

EFFECTIVENESS OF A REPEATED READING INTERVENTION FOR POSTSECONDARY STUDENTS

by

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Reading is a necessary skill in today's society. However, many students are graduating from high school, entering the workforce, and being accepted into college without adequate reading skills. Because a large portion of learning in college is done through close reading, inadequate reading skills are especially problematic for postsecondary students. Moreover, students have little opportunity in postsecondary education to focus on improving their basic reading skills, even though previous research has shown that reading interventions can help students with reading difficulties. The current study sought to improve the fluency skills of three postsecondary students by using a Repeated Reading intervention. The data in the study showed that Repeated Reading can be an effective intervention for postsecondary students who have reading difficulties ($PAND = 78\%$, $\Phi = .56$, $\tau\text{-}U = .6925$). This suggests that reading interventions can be effective regardless of the age of the student, and that although early intervention is important, older populations can also benefit from interventions. With this knowledge, interventions that are appropriate to use with postsecondary students with deficient reading skills can be developed and implemented.

EFFECTIVENESS OF A REPEATED READING INTERVENTION
FOR POSTSECONDARY STUDENTS

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TABLE OF CONTENTS

LIST OF TABLES	vi
LIST OF FIGURES	vii
CHAPTER 1: LITERATURE REVIEW	1
Basic Reading Fundamentals	1
Phonemic Awareness	3
Alphabetic Principle.....	3
Vocabulary Knowledge	3
Fluency.....	4
Comprehension	5
Reading Interventions for Older Students.....	6
Interventions for Vocabulary Knowledge.....	6
Interventions for Fluency	7
Interventions for Comprehension	7
Purpose of Study	8
CHAPTER 2: METHODS	10
Participants	10
Participant 1	10
Participant 2	12
Participant 3	13
Materials	14
Design	15
Baseline Procedures	17

Intervention Procedures	18
Data Collection and Progress Monitoring.....	18
Interscorer Agreement	18
Procedural Adherence.....	19
CHAPTER 3: RESULTS	21
Visual Analysis	21
Assessing Performance Level in Baseline and Intervention Phase	21
Assessing Latency of Change	21
Assessing Trend in Baseline and Intervention Phase	22
Assessing Variability Across Phases	22
Analysis through Non-Parametric Statistics	24
Tau-U	24
Percentage of All Non-overlapping Data.....	24
CHAPTER 4: DISCUSSION.....	26
Implications for Practice.....	27
Limitations and Recommendations for Future Research.....	28
Conclusion.....	30
REFERENCES	31
APPENDIX A: APPROVAL LETTER.....	35
APPENDIX B: PERMISSION LETTER	36
APPENDIX C: TREATMENT CHECKLIST.....	39

LIST OF TABLES

1. List of Participants' Demographics	14
2. List of Mean Words Read Correctly	22
3. List of Non-Parametric Data Results	25

LIST OF FIGURES

1. Graph of Multiple Baseline Data	23
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CHAPTER I: LITERATURE REVIEW

Basic Reading Fundamentals

The process of learning to read is considered to be hierarchical, wherein one fundamental skill must be mastered before the next can be learned (Spear-Swerling & Sternberg, 1994). Thus, students who do not adequately develop these early reading foundational skills are likely to struggle with reading throughout their lifetime (Stanovich, 1986). Yet, reading is a fundamental skill that is critical in today's society. Not only is reading important for daily life skills such as understanding street signs, important documents, and directions, it is also necessary in higher education and fundamental for students to fulfill their full educational potential.

The National Assessment of Educational Progress (NAEP) reports reading development for fourth, eighth, and twelfth grade students and determines the number of students who are at Basic, Proficient, and Advanced levels in their reading. For example, by their definition, fourth grade students who perform at the Basic level can identify relevant information, make an inference, use content clues to find a word meaning, and support a conclusion. Students in the same grade at the Proficient level can interpret what they have read, draw conclusions, and make evaluations about the reading. Advanced fourth grade students can make complex inferences and apply their understanding to support an argument.

A 2013 NAEP report revealed that 62% of high school seniors were at or below the Basic level on the reading assessment, and in 2015 66% of eighth-grade students performed at or below the Basic level. That same year (2015) the NAEP reading report concluded that 64% of fourth grade students performed at or below the Basic level on the NAEP reading assessment. These numbers suggest that the U.S. education system is not preparing students to be successful in reading, and many students around the nation are entering adolescence and completing high

school with inadequate literacy skills. Adolescents who complete high school without proper reading skills go on to enter the work force or college unprepared to succeed. This is problematic because 85% of learning completed in college is done through careful reading (Simpson & Nist, 2000). College textbooks can be dense with discipline-specific terminology and assume prerequisite knowledge of the reader. In addition to textbooks, college students are required to read more complex texts, such as journal articles, to supplement class lectures and prepare for tests and writing assignments (Burrell, Tao, Simpson, & Mendez-Berrueta, 1997). In an effort to close the literacy gap, some colleges offer remedial courses to help students at risk for literacy struggles develop basic reading skills. In 2000, one study reported that about 35% of undergraduate students who were awarded financial aid were enrolled in one of these courses (Horn, Peter, & Rooney, 2002).

Students who seek postsecondary education, but have a poor understanding of basic reading fundamentals, may find themselves on a dangerous trajectory. For example, in college, students who have not learned basic skills often have trouble identifying important information, organizing and understanding more than one text, using effective reading strategies, and reading actively. In 1997, the National Reading Panel (NRP) was formed by the U.S. Department of Education to identify how children learn to read. After reviewing years of research, the panel discovered that reading skills are improved by developing each skill in the reading hierarchy. Therefore, without mastering a basic skill, it will be difficult for an individual to continue to grow in other areas of reading. Skills include being aware of phonemes (Phonemic Awareness), applying sounds to corresponding letters to make words (Alphabetic Awareness), being able to read with speed and accuracy (Fluency), knowing the meaning of words (Vocabulary) and being able to apply word meanings to understand the text as a whole (Comprehension). Thus, these

foundational skills form the building blocks for the kind of reading college students must be able to do efficiently in order to keep up with the pace and volume of college reading expectations.

Phonemic awareness. Phonemic Awareness refers to the ability to hear, identify and change sounds in words that are spoken (Yopp, 1992). Research has shown that the ability to process phonemes is a predictor of whether a child becomes a successful reader (Ball & Blachman, 1991). It is important to note that phonemic awareness applies to auditory knowledge and does not involve printed material. Individuals with phonemic awareness are better able to understand printed materials due to the fact that decoding print requires an individual to match phonemes to graphemes. Phonemic awareness is important not only because it prepares students to understand printed material, but it also helps students apply the alphabetic principle.

Alphabetic principle. The alphabetic principle has two main components that lead to the development of a student's reading skill. The first involves learning that words contain letters and that letters have a corresponding sound (alphabetic understanding). The second involves learning how to blend sounds together to pronounce an unknown printed word or to spell a word (phonological decoding). Students who can successfully acquire and utilize the alphabetic principle have more advanced subsequent reading skills (Stanovich, 1986). When students lack understanding of the alphabetic principle they often have trouble associating a letter and a sound, blending letter-sounds to identify words that can be decoded, and reading nonsense words such as "nan." The skill can be improved when students are explicitly taught to decode words through targeted interventions (Liberman & Liberman, 1990). Once students are successful decoders, they can then start to focus on increasing their vocabulary skills.

Vocabulary knowledge. It has been well documented that vocabulary is important to being a successful reader (Baker, Simmons, & Kame'enui, 1998). The NRP concluded that

knowing the meaning of words influences both the ability to read and the ability to comprehend what is read. Vocabulary knowledge can be defined as knowing words and their meanings. It has also previously been referred to as the words that must be known to read and comprehend difficult text (Kamil & Hiebert, 2005). Children have various and extensive exposure to spoken words and printed text when they enter school. Even prior to formal schooling, some children have been exposed to rich learning environments and are able to increase their vocabulary through those interactions. Other children do not have those experiences and therefore begin school with a limited knowledge of words and their meanings (Hart & Risley, 1995; National Research Council, 1998). Whether for this reason or for other factors in a student's learning profile, students with limited vocabulary knowledge may later have difficulty with developing fluency and comprehension skills.

Fluency. After learning letter-sound correspondence and improving their decoding and vocabulary skills, students must learn to read with fluency (Torgesen, Rashotte, Alexander, Alexander, & McPhee, 2003). Fluency refers to reading with accuracy, speed, and prosody (Hudson, Mercer, & Lane, 2000). In order to read fluently, readers must be able to recognize and decode words accurately. Readers that read accurately have an increased understanding of the alphabetic principle, strong decoding ability, and a large vocabulary bank. Readers who have low word reading accuracy are often disfluent and therefore are more likely to misunderstand or misinterpret the author's intended message.

Readers' speed often increases as they can recognize words with automaticity. Automaticity refers to the rapid and simple word identification that occurs in or out of context (Ehri & McCormick, 1998). As automaticity improves, readers can use less mental effort for decoding and word recognition. Therefore, they can use their cognitive resources for

comprehension or other higher-level skills (LaBerge & Samuels, 1974). On the other hand, readers with poor automaticity often read in a slow and laborious fashion, inhibiting their ability to monitor comprehension as they move along in the text.

In addition to reading with accuracy and speed, readers must also read with prosody (Schreiber, 1980). Prosody requires the reader to use the correct intonation, syllable prominence and duration while contributing to how the text is expressed (Allington, 1983). Schreiber (1980) posited that although some readers may be able to decode single words, they may still read disfluently due to having a lack of prosody or being able to express written words in the same manner they would be spoken. Readers who are able to read quickly and accurately, but are unable to use an expressive voice often have no sense of phrasing, use emphasis in the wrong place, and ignore punctuation. Lack of prosody also leads to the inability to fully understand the text and interpret the meaning of the text. Overall, research shows that adequate fluency skills are paramount for successful readers and that poor fluency skills are predictors of future poor performance in the ultimate goal for reading - comprehension.

Comprehension. As their vocabulary and other aforementioned skills improve, individuals are able to complete higher order processes and comprehend or extract meaning from the text. Readers who comprehend the text, must also relate what they are reading to what they have previously learned, and monitor understanding as they read. Comprehension is usually the last step in the reading process. Research on reading comprehension shows that students who have difficulty comprehending text usually have difficulty with reading the words on the page (Nation, Cocksey, Taylor, Bishop, 2010). Oakhill and Yuill (1996) have further examined what inhibits comprehension. They found that students who have trouble with comprehension also have trouble making connections and inferences as they read. Students with poor comprehension

tend to be less engaged in reading than their peers, and weaknesses in basic reading skills are more prominent when reading tasks become more difficult, such as in the college setting.

Reading Interventions for Older Students

Reading demands increase for students as they get older. Students in the postsecondary settings must have the necessary skills to understand difficult and complex text. However, some older readers have not mastered reading fundamentals and have little opportunity in postsecondary education to focus on improving their reading ability. College instruction expects students to read to learn, and is not focused on learning to read. Therefore, reading interventions are necessary to remediate problems for students who have difficulty with vocabulary, fluency, and comprehension. Although most research has focused on younger students with reading delays, a few studies target adolescents and high school students (Kamil et al, 2008). Scammacca, Roberts, Vaughn, and Stuebing (2015) conducted a meta-analysis on the effectiveness of reading interventions for older students and found that targeted and appropriate reading interventions can improve the reading skills of older students. Explicit and systemic interventions that are tailored to students' reading needs have been shown to be effective interventions (Edmonds et al., 2009).

Interventions for vocabulary knowledge. Fortunately, vocabulary knowledge can be improved in older students with simple interventions such as direct instruction, activity-based methods, computer-assisted instruction, cognitive strategies, and mnemonics (Jitendra, Edwards, Sacks, & Jacobson, 2004). Teachers are more likely to expose students to more words and their meanings when they provide direct instruction as opposed to simply reading aloud. That said, the most effective strategies for teaching vocabulary and word meanings are those that include explicit instruction and allow the student to be engaged by manipulating words and their

meanings (Mastropieri, Scruggs, & Graetz, 2003). Although many teachers explicitly teach vocabulary through exposure to simple definitions, another way to explicitly teach vocabulary is through extended vocabulary instruction. Extended vocabulary instruction occurs when instructors provide explicit direction through utilizing both contextual and definitional information, exposing students to vocabulary words in a multitude of contexts, and encouraging students to make connections to vocabulary words already in their repertoire (Stahl & Fairbanks, 1986).

Interventions for fluency. Older students who are unable to read with speed, accuracy, and prosody often read less frequently than their peers (Stanovich, 1986). They do not read for pleasure and they are sometimes reluctant to read, regardless of the setting. This lack of practice further hinders their ability to improve the skills that need the most attention. Schreiber (1980) suggested that students wishing to increase their fluency skills should do so with contextual readings, especially Repeated Readings. Previous research has found Repeated Readings to be effective at increasing reading fluency. More particularly, in his meta-analysis, Therrien (2004) found an average effect size of .95 for increases in fluency. There are many alternative methods for implementing the Repeated Reading intervention. Some Repeated Reading interventions utilize a performance criterion, while others are implemented with a fixed number of readings. Therrien (2004) found a positive correlation between the number of times the readings were repeated and their effect sizes. Specifically, fluency effect sizes from two to three repetitions increased from .37 to .42, respectively. Other effective modifications to the Repeated Reading intervention have included a time to preview the reading and the availability of corrective feedback (Skinner, Cooper, & Cole, 1997).

Interventions for comprehension. As previously discussed, fluency is necessary, but not sufficient, for adequate reading comprehension skills (RAND Reading Study Group, 2002). Older readers who can read fluently but still have comprehension deficits may be able to improve their skill through monitoring their comprehension, summarizing main ideas, and generating questions (Vaughn et al., 2009). Interventions targeted for reading comprehension can vary; however, research has found three common themes among effective reading comprehension interventions. They include teaching key vocabulary that will be found in the text, teaching strategies that will help the student monitor their understanding (e.g., self-question and summarizing), and allowing students to discuss and receive feedback on what they have read (Sencibaugh, 2007).

Purpose of the Study

Most successful reading interventions target specific deficits in basic skills. Once these basic skills are improved, students can work toward improving their comprehension skills. The current study was designed to examine the effectiveness of a targeted intervention to improve the reading skills of three college students at a public university in North Carolina. Because less research has been done with this older population of poor readers, a single-subject design methodology was used to examine effectiveness while ensuring highly controlled internal validity. While all participants had other academic concerns, in addition to and perhaps as a result reading fluency difficulties, the current investigation focused solely on reading fluency skills. The NRP acknowledged that, to improve fluency, oral reading skills must be practiced (National Institute of Child Health and Human Development, 2000). Repeated Reading is an intervention that helps students practice these skills and involves repeatedly reading a passage until the passage is read with speed and accuracy. The Repeated Reading intervention was first

introduced by Samuels in 1979 with beginning readers who had learning disabilities. It has since been deemed effective with young readers, adolescent readers, as well as with adult readers, and therefore it was the chosen method of fluency instruction for this investigation. It was hypothesized that the Repeated Readings intervention would increase the fluency of the three participants, and that fluency would improve only in timing with the introduction of the intervention, thus demonstrating the functional relationship between the intervention and the reading improvement.

CHAPTER II: METHODS

Participants

Research participants were three male (two Caucasian and one African-American) students who were participants in a program for college students with learning disabilities. This program offers comprehensive academic, social, and life-skills support for students with learning disabilities who show potential for postsecondary success. In addition to background support from this specialized program (e.g. study skills and learning strategy instruction, mentoring, time management structure), students enrolled in the program receive accommodations from the Disability Support Services offices that include extended time for exams, a low-distraction environment for exams, a reader for exams, and use of assistive learning software (e.g., Read & Write Gold). All the participants have had full psychoeducational evaluations and show deficits in reading. Background information was gathered from a review of participants' records.

Participant 1. Participant 1 was a 20-year-old college sophomore. He was completing coursework towards a degree in Criminal Justice. His grade point average was a 2.31 on a 4.0 scale. He had a current diagnosis of Attention Deficient Hyperactivity Disorder. However, his medications were unknown to the researcher. He also previously had been diagnosed with phonological processing disorder (Dyslexia). In a letter of recommendation, a previous teacher noted that participant 1 is mature, determined, intelligent, and had a great personality. His most recent evaluation took place when the participant was 17 years old. During this evaluation, he was given the *Wechsler Adult Intelligence Scale - Fourth Edition* (WAIS-IV) and the *Wechsler Individual Achievement Test-Third Edition* (WIAT-III). On the WAIS-IV, the participant's Full Scale Intelligence Quotient was 94 placing him within the Average range relative to same-aged

peers, however due to discrepancy in index scores, his General Ability was measured and interpreted to be within the Average range with a score of 101.

On the WIAT-III, the participant received a score of 65 in Basic Reading and a score of 75 on the Total Reading Composite. He received a standard score of 86 on the Reading Comprehension and Fluency composite, which fell within the Low Average range. Specifically, he received an Average score (106) on the Reading Comprehension subtest and a Below Average score (74) on the Oral Reading Fluency subtest. In math, he received a standard score of 78. As a result of the evaluation, the participant was eligible to receive accommodations at the university. Accommodations included extended time for tests and exams, read aloud on tests and exams, and a low distraction environment.

During his junior year of high school, Participant 1 received services under the Specific Learning Disabled category in the areas of Reading and Written Expression. In addition to receiving extended time on test, he also received specially designed instruction in the form of Collaborative Math and History and he was given instruction in Academic Strategies. He received collaborative assistance ten times per week for 50 minutes with peers in his general education class and received academic strategies instruction five times a week for 50 minutes in an Exceptional Children's classroom.

At the conclusion of high school, the subject's overall unweighted grade point average was a 2.94 on a 4.0 scale. Participant 1 took both the Scholastic Assessment Test (SAT) and the American College Test (ACT) during high school. On the SAT, the participant received the following scores: Reading: 360, Math: 430, Writing: 380. His overall SAT composite score was a 1,170 out of 2,400, which put him in the 15th percentile. On the ACT, the participant received

the following scores: English: 11, Math: 16, Reading: 18, Science: 11. His overall ACT composite score was a 14, which put him at the 11th percentile.

Participant 2. Participant 2 was a 20-year-old college sophomore. He was working towards a degree in Business. His grade point average was a 2.78 on a 4.0 scale. In a letter of recommendation, his high school teachers noted that he had a strong work ethic, never lacked motivation, and always thought ahead. In high school, the participant had an Individualized Education Plan (IEP) that included accommodations and modifications such as extended time on tests, read aloud and copies of the notes and study guides. He also received consultative services twice a week for 10 minutes within his general education classroom. The extent of these services is unknown to the researcher. The most recent evaluation available to the researcher occurred when the participant was 17 years old. During this evaluation, he was given the *Reynolds Intellectual Assessment Scales* (RIAS) and the *Woodcock –Johnson Tests of Achievement-Third Edition* (WJ-III ACH). On the RIAS, the participant's Composite Intelligence Index of 102 put him within the Average range relative to same-aged peers.

On the WJ-III ACH, the participant received a score of 76 in Basic Reading. He had a standard score of 79 on the Reading Comprehension section of the test, which fell within the Below Average range. It was noted that the subject's Reading Fluency was in the poor range and was lower than would be expected when compared to his measured ability, age, and grade level. The participant received a score of 86 in Written Expression, which fell within the Low Average range. As a result of the evaluation, the participant continued to receive services for a Specific Learning Disability. At the conclusion of high school, the subject's overall unweighted grade point average was a 2.92 on a 4.0 scale. On the ACT, the participant received the following

scores: English: 12, Math: 19, Reading: 17, Science: 13. His overall ACT composite score was a 15, which put him at the 16th percentile.

Participant 3. Participant 3 was a 19-year-old college freshman. He was working towards a degree in Criminal Justice. His GPA was a 2.39 on a 4.0 scale. High school teachers previously described the participant as a hard-worker. They also noted in a letter of recommendation that he had a positive personality and was extremely eager to learn; however, concerns about reading, math and time management skills were noted. In high school, the participant had an Individualized Education Plan (IEP). He was evaluated for the first time when he was 17 years old. During this evaluation, he was given the WAIS-IV and the WJ-III ACH.

On the WAIS-IV, the participant's Full Scale Intelligence Quotient was 86, which falls within the Low Average range. On the WJ-III ACH, the participant received a score of 65 on both Basic Reading and Reading Comprehension, which put him in the Very Low range. He received a score of 61 in Math Calculation and Math Reasoning, which also put him in the Very Low range. Lastly, the participant received a score of 85 in Written Expression, which fell in the Low Average range. As a result of the evaluation, the participant was eligible to receive services for a Specific Learning Disability in math calculation, reading comprehension, and basic reading.

During his junior year of high school, the subject received services in reading four times a week in the Exceptional Children's classroom and services in math twice a week. However, during his senior year, he received reading services once a week for 30 minutes each session. The entirety of these services is unknown; however, it was noted that the participant made progress from two-syllable words with understanding of meaning to multi-syllabic words with comprehension of the meaning using the REWARDS reading system. It was suggested that he

continue to work on these skills in order to further improve his reading abilities. Other accommodations included preferential seating, read aloud, and extended time.

At the conclusion of high school, the subject's overall unweighted grade point average was a 2.41 on a 4.0 scale. On the ACT, the participant received the following scores: English: 14, Math: 16, Reading: 15, Science: 18. His overall ACT composite score was a 16, which put him at the 23rd percentile. He received extended time on this assessment. During his senior year, it was noted that he had made adequate progress. However, he continued to have difficulties with his reading skills and could benefit from targeted interventions that help to improve those skills.

Table 1

Participant Demographics

Participant	Ethnicity	Age	College GPA	Year in College	Reading Fluency Instructional level
Participant 1	White	20	2.31	Sophomore	6 th grade level
Participant 2	White	20	2.78	Sophomore	5 th grade level
Participant 3	Black	19	2.39	Freshman	4 th grade level

Materials. Participants' oral reading fluency was assessed using Dynamic Indicators of Basic Early Literacy Skill: Oral Reading Fluency Probes (DORF; Good, Kaminski, Dill, 2007). DORF is an individually administered reading passage that was designed to evaluate fluency skills in struggling readers (University of Oregon Center on Teaching and Learning, 2012). It is a curriculum-based measure (CBM) that is used to not only inform intervention but also to monitor the progress of an implemented intervention. Studies have shown that many CBM Reading measures have a test-retest reliability that ranges from .92 to .97 and alternate form

reliability of various texts that ranged from .89 to .94 (Tindal, Marston & Deno, 1983).

Therefore, it was concluded that DORF is an acceptable fluency measure. DORF measures the speed and accuracy of oral reading during 1-minute, individually administered reading probes.

A survey-level assessment was conducted first to identify participants' instructional level (Hintze, Christ, & Keller, 2002). Standard benchmarking procedures were followed as the researcher administered three DORF probes. The participant's median score was compared to the normative data for the corresponding grade-level. If the participant was below grade level, the researcher administered successively lower grade level probes until the participant scored within the 25th percentile. Once individual reading levels were determined, participants were given one-minute to read each individually administered passage and the total number of words read correctly per minute was recorded. Per traditional DORF administration, if a participant hesitated on a word for more than three seconds, omitted a word, or substituted a word for another, the word was counted as incorrect and was not counted toward the total number of words read correctly. However, any words that were self-corrected within three seconds were counted as correct.

Design. The current study used a Multiple Baseline design. This design allows researchers to evaluate the effectiveness of an academic intervention by replicating the outcome with similar subjects over time. Because the purpose of this study was to determine the effectiveness of the Repeated Reading intervention, the study utilized a single subject, Multiple Baseline design across participants. The design is effective for evaluating interventions, and it allows for continuous progress monitoring of learning and retention stages (Askov, Weidler, & Maclay, 1985). It is also particularly well suited for small *n* design and when the focus of the intervention is a behavior that cannot be reversed. Because academic skills cannot be unlearned,

they are not likely to diminish when an intervention is withdrawn. The Multiple Baseline design used in the current study also allowed the researcher to ensure experimental control across participants (Patrick, Mozzoni, & Patrick, 2000). Having participants start intervention at different time points allowed the researcher to control threats to internal validity that could go unnoticed if participants started intervention simultaneously.

Multiple Baseline design requires baseline data to be collected for all subjects; however, it varies the length of the baseline from one participant to another. Because each participant was his own control, changes from baseline after implementation can be attributed to the intervention assuming changes occur with the phase change from baseline to intervention. That is, an intervention can be deemed effective when the baseline data changes for the participant who is receiving the intervention but not for other participants who are not receiving the intervention yet. Replication of the results is achieved by implementing the intervention across three participants and observing a similar change in the dependent variable with the introduction of the intervention phase. Replication increases the likelihood that the change was due to the intervention and not confounding variables

After using DORF probes to get a stable baseline, the researcher implemented the intervention for three weeks with participant one. During this time, baseline data were continually collected for the other two participants for a predetermined amount of time. After participant 1 received intervention for one week, the intervention was implemented with the second participant and baseline was maintained for participant 3. One week after the second participant started intervention, participant 3 began the intervention. In this study, improvements in oral reading fluency after implementation of the intervention indicate that the intervention alone improved the skill and not a third, confounding variable. Although the participants in the

current study were not studied in a clinical setting, being a part of the same comprehensive program allowed them to share a similar environment beyond what would not normally be the case for postsecondary students. All three participants attended the same university, utilized the same study area to complete their assignments, had access to the same mentors/tutors, and used the same educational accommodations. Therefore, it is unlikely that an environmental confound could affect the results. It can be concluded that if another variable were influencing the change in the dependent variable (i.e., oral reading fluency), then the change would occur across more than one of the participants at the same time regardless of the intervention (Riley-Tillman & Burns, 2009).

Baseline procedures. Baseline data were gathered before any participant had any exposure to the intervention. This allowed the researcher to ensure that the participant's current functioning was accurately depicted. After identifying the grade level in which each participant read, the participants were given three DIBELS ORF probes to collect baseline data.

The interventionist told the participant to "Please read out loud. If you get stuck, I will tell you the word so you can keep reading. When I say 'Stop,' I may ask you to tell me about what you have read, so do your best reading." The interventionist then pointed to the first word of the passage and said, "Start here. Begin." The interventionist then started her stopwatch when the student said the first word of the passage. The administration was done in a quiet and secluded setting with mild distracters. The participant was seated across from the researcher and was told that each probe will only take one minute. At the end of the minute, the interventionist said "Stop," stopped her stopwatch, placed a bracket after the last word provided by the student, and removed the passage. The number of words the participant read correctly was summed and recorded. Participants were given a one-minute probe during each baseline session. Words read

correctly per minute is a standard progress monitoring measure used in academic intervention (Hosp, Hosp, & Howell, 2016).

Intervention Procedures. During the intervention, a passage was selected from the student's assigned textbook readings for class. Each participant utilized a different textbook. Content of each textbook was related to their major and fulfilled the required reading for their class, therefore the content text sections differed for each student and for each intervention session. During the intervention session, a passage of about 200 words was selected for the participant to read repeatedly. The student was asked to read the passage aloud. While the student read aloud, the interventionist corrected any words that the student misread or hesitated to read. The student was asked to read the missed word back to the interventionist. After the word was repeated, the participant continued to finish reading the passage. Once the passage was completed, the participant repeated the reading three additional times for a total of four repetitions. The importance of increasing speed and accuracy was highlighted.

Data collection and progress monitoring. During each intervention session, participants were administered a one-minute timed DORF probe in order to track their progress. The probe was administered in the manner as previously described during baseline. After the DORF probe was completed, the score was recorded, and the interventionist informed the participants of their performance, thus adding a basic performance-feedback component to the intervention. Participants' errors were identified and corrected by the interventionist. Participants were praised for their efforts regardless of their performance.

Interscorer Agreement

All data were collected as a permanent product, which included both a hard copy of each probe that was used to score the participant's oral reading fluency data and an audiotape

recording during the administration of each one-minute probe. An independent scorer used the audio recordings to ensure the correct calculation of the number of words each participant read correctly and to inform interscorer agreement. Interscorer agreement data were collected for 9 (25%) of the possible 36 probes that were administered throughout data collection.

To ensure that probes were chosen at random, the scorer picked a number out of a hat that corresponded to the session that they would co-score. The primary researcher trained the independent scorer on how to correctly score the DORF probes. The scorer listened to the audio recordings, started a timer after the reader read the first word, and marked the end of one-minute according to standard DORF procedure. If discrepancies occurred, the datum recorded by the primary researcher was used. The total interscorer agreement was calculated for each probe by dividing the number of agreements of words read correctly by the number of agreements plus disagreements and multiplying by 100 (House, House, & Campbell, 1981). Agreement scores ranged from 97% to 100% with a mean reliability of 98.78%.

Procedural Adherence

Procedural integrity of the research procedures was measured using a checklist that ensured consistent implementation of the intervention. A fellow graduate student listened to recorded intervention sessions and used a checklist to note what procedural steps had and had not been completed. To assure that sessions were chosen at random, the listener chose a number out of a hat. The chosen number had a corresponding session that was used to verify procedural adherence. The listener used the checklist (See Appendix C) in 9 (25%) of the 36 total sessions. If a step in the intervention was missed, the listener did not mark it as completed on the checklist. After the checklists were completed, procedural adherence was calculated by dividing the total number of items that were marked as completed and the total number of all the steps combined.

This result was then multiplied by 100 to determine that procedural adherence was 100% across all observed sessions.

CHAPTER III: Results

Visual Analysis

Data for the dependent variables were graphed for each participant. In addition to visual analysis of the data, including level, latency of change, trend, and variability, Tau-U was used to estimate the effectiveness of the Repeated Reading intervention. Individual Tau-U effect size estimates were calculated for each participant and then combined into an overall effect size for the intervention.

Assessing performance level in baseline and intervention phase. At the conclusion of intervention, the researcher calculated means from both baseline and intervention phases for all participants. All participants showed an increase in mean fluency scores after implementation of the Repeated Reading intervention. Although Participant 1 spent the most time in the intervention phase, he had the lowest mean increase. He increased his average words read correctly from approximately 120 words per minute to about 127 words per minute. Therefore, participant 1 remained at a moderate level across both phases. Participant 2 also showed an increase in fluency. His baseline mean was approximately 116 words per minute, which increased to an average of 136.5 words read correctly after intervention. It was concluded that participant 2 increased his level from moderate during baseline to high after implementation of the intervention. Participant 3 also had a mean increase in which he read approximately 95 words correctly during baseline and 116 words during the intervention phase. His level changed from low to moderate. Overall, it was observed that although all participants had mean increases, only participants 2 and 3 significantly increased in level.

Assessing latency of change. According to Kratochwill et al. (2010), latency of change refers to the change in level of correct words read per minute for the last three data points of

baseline and the first three data points after the implementation of the intervention. After calculating the mean for the last three data points in the baseline phases and first three data points in the intervention phase, the researcher concluded that participants 2 and 3 responded immediately to the intervention.

Assessing trend in baseline and intervention phase. The researcher utilized slope to compare the trend in both the baseline and intervention phases. It was concluded that participants 1 and 3 had an increasing trend during their baseline phase, but had a decreasing trend during the intervention phase. Participant 2 had decreasing trend in his baseline phase and an increasing trend in his intervention phase.

Assessing variability across phases. Participant 1 showed variability across the intervention phase but not in the baseline phases. This could be due to the fact that some probes proved to be more difficult to him than others because of the occurrence of proper nouns. Participant 2 showed some variability in the last three points of the baseline phase, however in the intervention phase, data were relatively stable with the exception of a few outliers. Participant 3 showed little variability in both baseline and intervention phases.

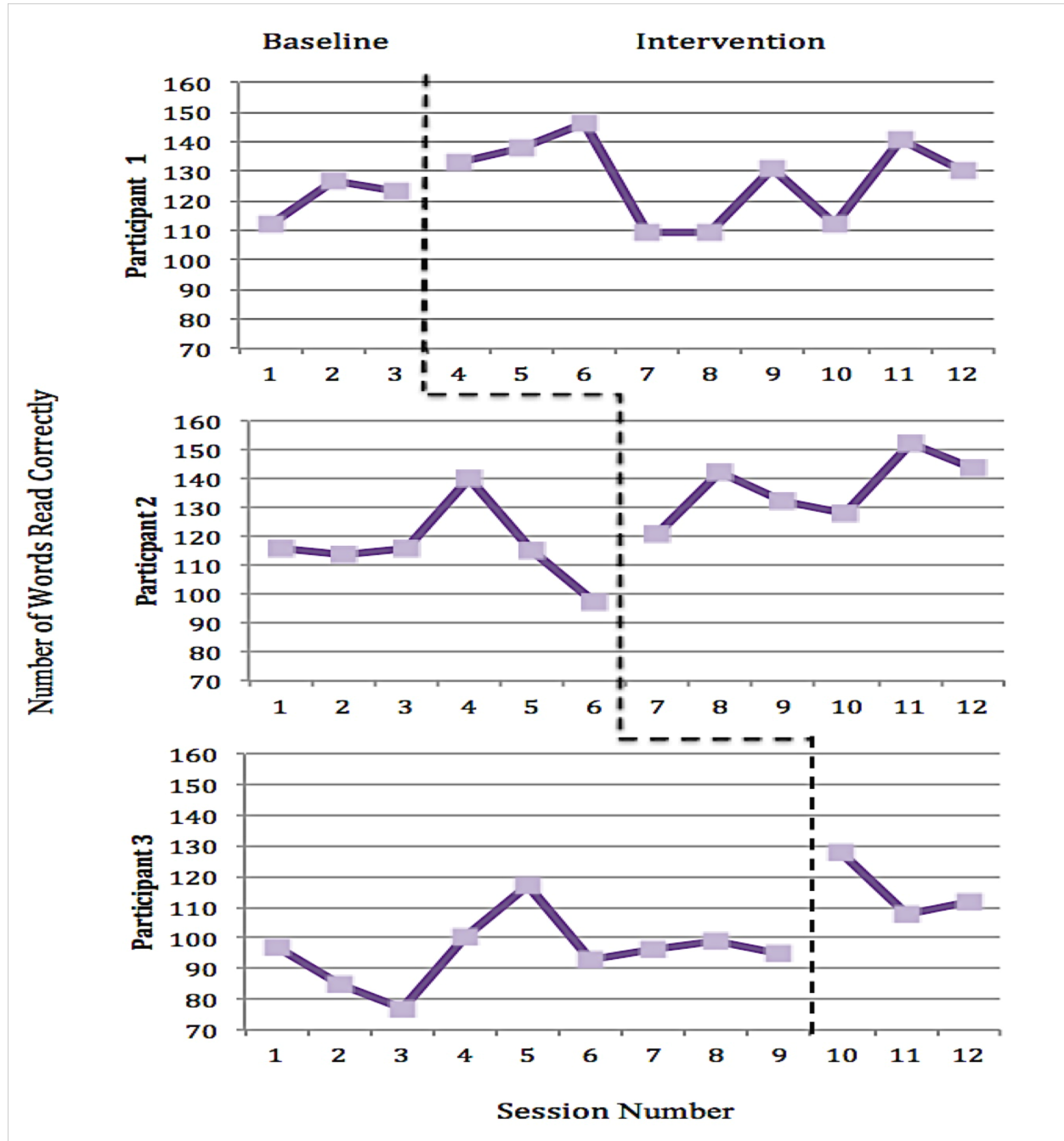
Table 2

Mean Words Read Correctly

Participant	Words Read Correctly Baseline Mean	Words Read Correctly Post- Intervention Mean
Participant 1	120	127
Participant 2	116	136.5
Participant 3	95	116

Figure 1

Graph of Multiple Baseline Data



Analysis through Non-Parametric Statistics

Tau-U. Tau-U was used to estimate the effectiveness of the Repeated Reading intervention. Tau-U combines non-overlapping methods between baseline and intervention phases, while taking baseline trend into consideration. Unlike other non-overlap methods, the ceiling effect does not alter the Tau-U effect size and Tau-U is not affected by autocorrelation. Therefore, it is considered to be appropriate for use in single-subject research designs (Parker, Vannest, Davis, & Sauber, 2011). Individual Tau-U effect size estimates were calculated for each participant, and then combined into an overall effect size for the intervention. Effect sizes were interpreted using the guidelines set forth by Ferguson (2009). A Tau-U of .80 or greater was deemed to have a strong effect size, moderate effect ranged from .50-.79, and small effects were from .20-.49.

Individually, two of the three participants showed a discernable change in their oral reading fluency as a result of receiving the Repeating Reading intervention. Participant 1 (.3407) demonstrated no significant change, while Participants 2 (.8333) and 3 (.8519) demonstrated a strong effect. Tau-U was also calculated for all three participants as a whole, shown in the overall weighted total. Overall, the weighted total showed a moderate effect (.6925) in the effectiveness of the Repeated Reading intervention in college students with learning disabilities.

Percentage of all non-overlapping data. According to Parker, Hagen-Burke, & Vannest (2007), analyzing the percentage of all non-overlapping data (PAND) will give researchers an estimate of intervention effect in single-subject design. The researcher in this study calculated the percentage of all non-overlapping data to estimate the effectiveness of the Repeated Reading intervention. PAND is computed by dividing the number of intervention points overlapping with the highest baseline data point by the total number of data points across sets. Due to a minimum

of 20 data points needed for calculation, PAND was only calculated for the overall effect of the intervention and not for each individual participant. Although Parker, Hagen-Burke, & Vannest (2007) provided no clear guidance for the numerical interpretation of PAND, other researchers have posited that a PAND should be converted to Pearson's *Phi* to determine effect size (Riley-Tilman & Burns, 2009). The data in this study resulted in a PAND equal to 78% and a *Phi* coefficient of .56, which is indicative of an effective intervention.

Table 3

Non-Parametric Data Results

Participant	TAU-U	SD	P-Value	Effect	PAND
1	0.3704	10.8167	0.3552	N/A	N/A
2	0.8333	12.4900	0.0163	Strong	N/A
3	0.8519	10.8167	0.0335	Strong	N/A
Overall	0.6925	N/A	0.0018	Moderate	78%

CHAPTER IV: DISCUSSION

The purpose of this investigation was to examine the effectiveness of the Repeated Reading intervention for college students with reading disabilities. The study focused on improving fluency skills, which were measured by using the number of correct words read on a one-minute reading probe. Previous literature has demonstrated that the Repeated Reading intervention is an effective intervention for increasing fluency in struggling adolescent readers (Guerin & Murphy, 2015), high school students with reading disabilities (Devault & Joseph, 2004; Wexler, Vaughn, Roberts, & Denton, 2010), and in college readers (Ari, 2015). This study extended the literature by demonstrating that the Repeated Reading intervention increased the oral reading fluency of postsecondary students with reading disabilities who were demonstrating reading fluency at 4th to 6th grade levels. Thus, the Repeated Reading intervention was an effective intervention for increasing the reading speed and accuracy for university students with reading delays.

Although only participants 2 and 3 responded significantly to the intervention in the current study, participant 1 did have an increase in the mean number of words read correctly from baseline to intervention phase. The increase may have resulted from the feedback that was given after a word was read incorrectly, which suggests that participant 1 may have benefitted from the practice with challenging vocabulary. Due to the fact that he had a difficult time with the proper nouns presented in the probes, the experimenter saw a decrease in the willingness to persevere. Therefore, the lack of the response to the intervention in participant 1 may be the result of a decrease in motivation during the implementation of the intervention. It is also speculated that the participant could have reached a ceiling after starting at the sixth grade level

and therefore did not show as much growth as the other participants. Unfortunately, DORF probes do not extend beyond the 6th grade level.

In addition to the lack of response to intervention in participant 1, the researcher was also surprised to find that participants 1 and 3 had an increasing trend in the baseline phase and a decreasing trend in the intervention phase. Only three data points were collected for participant 3 in the intervention phase, which showed an increasing trend. It is speculated that this trend may have changed direction if participant 3 had continued to receive the intervention.

In all, the efforts made during this intervention to improve the participants' fluency skills showed positive results for two of the three participants as mentioned in both the visual and non-parametric analyses. The data suggest that interventions can be effective regardless of the age of the student. More specifically, older students with learning disabilities can benefit from relatively simple reading interventions. Due to the quick implementation of interventions such as Repeated Reading, the benefit of providing postsecondary students with interventions in addition to accommodations in the university setting may outweigh the cost.

Implications for Practice

The university setting is not the typical place to implement reading interventions. However, the current research supports that postsecondary students who are given the opportunity to receive the Repeated Reading intervention may improve their reading fluency skills. Interventions can be implemented during remedial reading classes, in learning/tutoring centers, or in the university's Disability Support Services office.

As previously mentioned, many postsecondary students enroll in remedial reading classes during their first year of college. Remedial reading classes can be a great place to implement the Repeated Reading intervention for struggling college readers. Professors who teach students to

improve their reading at the college level can implement the Repeated Reading intervention in a large group or small group setting. Because of the age of the students, many of them may be able to monitor their own progress. Therefore, progress monitoring data can be turned in weekly for a grade. During this class, student can also build their literacy skills by using texts that are of interest to them.

Many colleges also offer learning and tutoring centers for their students. Many times, these centers only offer support for particular classes, however, the author of the current study posits that the centers can also be used to improve reading skills in struggling readers. When a remedial class is unavailable or perhaps in addition to a remedial class, students can receive the intervention. The interventions can be implemented while students are completing reading for various classes. Not only would the student be receiving an intervention to improve their reading, but repeating information for classes may help students remember the material better.

Students may also seek out intervention for themselves if given the opportunity to improve their reading fluency. The university's Disability Support Service office can offer interventions in addition to the accommodations they currently offer for students with disabilities.

Limitations and Recommendations for Future Research

Although there were positive outcomes from the study, there are also several noteworthy limitations. First, the study was conducted during a summer semester at a university. Because textbooks from the participants' current courses were used, all data needed to be collected within the 5-week summer session. Therefore, the number of sessions for intervention was limited, especially for participant 3 who only completed three intervention sessions. Additional data would have helped the researcher gain a better understanding of the effects of the intervention.

Future studies should allow longer intervention phases for all participants.

Another limitation to this study is the lack of feedback. Feedback from the participants would have helped to identify which component of the intervention they felt was most successful. Future research should include a feedback session with the participants at the completion of the intervention sessions to get their perspectives on the usefulness and acceptability of this reading intervention.

A third limitation involves the lack of following up with the participants to assess their reading fluency two or three months after all data had been collected. The follow up assessment would have helped to not only examine the maintenance of the fluency gains but to show whether participants had remembered vocabulary words that were taught when corrective feedback was given during intervention. Future research should include a maintenance check as it will provide insight into if the Repeated Reading intervention improves fluency over time.

In addition to the aforementioned changes, future research should examine if the Repeated Reading intervention can increase silent reading fluency. This would be beneficial to college students because when students read in public places such as the university library, reading must be done silently. Future research should also examine whether the Repeated Reading intervention helps improve comprehension for postsecondary students with learning disabilities and how improving fluency and comprehension may affect grade point average and the amount of time it takes to complete their undergraduate degree. Finally, future implementations of similar interventions should involve other CBM Reading measures that extend beyond the 6th grade level of difficulty, such as *Aimsweb* or *FastBridge Learning* CBM probes.

Conclusion

The purpose of this investigation was to examine the effectiveness of the Repeated Reading intervention for college students with reading disabilities. The researchers expected to extend previous findings that found the Repeated Reading intervention to be effective for older students and students with learning disabilities. The researchers also hoped to inform larger-scale studies and to help practitioners select appropriate interventions for postsecondary students. Results of this study indicated that the Repeated Reading intervention was effective in increasing the oral reading fluency of three college students. The increases in reading fluency occurred in timing with the intervention phase, suggesting that it was the intervention, and not another variable, accounting for the improvement. This suggests that although early intervention is important, older populations can also benefit from intervention support, especially when performance is at levels that can be improved with widely used evidence-based interventions.

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APPENDIX A: APPROVAL LETTER

EAST CAROLINA UNIVERSITY

University & Medical Center Institutional Review Board Office

4N-70 Brody Medical Sciences Building · Mail Stop 682

600 Moye Boulevard · Greenville, NC 27834

Office **252-744-2914** · Fax **252-744-2284** · www.ecu.edu/irb

Notification of Initial Approval: Expedited

From: Social/Behavioral IRB

To: Alysha Gray

CC: Kathleen King

Date: 5/10/2016

Re: UMCIRB 16-000712

Repeated Reading to Improve Fluency in Higher Education

I am pleased to inform you that your Expedited Application was approved. Approval of the study and any consent form(s) is for the period of 5/10/2016 to 5/9/2017. The research study is eligible for review under expedited category # 7. The Chairperson (or designee) deemed this study no more than minimal risk.

Changes to this approved research may not be initiated without UMCIRB review except when necessary to eliminate an apparent immediate hazard to the participant. All unanticipated problems involving risks to participants and others must be promptly reported to the UMCIRB. The investigator must submit a continuing review/closure application to the UMCIRB prior to the date of study expiration. The Investigator must adhere to all reporting requirements for this study.

Approved consent documents with the IRB approval date stamped on the document should be used to consent participants (consent documents with the IRB approval date stamp are found under the Documents tab in the study workspace).

The approval includes the following items:

Name	Description
Gray RR Research Submission	Study Protocol or Grant Application
IRB Informed Consent_Repeated Reading .doc	Consent Forms

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

APPENDIX B: PERMISSION LETTER

East Carolina University



Informed Consent to Participate in Research Information to consider before taking part in research that has no more than minimal risk.

Title of Research Study: Repeated Reading to Improve Fluency in Higher Education
UMCIRB 16-000712

Principal Investigator: Ms. Alysha Gray
Institution, Department or Division: Department of Psychology, Harriot College of Arts & Sciences
Address: 104 Rawl Building, Department of Psychology, East Carolina University, Greenville, NC 27858-4353
Telephone #: 252.328.6800
Faculty Advisor: Kathleen King, Ph.D
Telephone #: 252.328.6800

Researchers at East Carolina University (ECU) study issues related to society, health problems, environmental problems, behavior problems and the human condition. To do this, we need the help of volunteers who are willing to take part in research.

Why am I being invited to take part in this research?

The purpose of this research is to improve reading skills in college students. You are being invited to take part in this research because you may benefit from improved reading fluency. The decision to take part in this research is yours to make. By doing this research, we hope to learn whether a Repeated Reading intervention can help improve speed and accuracy in college students.

If you volunteer to take part in this research, you will be one of about three people to do so.

Are there reasons I should not take part in this research?

If you are uncomfortable reading aloud in a one or one setting or you feel that you cannot commit to the number of hours necessary to collect data, it would be best not to take part in this research.

What other choices do I have if I do not take part in this research?

You can choose not to participate and continue to receive other supports. Participation in this study does not impact other academic services you are currently receiving or may receive in the future.

Where is the research going to take place and how long will it last?

The research will be conducted at Joyner Library on ECU's campus. You will need to come the STEPP Program Cove on the second floor of Joyner Library approximately 12-18 times during the study. The total amount of time you will be asked to volunteer for this study is approximately 5 hours over the course of one month.

What will I be asked to do?

You will be asked to do the following:

- Read a one minute passage to help understand your current fluency skills and to monitor your progress.
- Read a passage of about 200 words that will be taken from a text that is currently assigned to you.
- Repeat unfamiliar words after the interventionist identifies a word for you.
- Repeat the passage four times.

What might I experience if I take part in the research?

We don't know of any risks (the chance of harm) associated with this research. Any risks that may occur with this research are no more than what you would experience in everyday life. We don't know if you will benefit from taking part in this study. There may not be any personal benefit to you but the information gained by doing this research may help others in the future. However, other people have that taken part of similar research have improved their fluency skills. By participating in this research study, you may also experience these benefits.

Will I be paid for taking part in this research?

We will not be able to pay you for the time you volunteer while being in this study. The intervention will be provided free of charge.

Will it cost me to take part in this research?

It will not cost you any money to be part of the research.

Who will know that I took part in this research and learn personal information about me?

ECU and the people and organizations listed below may know that you took part in this research and may see information about you that is normally kept private. With your permission, these people may use your private information to do this research:

- Any agency of the federal, state, or local government that regulates human research. This includes the Department of Health and Human Services (DHHS), the North Carolina Department of Health, and the Office for Human Research Protections.
- The University & Medical Center Institutional Review Board (UMCIRB) and its staff have responsibility for overseeing your welfare during this research and may need to see research records that identify you.
- The interventionist (Alysha Gray) and her faculty advisor (Kathleen King) will use the data obtained during the course of the study to make decisions about intervention phases and lengths.

How will you keep the information you collect about me secure? How long will you keep it?

All electronic data will be stored in on a secure flash drive. The flash drive and all paper data will be stored in a locked filing cabinet and will not contain any identifiable information. The data will be retained in a secure office within Joyner Library. All information will be kept for three years following completion of the study, after which time all information will be destroyed.

What if I decide I don't want to continue in this research?

You can stop at any time. There will be no consequences if you stop and you will not be criticized. You will not lose any benefits that you normally receive

Who should I contact if I have questions?

The people conducting this study will be able to answer any questions concerning this research, now or in the future. You may contact the Principal Investigator at 252-328-6800 (Monday through Friday, between 9:00am and 5:00pm).

If you have questions about your rights as someone taking part in research, you may call the Office of Research Integrity & Compliance (ORIC) at phone number 252-744-2914 (days, 8:00 am-5:00 pm). If you would like to report a complaint or concern about this research study, you may call the Director of the ORIC, at 252-744-1971.

I have decided I want to take part in this research. What should I do now?

The person obtaining informed consent will ask you to read the following and if you agree, you should sign this form:

- I have read (or had read to me) all of the above information.
- I have had an opportunity to ask questions about things in this research I did not understand and have received satisfactory answers.
- I know that I can stop taking part in this study at any time.
- By signing this informed consent form, I am not giving up any of my rights.
- I have been given a copy of this consent document, and it is mine to keep.

Participant's Name (PRINT)	Signature	Date
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Person Obtaining Informed Consent: I have conducted the initial informed consent process. I have orally reviewed the contents of the consent document with the person who has signed above, and answered all of the person's questions about the research.

Person Obtaining Consent (PRINT)	Signature	Date
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APPENDIX C: TREATMENT CHECKLIST

TREATMENT INTEGRITY CHECK ON REPEATED READING

Name of Participant:	Observer:
Interventionist:	Date:
Session #:	

Core Intervention Components

Check if completed

1. Interventionist used text already assigned to the participant.	
2. The participant was asked to read the text aloud total of four times.	
3. Interventionist corrected any words the participant did not know.	
4. The interventionist administered a DIBELS Oral Reading Fluency Probe.	
5. Interventionist followed the scripted directions.	
6. Interventionist checked and observed student performance.	
7. Interventionist provided praise for effort.	

Interventionist completed _____ out of the 7 core components during this session.

