

UTILIZING A PEER-MEDIATED ACADEMIC
INTERVENTION TO EVALUATE STUDENT GROWTH
BY TREATMENT DOSAGE

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Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
May, 2019

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ACKNOWLEDGEMENTS

I would like to acknowledge my family, first and foremost, for being there every step of the way and always being available for whatever I needed at the time. Without it, I don't think I could have achieved this milestone or completed a project like this one. I would also like to acknowledge my cohort members, Shelby, Eryn, Meredith, Justin, Sam, and Ayla, for helping me from the very beginning to the very end. They have helped me throughout every step and without the support of my cohort, I couldn't have completed this project. Their guidance, time, energy, and effort in helping me was the backbone of this project. I needed their support at every step throughout this process, and they gave it to me without question. I am truly grateful and will never forget their contribution to my success in this project and in graduate school.

Additionally, this project was only completed through the efforts of other graduate students in my program and through the staff at Skyline Elementary School. Without these supports in place, this project would likely have never been more than just an idea. Thank you to the other graduate students in the program who volunteered their time and effort to help with observations, progress monitoring, and scoring probes. I would also like to acknowledge the tireless and thankless work of the aides and teachers in the reading specialist's room where this project took place, especially Mrs. Buser. Without their input, insight, and assistance, this project could not be completed. Their work in monitoring the intervention and providing students an opportunity to engage in reading intervention was imperative to the success of this project. Without their hard work, students needing additional reading intervention would likely not succeed. It is through their hard work students at Skyline Elementary School are achieving success and gaining much needed skills to achieve at high levels.

Name: DANIEL ANDERSON

Date of Degree: MAY, 2019

Title of Study: UTILIZING A PEER-MEDIATED ACADEMIC INTERVENTION TO
EVALUATE STUDENT GROWTH BY TREATMENT DOSAGE

Major Field: SCHOOL PSYCHOLOGY

Abstract: Intervening on academic skills early in a child's academic career can remediate reading difficulties quickly and set the stage for early literacy skills (Velluntino, Scanlon, Small, & Fanuele, 2006). There are several evidence-based interventions suggested for use when a child presents with academic skill deficits (Shapiro, 2011); however, what is unknown in reading intervention research is exactly how much is needed to prevent or remediate skill deficits. Research has yet to inform practitioners of how much intervention a child will likely need to remediate the presenting difficulties. In essence, research has yet to suggest what dose of intervention to give a struggling student when presenting with reading skill deficits. This study sought to understand how the dosage (i.e., frequency of administration) of reading intervention effects learning. Specifically, in a group administered repeated readings intervention, what is the difference in intervention effectiveness when students are given different dosages of intervention between every day and every other day? Further, is there a more efficient dosage between reading intervention given every other day and every day? The current study examined these questions in an elementary school in the Southern Plains of the U.S. Students from grades 2-5 participated with a total of 34 students who received reading intervention daily or every other day, based on random assignment to groups. Oral reading fluency was measured weekly for progress monitoring and words correct per minute were calculated across a total of 6 weeks. A repeated measures ANOVA found significant growth for both groups across time, suggesting a group administered, peer-mediated repeated readings intervention is effective in increasing words correct per minute for all students who received intervention. However, there were no differences detected between groups. Post-hoc analyses were conducted to inform future research examining the dosage of intervention. Overall, the current study found significant results for a main effect of a peer-mediated repeated readings intervention, therefore suggesting a peer-mediated group administered repeated readings intervention is an effective tool for increasing a student's oral reading fluency performance. Limitations are discussed, and implications for practice and future research are examined.

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CHAPTER I

INTRODUCTION

Several academic interventions have been employed to increase learning for students who present with at-risk functioning or deficient skill sets in all academic areas (Shapiro, 2011). In fact, Velluntino and colleagues (2006) found that intervening on academic skills early in a child's academic career can remediate reading difficulties quickly and set the stage for early literacy skills. Research has long supported these notions and have suggested that early intervention can remediate deficient skills, and there are several evidence-based interventions suggested for use when a child presents with academic skill deficits (Shapiro, 2011). What is unknown in academic intervention research is exactly how much is needed to prevent problems or to remediate skill deficits. In other words, research has yet to inform practitioners of how much intervention a child will likely need to remediate the presenting difficulties.

In essence, teachers, interventionists, and school psychologists need to know what dose (e.g. how much) of intervention to prescribe to a child with his/her presenting difficulties. Subsequently, little is known about the effects of an intervention relative to the dosage delivered (e.g., frequency of administration). An important avenue of inquiry is to understand the effects on student performance when treatment dosage is changed. Furthermore, an important knowledge base to acquire from this type of research is to understand the differential effects of a treatment given at lower dosages and also at higher dosages (Warren, Fey & Yoder, 2007).

Understanding treatment effects at this level assists teachers and data teams in knowing what to expect when employing an intervention. For instance, an intervention given at a higher dosage may increase treatment effects to a desired outcome, or it may not increase treatment effects to the desired outcome, and subsequently, teachers and data teams making decisions regarding student academic intervention may have wasted time when a more efficient dosage of treatment was available. In this instance, additional resources were provided, but the child received no additional benefit from increasing the dosage. On the other hand, increasing the dosage of an intervention (i.e., frequency of intervention sessions) could lead to quicker skill acquisition, and potentially, some students may need higher dosages of intervention to achieve and maintain skills at benchmark levels (Duhon, Mesmer, Atkins, Greguson, & Olinger, 2009). Understanding intervention effects at this level is imperative to making the most appropriate decisions given a student presenting with academic difficulties. If intervention effects were understood at this level, data teams, teachers, and school psychologists could make better systematic decisions that would result in quicker outcomes that remediate academic difficulties and allow children presenting with problems to achieve at higher levels. In an era where resources are vastly limited in school settings, it is imperative that data teams and school psychologists understand treatment dosages at this level to know when an increase or decrease in treatment dosage is warranted in order for the child to receive the most benefit from additional resources and time away from regular education instruction.

Intervention Dosage

Intervention dosage is a construct defined differently across the literature. Coddling and Lane (2015) reviewed this research area and found five dimensions of intervention dosage used across the literature. Researchers manipulate treatment intensity by session length, session frequency, intervention duration, number of opportunities to practice, and interventionist characteristics (Coddling & Lane, 2015). Warren and colleagues (2007) defined dose as the number of learning trials administered during an intervention session, and learning trials are the efforts of the interventionist to cause measurable behavioral change (i.e., learning). Furthermore, the authors defined dose frequency

as the number of learning trials administered per day or per week. Defining treatment intensity as the frequency of intervention sessions implemented, Al Otaiba and colleagues (2005) found that in a sample of kindergarten students who were randomly assigned to three different tutoring conditions—4 days a week for 30 minutes, 2 days a week for 30 minutes, or a control condition—the students who received tutoring 4 days a week for 30 minutes significantly outperformed the other two groups on measures of word identification, passage comprehension, and basic reading skills. The authors concluded that for Kindergartners at-risk for reading difficulties, the more intense intervention was more effective in remediating reading difficulties compared to a less intense intervention and a control condition (Al Otaiba, Schatschneider, & Silverman, 2005). These findings suggest that, at least for students at-risk for reading difficulties in kindergarten, there may be potential differential treatment effects when treatment dosage is manipulated. Thus, offering the notion that if the dose frequency of an intervention is increased, students may gain more beneficial effects from the treatment.

In order to understand varying treatment dosages, one study found that increasing intervention dosages, in terms of number of intervention sessions, lead to quicker gains in math fluency goals (Duhon et al., 2009). In this study, the authors used a multiple baseline design across participants to measure intervention intensity effects. Specifically, after baseline data was collected, participants were given an explicit timing math fact fluency intervention for five sessions daily. One student did not reach mastery criteria in regards to digits correct per minute. Subsequently, this student's sessions were increased to ten sessions of intervention daily. After this change, the student obtained mastery criteria. These findings support the notion that increasing intervention dosage can lead to quick and desired intervention results, thus offering support for the notion that changing the dose of an intervention can impact the acquisition of a skill. In fact, without the increase of dose for this particular student, he or she may have not reached mastery criteria on this skill. Understanding the effects of different dosages of treatments may have important implications for choosing the frequency of an intervention.

Similarly, Coddling, VanDerHeyden, Martin, Desai, Allard, and Perrault (2016) utilized a math treatment package that consisted of guided practice with math facts (choral responding), timed practice of math fact fluency, and practice on conceptual and application oriented problems. The intervention was guided by an interventionist and lasted about twelve minutes. The researchers randomly assigned 141 participants to one of four conditions: four times weekly, twice weekly, once weekly, and control. The students in the control condition did not receive any instruction beyond daily math instruction. They found that students who were in the four times weekly condition outperformed the other groups and the control condition on measures of Math-Curriculum Based Measurement assessments. Furthermore, students in the four times weekly condition exhibited higher rates of growth compared to those in the control condition. With these findings, it appears that when changing the frequency of intervention sessions, students respond to higher frequencies and growth tends to be quicker with higher frequencies. This study provided further evidence that changing the dosage of an intervention may in fact lead to not only more effective results, but in this instance, quicker results.

Learning Rate. A critical method of measuring differing treatment effects by dosage frequency is understanding the intervention effectiveness via measuring a student's learning rate. Since intervention effectiveness studies measure a learning level change (i.e., increased words correct in a passage), these studies can only speak to a change in behavior, but they do not take into account the amount of time it took to cause the behavioral change (Skinner, 2008). Measuring learning rate requires that the experimenter understands how much instructional time it takes to bring about learning (i.e., behavioral change: words correct per minute, digits correct per minute) (Skinner, Belfiore, & Watson, 1995/2002). Instructional time is relevant and imperative to study when assessing the efficiency of an academic intervention since it's a more precise measure of the effects of an intervention, and understanding intervention effects at this level can lead to choosing more efficient interventions (Skinner et al., 1995/2002).). Learning rate is calculated by dividing learning level (or the amount of behavioral change) by instructional time (or the amount of time spent engaged

in a learning experience) (Skinner, Belfiore, Mace, Williams-Wilson, & Johns, 1997; Skinner, 2008; Skinner, 2010).

In fact, in a commentary on a study comparing the effectiveness of two different sight word interventions (Nist & Joesph, 2008), Skinner (2008) reanalyzed the data by utilizing a rate measure (words read correct per minute) and found that although the incremental rehearsal intervention was more effective, it would take 11 weeks to remediate sight word deficits compared to the traditional drill and practice condition, which would only take 6 weeks to remediate sight word deficits. Thus, Skinner (2008) argued that the more efficient intervention is the appropriate choice to quickly remediate sight word deficits. Furthermore, in an attempt to understand how utilizing learning rate to make better intervention decisions, Forbes, Skinner, Black, Yaw, Booher, and Delisle (2013) found that when comparing two different flashcard interventions, traditional drill and practice and interspersal, students who practiced more unknown flashcards learned at faster rates compared to students who practice less unknown flashcards (interspersal).

This study was important because interspersal flashcard interventions are effective, but students only practice 3 unknown flashcards to 12 known flashcards; whereas, traditional drill and practice flashcard interventions are thought to not be as effective because the student does not view known flashcards during session. This study showed that, in fact, practicing only unknown flashcards is more efficient and can lead to quicker skill acquisition than interspersing known flashcards. It is not enough to simply understand how much learning occurs or how effective an academic intervention is, but what is needed for interventionists is how rapidly learning occurs from a specific academic intervention (Skinner, 2010).

Reading Intervention

As the aforementioned studies have utilized mathematics interventions, an area of research that has yet to be studied is examining the differential treatment effects of implementing reading interventions at differing treatment dosages. Reading interventions are imperative, as students reading

at or above proficient levels of reading achievement across the nation is low (National Center for Education Statistics; NCES, 2015). Specifically, the National Center for Education Statistics (2015) reported that only 36% of 4th graders were at or above proficiency in reading. Similarly, only 34% of 8th graders and 37% of 12th graders were at or above proficiency levels in reading (NCES, 2015). In 2000, the National Reading Panel found that a combination of phonemic awareness, phonics, fluency, guided oral reading, teaching vocabulary words, and reading comprehension strategies were the most effective methods for children to learn to read. The panel recommended that explicit instruction in the aforementioned strategies are necessary for students to learn to read.

As pointed out by the National Reading Panel, one area of reading that is commonly targeted when students present with reading deficits is oral reading fluency. In conjunction with The National Center for Education Statistics, Daane and colleagues (2005) found that oral reading fluency was positively related to reading achievement levels in 4th graders. Specifically, this report showed that students who read more words in a minute also scored higher on broad reading achievement measures (Daane et al., NCES, 2005). When students were grouped by fluency levels, the students with the highest level of fluency scores were more likely to score at or above proficiency levels of reading achievement (Daane et al., NCES, 2005). Taken together, these data suggest that reading achievement is low across the nation, and further, an area that interventions can target is oral reading fluency to increase overall reading achievement.

Oral Reading Fluency. Oral reading fluency is a reading skill that has substantial research support across the literature in terms of its relevance and importance to reading skill development. For instance, Skinner, Williams, Morrow, Hale, Neddenriep, and Hawkins (2009) found that reading speed was a significant predictor of overall reading achievement measured by the Broad Reading clusters on the Woodcock-Johnson tests of Achievement. Specifically, reading speed accounted for 59.7% and 56.4% of the variance in Broad Reading Cluster scores for 5th and 10th grade students. Similarly, Good, Simmons, and Kame'enui (2001) found that students who read at 110 words correct per minute were more likely to pass the state reading achievement assessment; whereas, students who

were below 70 words read correct per minute were not likely to meet reading achievement standards outlined by the state's reading assessment. Taken even further, Schall, Skinner, Cassell, Ciancio, Ruddy, and Thompson (2016) found that using rate measures, such as oral reading fluency, is a better predictor of reading skill development than using accuracy measures. Specifically, words correct per minute accounted for more of the variance in comprehension measures compared to the percentage of words correct, and reading speed, by itself, could explain the majority of the explained variance in standardized reading scores (Schall et al., 2016). Taken together, this research suggests that the rate at which an individual can read is a predictor of overall reading achievement and should be a targeted skill for students presenting with reading difficulties.

Repeated Reading. A reading intervention that is empirically derived and has received much attention in the literature is repeated readings. Repeated Readings is a fluency-based intervention that targets oral reading fluency by systematically increasing words correct per minute. One of the first experimental investigations of this intervention sought to explain Repeated Readings as effective and essential because it targets automatic processing of decoding, such that "In order to simultaneously, decode and comprehend, the decoding must be done automatically so that attention can be directed at the task of extracting meaning from the passage" (Dahl, 1974, pg. 14). In her experiment, Dahl (1974) randomly assigned participants to three different conditions, hypothesis/test (cloze procedures), flashed word, and repeated readings, in which the hypothesis/test and repeated readings groups produced significant results on eight measures of reading achievement. Similarly, Dowhower (1987) found that when repeated reading procedures were employed, participants grew significantly in reading rate, reading accuracy, and reading comprehension. In one group, the mean words read correct per minute increased approximately 50 words across seven weeks of intervention (Dowhower, 1987). Furthermore, Herman (1985) found similar results, such that students who were given repeated readings procedures, grew significantly in reading rate across the same passage and across a new, unpracticed passage.

Peer-Mediated Repeated Readings. A modification that has received empirical evidence of repeated readings is peer-mediated repeated readings. For instance, in a multiple baseline design across reading probes, Hofstadter-Duke and Daly (2011) found that their participant had a level change and maintained that level change in a maintenance phase after the implementation of a peer-mediated repeated readings intervention. Similarly, Josephs & Jolivette (2016) compared a peer-mediated repeated readings intervention to a comprehension intervention and found that all four of their participants grew significantly more in terms of words correct per minute during the peer-mediated repeated readings intervention. Furthermore, in a research report on the effectiveness of PALS (Peer Assisted Learning Strategies), Fuchs and colleagues (2001) reported on a large study comparing the effects of PALS with and without a fluency component across 33 first grade classrooms. When compared to a control condition and PALS without a fluency component, the PALS group with a fluency component was statistically significant compared to the control group. Interestingly, although the PALS with a fluency component was not statistically significantly better than the PALS without a fluency component (although this group grew more at post-test), the PALS with a fluency component only added approximately 2.5 hours of instruction across 22 weeks compared to the PALS without a fluency component condition. Overall, the authors suggested that by adding a simple intervention component, peer-mediated fluency drills, that does not take much time, can significantly impact fluency and comprehension (Fuchs, Fuchs, Yen, McMaster, Svenson, Yang, Young, ..., 2001). These studies provide support for utilizing peer-mediated repeated readings as an effective oral reading fluency intervention to increase words correct per minute.

Current Study

As data teams, teachers, and school psychologists are searching for the most effective interventions that lead to the quickest skill acquisition, in terms of instructional time, the purpose of this study was to determine an effective dosage for a peer-mediated repeated readings intervention on words correct per minute. In a group administered repeated readings intervention, what is the difference in intervention effectiveness when students are given different dosages of intervention? For

this study, dosage was defined as frequency of intervention session (similar to Duhon et al., 2009). Specifically, is there a more effective dosage between every other day and once a day? Furthermore, a second purpose of this study was to determine if there is a more efficient dosage. For instance, if there is a more effective dosage, is it also the most efficient in regards to how much instructional time it takes for students to grow at a quicker rate? Based on previous research, it is hypothesized that the participants in the once a day group would grow the most in terms of words correct per minute, relative to the dose provided, thus making it the most effective dosage out of the two.

CHAPTER II

REVIEW OF LITERATURE

Intervention Dosage

Research has long supported the notion that academic interventions to remediate skill deficits are effective, and they are even necessary to remediate early deficits to prevent much larger problems later on in a child's education (Shapiro, 2011; Velluntino, Scanlon, Small, & Fanuele, 2006). In essence, researchers, practitioners, school psychologists, and data teams have long understood that academic interventions are useful practices when children present with deficient academic skills, but what is unknown to the field is exactly how much is needed to remediate current skill deficiencies and prevent further academic difficulties. Little is known about the effects of an academic intervention when the frequency of the administration, commonly referred to as the dosage or intensity, is increased or decreased.

Although treatment intensity, in other words more intense dosages, is not well understood in terms of its effects on intervention outcomes, it can broadly be understood as the probability that the intervention can affect a problematic circumstance, and further, this broad definition implies that more intensive treatments can have larger effects on the problematic circumstances (Gresham, 1991).

In order to summarize the lack of agreement between researchers, Coddington and Lane (2015) found five aspects of treatment intensity that were common among seventeen articles. Across the literature, researchers define treatment intensity as “treatment session length (minutes), treatment session frequency (per day/week), total treatment duration (weeks), number of practice opportunities supported by the treatment, and interventionist characteristics” (pg. 3). They summarize this by concluding that the most common form of treatment intensity is treatment dose (Coddington & Lane, 2015). Although treatment dose is the most common dimension among the literature, the intervention being implemented can be changed across any of these dimensions and these all warrant further investigation, as they each may differentially affect student response to intervention (Coddington, VanDerHeyden, Martin, Desai, Allard, & Perrault, 2016; Coddington & Lane, 2015).

Furthermore, Warren and colleagues (2007) defined treatment dose as the number of learning trials administered during an intervention session, and learning trials are the efforts of the interventionist to cause measurable behavioral change (i.e., learning). Dose frequency was defined as the number of learning trials administered per day or per week. Although treatment dosage, otherwise broadly understood as treatment intensity or treatment frequency, is not well studied, it appears treatment dosage can broadly be understood as treatment frequency, or the amount of sessions an intervention is administered. There are few studies that have studied the effect of treatment dose (e.g. frequency of treatment) on student outcomes. One explanation for this lack of research might be previous researcher’s quantification of intervention intensity, such that most studies who have focused on intervention intensity have changed the intervention participants received (Duhon, Mesmer, Atkins, Greguson, & Olinger, 2009). Since participants received either a different intervention or experienced an added intervention component, the intervention was intensified, but it is unknown if the interaction between two different intervention components, the new intervention, or the interaction between the first and second intervention caused the change in the problematic area the intervention was targeting.

Additionally, it is unknown if the addition of a new intervention caused the change in the outcome.

With these difficulties associated with changing and quantifying the intensity of an intervention, one dimension researchers can focus on is the frequency of the same intervention, or treatment dose. Thus, teachers and interventionists can deliver the same instruction more frequently to ensure student responses are maximized (Shapiro, 2011). With simply changing the frequency of the treatment (e.g. dosage), researchers now have the ability to quantify and measure the changes in the intensity of the intervention since student outcomes can be evaluated relative to the intensity of the original intervention (Duhon et al., 2009). Simply put, if an intervention is delivered once a week, and the desired treatment outcomes are not observed, the interventionist can increase the frequency of intervention delivery to twice a week, and thus, a comparison to the original intensity of the intervention has been created (Duhon et al, 2009). With this in mind, researchers have a better understanding of measuring the effects of applying different intervention dosages to an academic skill and understanding that effect on student academic outcomes.

In an effort to understand the outcomes on student performance when interventions are given at different frequencies (e.g. dosages), Duhon and colleagues (2009) assigned different treatment dosages to students and measured student performance in math. In this study, the authors used a multiple baseline design across participants to measure intervention dosage effects. Specifically, after baseline data was collected, participants were given an explicit timing math fact fluency intervention for five sessions daily. One student did not reach mastery criteria in regards to digits correct per minute. Subsequently, this student's sessions were increased to ten sessions of intervention daily. After this change, the student obtained mastery criteria. Thus, intensifying intervention via increasing the number of intervention sessions lead to quicker gains in math fact fluency. The findings from this study support the notion that increasing intervention intensity by increasing the dose of treatment can lead to quick and desired intervention effects, thus supporting the notion that changing the dose of an intervention can impact the acquisition of

a skill. In this instance, without the change in intervention dosage, one participant would not have met mastery criteria for math fact fluency. Duhon and colleagues (2009) were among the first to identify adjusting treatment dosage as a viable option to increase desired treatment effects. In a similar study, Al Otaiba, Schatschneider, and Silverman (2005) used a reading intervention that involved tutoring by a community member to determine if different treatment dosages created different outcomes in student performance in reading achievement. Specifically, the authors utilized a reading intervention package, TRAILS, to target kindergarten students who were determined at-risk for reading difficulties based off of school-wide screening scores. Once students were identified, the authors randomly assigned participants to two different treatment dosages and one control condition. One group received the TAILS intervention 4 days a week, one group received the TAILS intervention 2 days a week, and the control group was read to by a community tutor for 20 minutes twice a week. They measured student reading achievement via the two subtests from the Comprehensive Test of Phonological Processing (CTOPP), three subtests from the Woodcock Reading Mastery Test—Revised, and the Peabody Picture Vocabulary Test. The TAILS intervention consisted of 30 minutes of instruction and practice from a tutor from the community in phonemic awareness, phonics, fluency, vocabulary, and comprehension.

Based on the results of the reading achievement scores, the authors found that the students who received the TAILS intervention 4 times a week gained significantly from pretest to posttest compared to the other two groups on the Woodcock Reading Mastery Test—Revised subtests. The group who received the TAILS intervention twice a week gained significantly more than the control group CTOPP Blending Sounds subtest. The authors concluded that the more intensive intervention was more effective in remediating at-risk reading difficulties for kindergarten students. These findings suggest that, at least for students at-risk for reading difficulties in kindergarten, there may be potential differential treatment effects when treatment

dosage is manipulated. Thus, offering the notion that if the dose frequency of an intervention is increased, students may gain more beneficial effects from the treatment.

Similarly, Coddling and colleagues (2016) sought to give students different treatment dosages and measure the outcomes on math achievement. Specifically, the authors utilized a math treatment package that consisted of guided practice with math facts (choral responding), timed practice of math fact fluency, and practice on conceptual and application oriented problems. The intervention was guided by an interventionist and lasted about twelve minutes. The researchers randomly assigned 141 participants to one of four treatment dosages: four times weekly, twice weekly, once weekly, and control. The students in the control condition did not receive any instruction beyond daily math instruction. They found that students who were in the four times weekly condition outperformed the other groups and the control condition on measures of Math-Curriculum Based Measurement assessments. Furthermore, students in the four times weekly condition exhibited higher rates of growth compared to those in the control condition. With these findings, it appeared that when changing the frequency of intervention sessions, students responded to higher frequencies and growth tended to be quicker with higher frequencies. This study provided evidence that changing the dosage of an intervention may in fact lead to not only more effective results, but in this instance, quicker results.

Although this area of research is sparse, it is important to understand the differential effects of a treatment given at lower dosages and also higher dosages (Warren, Fey, & Toder, 2007). Understanding treatment dosages at this level allows for teachers and data teams to know what to expect when employing an intervention. For instance, an intervention given at a higher dosage may increase treatment effects to a desired outcome, or it may not increase treatment effects to the desired outcome, and subsequently, teachers and data teams making decisions regarding student performance may have wasted the student's time when a more efficient dosage of treatment was available. In this instance, resources were wasted and the child received no additional benefit from increasing the dosage.

As the aforementioned study from Duhon and colleagues (2009) found that without increasing the treatment dosage, the child would not have achieved benchmark levels; thus, increasing the treatment dosage lead to skill acquisition. Understanding intervention effects at this level is imperative to making the most appropriate decisions given a student presenting with academic difficulties. If intervention effects were understood at this level, data teams, teachers, and school psychologists could make better systematic decisions that would result in quicker outcomes that remediate academic difficulties and allow children presenting with problems to achieve at higher levels. In an era where resources are vastly limited in school settings, it is imperative that data teams and school psychologists understand treatment dosages at this level to know when an increase or decrease in treatment dosage is warranted in order for the child to receive the most benefit from additional resources and time away from regular education instruction.

Learning Rate

A critical method of measuring differing treatment effects by dosage frequency is understanding the intervention effectiveness via measuring a student's learning rate. Since intervention effectiveness studies measure a learning level change (i.e., increased words correct in a passage), these studies can only speak to a change in behavior, but they do not take into account the amount of time it took to cause the behavioral change (Skinner, 2008). Measuring learning rate requires that the experimenter understands how much instructional time it takes to bring about learning (i.e., behavioral change: words correct per minute, digits correct per minute) (Skinner, Belfiore, & Watson, 1995/2002). Instructional time is relevant and imperative to study when assessing the efficiency of an academic intervention since it a more precise measure of the effects of an intervention, and understanding intervention effects at this level can lead to choosing more efficient interventions (Skinner et al., 1995/2002). Learning rate is calculated by dividing learning level (or the amount of behavioral change) by instructional time (or the amount of time spent engaged in a learning experience) (Skinner, Belfiore, Mace, Williams-Wilson, & Johns,

1997; Skinner, 2008; Skinner, 2010). It is not enough to simply understand how much learning occurs or how effective an academic intervention is, but what is needed for interventionists is how rapidly learning occurs from a specific academic intervention (Skinner, 2010).

In fact, in a commentary on a study comparing the effectiveness of two different sight word interventions (Nist & Joseph, 2008), Skinner (2008) reanalyzed the data by utilizing a rate measure (words read correct per minute) and found that although the incremental rehearsal intervention was more effective, it would take 11 weeks to remediate sight word deficits compared to the traditional drill and practice condition, which would only take 6 weeks to remediate sight word deficits. Thus, Skinner (2008) argued that the more efficient intervention is the appropriate choice to quickly remediate sight word deficits, and in fact, it would take less time to utilize the traditional intervention rather than the more effective intervention. Although Nist and Joseph (2008) found that incremental rehearsal was the most effective intervention in terms of behavioral change, when taking into account the amount of time it took for behavioral change to occur, the traditional drill and practice intervention was superior because it could create the same amount of behavioral change in less time.

Understanding effectiveness not only by behavioral change, or learning level, but by learning rate, taking into account instructional time, is important due to the possibility that making simple changes to interventions can create more efficient (i.e., create higher learning rates) interventions. For instance, Skinner and colleagues (1997) found that by simply changing the response topographies, verbal responses rather than written responses, it allowed for more learning trials within the same sessions while time was held constant, and thus, allowed for higher learning rates. Therefore, by simply changing the mode of student response, Skinner and colleagues (1997) were able to provide a more efficient intervention since it took students less time to respond to more items. Taking into account the time it takes for learning to occur becomes relevant since there are effective interventions that may be more efficient than others, and in this

study, Skinner and colleagues (1997) found that by simply changing the mode of response, they were able to find a more efficient means of student learning.

Furthermore, in an attempt to understand how utilizing learning rate assists in making better intervention decisions, Forbes, Skinner, Black, Yaw, Booher, and Delisle (2013) found that when comparing two different flashcard interventions, traditional drill and practice and interspersal, students who practiced more unknown flashcards learned at faster rates compared to students who practiced less unknown flashcards (interspersal). This study was important because interspersal flashcard interventions are effective, but students only practice 3 unknown flashcards to 12 known flashcards; whereas, traditional drill and practice flashcard interventions are thought to not be as effective because the student does not view known flashcards during session. This study showed that, in fact, practicing only unknown flashcards is more efficient and can lead to quicker skill acquisition than interspersing known flashcards. Therefore, by utilizing learning rate by taking into account the time it took for both types of flashcard interventions, Forbes and colleagues (2013) were able to show that although traditional drill and practice may seem less effective since students are not reinforced with known items, it is more efficient and leads to quick skill acquisition. Understanding interventions at this level allows for practitioners to make better intervention decisions since they are equipped with what works the quickest in the least amount of time to remediate skill deficits.

Oral Reading Fluency

Although Al Otaiba and colleagues (2005) studied the effects of a kindergarten reading intervention package at different treatment dosages, there are no other studies that have focused on reading achievement at any level. Reading achievement is imperative, as students reading at or above proficient levels of reading achievement across the nation is low (National Center for Education Statistics; NCES, 2015). In fact, the National Center for Education Statistics (2015) reported that only 36% of 4th graders and 34% of 8th graders were at or above the proficient level in overall reading achievement. Students across the nation are struggling to achieve at proficiency

levels in reading and understanding the effects of differential treatment dosages on student reading outcomes is needed to remediate reading deficits across the country.

In 2000, the National Reading Panel found that a combination of phonemic awareness, phonics, fluency, guided oral reading, teaching vocabulary words, and reading comprehension strategies were the most effective methods for children to learn to read. The panel recommended that explicit instruction in the aforementioned strategies are necessary for students to learn to read. As pointed out by the National Reading Panel, one area of reading that affects low reading achievement is oral reading fluency. In conjunction with the National Center for Education Statistics, Daane and colleagues (2005) found that oral reading fluency was positively related to reading achievement levels in 4th graders. Specifically, this report showed that students who read more words in a minute also scored higher on broad reading achievement measures (Daane, et al., NCES, 2005). When students were grouped by fluency levels, the students with the highest level of fluency scores were more likely to score at or above proficiency levels of reading achievement (Daane et al., NCES, 2005). Taken together, these data suggest that reading achievement is low across the nation, and further, an area that interventions should target is oral reading fluency to increase overall reading achievement, as it appears to be related to high levels of reading achievement.

The basic tenant of oral reading fluency includes reading aloud from a reading passage under timed conditions. It includes “the oral translation of text with speed and accuracy” (Fuchs, Fuchs, Hosp, & Jenkins, 2001, pg. 241). Essentially, oral reading fluency is targeting the automaticity of reading in connected text. Researchers suggest automaticity of reading in connected text is imperative, as “in order to simultaneously, decode and comprehend, the decoding must be done automatically so that attention can be directed at the task of extracting meaning from the passage” (Dahl, 1974, pg. 14). It is theorized that individuals who are fluent readers automatically translate text into spoken language, automatically make textual connections between phrases and words, and automatically create meaning based on the text (Fuchs et al.,

2001). It follows a model of automaticity of skills needed to decode and comprehend quickly in order to free up the attentional capacity to simultaneously conduct the skills necessary to read and understand the meaning of the text (LeBerge & Samuels, 1974). Overall, researchers agree that oral reading fluency is vital for reading developmental and achievement since the ability to automatically decode frees up attention to be used on higher order abilities, such as comprehension and searching for the meaning of the passage.

Thus, in creating an evaluation tool to make instructional decisions regarding oral reading fluency, Stan Deno (1985) and his colleagues from the University of Minnesota created Curriculum Based Measurement (CBM) in which their oral reading fluency measure targeted words correct in a reading passage per one minute. He found that words correct per minute followed a developmentally trajectory—as students’ progress through school, their ability to word more words in one minute increases—, and his research suggested measuring oral reading fluency was reliably associated with reading achievement. Oral reading fluency became a target for instructional decisions with the emergence of the evaluation tools created by educators from the University of Minnesota. Further, measuring oral reading fluency by words correct per one minute allowed Deno (1985) and the creators of CBM to “reliably and validly discriminate growth in reading proficiency throughout the elementary school years” (pg. 224). In other words, reading speed was an indicator of students who were proficient at reading and students who were not proficient at reading throughout students’ elementary school years.

Since the creation of CBM, oral reading fluency has been a topic of research at the forefront of reading skill development. For instance, Good, Simmons, and Kame’enui (2001) found that students who read at 110 words correct per minute were more likely to pass the state reading achievement assessment; whereas, students who were below 70 words read correct per minute were not likely to meet reading achievement standards outlined by the state’s reading assessment. This data suggested that students who read more words in a one minute were more likely to meet state reading standards. Similarly, Skinner, Williams, Morrow, Hale, Neddenriep,

and Hawkins (2009) found that reading speed was a significant predictor of overall reading achievement measured by the Broad Reading clusters on the Woodcock-Johnson tests of Achievement. Specifically, reading speed accounted for 59.7% and 56.4% of the variance in Broad Reading Cluster scores for 5th and 10th grade students. Thus, the majority of the scores on the Woodcock-Johnson Reading clusters were explained by student's reading speed performances, indicating this skill is imperative to reading achievement.

Taken even further, Schall, Skinner, Cassell, Ciancio, Ruddy, and Thompson (2016) found that using rate measures, such as oral reading fluency, is a better predictor of reading skill development than using accuracy measures. Specifically, words correct per minute accounted for more of the variance in comprehension measures compared to the percentage of words correct, and reading speed, by itself, could explain the majority of the explained variance in standardized reading scores (Schall et al., 2016). Thus, similar to Skinner and colleagues (2009), the authors found that oral reading fluency could explain most of the scores in overall reading achievement. These findings support the notion that oral reading fluency is a key indicator of reading achievement, and it is a key area to target during intervention for students presenting with reading deficits. Oral reading fluency is a targeted area for reading intervention due to its support through research to determine an individual's overall reading ability.

Repeated Readings

A reading intervention that is empirically derived and has received much attention in the literature is repeated readings. Repeated Readings is a fluency-based intervention that targets oral reading fluency by systematically increasing words correct per minute. The basic tenant of repeated readings is rereading passages. The student rereads a passage over and over until a criterion level of speed (words correct per minute) is reached (Samuels, 1979). While the student is reading, another person is marking errors and tracking words correct per minute in order to have an accuracy score and a fluency score (Samuels, 1979). This method was created using the theoretical rationale of automatic processing of decoding in order to free up attention to

accurately and quickly read for the purposes of understanding the meaning and content of the passage (Samuels, 1979; LeBerge & Samuels, 1974). In other words, when a student is automatic with decoding of written text (i.e. reading fluently), he can give attention to the meaning of the text rather than using all his attention on sounding out the words in a connected text.

One of the first experimental investigations of this intervention sought to explain Repeated Readings as effective and essential because it targets automatic processing of decoding, which allows for students to read at quick speeds and enables them to comprehend and focus on the meaning of the text. In her experiment, Dahl (1974) randomly assigned participants to three different conditions, hypothesis/test (cloze procedures), flashed word, and repeated readings, in which the hypothesis/test and repeated readings groups produced significant results on eight measures of reading achievement. Using the same procedures outlined by Samuels (1979), Dahl (1974) was able to establish repeated readings as a potentially effective intervention to increase oral reading fluency.

Similar to Dahl (1974) and Samuels (1979), Herman (1985) had eight students, who were identified as underperforming in reading based on a reaching achievement measure, read five passages until they could reach each passage at 85 words correct per minute. Once a student reached the criterion, he or she chose another passage until he or she could read five passages at the criterion. Students averaged 47 words correct per minute on the initial read for the first story, and they averaged 69 words correct per minute on the initial read for the fifth story. Furthermore, students read on average at 87% accurately on the initial read for the first story, and they read at an average of 92% on the initial read of the fifth story. Overall, Herman (1985) found that for eight students, from story one to story five, their reading rate and reading accuracy significantly increased, suggesting a positive effect of repeated practice over time. Thus, Herman (1985) found support for using repeated reading procedures to increase the rate of reading speed over time and the accuracy of reading over time further establishing the effectiveness of this reading intervention.

In another experiment to validate repeated reading procedures, Dowhower (1987) found that in a sample of 18 students who were identified as poor readers via standardized measures, repeated reading procedures worked and created significantly improved scores in reading rate (words correct per minute). Specifically, Dowhower (1987) utilized two different procedures and randomly assigned participants to conditions. The first condition was a repeated reading procedure in which the students received assistance from a pre-recorded audiotape. The students were instructed to read until they were as fluent as the audio recording. In the other condition, the students were not given assistance unless they asked for it. Each student had to read each passage until they could read it at 100 words correct per minute. Dowhower (1987) found that readers showed significant gains in reading rate, accuracy, and comprehension of the passages. Furthermore, Dowhower (1987) compared their reading rate scores to national norms from the standardized measures used to screen students at the beginning of the study and found that after repeated reading procedures, students read at the average rate in comparison to same-aged peers in the norming group. This study found additional evidence to support repeated reading procedures as an effective tool to improve students overall reading rate.

In an experiment to determine the effect of repeated reading with additional intervention components, Lo, Cooke, and Starling (2011) utilized a multiple baseline design to measure the intervention's effects on oral reading fluency. The intervention phase included goal setting in which the interventionist showed the student his/her graphed performance from the previous session and encouraged the student to beat previous scores. Then, the interventionist had the student practice five pre-determined difficult words. After practicing difficult words, the interventionist had the student read for the first time and timed the student for a minute. The interventionist marked the student's errors and utilized error correction to have the student practice his/her errors before reading again. To practice the errors, the interventionist had the student practice these words via flashcard drills. After practicing errors, the interventionist asked the student to read in unison with him/her. Finally, the interventionist asked the student to read

the passage two more times for one minute each while using the same procedures (error correction, flashcard practice of errors, and performance feedback) for each read. For two of the three students, their reading rate increased to instructional levels for second grade. This study was unique in that the authors utilized first grade passages for intervention, while assessing student growth with first and second grade passages throughout the study. For two of the three participants, on both first and second grade passages, their reading rate increased with one student reaching benchmark levels for second grade, one student remaining below benchmark but on track to benchmark, and one student having a decreasing trend. Though repeated readings has extant literature support, Lo and colleagues (2011) measured its transfer effects and found initial results of transfer effects to, in this instance, grade level material.

Since Lo and colleagues (2011) utilized a treatment package to determine repeated reading's effects on oral reading fluency, Lee and Yoon (2017) attempted to understand the different components that can be used with the repeated readings procedures. In a meta-analysis to understand the effects of the repeated reading literature with students who are at-risk for specific learning disability in reading or who have been diagnosed with specific learning disability in reading, Lee and Yoon (2017) found that out of 34 studies, the effect sizes of post treatment effects in studies that employed repeated reading were 1.41, which is a large effect, which essentially suggests consistent support for repeated readings across the literature. Further, Lee and Yoon (2017) found that a large proportion of the observed differences could be due to systematic differences across studies (different intervention components), thus they included subgroup analyses by intervention component to determine which component may be contributing to the large effects.

As there are several different intervention components that can be combined with repeated reading, Le and Yoon (2017) sought to explore their relationships with post treatment effects. Some types of intervention components that can be added to the repeated reading procedures are word preview (targeting specific words and having the student practice specific

words before reading), listening passage preview (reading the passage to the student to act as a model of the text), performance feedback (having the student go over the errors from the previous read), goal setting (setting a criterion goal the student should reach before receiving a reward), rewards (extrinsically giving a student a desired reward for reaching performance goals), and peer-mediated reading (having students work in sets of dyads with their peers). The statistically significant results based on subgroup analyses were maximum number of reads, such that those studies who had their participants read the passage a total of four times had larger effect sizes, and Listening, passage, preview was statistically significant, such that those studies who included listening, passage, preview had larger effect sizes. Overall, Lee and Yoon (2017) found that out of 34 studies that included repeated reading procedures, the effect sizes of these studies results were large, suggesting that repeated reading is an empirically derived reading fluency intervention that greatly impacts the oral reading fluency of students, especially those at-risk or diagnosed with reading disabilities. Furthermore, they found that the intervention components that may have the largest effect of student growth are reading the passage to the student before the student reads (listening, passage, preview) and the number of maximum reads the student practices within session (four reads).

Peer-Mediated Repeated Readings

One way to modify repeated readings to fit the needs of teachers in a busy school day is to utilize other peers to implement the intervention while simultaneously monitoring reading rate and word errors. This modification is referred to as peer-mediated repeated readings. This modification is based on research suggesting that with more cooperative learning between peers, teachers are able to differentiate instruction to meet more student's instructional needs (Fuchs, Fuchs, Thompson, Svenson, Yen, Al Otaiba, ..., 2001). Subsequently, researchers have found positive effects for both behavioral and academic outcomes. For instance, Greenwood, Delquadri, and Hall (1989) found that students spent more time engaged in academic behavior when working in structured peer groups, and they found that over 4 years, teachers who used

peer-mediated instructional strategies had students who significantly outperformed students in control conditions on broad-band achievement measures. Thus, it appears that utilizing peers for reading instruction is an effective instructional technique to assist students who are at-risk for developing academic deficits.

Since peer-mediated instruction is supported by research, researchers were interested in combining this idea within a repeated readings context, and according to Hofstadter-Duke and Daly (2011), in multiple baseline design across reading probes, they found that their participant had a level change in terms of correct words read per minute after the introduction of a peer-mediated repeated reading intervention. Additionally, their participant maintained the same level change in a maintenance phase. Similarly, Josephs and Jolivette (2016) compared a peer-mediated repeated readings intervention to a comprehension intervention and found that all four of their participants grew significantly more in terms of words correct per minute during the peer-mediated repeated readings intervention. Both of these experiments support the notion that a peer-mediated repeated readings intervention can lead to an increase in oral reading fluency. Furthermore, a peer-mediated repeated readings intervention may have additional positive effects, such that they are easy to monitor implementation, require less of the teacher's time, and usually produce positive effects (Hofstadter-Duke & Daly, 2011). As such, these experiments provide support that having students implement a repeated readings intervention with each other is an effective means of improving oral reading fluency and allows for ease of implementation by teachers.

In an effort to combine the knowledge base of the effectiveness of utilizing peers for instructional purpose, Fuchs and colleagues (2000) created Peer-Assisted Learning Strategies (PALS) to meet the needs of teachers and the needs of students presenting with reading difficulties. Although this intervention is a packaged intervention and targets more than oral reading fluency, the PALS intervention has received significant support from research as an effective intervention to increase reading achievement (Fuchs, Fuchs, & Burish, 2000). In a

research report on the effectiveness of PALS, Fuchs and colleagues (2001) reported on a large study comparing the effects of PALS with and without a fluency component across 33 first grade classrooms. When compared to a control condition and PALS without a fluency component, the PALS group with a fluency component was statistically significant compared to the control group. Interestingly, although the PALS with a fluency component was not statistically significantly better than the PALS without a fluency component (although this group grew more at post-test), the PALS with a fluency component only added approximately 2.5 hours of instruction across 22 weeks compared to the PALS without a fluency component condition. Thus, the additional component of fluency does not add significantly more time and is as effective as the group without the component, suggesting fluency is an important component to this packaged intervention. Overall, peer-mediated instruction, whether in the context of the packaged intervention of PALS or a repeated readings intervention, appears to be an effective tool for teachers to use to increase reading achievement in struggling readers, and it appears to be an easily implemented intervention that can be monitored with ease and allows for the teacher to easily meet the needs of classrooms with differing reading levels.

Current Study

As data teams, teachers, and school psychologists are searching for the most effective interventions that lead to the quickest skill acquisition in terms of instructional time, the purpose of this study is to determine an effective dosage for a peer-mediated repeated readings intervention on words correct per minute. In a group administered repeated readings intervention, what is the difference in intervention effectiveness when students are given different dosages of intervention? For this study, dosage was defined as frequency of intervention session (similar to Duhon et al., 2009). Specifically, is there a more effective dosage between once a day or twice a day? Furthermore, a second purpose of this study was to determine if there is a more efficient dosage. For instance, if there is a more effective dosage, is it also the most efficient in regards to how much instructional time it takes for students to grow at a quicker rate? Based on previous

research, it is hypothesized that the participants in the twice a day group would grow the most in terms of words correct per minute, relative to the dose provided, thus making it the most effective dosage out of the two.

CHAPTER III

METHODOLOGY

Participants and Settings

Participants. The current study included 34 participants from an elementary school in the Southern Plains region of the United States. Informed consent was obtained and child assent was obtained (See Appendix A.1 and A.2). Participants were selected based on students who were receiving additional levels of reading supports from the reading specialist. The school utilized the STAR reading test and students who scored below the 25th percentile received additional reading supports. All students receiving additional reading intervention were recruited for this study. Grades 2 through 5 received additional services from the reading specialist; therefore, students were recruited from grades 2 through 5. Table 3.1 includes recruitments, participants, and attrition rates.

Table 3.1 *Recruitment, Participants, and Attrition*

Recruitment	Number/Percentage of Students
Total Recruitment	64
Response Rate	56%
Initial Participants	36
Total Participants	34
Attrition Rate	5.6%

Settings. All intervention procedures were conducted in the reading specialist's classroom using repeated reading intervention passages. There was a total of 27 days of intervention. Progress monitoring procedures were conducted individually outside of each student's general education classroom in an available classroom, library, or in the hallway.

Materials

Materials for this study were paper oral reading fluency passages from the AIMSweb program for daily intervention. In order to avoid using the same passages for evaluating intervention effects, Progress monitoring, pre-test, and post-test passages were from the AIMSweb+ program. The reading passages are constructed with grade level reading material and include the number of words to the right side of the passage in order to count how many words a student reached in a minute. Participants received intervention folders with reading probes at each participant's instructional level. For each of the treatment conditions, students received a different reading probe per intervention session. Since students conducted the intervention in pairs, each pair had duplicates of each reading probe in order to score and provide corrective feedback while the other is reading his or her probe for that day. For each of the progress monitoring sessions, students received 3 random reading passages, on their specific instructional level, that were different each progress monitoring session. The median of the 3 passages was taken to obtain their progress monitoring score and to control for potential passage differences (i.e., passage difficulty).

Independent Variable

There was one independent variable for this study which included the frequency of the intervention delivered (i.e., intervention dosage) with two different levels – (1) once a day dosage and (2) once every other day dosage. With two different levels of the independent variable, this study included a total of two treatment groups.

Dependent Variable

The dependent measure for this study was oral reading fluency, as measured by words correct per one minute (WCPM). WCPM are the number of words read accurately during the one-minute repeated readings intervention. A word was counted correct if the student blended it correctly using the correct pronunciations within 3 seconds. The same procedures were used for daily intervention, with the exception of corrective feedback. Since the basic feature of repeated readings is the repeated reading of connected text, the addition of corrective feedback was not measured in this study. However, students were told the word, if they did not correctly identify it within 3 seconds during progress monitoring to ensure accuracy did not affect fluency scores. Growth rates were calculated across students and group, which were in the form of words correct per minute.

Experimental Design

The experimental design of this study was a 2x1 repeated measures ANOVA. The independent variable had two different levels, which included once a day dosage and once every other day dosage. Data collected from this study was blocked by fluency level using a random assignment procedure where students were first rank ordered by fluency level and then randomly assigned to one of the two treatment conditions. This was completed to ensure the range of fluency levels before intervention were similar across groups, in order to prevent pre-treatment differences.

Data Analysis

The method for statistical analysis in this study was repeated measures ANOVA. Main effects and interaction effects were examined. An interaction between treatment, growth over time, and fluency level were examined. Post-hoc analyses were conducted to compare differences between fluency levels across groups. Additionally, data was analyzed utilizing pre-test/post-test repeated measures ANOVA to determine differences before and after data collection. The addition

of a pre-test/post-test repeated measures ANOVA was added solely for the purpose of speculation to inform future studies.

Procedure

Treatment Skill Identification. The treatment skill identification for this study was identified by taking the median of three reading probes starting with grade level material to determine at which grade level participants were reading at instructional levels. Instructional criteria were set to being above the cut-off point for risk based on AIMSweb+ cut-points. Each participant was assigned the grade level that he or she was above the cut-off point for risk (i.e., 25th percentile). Each participant received one-minute beginning with grade level passages and continuing down to earlier grade levels to determine instructional level.

Baseline. Baseline data was collected by administering three random reading probes to each participant. Each participant received one minute to read as many words as possible. Words correct per minute scores were collected by dividing total words correct by how many total words read in a minute. Each reading probe was administered to participants one by one in the reading specialist's classroom by graduate research assistants utilizing a standard protocol approach (See Appendix B.1). After three probes were administered, the median score was taken to create a baseline score. After baseline scores were created, each participant was rank ordered by initial fluency level to create two treatment groups. These groups were used as the stratum for the stratified random sampling procedure.

Peer-Mediated Repeated Reading Lesson. After being randomly assigned to treatment conditions, participants were divided into two different groups for the duration of the study. Both treatment conditions received training in peer-mediated repeated reading procedures after baseline was collected. During each grade's repeated reading time with the reading specialist, the author delivered the peer-mediated repeated reading lesson (see Appendix C.1) with each group of students. The lesson included covering each step of the intervention for the student reading and each step for the student listening. Using the same procedures the students were instructed to use,

the author marked random errors on one reading probe of each grade level and a stopping point in order for students to practice calculating words correct per minute. Students were provided corrective feedback throughout this entire training. Students were trained to mark errors, but they were not instructed to provide corrective feedback, as the variable of interest in repeated readings, and the current study, was the repeated practice of reading in connected text.

Daily Intervention. Each grade came to the reading specialist's classroom during the designated time, which was determined by the reading specialist. Students rotated throughout reading centers during their time in the classroom (approximately 50 minutes). The intervention was conducted during one of these rotations, which was about 10-15 minutes Monday through Thursday. An aide sat at a table with a group of approximately 5-7 students. Only students who had returned their consent forms were included in the data collection for the current study. After training, the reading aide followed a standard protocol approach to intervention delivery (see Appendix B.1 for protocol). Students were split into two different treatment conditions: peer-mediated repeated readings once a day and peer-mediated repeated readings every other day. On the days where students in the every other day group were not to engage in the peer-mediated repeated readings intervention, they participated in a comprehension activity. This activity came from the instructional materials the reading specialist was already utilizing in the classroom. Following the completion of the intervention, the aide implemented a mystery motivator to ensure students were motivated to follow procedures. This was implemented in order to ensure students were rewarded for following directions and adhering to the procedures of the peer-mediated repeated readings protocol.

Mystery Motivator. Before the intervention began for each group, the aide instructed the students that those who followed procedures would participate in an opportunity to win a prize from the "treasure box" (i.e., candy, school supplies, small tangibles, etc.). After the intervention was completed, the aide counted off only the students who followed procedures during the

intervention and rolled a dice. Whoever's number the dice landed on had the opportunity to choose from the "treasure box."

Intervention Data Collection. Data collected for this study was collected by progress monitoring (see Appendix D.1 for protocol) of the intervention effects once a week for 5 weeks. Progress monitoring procedures were conducted by the author and graduate research assistants. Each student was asked to read three times on three different probes for one minute each on the student's specific instructional level. Probes were scored by calculating words correct per minute, and the median of the three scores was taken as their data point.

Post-Test. Post-test was conducted by utilizing the same exact procedure for baseline (pre-test). Each participant received three random probes (based on their instructional level) and received one minute for each probe. The median of the three probes was taken and served as their post-test score.

Procedural Integrity. Procedural integrity was assessed by using a fidelity checklist that outlines each step of the intervention protocol (see Appendix B.1). Graduate research assistants who were not conducting the intervention observed the aide assisting each group in implementing the peer-mediated repeated readings intervention. 30% of intervention implementation was assessed. Procedural fidelity was calculated by dividing the number of steps completed on the checklist by the total number of steps possible and multiplying by 100. The average percentage of procedural integrity was 80% across 30% of intervention implementation (range: 17% - 100%). During two of the integrity checks (i.e., two separate days of intervention), more than one grade was absent due to field trips; therefore, procedural integrity for those groups not completing the intervention were calculated as 0%. Furthermore, on more than one occasion each pair only read to each other once, rather than the designed two times (i.e., students only had 1 practice read, in between their hot and cold reads).

Inter-Scorer Reliability. Inter-scorer reliability was assessed by comparing the initial scorers WCPM to an independent scorers WCPM scores for 30% of all progress monitoring probes. The progress monitoring probes were selected at random. A percentage of agreement was calculated by dividing the number of agreed upon WCPM by the disagreed upon WCPM between scorers and then multiplying by 100. The percentage of agreement for 30% of all progress monitoring probes was 99% (range: 87% - 100%).

CHAPTER IV

FINDINGS

Treatment Skill Identification

Participants were administered three random AIMSweb+ reading passages on their grade-level and one grade-level below. The median of three passages was taken, and if participants were above the 25th percentile, based on AIMSweb+ norms, that was determined as their instructional level. 50% of students were assigned grade-level materials, 47% of students were assigned one grade-level below grade, and 3% of students were assigned two grade-levels below grade. Once you have the correct amount of content on the first page, you **must** then move your cursor onto the next page of the template and add the rest of the content of the chapter by either typing or copying and pasting.

Repeated Measures ANOVA

The research questions this study sought to answer were, “Is there a significant difference between intervention given once a day and once every other day?” and “If there is a difference, is one more efficient?” Demographic information for participants in the study are included in table 4.1. Gender, grade, ethnicity, and IEP status were the demographic variables available from the participating school. It should be noted that data for ethnicity was only available for a total of 29 participants.

Table 4.1 *Demographics of Participants*

	<u>N</u>	<u>%</u>
<u>Gender</u>		
Male	13	38.2%
Female	21	61.8%
Total	34	100%
<u>Ethnicity</u>		
Hispanic/Latino	1	3.4%
American Indian/Native American	7	24%
Black	2	6.9%
Asian	3	10%
White	15	51.7%
Two or More	1	3.4%
Total	29	100%
<u>Grade</u>		
2	11	32.3%
3	8	23.5%
4	5	14.7%
5	10	29.4%
Total	34	100%
<u>504 & IEP</u>		
504	3	8.8%
IEP	2	5.9%
Total	5	14.7%

A repeated measures ANOVA was conducted to determine which dosage was significantly different and if there was significant growth across time. Overall, there were six group data points observed in this study, including pre-test and post-test, and that were included in the analysis. Mean differences, standard deviations, and total number of participants per condition are presented in Table 4.2 below.

Table 4.2 Means, Standard Deviations, and Total Participants per Condition

<u>Time</u>	<u>Dosage</u>	<u>Mean</u>	<u>SD</u>	<u>N</u>
Pre-Test	Once a Day Dosage	79.47	36.46	17
	Every Other Day Dosage	81.13	37.90	16
Progress Monitoring 1	Once a Day Dosage	90.64	36.29	17
	Every Other Day Dosage	87.00	32.62	16
Progress Monitoring 2	Once a Day Dosage	90.94	40.62	17
	Every Other Day Dosage	88.19	38.50	16
Progress Monitoring 3	Once a Day Dosage	89.82	32.14	17
	Every Other Day Dosage	88.06	31.82	16
Progress Monitoring 4	Once a Day Dosage	99.77	37.04	17
	Every Other Day Dosage	92.38	32.40	16
Post-Test	Once a Day Dosage	101.41	35.52	17
	Every Other Day Dosage	92.13	32.67	16

Due to the violation of Mauchly's Test of Sphericity, (*Mauchly's* $W = .383, p = .015$), the Greenhouse-Geisser correction was used for this analysis. However, Levene's Test of Equality of Error Variances was not violated in this analysis. Overall, the repeated measures ANOVA with a Greenhouse-Geisser correction showed that the mean words correct per minute was significantly different across time, [$F(4.028, 124.860) = 11.244, p < .000, \eta_p^2 = .266$]. However, the repeated measures ANOVA with the Greenhouse-Geisser correction did not show a significant mean difference between the two different dosages, [$F(4.028, 124.860) = 1.222, p < .305, \eta_p^2 = .038$]. In sum, the results suggest significant effects for within subjects over time, indicating peer-mediated repeated readings was an effective intervention for producing significant growth across time for every student receiving intervention, no matter the dosage. However, there were no significant

mean differences observed between the two different dosages, suggesting the dosage of intervention the participant received did not produce significant differences.

Follow-Up Analyses and Post-Hoc Analyses. Upon further examination of the data, post-hoc analyses were conducted due to variability within the data. Furthermore, the second question of this study sought to answer was, “Is there a more efficient dosage of intervention?” Since repeated measures ANOVA measures the differences between two groups across time and does not take into account instructional time and growth rates, this question is answered by follow-up analyses. However, these analyses are meant solely for speculation and directions for future research. A repeated measures ANOVA Pre-Test/Post-Test was conducted to examine the data without variability and examine significant differences before and after the treatment was implemented. Levene’s Test of Equality of Error Variances was not violated in this analysis. Overall, the Pre-Test/Post-Test repeated measures ANOVA showed a significant mean difference between the once a day and every other dosage [$F(1, 32)= 4.143, p < .050, \eta_p^2 = .115$]. Mean differences and standard deviations are presented in table 4.3 below.

Table 4.3 *Mean Differences and Standard Deviations*

<u>Dosage</u>	<u>Time</u>	<u>Mean</u>	<u>SD</u>
Once a Day	Pre-Test	79.33	8.58
	Post-Test	100.50	7.96
Every Other Day	Pre-Test	81.50	9.10
	Post-Test	92.13	8.44

In sum, these results are incongruent with the above analyses, such that when examining the pre-test and post-test data, the differences between the two dosages are statistically significant. Therefore, the dosage of the intervention had a significant impact on participant’s mean words correct per minute scores, indicating a dosage effect. Based on the above table, the once a day group grew approximately 21 words correct per minute, while the every other day group grew approximately 10 words correct per minute in a five week period. Therefore, the dosage of intervention may likely impact the amount of growth in words correct per minute

performances, as the above data indicate the students who received the intervention twice as much (i.e., once a day versus every other day) grew double. However, this is only seen when pre-test and post-test data are examined, and caution is warranted when interpreting post-hoc analyses.

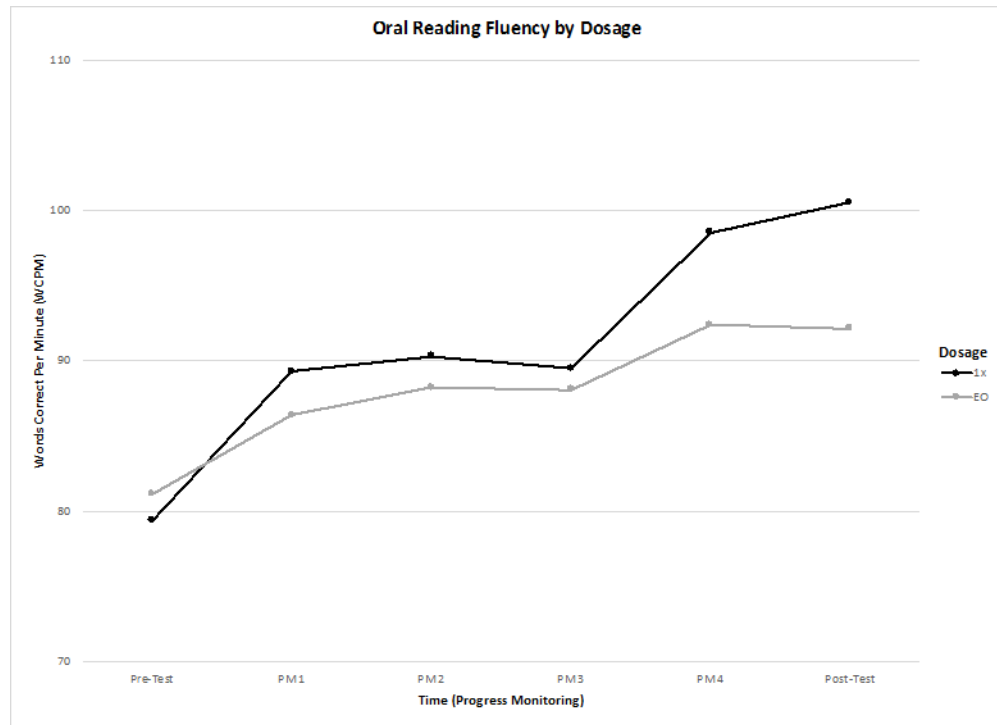


Figure 1 Words Correct per Minute Growth Plot by Treatment Dosage

CHAPTER V

CONCLUSION

Discussion

The present study sought to find a more effective dosage of academic intervention in order to inform school psychologists, teachers, and interventionists on exactly how much intervention is needed to remediate skill deficits. Specifically, this study sought to answer the following questions: “Is there a more effective dosage of intervention between once a day and once every other day?” and “If there is a more effective dosage of intervention, is one more efficient?” For this study, dosage was defined as the frequency of administration of the intervention. The author hypothesized that students receiving intervention once a day would significantly outperform students receiving intervention every other day in regards to words correct per minute in a peer-mediated repeated readings context.

Results showed a significant main effect for treatment across time. This finding is in line with previous research (Hofstadter-Duke & Daly, 2011; Josephs & Jolivette, 2016; Fuchs, Fuchs, & Burish, 2000). Specifically, all students grew significantly in terms of words correct per minute, regardless of dosage. Therefore, the administration of a group administered, peer-mediated, repeated readings intervention likely leads to significant growth in the area of oral reading fluency.

This finding is especially important, as teachers, school psychologists, and interventionists struggle to find the resources and time to provide needed reading intervention for students struggling with oral reading fluency. Students who do not engage in adequate levels of oral reading fluency (i.e., do not meet national benchmarks for oral reading fluency) should receive additional instruction in oral reading fluency, as this component of reading has shown a strong relationship to overall reading achievement and is a strong predictor of later reading achievement (Daane, Campbell, Grigg, Goodman, Oranje, & NCEES, 2005; Deno, 1985; Good, Simmns, & Kame'enui, 2001; Skinner, Williams, Morrow, Hale, Neddenriep, & Hawkins, 2009; Schall, Skinner, Cassell, Ciancio, Ruddy, & Thompson, 2016). The administration of this intervention utilizing peers is an easy approach to employing needed intervention when the needs outweigh the resources in the school (i.e., too many students need intervention services with not enough individuals to provide services). Therefore, peer-mediated repeated readings is an effective intervention to increase student's performance on oral reading fluency measures.

However, results showed no significant effects regarding the dosage the student received. Specifically, students in the once a day dosage did not outperform students in the every other day dosage. This finding is especially important in terms of answering the second purpose of this study: "Is there a more efficient dosage?" Since a repeated measures ANOVA does not answer this question, follow-up analyses were used to speculate and offer recommendations for future directions. When the data is examined with every data point included in the analyses, the results did not show a significant effect based on mean differences between dosages. These results may suggest there is no significant effect when students are given intervention once a day versus every other day in regards to their growth in words correct per minute. Therefore, in order to save resources and time, teachers, school psychologists, and interventionists may provide intervention every other day and see a similar effect if they were to provide intervention once a day.

However, this data should be interpreted with caution as there are several factors that influence student performance on measures of oral reading fluency. Specifically, previous

research has suggested the standard error of measurement in reading curriculum-based measurement (i.e., oral reading fluency) ranges from 5-15 with a median of 10 words read correctly in one minute (Christ & Silberlitt, 2007). Thus, an individual student's progress monitoring performance from time 1 to time 2 may be a difference of up to 15 words correct in one minute. Without extending data collection to several more weeks, in order for the data to normalize, the variability among individual student performance may have masked a significant effect in this data. Furthermore, there is some evidence to suggest the differences in passage difficulty used for progress monitoring of oral reading fluency can impact observed fluency, regardless of the intensity of the intervention (Ardoin, Christ, Morena, Cormier, & Klingbeil, 2012). Therefore, there may have been variability in the difficulty of the specific passages, which may have caused student performance to decline and further impacted individual variability in the data. It is important for speculation and future studies to consider examining performance before and after administration of the intervention. With the standard error of measurements ranging from 5-15 words correct per minute, and with the specific passages impacting performance of oral reading fluency, these factors may have likely impacted the growth rates of the participants in this study. Specifically, statistical significant differences may not have been detected due to significant variability in each student's weekly performance.

When solely examining the pre-test and post-test data, there are significant differences between the two groups. This finding likely suggests that the dosage of the intervention may be an important variable to consider when deciding the frequency of the administration of the intervention. According to the follow-up analysis in this study, the students who received the intervention every day significantly outperformed the students who received the intervention every other day. Therefore, the students receiving the peer-mediated repeated readings intervention every day outgrew the students receiving the intervention every other day by about 10 words correct per minute. Specifically, the students in the everyday group grew about 21 words correct per minute from pre-test to post-test, and the students in the every other day group

grew about 11 words correct per minute from pre-test to post-test. Although in the main analysis of this study, statistical procedures were unable to detect significant differences, when solely examining performance before and after intervention, students who received the intervention double the amount of time (i.e., students in the every day group received intervention for a total of 24 days, whereas students in the every other day group received intervention for a total of 12 days), grew about double the amount. Although post-hoc analyses did detect a significant difference, it is important to note that caution is warranted when making causal claims, as this finding is only seen when solely examining pre/post-test data.

However, this potential finding is especially important, as the need to understand exactly how much intervention is warranted to remediate skill deficits is critical in decision-making regarding the amount of time and resources a student needs to reach benchmark levels. As there is currently no evidence from previous research to suggest a guideline of exactly how much intervention a student needs to be on par with his/her peers, the question of dosage and efficiency this study attempted to answer remain imperative. Furthermore, as the use of high-stakes tests are employed throughout the country, understanding intervention effects at the dosage level may help data teams, teachers, and school psychologists make more informed decisions that predict better performance on high-stake tests. Additionally, all across the country schools struggle to find extra instructional time to meet the needs of their students. It is critical to understand the effect of dosage on oral reading fluency, as according to the follow-up analysis in this study, students could possibly grow about double the amount of words correct per minute if given intervention daily compared to every other day. With the question of dosage being answered empirically, teachers, data teams, and school psychologists may be more informed to allocate resources (i.e., instructional time) in way that does not waste resources or time to improve student outcomes. Therefore, future research is needed to support the follow-up analysis from the current study.

Limitations and Future Directions. There are several limitations in the current study. One limitation is the sample size. In any statistical analysis, a sample size of 34 participants is

quite small to detect significant results, regardless if one exists or not. Future studies should seek to examine a dosage effect in a much larger sample size. Additionally, the standard error of measurement may have impacted the variability of the data beyond the control of the author. If the study was conducted for about 8 weeks, compared to the current 5 weeks, there may have been more stable data for the analysis. Although there is no suggested time frame based on evidence, it is likely data would have stabilized with more opportunities for student performance (i.e., more progress monitoring data points). Therefore, future research should replicate this study for much longer than 5 weeks. Furthermore, future studies should seek to determine when data begins to stabilize, as well, in order to inform practitioners of about how long is needed for a peer-mediated repeated readings intervention to be effective. It is likely the answer to this question is needed even before a potential dosage effect can be observed, as practitioners would need to know about how long it takes to obtain meaningful growth before an interventionist can determine if adding another dosage of intervention would potentially double the student's performance.

Additionally, there were some students who did not receive the intervention daily due to absences and other factors (i.e., the teacher did not send the student to the reading specialist that day), but this data was not collected by the examiner since the dependent variable was collected via progress monitoring of the effects of the intervention. In fact, fidelity of intervention implementation was 80% for 30% of sessions. It is unknown how the two groups would have performed if implementation fidelity was closer to 100%. Therefore, future research should monitor daily intervention sessions and consider examining the differences between students who received the intervention without any interruptions and students who did not receive the intervention as planned.

Another limitation of the current study was students in the every other day condition were instructed to complete a comprehension task on the days in which they were not to engage in the peer-mediated repeated readings intervention. This comprehension task was not measured in the

current study and its impact on the outcome is not known. Future studies should seek to replicate this study by utilizing a task completely unrelated to reading instruction, as there is a possibility that the comprehension task could have impacted students' growth on an oral reading fluency measure.

Future research should also examine the impact of additional intervention components to a dosage effect. For instance, the current study did not control for corrective feedback, as the essential component of repeated readings is repeatedly reading a passage within connected text. However, adding intervention components, such as corrective feedback, may in fact improve the growth rate quicker and overall oral reading fluency performance quicker than without corrective feedback.

Another important direction for future research to investigate is the addition of a control group. Since this study occurred in a reading specialist's classroom and the author could not acquire a control group, future studies should seek to understand how repeated readings and a dosage effect compares to students who do not receive oral reading fluency interventions and are simply receiving traditional progression through a reading curriculum. However, the results of this study should not be overlooked as insignificant without a control group since the specific school this study was conducted at had identified the participants as needing additional instruction in reading based on school-wide reading screening data. Therefore, the participants in this study had significant differences in reading performance before intervention compared to students who were not identified as needing additional reading instruction. Future research should replicate this study in the general education classroom, regardless of reading performance before intervention, to determine if students who may not necessarily need reading intervention (i.e., meet national benchmarks in reading performance) experience similar results to students who need intervention services.

Summary

Overall, the current study found significant results for a main effect of a peer-mediated repeated readings intervention, therefore suggesting a peer-mediated repeated readings intervention is an effective intervention for increasing a student's oral reading fluency performance. Secondly, although not included in the overall analysis of this study, upon follow-up analysis, a significant dosage effect was observed when examining students' performances before the intervention and after the intervention. Thus, there is potentially a dosage effect when employing a peer-mediated repeated reading intervention once a day and every other day, such that students receiving the intervention every day significantly outperformed students receiving the intervention every other day. Although this finding is used purely for the purposes of directions for future research, it is an important feature of this analysis, as educators are continually seeking ways to efficiently meet the academic needs of their students, specifically students who struggle.

In an era where resources are extremely limited and adding needed instructional time for students who require additional academic support is difficult to attain, educational researchers should be examining the effects of the interventions when the administration is doubled. In order to support educators, the next step in academic intervention research is not only to support effective interventions, but to find the most efficient way possible to meet the needs of struggling students (i.e., that takes the least amount of time with the least amount of resources). Although researchers agree on an effective oral reading fluency intervention, this may not be enough to meet the dire needs of poor reading performances.

For instance, in the state where this study was conducted, according to The Nation's Report Card (NCES, 2017), 4th grade students who performed at or above the *Proficient* level was 29%, which was lower than their performance in 2015 (33%). Furthermore, according to the same report (NCES, 2017), 4th grade students who performed at or above the *Basic* Level was 63% in 2017, which was lower than their performance in 2015 (71%). Additionally, there was a similar

pattern for 8th grade students, although the difference is not significant. For instance, 8th grade students at the *Proficient* level was 28% in 2017 and 29% in 2015 (NCES, 2017). Similarly, their performance at the *Basic* level was 74% in 2017 and 76% in 2015 (NCES, 2017). Both 4th grade and 8th grade students' performances in 2017 were lower than the national averages. This decline in scores highlights the need for further research in supporting educators in the development of reading skills for all students, such that educators need to understand exactly how much intervention is needed in order to prevent and remediate academic difficulties for students who are struggling.

Simply understanding the effect of an intervention is no longer enough to appropriately equip schools with the needed resources to support all students, regardless of the gap between the expected level of behavior and the current level of behavior. In an era where data and test scores are utilized for high-stakes decisions, understanding exactly how to remediate an academic skill deficit is imperative. Even more important, educators should understand exactly how much of an intervention is needed to prevent and remediate skill deficits. Understanding academic intervention at this level gives data teams, teachers, and school psychologists the much needed guidance to employ more efficient and more effective interventions that better support struggling students. Decisions at this level may potentially help teachers, interventionists, and school psychologists employ interventions that take less time and less resources for struggling students to meet benchmark levels of performance.

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APPENDICES

APPENDIX A

Parent Permission Form

Date: _____

Research Project Title:

Utilizing a Peer-Mediated Academic Intervention to Evaluate Student Growth by Treatment Dosage

Principal Investigator:

Daniel Anderson, M.S. Doctoral Student at Oklahoma State University

Your child has been identified as a student who would benefit from participation in a research project that is designed to increase school success. This consent form contains important information to help you decide if it is in your child's best interest to take part in this study.

Purpose:

The purpose of the study is to determine the most effective academic intervention when it is given across two different times (i.e., once a day and every other day). A second purpose of the study is to determine which academic intervention causes students to learn at the quickest rate.

Procedures:

For the study, your child will be receiving practice with a peer in reading instructional level passages under timed conditions. The practice sessions will last for approximately 15 minutes every day, and the study should last approximately 30 school days. Once permission has been signed, a time to do these practice sessions will be arranged with your child's teacher. The practice sessions will not occur during your child's core classroom instruction, or other important educational activities. Also, as part of the practice sessions, your child will be able to earn rewards approved by the child's teacher for adhering to the protocol of the intervention (e.g. stickers, erasers). This project has been approved by Stillwater School District, and the administration at your child's school

Confidentiality:

The data will be housed at Oklahoma State University and only the principal investigators and the doctoral level research assistants working on the project will have access to it. At the end of the study, the results will be made available for both you and your child's teacher. The records of this study will be kept private. Any written results will be done so anonymously and all identifying information will be removed from the data.

Risks of Participation:

There are no known risks associated with this study.

Benefits:

The benefit of the study is that it may also help your student by improving his or her performance in reading. It also may assist his or her teacher in instructional planning for your child.

Participant Rights:

Your child's involvement in this project is completely voluntary. In addition, you may choose to withdraw your child from the project at any time without penalty.

If you have any questions with regard to your child's involvement in this study, please contact us at your earliest convenience. For information on subjects' rights, contact the IRB office at 223 Scott Hall, Stillwater, OK 74078, 405-744-3377, or irb@okstate.edu

Contact Information:

Daniel Anderson
Doctoral Student
Oklahoma State University
(918) 576-9288

Gary Duhon
Associate Professor
Oklahoma State University
(405) 744-9436

If you have questions about your child's rights as a research volunteer, you may contact the IRB office at irb@okstate.edu or 405-744-3377.

I give my permission for my child to be included in the research project.

No, I prefer that my child not be included in the research project.

Parent/Guardian Signature: _____ Date: _____

Student's Name: _____

APPENDIX B

Child Assent/Recruitment Process

Research Project Title:

Utilizing a Peer-Mediated Academic Intervention to Evaluate Student Growth by Treatment Dosage

Principal Investigator:

Daniel Anderson, M.S. Doctoral Student at Oklahoma State University

Read the following sections along with me.

Purpose:

I want to see how quickly you read and how quickly you can do basic math facts.

Procedures:

You will be practicing reading with a partner. I am going to ask you to read quickly. We will work together every day for about 6 weeks, and the things we are doing will be extra to your normal class work and you will not miss anything important in your classroom. You do not have to work with me if you don't want to and can stop at any time.

Risks:

Since you normally practice reading at school, my reading passages will not change what you and your teacher are doing. You will not get a grade for these passages, and your teacher and parent have said that it is ok for me to give you these passages and worksheets. Even if your parents have said it is ok for you to be a part of this project, it is ok to still say no.

Benefits:

Participating in this study may help you to read quicker.

Rights:

You do not have to work on this project if you do not want to. You can stop at any time you want. You do not have to do anything that makes you feel uncomfortable or sad.

You have been told about the study.

You have been told what you have to do.

You have been told that you do not have to do any of the worksheets if you do not want to.

You have also been told that you can stop any time you want.

Would you like to do this project?

Print your name _____ Sign your name _____

APPENDIX C

Peer-Assisted Repeated Readings Protocol

1. Pass out each student's intervention folder, and make sure each student has a pencil.
2. Remind students of the intervention procedures and the reward procedures. If students are working on comprehension (i.e., not engaging in the repeated readings intervention), instruct them as needed.

Consider saying to the students:

"Open your folders, and take out the first sheet of paper. You each have a reading passage, and you and your partner will read passages using repeated reading procedures for one minute each."

"When I say begin, start reading to your partner and try to read as far as you can without making mistakes. Remember, if you are listening, you will be marking errors and calculating all the words that your partner read correctly in one minute."

"Are there any questions? Ready.... Begin!" (Start timer or stopwatch for one minute).

3. During the intervention, provide students with procedural feedback and encourage students as needed.
4. After one minute, stop the timer and consider saying to students:

"Stop! Use a bracket to mark where your partner stopped reading and put your pencils down. Take 30 seconds to calculate how many words your partner read correctly in one minute and tell your partner (Allow students about 30 seconds to calculate WCPM)."

"Remember, try to read farther this time without making mistakes, and continue listening and marking incorrect words during one minute."

5. Repeat steps 2-4 six times to ensure each student has read to their partner for a total of 3 times.
6. Thank students for their hard work and implement the mystery motivator.

APPENDIX D

Training Protocol

1. Open your folder.
2. Take out the reading passage with your name on it.
3. Once you have been told to begin, listen to your partner read the passage.
4. Mark incorrect words with a slash mark (/).
5. If your partner hesitates for more than 3 seconds, give your partner the correct word.
6. After time is up, quickly count how many words your partner read correctly in one minute. Remember to use the numbers on the side of the page.
7. Continue this process until you are told to stop.
8. Raise your hand if you have any questions.

APPENDIX E

Progress Monitoring Protocol

1. Say these specific directions to the student:

“When I say Begin, start reading aloud at the top of this page. Read across the page (demonstrate by moving finger across the page). Try to read each word. If you come to a word you don’t know, I’ll tell it to you. Be sure to do your best reading. Are there any questions? Ready? Begin.”

2. Start your stopwatch (or timer) after the student says the first word of the passage. Place a bracket and say “Stop” after 1 minute.

3. Move to the next passage and say:

“Let’s try another one. Be sure to do your best reading. Ready? Begin.”

4. Start your stopwatch (or timer) after the student says the first word of the passage. Place a bracket and say “Stop” after 1 minute.

5. Move to the next passage and say:

“Let’s try another one. Be sure to do your best reading. Ready? Begin.”

6. Start your stopwatch (or timer) after the student says the first word of the passage. Place a bracket and say “Stop” after 1 minute.

7. Say the following to the student:

“You did an excellent job! Thank you. Let’s go back to class.”

Things to keep in mind:

-If no response in 3 seconds, say the word and mark it as incorrect.

-If no words are read correctly in the first line, say “Stop,” and record a score of 0.

-If the student stops (not a hesitation on a specific item), say “Keep going.” (Repeat as often as needed)

-If the student loses his/her place, point. (Repeat as often as needed)

APPENDIX F

Oklahoma State University Institutional Review Board

Date: Wednesday, August 16, 2017
IRB Application No ED1772
Proposal Title: Utilizing a Peer-Mediated Academic Intervention to Evaluate Student Growth by Treatment Dosage

Reviewed and Processed as: Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 8/15/2020

Principal Investigator(s):

Daniel Anderson	Gary J Duhon
415 Willard	423 Willard
Stillwater, OK 74078	Stillwater, OK 74078

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of the research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Scott Hall (phone: 405-744-5700, dawnett.watkins@okstate.edu).

Sincerely,



Hugh Crethar, Chair
Institutional Review Board

VITA

Daniel Blake Anderson

Candidate for the Degree of

Doctor of Philosophy

Dissertation: UTILIZING A PEER-MEDIATED ACADEMIC INTERVENTION TO
EVALUATE STUDENT GROWTH BY TREATMENT DOSAGE

Major Field: SCHOOL PSYCHOLOGY

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in School Psychology at Oklahoma State University, Stillwater, Oklahoma in May, 2019.

Completed the requirements for the Master of Science in Educational Psychology at Oklahoma State University, Stillwater, Oklahoma in 2015.

Completed the requirements for the Bachelor of Arts in Psychology at Oklahoma State University, Stillwater, Oklahoma in 2013.

Experience:

External Site Coach for Osage County Interlocal Cooperative under a School Climate Transformation Grant, Hominy OK, 2016-2018

Completed over 1200 hours in practicum experiences in schools and clinic-based settings, Oklahoma State University, Stillwater, OK, 2014-2018.

Graduate Teaching Assistant, *Psychology of Adolescence, Learning to Learn*, Oklahoma State University, Stillwater, OK, 2014-2016

Professional Memberships:

Member of the National Association of School Psychologists, 2013-present

