our schools.

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Table 1

Intervention and Assessment Schedule

	Intervention	WA	CBM-R	Maze	Rapid Naming
Week 1					
Days 1 and 2		X	X	X	X
Day 3	X				
Day 4	X				
Week 2					
Day 5	X		X		
Day 6	X				
Day 7	X				
Day 8	X				
Week 3					
Day 9	X		X		
Day 10	X				
Day 11	X				
Day 12	X				
Week 4					
Day 13	X		X		
Day 14	X				
Days 15 and 16		X	X	X	

Note. WA = Word Attack. CBM-R = Curriculum Based Measurement –Reading.

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Table 2

Skewness and Kurtosis Estimates for Pre-intervention and Post-intervention Measures

	<u>Pre-Intervention</u>			<u>Post-Intervention</u>		
	Word Attack	ORF	Maze	Word Attack	ORF Slope	Maze
Skewness	0.67	0.92	0.84	0.48	0.14	0.97
Kurtosis	0.66	0.33	0.43	- 0.36	- 0.37	0.76

Note. The standard error for all skewness estimates is 0.34. The standard error for all kurtosis estimates is 0.66.

ORF = Oral Reading Fluency. ORF slope is ordinary least squares linear regression based on five administrations across four weeks.

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Table 3

Means and Standard Deviations for Word Attack by Intervention Condition

	<u>Targeted - PRESS</u>		<u>Multicomponent – Leveled Literacy Intervention</u>	
	<i>(n = 26)</i>		<i>(n = 24)</i>	
	M	SD	M	SD
Pre-intervention	11.23	3.48	11.04	4.84
Post-intervention	12.39	3.41	12.00	4.08

$F(1, 46) = 0.35, p = .16, \eta^2 = .02$

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Table 4

Means and Standard Deviations for ORF by Intervention Condition

	<u>Targeted - PRESS</u>		<u>Multicomponent – Leveled Literacy Intervention</u>	
	<i>(n = 26)</i>		<i>(n = 24)</i>	
	M	SD	M	SD
Pre-intervention	51.19	21.95	55.04	29.63
ORF Slope	1.46	2.96	1.91	2.48

$F(1, 46) = 0.01, p = .94, \eta^2 = .01$

Note. ORF = Oral Reading Fluency. *ORF* slope is ordinary least squares linear regression based on scores from five administrations across 4 weeks.

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Table 5

Means and Standard Deviations for Maze by Intervention Condition

	<u>Targeted - PRESS</u>		<u>Multicomponent – Leveled Literacy Intervention</u>	
	<i>(n = 26)</i>		<i>(n = 24)</i>	
	M	SD	M	SD
Pre-intervention	4.88	3.02	4.46	2.65
Post-intervention	6.04	4.21	6.46	3.27

$F(1, 46) = 1.84, p = .18, \eta^2 = .04$

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Table 6

Means and Standard Deviations for Word Attack Pre-post Intervention Change Score, Oral Reading Fluency (ORF) Slope and MAZE Pre-post Intervention Change Score by Student Need.

	<u>Decoding (n = 15)</u>		<u>Fluency (n = 35)</u>	
	M	SD	M	SD
Word Attack	2.20	2.11	0.57	3.42
ORF slope	1.50	2.07	1.75	2.98
Maze	1.40	1.50	1.63	2.34

Note. ORF slope is ordinary least squares linear regression based on raw scores from five reading passages across four weeks.

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Table 7

Comparison of Regression Models Predicting Response to Intervention on the Word Attack Pre-post Change Score

Predictor	<u>Model 1</u>			<u>Model 2</u>		
	B	SE B	β	B	SE B	β
Constant	- 5.01	4.64		- 5.44	4.50	
CTOPP Rapid Naming Composite	0.07	0.05	0.19	0.08	0.05	0.24
Need Group				- 1.93	0.95	- 0.28*
R^2	3.6%			11.3%		
ΔR^2				7.7%		

* $p < .05$

Note. CTOPP = Comprehensive Test of Phonological Processing. Need Group is based on decoding and fluency scores.

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Table 8

Comparison of Regression Models Predicting Response to Intervention on ORF Slope

Predictor	<u>Model 1</u>			<u>Model 2</u>		
	B	SE B	β	B	SE B	β
Constant	- 7.43	3.85		- 7.45	3.90	
CTOPP Rapid Naming Composite	0.10	0.04	0.33*	0.10	0.04	0.33*
Need Group				- 0.10	0.83	- 0.02
R^2	10.5%			10.6%		
ΔR^2				0.1%		

* $p < .05$

Note. CTOPP = Comprehensive Test of Phonological Processing. Need Group is based on decoding and fluency scores.

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Table 9

Comparison of Regression Models Predicting Response to Intervention on the Maze Pre-post Change Score

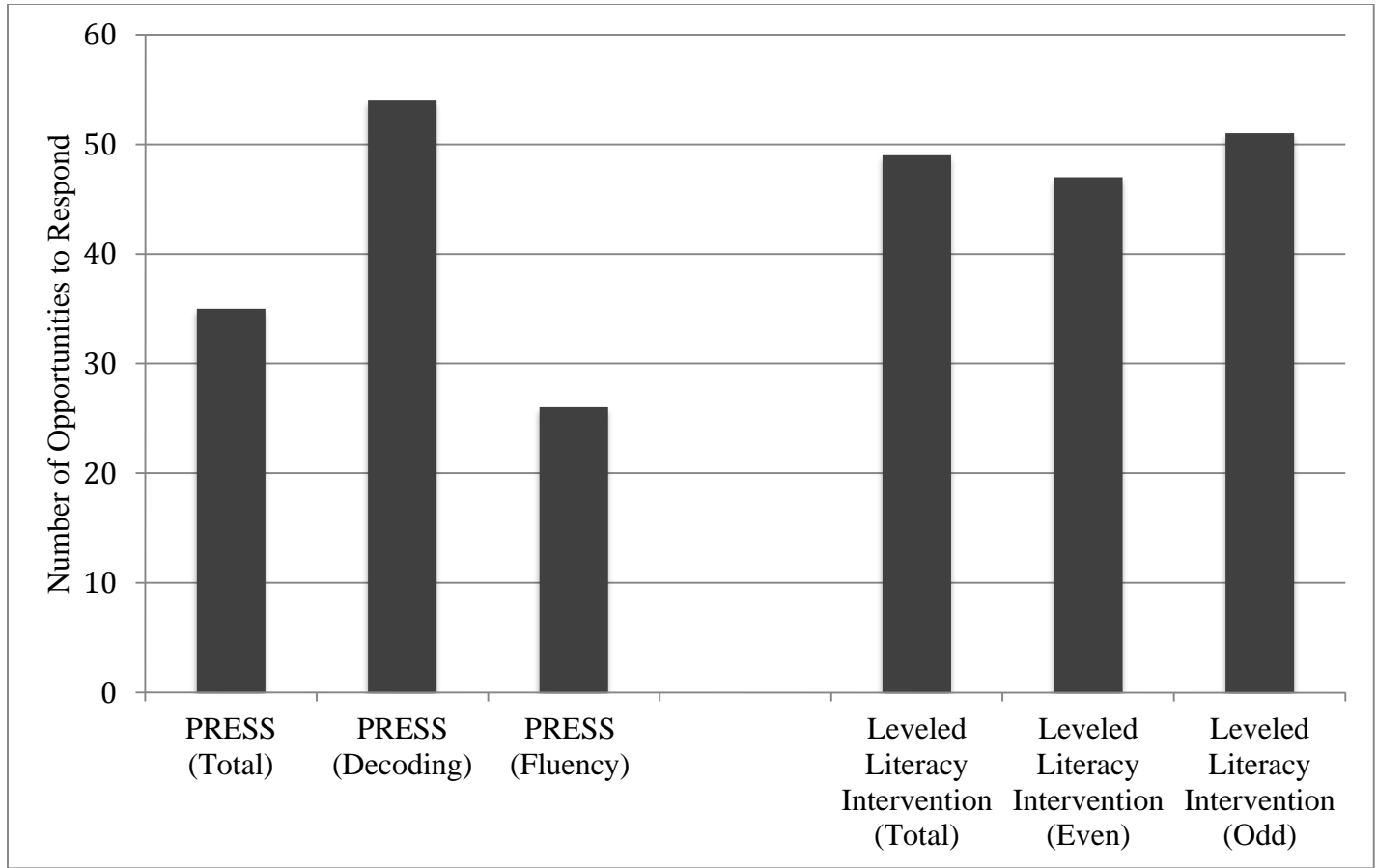
Predictor	<u>Model 1</u>			<u>Model 2</u>		
	B	SE B	β	B	SE B	β
Constant	- 1.39	3.13		- 1.37	3.16	
CTOPP Rapid Naming Composite	0.03	0.03	0.14	0.03	0.03	0.13
Need Group				0.12	0.67	0.03
R^2	1.8%			1.9%		
ΔR^2				0.1%		

* $p < .05$

Note. CTOPP = Comprehensive Test of Phonological Processing. Need Group is based on decoding and fluency scores.

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Figure 1. Number of opportunities to respond by intervention condition and lesson type within condition



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Figure 2. Instructional components added by the interventionists that were not a part of the intervention.

Added Components to PRESS Interventions	Added Components to LLI Interventions
<p>Error correction during phonic instruction</p> <ul style="list-style-type: none"> • Taught students how to recognize the difference between b and d by using picture tools (i.e. b and d as posts on a bed and as a bat and ball) • Taught students how to correctly say the h sound by putting their hand in front of their mouth and feeling their breath <p>Before students read a passage</p> <ul style="list-style-type: none"> • Discussed parts of the book (e.g. table of contents, glossary, index) • Read the title and asked students to predict what they thought the passage would be about • Had students preview the book, and look at the pictures <p>Error correction following passage reading</p> <ul style="list-style-type: none"> • Taught students to break words up by syllables during error correction • Defined word for the students and gave examples for how to use the word in different contexts • Wrote word students continually read incorrectly on a white board, underlined parts of the word and had students read each part one at a time <p>After students completed a passage</p> <ul style="list-style-type: none"> • Asked students to relate the contents of the story to their personal lives • Asked students to discuss their favorite parts of the story 	<p>During phonics word work</p> <ul style="list-style-type: none"> • In addition to completing a word sort with cards, had students write the words on a white board • Incorporated vocabulary and word definitions into the word work • Discussed homophones and asked students to think of further examples <p>During reread passage</p> <ul style="list-style-type: none"> • Prompted all students to answer comprehension questions during the reread as a group • Walked all students through the reread passage showing examples for how they can use context to figure out unknown words <p>During new passage reading</p> <ul style="list-style-type: none"> • Interventionist took turns reading pages with the students • Prompted all students to answer comprehension questions as a group during the reading • Interventionist modeled reading the new passage before having the students read it • After completing the reading, had students practice words read incorrectly using flash cards, then had students sort the words based on their vowel teams <p>Other</p> <ul style="list-style-type: none"> • Shortened or lengthened phonics or fluency sections depending on the skill level of students in the group • Created additional phonics worksheets for students to take home

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Appendix A

PRESS Decoding Inventory



Decoding Inventory

Student Name: _____ Teacher Name: _____ School: _____

Date: _____ Evaluator Name: _____

Begin with Letter/Sound Correspondence to determine where to begin a decoding intervention:

Letter Sound Correspondence	<21 <i>move back to PA</i> >21 <i>Assess vowel sounds and decoding</i>
Decoding	
A. Short vowels in CVC words	8/10 use P-1 or P-2 intervention >9 Move onto B.
B. Short vowels and digraphs	8/10 use P-3 intervention >9 Move onto C.
C. Consonant blends with short vowels	8/10 use P-4 intervention >9 Move onto E
D. vowel spellings	8/10 use P-4 intervention >9 Move onto E
E. r- and l-controlled vowels	8/10 use P-5 intervention >9 Move onto F
F. Variant vowels and diphthongs	8/10 use P-5 or P-6 intervention >9 Move onto Fluency

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Decoding Inventory

Letter Sound Correspondence

Point to the first letter and say to the student:

"Look at these letters. Can you tell me the sound each letter makes?"

- If the sound given is correct, do not mark the Record Form. If it is incorrect, write the sound the student gives above each letter.
- If a student takes longer than 3 seconds, prompt for the next letter by saying, "What sound?"
- Correct responses for vowels: short sound
- Correct response for /g/ is /g/ as in /gift/
- Correct response for /c/ is /c/ as in /cat/
- If other than the correct response for these letters, say to the student:
"Is there another sound that letter makes?"

m t p n c d s a g h i f b l r o
w k x e v y z u j

_/26

>21 move back to PA assessment

<21 Assess decoding starting with A.

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Decoding Inventory

Reading and Decoding

For items A through G, students must read both real and pseudo words (made-up words). For the first line of real words, tell the student:

"I want you to read these words."

If the student cannot read two or more of the real words, do not administer the line of pseudo words. Go to the next set of items. Before asking the student to read the line of pseudo words, say:

"Now, I want you to read some made-up words. Do not try to make them sound like real words."

A. Short vowels in CVC words

___/ 5	sip	nap	let	but	hog (real)
___/ 5	vop	fut	dit	kem	laz (pseudo)

8/10 try P-1 or P-2 intervention
> 9 Move onto B.

B. Short vowels and beginning digraphs

___/ 5	deck	chop	ring	shut	path (real)
___/ 5	plick	shom	thap	fath	chud (pseudo)

8 / 10 try P-3 intervention
> 9 Move onto C.

C. Consonant blends with short vowels

___/ 5	stem	trap	grit	spell	plan (real)
___/ 5	stig	brab	pled	snop	dran (pseudo)

8/ 10 try P-3 intervention
> 9 Move onto D.

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Decoding Inventory

D. Long vowel spellings

___/ 5	tape	key	lute	paid	feet (real)
___/ 5	loe	bine	joad	vay	soat (pseudo)

8/ 10 try P-4 intervention
> 9 Move onto E

E. r- and l-controlled vowels

___/ 5	bark	horn	chirp	term	cold (real)
___/ 5	ferm	dall	gorf	murd	chal (pseudo)

8/ 10 try P-5 intervention
> 9 Move onto F

F. Variant vowels and diphthongs

___/ 5	few	down	toy	hawk	coin (real)
___/ 5	voot	rew	fout	zoy	bawk (pseudo)

8/ 10 try P-5 intervention
> 9 Move onto Fluency

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Appendix B

PRESS Order to Teach Phonics and Supporting Interventions Chart

ORDER TO TEACH PHONICS AND SUPPORTING INTERVENTIONS

	Acquisition Emergent (PAE) (P-1)	Proficiency Emergent (PPE) (P-2)	Acquisition Beginning (PAB) (P-3)	Proficiency Beginning (PPB) (P-4)	Acquisition Transitional (PAT) (P-5)	Proficiency Transitional (PPT) (P-6)
Consonant Sounds	X	X				
Short Vowel Sounds	X	X				
VC Words		X	X	X	X	X
CVC Words		X	X	X	X	X
Consonant Digraphs th sh ch	X	X	X	X	X	X
Blends • CCVC • CVCC • CCVCC	X	X	X	X	X	X
CVC-e	X	X	X*	X	X	X
Vowel Teams ea oa ai ie ue oe ee • CVVC	X (works for some)	X	X*	X	X	X
Diphthongs ou/ow au/aw oi/oy ew	X (ou and oy, but not oi and oy together)	X	X*	X	X	X
R-controlled	X (ar and or only)	X	X*	X	X	X
Inflected endings -s -ed -ing	X	X		X	X	X

*Use letter boxes sparingly from this point on and transition students off of them.

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Appendix C

PRESS and LLI Intervention Implementation Fidelity Checklists

PRESS P-3 Fidelity Checklist

Target words: CVC

Materials needed: List of CVC words; Cookie sheets with letter boxes (one for each student); Magnetic letters; Connected text that includes the CVC words from the word list

Yes	No	Step	Intervention Procedure
		1. Gather and organize materials	1 Select letter sounds to teach (include sounds the students need to learn with sounds they already know well). Prepare a list of CVC words that contain the selected letters. Prepare a letter sound box mat for each student with magnetic letters of the selected letter sounds to teach. Set the prepared letter sound box mats aside (except the one you will use for modeling and guided practice) until independent practice (step 8).
		2. Articulate objective	2 “Today you will learn how to blend letter sounds together to make words.”
		3. Explain activity	3 “First we will review some letters and their sounds and then we will put those letter sounds together to make words.”
		4. Check for student understanding	4 Hold up each letter one at a time and have the students tell you the names and sounds of each selected letter.
		5, 6. Model the activity	<p>5 Say the first word: “ ___ (cat).” Say: “I hear the /_/, /_/, and /_ / (e.g. /c/, /ă/, and /t/) sounds in the word ___ (cat).”</p> <p>6 Then hold up the first letter and say: “This is the letter ___ (c) and it makes the /_ / (/c/) sound. I hear the /_ / (/c/) sound first, so I am going to put the letter ___ (c) in the first box. I hear the /_ / (/ă/), sound second, so I will put ___ (a) here. Finally, I hear the /_ / (/t/) sound last, so I will put ___ (t) at the end.”</p> <p>Next, say each sound individually while pointing at the letters. Then, blend the sounds together to read the whole word.</p> <p>Letter sound boxes should look like this:</p> <div style="display: inline-block; border: 1px solid black; width: 100px; height: 20px; margin-left: 20px;"></div>
		7, 8. Provide guided practice	<p>7 Say the next word: “ ___ (e.g. tan).” Then ask: “What sounds do you hear in ___ (e.g. tan)?” Wait for the students to say the sounds /_/, /_/, /_ / (e.g.</p>

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		<p>/t/, (/ă/), /n/).</p> <p>Give feedback using the script in step 7.</p> <p>8 Say: “The letters that make up the word ___ (tan) are ___ (t), ___ (a), ___ (n).”</p> <p>Say the sounds again with the students and hold up each magnetic letter as you say its sound and put it in the correct box on the mat. Have the students blend all the sounds together and read the word. Provide feedback.</p>
	9. Give specific feedback to students’ responses in Steps 7 & 8	<p>9 If correct: “Good. You hear the /_/, /_/, and /_/ sounds in the word _____.”</p> <p>If incorrect or students fail to respond: “No, I hear the /_/, /_/, and /_/ sounds in the word _____. What are the sounds?”</p>
	10, 11. Provide independent practice	<p>10 Repeat step 6 with different words as necessary. Once the students successfully complete the task with guidance, hand them their own letter box mats and give them independent practice by saying more words from the prepared word list. After you say a word have them place the letters in the boxes one at a time while saying the letter sound as they place it in the box. Have them blend all the sounds together to say the word. Remember to provide explicit feedback (Step 7).</p> <p>11 Conclude the lesson by having the students read a word list containing the words used in the lesson and having students read connected text that contains a high proportion of words that have just been decoded.</p>

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PRESS: P-4 Fidelity Checklist

Target words: CVCC or CCVC

Materials needed: List of CVCC or CCVC words; Small dry erase boards; Dry erase markers; Flash cards, Connected text that includes the CCVC or CVCC words from the word list

Yes	No	Step	Intervention Procedure
		1. Gather and organize materials	1 Before the lesson, prepare CC target letter sounds to present to students by writing the letter sounds and at the top of a white board for each student (e.g. th, ch, sh). Prepare a list of words that include the target letter sounds that change by only one letter or letter sound. Write each word individually on a flash card.
		2. Articulate objective	2 “Today we will learn how to say the sounds letter teams make. Letter teams are two letters that when they are put together make a different sound than when they are by themselves. We will then learn how to blend letter team sounds together with other letter sounds to make words.”
		3. Explain activity	3 “First we will learn (or review) the sounds two letters make when they are put together. Then we will put the letter teams with other letters and blend all their sounds together to make words.”
		4. Check for student understanding	4 Point to the target letter teams written at the top of the white board as you say their names. Say: “Here are some letter teams written on this white board. They are ____, ____, and ____ (e.g. <u>th</u> , <u>sh</u> and <u>ch</u>).” Point to the first letter team and say: “When the letters __ and __ are put together, they make the sound / __ / (e.g. When the letters <u>t</u> and <u>h</u> are put together they make the sound /th/).” 5 Ask the students to repeat the letter names and the sound they make when they are together. Provide feedback from step 4.5. Repeat for each letter team.
		4.5 Give specific feedback to students’ responses in Step 4	6 Letter Team Names Student responds correctly: “Good! Now tell me the sounds they make.” Student responds incorrectly: “No, the letters in this letter team are __ (th).” Ask the student to repeat the letter names. “What are the letters in this letter team?” Letter Team Sounds Student responds correctly: “Good! The sound the __ (th) letter team makes is / __ / (/th/).” Student responds incorrectly: “No, The sound the __ (th) letter team makes is / __ / (/th/).” Ask the student to repeat the

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			letter team sound. “What sound does this letter team make?”
		5. Model the activity	<p>7 Say: “Now I am going to use a letter team with other letters to make the word ____ (e.g. path).” I hear three sounds in the word ____ (path). The first sound I hear in the word ____ (path) is ____ (/p/), so I am going to put the letter ____ (p) first. The next sound I hear is ____ (/ă/), so I am going to put the ____ (a) next. The last sound I hear in ____ (path) is ____ (/th/), so I am going to the ____ (th) last. Let’s check: ____ (/p/), ____ (/ă/), ____ (/th/), ____ (path).”</p> <p>8 Next, demonstrate how to replace one letter (or letter team) from the word with a new letter to make a new word. For example, erase the _p_ from the word and write a _b_ in its place. Say: “I took away the _p_ from the word and put a _b_ in its place. Now I have the word _ bath _).”</p>
		6. Provide guided practice	<p>9 Say: “Now let’s try it together.”</p> <p>Instruct a student to erase one letter or letter team from your word and replace it by writing in a different letter or team. Say: “Can you take away the ____ (th) from my word and write a ____ (sh) in its place? Can you read the new word?” (Wait for all students to respond and provide feedback from step 6.5)</p> <p>Repeat until students are ready to move to independent practice.</p>
		6.5. Give specific feedback to students’ responses in Step 6	<p>10 When Changing Letter Sounds: Student responds correctly: “Good! The letter team ____ (sh) belongs where the letter team ____ (th) used to be.” Student responds incorrectly: “No, the letter ____ (sh) belongs here, where the ____ (th) used to be.” Have the student try again.</p> <p>Reading Words: Students respond correctly: “Good! That word is ____ (bash).” Students respond incorrectly: “No, that word is ____ (bash).” Ask the students to read the word again. “What word is it?”</p>
		7. Provide independent practice	<p>11 Give each student a white board with the target letter teams written at the top and a dry erase marker. Continue with the word building activities by having the students change the words by one letter sound or team.</p> <p>12 After completing a word building sequence, administer a flashcard assessment of all the words used during the activity. The students should be able to read correctly at least</p>

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			<p>80% of the words they “built” during the lesson. If not, continue using the same words during the next lesson.</p> <p>13 Conclude the lesson with a sentence reading activity that contains a high proportion of words that have just been decoded.</p>
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A COMPARISON OF SMALL-GROUP READING INTERVENTIONS

PRESS: Duet Reading Fidelity Checklist

Materials needed: *Reading passages*

Yes	No	Step	Intervention Procedure
		1. Gather and organize materials	1 Group the students into dyads. If there are three students, then two students (A and B) will be the first dyad and the third (Student C) will follow along and note errors as the other two students read. Provide each student with a grade-level (or appropriate current skill-level) text of substantial length to engage in meaningful reading, but not too long so as to overwhelm the student.
		2. Articulate objective	2 “We will practice reading today. You will take turns reading words so that you can practice reading accurately. “
		3. Model the activity	3 The interventionist will then read a reasonable amount of text (e.g. a paragraph) to the students as they follow along. Have the students follow along with their finger to ensure they are following along.
		4. Explain activity	4 “We are going to read it again, but this time two of you will read the passage together. Start at the beginning and you (select a student) will read the first word, then you (identify the second student) will read the second word, and then you will go back and forth until you read the entire (passage/paragraph etc.)” Explain that the third student will follow along and keep track of errors.
		5. Check for understanding	5 “Any questions?”
		6. Provide practice	6 The two students will then alternate reading every other word until the paragraph is complete.
		7, 8. Provide feedback	7 After completing the paragraph, errors are corrected by pointing to the word and saying “That word (pointing to the word) is _____. What word?” “Yes, that word is _____. Good.” 8. Next, all students re-read the sentence (or part of a sentence) that contains the word three times.
		9. Re-read the passage	9 After completing the passage and error correction, the two start over again on the same passage, but this time the student that read the second word starts and the one that previously

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			read first reads the second word. The third student continues to follow along and keep track of errors.
		10. Next passage	10 Next, the interventionist directs the students to listen as he/she reads the next paragraph to the students and starts over again with step 3. The student who was keeping track of errors now joins a reading dyad. Repeat all the steps until all students have been the error corrector.

A COMPARISON OF SMALL-GROUP READING INTERVENTIONS

PRESS: Repeated Reading Fidelity Checklist

Materials needed: *Reading passages at students’ instructional level; Graph paper for each student*

Yes	No	Step	Intervention Procedure
		1. Gather and organize materials	1 Select passages that are at the students’ instructional level (i.e. students will read with 93 to 97% accuracy).
		2. Articulate objective	2 “Today, you’ll read a passage multiple times to work on increasing your fluency. Fluency is the rate, accuracy, and expression that we use when we read—not just how fast we can read.”
		3. Explain activity	3 Say: “We will read a passage together for one minute. One of you will be the lead read and read at a normal volume and the other two will read on long at a slightly quieter volume. After the first read, I will help you correct any mistakes that were made and the lead reader will mark on the graph the number of words read correctly. We will then read the passage two more times, following the same procedure, and the lead reader will try to read more words each time.”
		4. Check for understanding	4 “Does anyone have any questions?”
		5. Model the activity	5 Model reading the passage to the students, explaining that they will be working on reading with rate, accuracy, and expression. Have the students follow along with their finger to ensure they are following along as you read the passage.
		6. Provide practice	6 Explain that we will all be reading together for one minute. One student will be the leader reading at a normal volume, while the other two students whisper read along. Start the first child, “Begin.” Teacher starts stopwatch, follows along and marks any mistakes made by the lead student. If the students get stuck on a word, tell them the word after three seconds and mark it as incorrect. At one minute, say, “Stop” and mark the last word read.
		7, 8, 9. Provide feedback	7 After the students read for one minute go back and correct errors made by the lead reader using the following script: “This word is _____. What word is this? Yes this

A COMPARISON OF SMALL-GROUP READING INTERVENTIONS

			<p>word is ____.”</p> <p>8 Have all the students read the short sentence (or part of a longer sentence) that contains the missed word. Provide the error correction script as necessary, with re-reading the sentence again or congratulate, “Great job!”</p> <p>9 Move to the next error following the same process until all errors have been corrected. (If necessary, remind student about reading with good expression.)</p>
		10. Re-read two more times	<p>10 Re-read the passage two more times following steps 7, 8 and 9 with the same student as the lead reader. Remind the student to try to read more words than they previous read.</p>
		11. Next passage	<p>11 Start from step 5 with a new passage, having a different student as the lead reader. Repeat, until all students had a chance to be the lead reader.</p>

A COMPARISON OF SMALL-GROUP READING INTERVENTIONS

LLI Odd-Number Lesson Fidelity Checklist

Yes	No			
		Goals for Lesson	<ul style="list-style-type: none"> • Teacher uses the lesson goals to plan for children’s needs. 	
		Rereading Books: 5 min	<ul style="list-style-type: none"> • Children are invited to reread previously read books. 	
			<ul style="list-style-type: none"> • Teacher selects a specific teaching point to explicitly teach for, prompt for, or reinforce effective strategic actions. 	
		Phonics/Word Work: 5 min	<ul style="list-style-type: none"> • Teacher uses concise language to introduce a phonics principle children need to understand. 	
			<ul style="list-style-type: none"> • The teacher uses and/or creates a visual or a chart to highlight the principle and usually includes an active element for children. 	
		New Book: 15 min Introducing the Instructional Level Text: Reading the Text: Discussing and Revisiting the Text: Teaching Points:	<ul style="list-style-type: none"> • Teacher familiarizes the children with the meaning of the text (not necessarily every page). 	
			<ul style="list-style-type: none"> • Teacher scaffolds the child’s use of meaning, language, and visual information in text. 	
			<ul style="list-style-type: none"> • Teacher adjusts the kind of support children need to process the text with fluency and excellent comprehension. 	
			<ul style="list-style-type: none"> • Each child reads the entire text either softly or silently. 	
			<ul style="list-style-type: none"> • Teacher samples oral reading and interacts briefly with children to support effective problem-solving strategies. 	
			<ul style="list-style-type: none"> • Teacher invites children to talk about the meaning of the text. 	
			<ul style="list-style-type: none"> • Teacher looks for evidence of children’s ability to think within, beyond and about the text. 	

A COMPARISON OF SMALL-GROUP READING INTERVENTIONS

			<ul style="list-style-type: none"> • Teacher selects a specific teaching point to explicitly teach for, prompt for, or reinforce effective strategic actions.
		Letter/Word Work: 5 minutes	<ul style="list-style-type: none"> • Teacher guides children in some quick ‘hands-on’ word work.
			<ul style="list-style-type: none"> • Teacher uses magnetic letters, word and picture cards, and other materials to reinforce letters and words.

A COMPARISON OF SMALL-GROUP READING INTERVENTIONS

LLI Even-Number Lesson Fidelity Checklist

Yes	No			
		Goals for Lesson	<ul style="list-style-type: none"> • Teacher uses the lesson goals to plan for children’s needs. 	
		Rereading Books and Assessment: <i>5 min</i>	<ul style="list-style-type: none"> • Teacher selects previously read books for two of the children to reread silently. 	
			<ul style="list-style-type: none"> • Teacher assesses one child’s accuracy, fluency, and comprehension using a reading record with yesterday’s new book. 	
			<ul style="list-style-type: none"> • Teacher selects a brief teaching point that will be helpful for this child. 	
		Phonics/Word Work: <i>5 min</i>	<ul style="list-style-type: none"> • Teacher uses concise language to introduce a phonics principle children need to understand. 	
			<ul style="list-style-type: none"> • The teacher uses and/or creates a visual or a chart to highlight the principle and usually includes an active element for children. 	
		Writing About Reading: <i>10 min</i>	<ul style="list-style-type: none"> • Teacher talks with children about yesterday’s new book. 	
			<ul style="list-style-type: none"> • Teacher engages the students in the suggested writing activity (dictated, interactive, or independent), following appropriate procedures and supporting students as needed/required. 	
		New Book: 10 min Introducing the Instructional Level Text Reading the Text	<ul style="list-style-type: none"> • Teacher familiarizes the children with the meaning of the text (not necessarily every page). 	
			<ul style="list-style-type: none"> • Teacher scaffolds the child’s use of meaning, language, and visual information in text. 	
			<ul style="list-style-type: none"> • Teacher adjusts the kind of support children need to process the text with fluency and excellent comprehension. 	
			<ul style="list-style-type: none"> • Each child reads the entire text either softly or silently. 	
			<ul style="list-style-type: none"> • Teacher samples oral reading and interacts briefly with children to support effective 	

A COMPARISON OF SMALL-GROUP READING INTERVENTIONS

		<p>Discussing and Revisiting the Text:</p>	<p>problem-solving strategies.</p> <ul style="list-style-type: none"> • Teacher invites children to talk about the meaning of the text.
		<p>Teaching Points:</p>	<ul style="list-style-type: none"> • Teacher looks for evidence of children’s ability to think within, beyond and about the text. • Teacher selects a specific teaching point to explicitly teach for, prompt for, or reinforce effective strategic actions.