THE EFFECTS OF A REPEATED READINGS INSTRUCTIONAL PACKAGE ON THE
FLUENCY AND COMPREHENSION OF ELEMENTARY STUDENTS WITH MILD
INTELLECTUAL DISABILITIES

by

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(Under the Direction of Richard T. Boon)

ABSTRACT

The purpose of this study was to examine the efficacy of repeated reading on the reading fluency and comprehension of three elementary-age students with intellectual disabilities. A multiple probe across participants design (Tawney & Gast, 1984) was utilized. During baseline, the researcher recorded the correct words per minute, errors per minute, and percentage of comprehension questions answered correctly during single readings of passages without error correction. During the intervention phase, students read each passage three times while the researcher delivered error correction. Correct words per minute, errors per minute, and percentage of comprehension questions answered correctly were noted for the third and final reading of the passage. Finally, a week after meeting the established criteria for mastery, the students entered into the maintenance phase during which baseline procedures were replicated. After the conclusion of the study, social validity was measured through student responses to questions presented by the researcher. Results indicate that the intervention increased the oral reading fluency of all three participants. There was not enough evidence to indicate a functional
relationship between the intervention and reading comprehension of elementary-age students with intellectual disabilities. Limitations of the study, practical considerations for both special and general education classroom teachers, and future research questions are discussed.

INDEX WORDS: Repeated Reading, Error Correction, Reading Fluency, Reading Comprehension, Elementary-Age, Autism, Developmental Disabilities, and Intellectual Disabilities
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DEDICATION

This is dedicated to Shane, Bryson, and Kathryn.
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I would like to first and foremost thank my family. Shane, you are the most supportive, patient, and loving husband and friend I could have asked for. Your strength and encouragement carried me through this. Bryson, thank you for staying up late with me and keeping me motivated. Kathryn, you are my inspiration. Mom and Morgan, thank you for keeping me sane, constantly reminding me why I chose to pursue my Ph.D., and for your true understanding. Dad, your pride in me is motivating. Jim and Mary, thank you for your unconditional love and for all your hours of babysitting.

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CHAPTER 1
INTRODUCTION

There are five areas of literacy: oral language and vocabulary, phonological awareness, phonics and word recognition, fluency, and comprehension. Each skill is vital to becoming a successful reader. Boyle (2008) states that reading is a combination of skills that builds slowly over time and suggests that early reading activities should be composed of a variety of integrated activities that include phonological awareness, syllabication, print awareness, and early writing skills. Comprehending information from text is the ultimate goal of literacy. True comprehension is independently achieved only when the five areas of literacy are mastered.

It is vital to focus on the development of oral language and vocabulary before students begin to learn how to read. “Oral language and vocabulary underlie all other stands of reading instruction” (Allor, Mathes, Champlin, & Cheatham, 2009, p. 358). Students need to understand the meaning of words before they are able to gain meaning, comprehend, or understand what is being read. Students need opportunities to engage with the vocabulary to understand the concepts presented (Browder, Gibbs, Ahlgrim-Delzell, Courtade, & Lee, 2009). Vocabulary acquisition facilitates comprehension.

Phonological awareness and reading acquisition have a very important relationship in emergent reading. Phonological awareness is defined as an individual’s awareness of the sound structure of a spoken word (Gillon, 2004). It is an umbrella term that includes awareness of phonemes as well as larger spoken units such as syllables, onsets, and rimes (Ehri & Nunes, 2002). Phonemic awareness is defined as the knowledge that words consist of separate sounds or
phonemes and the subsequent ability to manipulate these individual sound units (Kame‘enui, Carnine, Dixon, Simmons, & Coyne, 2002). The phoneme refers to the smallest unit in speech, and phonemes are combined to make words. Tasks that require students to manipulate spoken units larger than phonemes appear to be easier than tasks requiring manipulation of phonemes. Thus, tasks requiring phonemic awareness are more difficult than overall phonological awareness tasks. Yopp (1988) placed different phonological awareness dimensions on a spectrum of easiest to hardest, respectively: rhyme, auditory discrimination, phoneme blending, word-to-word matching, sound isolation, counting, phonemic segmentation, and deletion and substitution. It should be noted that phonemic and phonological awareness tasks and activities are mostly oral. Phonological awareness must be taught to students with differing abilities and disabilities; it cannot be left to “develop in the absence of explicit instruction” (Smith, Simmons, & Kame‘enui, 1998, p. 108) or “inference by the learner during instruction” (Smith et al., 1998, p. 131).

As students learn how to decode and identify sounds, phonemes, and sound units, they begin to recognize combinations of these units as words. Students proceed from phonological skills to syllabication to structural analysis skills (Boyle, 2008). O’Connor (2007) suggested first teaching letter sounds followed by blending sounds, common letter and word patterns (such as silent e words), common sight words, high-frequency words with irregular spellings, and finally, multisyllabic words.

Fluency is often mastered toward the end of literacy acquisition. Fluency is a skill that has many different definitions. For example, Rasinski (2003) defines fluency as “the ability of readers to read quickly, effortlessly, and efficiently with good, meaningful expression” (p. 26). LaBerge and Samuels (1974) describe fluency as the ability to translate letters to sounds to
words fluently and without effort. Valleley and Shriver (2003) simply define reading fluency as “how fast and accurately a person reads a passage” (p. 56). No matter how one defines it, reading fluency is essential. Fluent readers are able to read text without struggling to decode words. They are able to recognize words and phrases automatically. According to the automaticity theory, a fluent reader can decode text automatically, leaving attention free to comprehend what is being read (Samuels, 1979). In other words, “fluent word recognition affords readers the opportunity to focus on comprehension and information retrieval by minimizing the demands on them to attend to decoding” (O’Shea & O’Shea, 1988, p. 26). Consequently, a lack of automaticity in decoding among dysfluent readers “overloads the attentional system, leads to the use of small, meaningless visual processing units such as the individual letter, places heavy demands on short-term memory, and interferes with comprehension” (Samuels, 1987, p. 18). Struggling readers have difficulties in the “ability to read sight words, decode words, and read phrases and sentences automatically and rapidly” (Chard, Vaughn, & Tyler, 2002, p. 386). Therrien (2004) describes fluency difficulties as a “bottleneck” that impedes the flow of thought and hampers comprehension.

Comprehension refers to the construction of the meaning of spoken communication or of text that involves an interaction between the reader and the message as the reader processes and interprets a given message (Snow, 2002). It requires that the reader apply thinking processes to gain meaning while listening or reading. Effective readers apply strategies to help them construct meaning while they read. These strategies include activating background knowledge, asking questions, making predictions, creating mental images, and recognizing when they are not able to make sense out of a given message (Browder et al., 2009). Comprehension is the ultimate goal of literacy and is essential for one to gain meaning from various types of text.
The relationship of the five areas of literacy is complex. You cannot teach one skill without influencing or touching another skill. As students become stronger in one area, other areas of literacy improve. Unfortunately, deficits in one area influence other areas and negatively impact reading. Students with developmental disabilities usually display deficits in several, if not all areas of literacy. Although it can be very challenging to teach students with developmental disabilities how to read, federal legislation mandates that all children, including those with disabilities, be taught to read in ways that are consistent with reading research. Therefore, special education teachers must be knowledgeable about research-based interventions and techniques that improve the literacy skills of students with various disabilities, including those with developmental disabilities.

Traditionally, reading instruction for those with developmental disabilities emphasizes decoding and sight word identification; this practice distances students from the general curriculum. Recent literature, however, suggests that educators shift to a more holistic approach to teaching reading to students with developmental disabilities. Comprehensive programs, similar to those used with typical students, should be used to emphasize fluency, whole word knowledge, and guided passage comprehension instruction in meaningful curriculum-based materials (Freeze, 2006).

Allor, Mathes, Roberts, Cheatham, and Champlin (2010) conclude that “students with intellectual disabilities, even those with IQs in the moderate range, learn basic reading skills given consistent, explicit, and comprehensive reading instruction across an extended period of time” (p. 445). Allor et al. (2010) also concluded that students with intellectual disabilities experience needs that vary from those of typical students with learning disabilities in reading. For example, they found that students in their longitudinal study required approximately three
years of intensive academic instruction to reach minimum levels for ending first grade. In other words, students with intellectual disabilities require intensive practice across multiple years to become successful readers (Allor et al., 2010).

Successful readers can read text fluently and with ease, comprehending the material that is read. There are many strategies designed to improve the reading fluency of students with differing needs and abilities. Some strategies are research-based while others lack empirical evidence to prove their effectiveness. Although repeated reading is the most widely used and researched intervention to increase reading fluency, other popular strategies include paired reading, partner reading, choral reading, oral previewing, radio reading, phrase reading, Neurological Impress Method, shared reading, Readers Theatre, the use of technology, and independent reading. Specific methods can and should be adapted and modified to fit the particular needs of individual learners. While one strategy may be the most beneficial for one person, another type of strategy may be better for another. Choosing the most appropriate and helpful strategy requires a great deal of thought, research, planning, open-mindedness, knowledge, familiarity with the student, and trial and error.

Chard, Ketterlin-Geller, Baker, Doabler, & Apichatabutra (2009) challenge that repeated reading is not supported by rigorous research as defined by the quality indicators used and, therefore is not an evidence-based practice based on the quality indicators for students with learning disabilities. In light of these findings, the authors do not suggest that educators discontinue the use of repeated readings in the classroom. “Repeated reading is a logical extension of multiple theoretical frameworks that suggest its use in supporting students who need fluency development… Repeated reading practices should be continued” (Chard et al., 2009, p.
278). They do, however, suggest that when conducting research studies, researchers apply more rigorous adherence to quality indicators and standards for evidence-based practices.

In light of the findings by Chard et al. (2009), the use of repeated reading as the sole intervention has been found to be an effective strategy to increase reading fluency among students with learning disabilities (Chafouleas, Martens, Dobson, Weinstein, & Gardner, 2004; Nelson, Alber, & Gordy, 2004; O’Shea, Sindelar, & O’Shea, 1987; Rashotte & Torgensen, 1985; Sindelar, Monda, & O’Shea, 1990; Therrien & Kubina, 2007; Weinstein & Cooke, 1992; Yurick, Robinson, Cartledge, Lo, & Evans, 2006). Likewise, repeated reading has been found to be an effective strategy to increase the reading fluency of students with developmental disabilities (Devault & Joseph, 2004; Mefferd & Pettegrew, 1997; Musti-Rao, Hawkins, & Barkley, 2009; Valleley & Shriver, 2003).

Repeated reading requires that a student orally read a passage a certain number of times or until predetermined mastery criteria is met. The reading is timed, usually for 1 min. Then the procedure is repeated with a new passage. Correct words per min and errors are recorded, and a fluency rate is established. Passages can be repeated any number of times. O’Shea et al. (1987) compared the effectiveness of reading passages one, three, and seven times and found that students read and retold passages more accurately as the number of repetitions increased.

When implementing repeated reading activities, researchers and teachers can incorporate scaffolding and differentiated instruction by varying mastery criteria, the times a passage is read, the length of the passage, and the content that is in the passage. Repeated reading may also be accompanied by other factors including peer support, error correction, performance feedback, and student self-graphing of progress. While self-graphing is not a necessity, Samuels (1979)
stresses that it is an excellent motivating device because it provides visible proof of progress for students. There are many strategies, variations, and activities that include repeated reading.

Dowhower (1994) gives educators and researchers some guidelines when choosing passages for repeated reading. Passages are kept between 50-300 words and can be read by the student with at least 85% accuracy. Mastery criterion (i.e. rate of speed) should be developed to increase progress in fluency after repeated reading training. Other suggestions by Dowhower (1994) include moving up to more difficult text if the student meets mastery criteria after the second reading of a new passage; sending passages home with students so they can read to as many people in as many different settings as possible; setting up listening centers in the classroom; and giving students a reading spot where they can independently read, time their readings with an hourglass, egg timer or stopwatch, and keep track of their own progress.

Alber-Morgan (2006) also provides specific suggestions for making repeated reading interventions more effective. Repeated readings take little time and effort to implement and should be utilized on a daily basis. Repeated readings should be used as a supplement to structured reading programs that emphasize decoding and comprehension. Teachers should provide materials at the readers’ appropriate reading and instructional levels. Systematic error correction and performance feedback should be used to improve outcomes. Program reinforcement procedures should be included in repeated reading instruction to increase the likelihood of increased reading proficiency. Progress monitoring is necessary for teachers to make appropriate decisions about the progression of instruction. Reading comprehension should be assessed and incorporated into the repeated reading instruction to gauge the effectiveness of improved reading fluency on the comprehension of reading material. Finally, repeated reading instruction is the most effective when implemented in a one-on-one instructional setting.
Although one-on-one instruction is often impossible to employ in classroom settings, Alber-Morgan (2006) suggests getting family members, paraprofessionals, and peers involved to assist with reading fluency instruction.

Samuels (1979) emphasizes that for the purposes of building fluency, speed rather than accuracy should be addressed. Why? There is a trade-off between accuracy and speed. If 100% word recognition accuracy is required before the student can progress to a new passage, the student becomes fearful of making a mistake, and the pace of reading automatically slows down (Samuels, 1979). Although repeated reading is the most recognized approach for increasing reading fluency and there have been successful results with this method, Nichols, Rupley, & Rasinski (2009) feel that “continual reliance on repeated readings without appropriate guidance and support can lead to diminished student engagement” (p. 1).

Rationale

Some readers naturally acquire reading skills in the midst of learning while other students need explicit instruction for reading progress to be made. For some learners, progress is slow and laborious. This is especially true for learners with disabilities. Learners with disabilities have individual strengths, weaknesses, and needs. Therefore, they require individualized instruction. Unfortunately, given staff, funding, and curricular limitations, individualized instruction is often nearly impossible to implement. Students with different disabilities are often grouped together in noncategorical instructional settings.

Caffrey and Fuchs (2007) conducted a literature review to determine the differences in academic performance between students with learning disabilities and students with mild intellectual disabilities (MID). Their findings seem to support the notion that students with learning disabilities learn differently than students with MID. For example, both groups benefit
from constant time delay, interspersal of known items, direct instruction, and strategy instruction. On the other hand, students with MID required more support, explicit hints, and coaching during guided inquiry learning. Students with MID required more trials of interspersal of known items to learn new responses (Caffrey & Fuchs, 2007). On inductive reasoning tasks, students with learning disabilities often performed more like their normally achieving peers than students with MID (Caffrey & Fuchs, 2007). In addition, students with learning disabilities generalized information to new contexts more efficiently (Caffrey & Fuchs, 2007).

Why is this important? There are numerous studies about techniques to increase reading fluency among students with learning disabilities. On the other hand, the number of empirically-based research methods of increasing reading fluency among students with developmental disabilities is severely lacking. The researcher had a very difficult time finding studies that included both reading fluency as a dependent variable and participants with developmental disabilities. As a result of the shortage of information about how to teach reading fluency to students with developmental disabilities, special educators have been using reading instruction techniques for students with developmental disabilities that were actually meant to be used with students with different types of disabilities.

Purpose

Although there are many studies that demonstrate the effectiveness of repeated readings to increase reading fluency among students without disabilities and with learning disabilities, there are a limited number of studies that demonstrate the effectiveness of repeated readings among students with intellectual disabilities. This gap in the research is significant in that fluency is a vital reading skill and is necessary for the reader, regardless of his or her intelligence quotient, to comprehend what is being read. The purpose of this study was to examine the
efficacy of using a combination of repeated readings and error correction on the reading fluency and reading comprehension of students with intellectual disabilities at the elementary level.

Research Questions

This research study was intended to investigate:

1. Will the combined effects of repeated readings and error correction increase the number of words read correctly per minute of elementary students with intellectual disabilities?
2. Will the combined effects of repeated readings and error correction decrease the number of reading errors per minute of elementary students with intellectual disabilities?
3. Will the combined effects of repeated readings and error correction increase the reading comprehension of elementary students with intellectual disabilities?
4. What are the students’ opinions of repeated readings combined with error correction?
CHAPTER 2
REVIEW OF THE LITERATURE

Introduction

This section provides an extensive review of the literature in three related topics. The first topic involves repeated reading strategies to improve the reading fluency of students with learning disabilities. The second topic involves instructional strategies to improve the reading fluency of individuals with developmental disabilities. The third topic involves repeated reading strategies to improve the reading fluency of students with developmental disabilities. Results and limitations are discussed for each topic. Suggestions for instructional implications and future research to replicate and extend current research findings are offered.

In our society, reading is a valued skill. Individuals are expected to have the ability to read thoroughly, accurately, and quickly. In 2000, the National Reading Panel issued a report describing the five reading skill areas considered to be important: phonemic awareness, phonics, vocabulary instruction, text comprehension strategies, and reading fluency (National Institute of Child Health and Human Development, 2000). Chard et al. (2002) concluded that “both rapid reading of high-frequency words and rapid decoding as a means to enhance text understanding appear critical for typical reading development” (p. 386). LaBerge and Samuels (1974) theorized that automatic information processing – increasing automaticity in processing word units, processing the units into words, and connecting the words to gain meaning from a passage – is necessary when reading to gain understanding and meaning.
Unfortunately, not all individuals naturally possess the necessary skills for successful reading. Reading is especially difficult for individuals with learning disabilities and developmental disabilities. The most basic difficulties lie in the ability to decode single words. For example, many students cannot decipher whether a vowel within a word should have a short or long vowel sound. Fluency is often another problem. The core problem with fluency is the “ability to read sight words, decode words, and read phrases and sentences automatically and rapidly” (Chard et al., 2002, p. 386). Therrien (2004) describes fluency difficulties as a “bottleneck” that impedes the flow of thought and hampers comprehension. In addition, students with disabilities spend most of their reading time trying to decode words, thus taking away from comprehension and gaining meaning from the text.

Repeated reading is an intervention that has been used to increase the reading fluency and comprehension of students both with and without disabilities. “The basis for using repeated reading is that students practice reading passages rather than isolated words, which improves both word recognition and comprehension” (O’Shea & O’Shea, 1988). Repeated reading is a fluency strategy “that consists of re-reading a short and meaningful passage until a satisfactory level of fluency is reached” (Samuels, 1979, p. 404). Implementation in the classroom is relatively easy and requires little preparation time by the teacher. In addition, repeated reading can be utilized in a variety of settings: small-group instruction, peer reading, and learning centers (O’Shea & O’Shea, 1988).

Recent research has revealed some promising and effective practices to improve the reading skills, especially oral reading fluency and comprehension, of elementary students with learning disabilities through repeated reading instruction. For example, recent research has demonstrated the effectiveness of repeated reading as the only intervention (Nelson, Alber, &
Gordy, 2004), compared repeated reading to other interventions to illustrate effectiveness (Therrien & Hughes, 2008), and included repeated reading as part of an intervention package to increase reading skills (Therrien, Wickstrom, & Jones, 2006). There is also a small amount of research that demonstrates the effectiveness of repeated reading strategies to increase reading fluency among students with developmental disabilities (Devault & Joseph, 2004; Mefferd & Pettigrew, 1997; Musti-Rao et al., 2009; Valleley & Shriver, 2003).

The purpose of this literature review is to examine the published, peer-reviewed literature about: 1) the use of repeated reading interventions to increase the reading fluency of elementary students with learning disabilities; 2) reading fluency strategies to increase the reading fluency of students with developmental disabilities; and 3) repeated reading strategies to increase the reading fluency of students with developmental disabilities. Such a research analysis can provide both special and general educators an extensive review of: 1) the types of repeated reading strategies conducted with students with learning disabilities, and 2) the types of reading fluency and repeated reading strategies conducted with students with developmental disabilities. Through such a review, researchers can gain greater insight into future efforts to replicate and extend repeated reading research for students with disabilities, especially among those with developmental disabilities.

Repeated Reading Strategies for Elementary Students with Learning Disabilities

Literature Search Procedures

The researcher conducted a literature review on the use of repeated reading procedures to increase the reading fluency of elementary students with learning disabilities. The following search procedures were used to retrieve relevant articles. First, a computer-assisted search of five major databases was conducted including Academic Search Complete, ERIC, PsycARTICLES,
PsycINFO, and Education Research Complete from 1980 to 2009. The descriptors used in the search procedure included repeated reading, disabilities, special education, learning disabilities, and reading fluency. Second, a university employee with access to journals was contacted in order to secure copies of articles not found online. The search procedures revealed 22 studies that met the criteria for inclusion in this literature review.

Criteria for Inclusion

The four main criteria for inclusion in this literature review included: (a) peer-reviewed studies between 1980 to 2009; (b) studies that included repeated reading strategies to increase reading fluency; (c) individuals included in the study are explicitly classified as having a learning disability; and (d) individuals in the study are in kindergarten through fifth grade. Studies with participants in middle school were included only if elementary students were also participating in the study. For the purposes of this review, studies were excluded when there wasn’t clear use of repeated readings or when participants were described as low-achieving readers without specific classifications of learning disabilities. Many of the studies used repeated reading strategies to increase both reading fluency and reading comprehension; these were included as long as they met the four main criteria.

Overall Study Characteristics

Preventing School Failure, and Learning Disabilities: A Contemporary Journal. A total of 632 participants (range 1 to 119) who had a mean age, of those reported, of 10.09 (range 8.0 to 12.45) and a mean IQ of 94.04, of those reported, participated in these studies. The total number of participants with learning disabilities in these studies was 312 (range 1 to 67). The median total number of subjects per study was 18 (range 1 to 119), and the medial total number of subjects with learning disabilities per study was 10 (range 1 to 67). Participants in the studies were in grades 2 to 8 with a mean grade level of 4.0 and a median grade level of 3.75. The majority of studies included in the review employed experimental designs. The interventions included three major areas: a) repeated reading as the only intervention, b) repeated reading compared to other interventions, and c) repeated reading as part of a package of interventions.

The final sample of studies included in this review consisted of nine studies with repeated reading as the only intervention (Chafouleas, Martens, Dobson, Weinstein, & Gardner, 2004; Musti-Rao, Hawkins, & Barkley, 2009; Nelson, Alber, & Gordy, 2004; O’Shea, Sindelar, & O’Shea, 1987; Rashotte & Torgeson, 1985; Sindelar, Monda, & O’Shea, 1990; Therrien & Kubina, 2007; Weinstein & Cooke, 1992; Yurick, Robinson, Cartledge, Lo, & Evans, 2006), seven studies that compared the effectiveness of repeated reading to other interventions (Begeny, Daly, & Valleley, 2006; Ellis & Graves, 1990; Mathes & Fuchs, 1993; O’Connor, White, & Swanson, 2007; Therrien & Hughes, 2008; Vaughn, Chard, Bryant, Coleman, Tyler, Linan-Thompson, & Kouzekanani, 2000; Welsch, 2007), and five studies that used repeated reading strategies as part of a package of interventions to increase reading skills (Denton, Fletcher, Anthony, & Francis, 2006; Manset-Williamson & Nelson, 2005; Tam, Heward, & Heng, 2006; Therrien, Wickstrom, & Jones, 2006; Vadasy & Sanders, 2008).
Repeated Reading as the Only Intervention


Chafouleas et al. (2004) studied the impact of repeated readings (RR), repeated readings with performance feedback (RR/FB), and repeated readings with performance feedback and contingent reward (RR/FB/REW) on oral reading fluency in an alternating treatments design. Three students in the second grade participated in the study, but only one, Molly, was diagnosed with a learning disability and received special education services in a self-contained classroom. For the purposes of this study, only Molly’s procedures and results will be discussed. The dependent variables were correct words per minute (CWPM) and errors per minute (EPM). The repeated readings (RR) component of each of the interventions required that the students read each passage three times, and the CWPM and EPM were recorded for the last reading. During
performance feedback (FB), the researcher told the student how many words she read correctly at the end of each session. During contingent reward (REW), the student picked a tangible item before reading the passage and placed it on the table. She was told that if she read at least one more word than she did during the previous session, she would receive the reward. Molly’s order of conditions was RR/FB, RR/FB/REW, and RR. “For Molly, the RR/FB condition produced the largest improvement followed by RR/FB/REW and finally, RR alone” (Chafouleas et al., 2004, p. 74). She displayed a decreasing trend in EPM.

Nelson et al. (2004) investigated the effects of systematic error correction and systematic error correction paired with repeated readings on the reading accuracy and fluency of elementary students with disabilities. Four students in the second grade participated in the study; three students had learning disabilities and one student was diagnosed with Attention Deficit/Hyperactivity Disorder (ADHD). The students received special education services in a resource room. A multiple-baseline across participants design was used to measure the dependent variables – the number of words read correctly per minute (CWPM) and the number of errors per minute (EPM). During baseline, the students read a passage for 5 min during which, if they made a mistake, the teacher told them the correct word but did not make them repeat it. When finished, the students read the same passage for 1 min while the teacher recorded CWPM and EPM. In the systematic error correction condition, the students read a passage for 5 min. If they made a mistake, the teacher said the correct word, the students repeated the word, then repeated the sentence. After the five-min reading period, the teacher pointed to the words the students read incorrectly; if the students read it incorrectly, the teacher said the correct word, and the student repeated it. After systematic error correction, the students reread the passage for 1 min while the teacher recorded CWPM and EPM. In the error correction plus repeated readings
condition, the teacher followed the same procedures as the systematic error correction condition with the following differences. Systematic error correction took place for 3 min following three 1-min timed rereadings of the passage from the beginning. In the error correction plus repeated readings with previously read materials condition, procedures were the same as the error correction plus repeated readings condition except that the reading passages were the ones used during baseline. The teacher recorded the CWPM and EPM during the last timed reading. “When repeated readings were implemented in conjunction with the error correction procedures, evidence of a functional relationship was demonstrated for all four students in terms of their reading accuracy and proficiency” (Nelson et al., 2004, p. 186).

O’Shea et al. (1987) investigated the effects of repeated readings and attentional cues on the reading fluency and comprehension of 32 students with learning disabilities in grades 5-8. In a 2 x 3 mixed design with one between factor and one within factor experimental design, the dependent variables were reading rate and comprehension, and the independent variables were attentional focus and the number of repeated readings. Students were randomly assigned to one of two conditions; in one, the students were instructed to read quickly and accurately, and in the other, the students were instructed to read for comprehension. Students in both conditions participated in all levels of repeated reading by reading 1, 3, and 7 times. In the fluency condition, students were given a fluency cue and then asked to orally read a passage. Then they were instructed to read it again (if repeating the story 3 or 7 times). After the last reading, the students were praised for reading quickly and accurately and given a sticker. Then they were asked to tell what they remembered from the story. In the comprehension condition, students were given an initial comprehension cue. When they were finished reading the last passage, the students were asked to retell the story and then praised for remembering so much about the story.
and given a sticker. Separate ANOVAs were calculated to obtain results. Students read more fluently on seventh readings than on third readings, and they read more fluently on third readings than on one reading. Students accurately retold more of the story with more readings versus fewer readings. In addition, students cued to remember the stories recalled and comprehended more of the stories than students who were cued to read fluently.

Rashotte and Torgesen (1985) assessed whether the degree of word overlap among passages affects fluency and comprehension across different stories that are repeatedly read and whether repeated reading is more effective than nonrepetitive reading. The researchers employed a pretest posttest ABC design using 12 students with learning disabilities in second through fifth grades. The students were assigned to dyads based on pretest reading speeds; each dyad had a low and a high reader based on reading speed. Each dyad participated in the three conditions of the study but in different orders. Conditions 1 and 2 were considered to be the repeated reading conditions while Condition 3 was the nonrepetitive reading condition. In Condition 1, students read one of seven passages four times each day. The passages in Condition 1 were designed with minimal word overlap; there were about 20 common words among the passages. In Condition 2, students read one of seven passages four times each day, but these passages were designed with a high degree of word overlap (approximately 60 common words) among the passages. In Condition 3, students read four different stories, and the stories were not repeatedly read. During all conditions, comprehension questions were asked after the first reading, and the students were provided with feedback about their reading speed and the number of errors they made after each reading. Dependent variables were reading speed, defined as the number of words read per minute; word accuracy, defined as the number of errors read; and comprehension. Results indicated that reading speed is positively affected by repeated readings as long as there is a high
degree of word overlap among different stories. In contrast, results from this study illustrate there is not a significant difference in errors read and comprehension between repeated readings and nonrepetitive readings.

Sindelar et al. (1990) sought to examine and compare the effects of repeated readings on the fluency and recall of readers with and without learning disabilities. Participants included 25 students with learning disabilities and 25 students considered “nondisabled” in grades three through five. Those students reading more than 100 words per minute were considered mastery-level readers, and those reading between 50 and 100 words per minute were considered instructional-level readers. Students from the LD group were matched and compared with students from the nondisabled group on fluency and comprehension based on performances on two screening passages. Dependent variables were words read correctly per minute (WPM), errors per minute (EPM), and the number of prepositions retold (NPR). The researchers used a 2 x 2 x 2 factorial design, with two between-group factors and one within-group factor. During the intervention, students were asked to read two passages – one once and the other three times. During the readings, the researchers recorded WPM and EPM but did not provide error correction or performance feedback. After the students read the passages, the students were asked to retell the passage to the best of their abilities. Predictably, WPM and recall increased significantly from one to three readings among all students. Interestingly, as EPM decreased for the students with LD from one to three readings, EPM slightly increased for the students without disabilities. “One can reasonably conclude that the effects of repeated readings were comparable for LD and nondisabled readers” (Sindelar et al., 1990, p. 224).

In a two by two design (type of training materials and order of training materials), Therrien and Kubina (2007) investigated the importance of context and connected text in
repeated reading. 16 students in grades third through fifth reading below grade level participated in the study; 2 of the participants were classified as having learning disabilities. Participants were randomly assigned to begin in Condition 1 or Condition 2. On the first day of intervention, the participants were given an easy passage to repeatedly read out loud until they reached a rate of 93 correct words per minute (CWPM) was reached. Next, students in Condition 1 were given an experimental passage with words in context while the students in Condition 2 were given randomized words out of context; they orally read the passage/words until they reached a rate of 93 CWPM or the passage/words were read six times. A transfer passage (with an average of 55% of the same words as the experimental passage) was then given to the participants in Condition 1, and they were asked to read the passage as quickly and accurately as possible. On the second day of the intervention, the students switched conditions. Dependent measures were the number of readings to criterion, number of errors in the first reading training passage, the CWPM in the transfer passage, and the number of errors in the transfer passage. The results of this study demonstrated “the superiority of reading connected text in a repeated reading intervention over reading words out of context” and that “repeated reading improves word recognition during practice” (Therrien & Kubina, 2007, p. 186).

Weinstein and Cooke (1992) compared the effects of two types of mastery criteria for repeated reading on reading fluency. The study employed a multitreatment, single-subject research design (ABACA) and included four students with learning disabilities in the second and third grades. The dependent measure was the number of correct words per minute (CWPM). The two interventions were repeated readings with a criterion of 90 CWPM and repeated readings with criterion based on three successive fluency improvements. During both interventions, students first listened to a taped reading of the passage at a rate of approximately 100 words per
minute and were then asked to orally read the passage by themselves. They were given two opportunities to reread each day until the specified criterion was met. During the fixed-rate intervention phase, students reread the passage until meeting a criterion of 90 CWPM. During the improvements phase, students reread the passage until they achieved three successive improvements on CWPM. During each session, the researcher plotted the CWPM on a graph and immediately shared it with the student. Results indicated that “all students made gains in their mean correct words per minute with the repeated reading technique, regardless of the type of criterion” (Weinstein & Cooke, 1992, p. 26). Students averaged a mean gain of 24.8 CWPM with a mean number of 8.2 rereadings in the fixed-rate phase and 20.0 CWPM with a mean number of 17.5 rereadings in the improvements phase.

Utilizing a multiple baseline across participants design, Musti-Rao (2009) measured the effects of peer-mediated repeated readings on the oral reading fluency of fourth grade students with and without disabilities. A total of 12 students (three with learning disabilities, one with an eligibility of Other Health Impairment, one with an intellectual disability, and one with a severe emotional disability) participated in the study. The dependent variable was the number of correct words per minute (CWPM). During baseline, students independently and silently read books for 30 min after which the researcher administered a DIBELS oral reading fluency (DORF; Good & Kaminski, 2002) passage. Prior to the paired repeated readings intervention, students were provided training about the correction procedure and the role of reader and listener. During each session, each student in the pair sat across from each other and placed their reading passage, good tutor card, and correction card in front of them. The good tutor card was stamped by the circulating teacher if appropriate tutoring behavior was observed. The students took two turns reading the passage for 10 min. A correction procedure was used. After the repeated readings of
the passage, the students individually read the passage for 1 min and recorded their correct words per minute in their reading logs. Tangible rewards were given if a student met his or her goal on the third day of repeated readings. Overall results indicated an increase in oral reading rate from baseline to intervention for all students. On the other hand, none of the students met their end-of-year goals on the end of year DIBELS (Good & Kaminski, 2002) benchmark. Effect size estimates indicated that the intervention had a moderate to large effect on students’ oral reading fluency. Specifically, among the students with LD, mean CWPM scores during baseline were 42.7, 37.0, and 55.4 and increased to 64.6, 47.7, and 60.8, respectively, during intervention.

Through three experiments, Yurick et al. (2006) evaluated the effects of peer-mediated repeated readings on students’ oral reading fluency and comprehension. Only experiments 1 and 3 will be discussed since they included students with learning disabilities. In both experiments, a multiple baseline across participants design was used; only Students A6 and A8, fifth graders, in experiment 1 and Student C1, nine years old, in experiment 3 will be discussed since they are the only students identified as having a learning disability. Dependent variables were the total number of words read in 1 min (WPM), reading accuracy, and the number of comprehension questions answered correctly. In experiment 1, the first condition was sustained silent reading (SSR) in which the students were given a passage to independently and silently read for 10 min. After that, each student was taken into the hallway, asked to orally read the passage, and asked five comprehension questions about the passage. The second condition was student training where the students were trained in pairs as to how to correct their partner’s mistakes; data was not collected during this condition. The third condition was paired repeated readings (RR). RR included 10 min of partner reading with feedback and self-correction followed by a timed 1-min individual reading of the same passage. After that, students self-graphed their score or chose to
re-do their reading (students were allowed one re-do if their score wasn’t higher than the previous day’s score). Once criteria were mastered (180 WPM and 10 or fewer errors were made), students were asked comprehension questions; if the students answered the questions correctly, they moved into the next level passage for repeated reading. If the questions were not answered correctly, they continued working on the passage until all the criteria were met. When the students met the total criteria, they received a tangible reward. In SSR, Student A6 read 107 WPM with 95% accuracy and Student A8 read 81 WPM with 94% accuracy; in RR, Student A6 averaged 173 WPM with an average of 98% accuracy while Student A8 averaged 151 WPM with an average of 97% accuracy. Based on the Woodcock-Johnson Test of Achievement-Revised (Woodcock & Johnson, 1989) pretest and posttest, Student A6 made .4 and 1.1 gains in grade equivalency scores on the Letter-Word Identification and Passage Comprehension subtests, respectively; Student A8 made .0 and 1.0 gains in grade equivalency scores on the same subtests. In experiment 3, the SSR and student training conditions were the same with the exception that during SSR, the students were pulled out of class to read in a vacant classroom. The RR condition was the same as that in experiment 1 with three exceptions – the students were in a pull-out model, all the students began reading passages at the third-grade level, and the “students were trained to follow a more explicit correction procedure when their partner made an error” (Yurick et al., 2006, p. 493). An additional condition, generalization, was added in experiment 3 in which “three different generalization conditions were examined: covertly-timed, overtly-timed, and overtly-timed and charted generalization” (Yurick et al., 2006, p. 493). From SSR to generalization, Student C1 increased WPM from 32 to an average (across generalization conditions) of 42 WPM while decreasing accuracy from 87% to 85%, respectively. Based on the Woodcock-Johnson-III (Woodcock, McGrew, & Mather, 2001) pretest and posttest, Student C1
made .9, .7, .5, and 1.4 gains in grade equivalency scores on the Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack subtests. Overall “results indicated that peer-mediated repeated reading improved students’ oral reading rate, reading accuracy, and comprehension” (Yurick et al., 2006, p. 469).

Repeated Reading Compared to Other Interventions

Seven studies compared the use of repeated reading to other interventions on reading skills such as reading fluency and reading comprehension. Begeny et al. (2006) compared drill phase error correction to repeated reading and their effects on oral reading fluency. Ellis and Graves (1990) compared the effects of repeated reading, paraphrasing cognitive strategy instruction, and the combination of the two interventions on reading comprehension. Mathes and Fuchs (1993) compared peer-mediated repeated reading to peer-mediated sustained on fluency and comprehension. O’Connor et al. (2007) compared repeated reading to continuous reading on fluency and comprehension. Therrien and Hughes (2008) compared the effects of repeated reading and question generation on fluency and comprehension. Vaughn et al. (2000) compared partner reading (including repeated reading procedures) to collaborative strategic reading to measure fluency, rate, and comprehension. Welsch (2007) compared repeated reading to five other conditions – baseline instruction at the students’ grade level, baseline instruction below the students’ grade level, listening passage preview, repeated reading with easier material, and listening passage preview with easier material – on reading fluency and comprehension.

Begeny et al. (2006) compared phrase drill error correction with repeated readings and their effects on oral reading fluency. The singular participant in this study was an eight-year-old male in the third grade with a Speech-Language Impairment and a Learning Disability in Written Expression. Repeated readings, phrase drill error correction, baseline, and a reward condition
were alternated in an alternating treatments design. A different passage was used for each condition and session. The dependent variables were words correct per minute (WCPM) and words incorrect per minute (WIPM). In the baseline sessions, the participant read a passage once without feedback. During the repeated reading condition, the participant was asked to orally read each passage three times; the WCPM and WIPM were recorded during the third reading. In the phrase drill error correction phase, the participant read a passage once, practiced words read incorrectly, and read the passage again. He practiced each incorrect word by reading a three to five word phrase containing the word; he read each phrase three times before practicing the next phrase. During this phase, the WCPM and WIPM were recorded during the second reading. In the reward sessions, the participant received a preferred reward if, without practice, he read the passage faster or more accurately than a previous passage of similar difficulty. Results indicated that phrase drill error correction and repeated readings greatly improved the participant’s WCPM and, when compared, are equally effective at improving reading fluency. In addition, though there was a reduction in WIPM during both treatments, the greatest decrease in WIPM occurred during the phrase drill error correction.

Utilizing a randomized comparison group design with 4 groups, Ellis and Graves (1990) compared the effects of repeated readings to the effects of paraphrasing cognitive strategy instruction. In addition, the researchers measured the effects of combining the two interventions. 32 students with learning disabilities in grades 5, 6, and 7 participated in this study. The dependent variable was the identification of the main idea, a measure of reading comprehension. The independent variables were repeated readings (RR) alone, paraphrasing strategy instruction (PSI) alone, and the combination of the RR and PSI strategies (PSI+RR); each of three experimental groups was assigned an independent variable while the fourth group was the
control group. In the beginning sessions of the control condition, students were provided with a brief definition of the main idea, asked to read the story, and then asked to answer multiple-choice questions about the main idea. In later control condition sessions, the students were asked to read the story and answer the questions without first being told the main idea. In the RR condition, students were given a brief definition of the main idea then asked to repeatedly read the story within the given time to find the main idea. In the PSI condition, students were taught a task-specific strategy for paraphrasing. The steps of the strategy were to read a paragraph, ask themselves “What is the main idea of the paragraph?”, and put the main idea into their own words. In the PSI+RR condition, students were taught the paraphrasing strategy. Then they were told that if they were unsure of the main idea, they should repeatedly read the story in the allotted time to find the main idea. Students who missed the main idea were asked to re-read until they found the main idea. Results indicated that the paraphrasing strategy was more effective than the repeated readings strategy. In addition, the combination of the two strategies was no more effective than the paraphrasing strategy alone.

Mathes and Fuchs (1993) compared the effects of peer-mediated repeated reading and peer-mediated sustained reading on the dependent variables of correct words read orally in 3min, the average number of correct responses to 10 comprehension questions, and the number of maze items replaced correctly on a 2-min maze activity. The dependent variables were measured on pretests and posttests in a two-factor, multiple-treatment, pretest and posttest control group design; the two factors were the type of peer-mediated instruction (repeated reading vs. sustained reading) and the level of difficulty (instructional vs. independent). 67 students with learning disabilities in reading in grades 4-6 participated in the study. Students were assigned to dyads; pairs of students read near the same reading level. Dyads were assigned to one of the peer-
mediated instructional conditions or to a control group. Students in the control condition received normal reading instruction from their teachers. In the sustained reading condition, the tutee read orally from an assigned passage for 9 min while the tutor monitored for errors. If the tutee read a sentence correctly, he was awarded 2 points; if not, the tutor corrected the mistake. The objective was to read as many sentences correctly as possible in the allotted time, thus allowing the tutee to accrue as many points as possible. At the end of the 9 min, the tutee and tutor switched roles with a new passage. In the repeated reading condition, the tutee was assigned 3 passages. He read each passage 3 times, 1 per minute. The tutee read a total of 9 min. The objective was to read more of each passage with fewer mistakes. At the end of each reading, the tutor awarded points and corrected mistakes in the same manner as in the sustained reading condition. After 9 min, the tutor and tutee switched roles with the tutee reading different passages. Results indicated that students in the sustained reading condition performed better than students in the control condition on fluency measures but not on comprehension measures. Students in the repeated reading condition did not perform significantly better than students in either the control condition or the sustained reading condition. Mathes and Fuchs stated that the findings are “not in keeping with previous studies using this technique… however, our study was the first to examine its efficacy within the context of peer tutoring, with students with LDs serving as tutors for other student with LDs” (1993, p. 240).

Using a randomized comparison group study design, O’Connor et al. (2007) compared the effects of repeated reading to continuous reading on the reading fluency and comprehension of struggling readers in the second and fourth grades. 16 students with learning disabilities and 21 struggling readers without learning disabilities participated in this study. Students were put into trios based on their fluency scores on the Gray Oral Reading Tests, Fourth Edition (GORT-
4; Wiederholt & Bryant, 2001) and then randomly assigned to one of three conditions – repeated reading (RR), continuous reading (CR), or control. Among the 17 students with learning disabilities, 6 were assigned to RR, 6 to CR, and 5 to the control group. In the RR condition, students were provided with a book and asked to read each page three times for a total of 15 min. During CR, students were provided with the same book as those in RR but were asked to read for 15 min without rereading pages (i.e. read the book straight through). The researchers did not provide intervention for the students in the control group. Three reading measures – the Peabody Picture Vocabulary Test-Third Edition (Dunn, Dunn, & Dunn, 1997), the Woodcock Reading Mastery Tests-NU (Woodcock, 1998), and the GORT-4 (Wiederholt & Bryant, 2001) – were administered as pretests, midway tests, and posttests to assess the dependent variables of reading rate, word identification, and reading comprehension of sentences comprehension between repeated reading versus continuous reading. Results indicated no significant differences between repeated reading and continuous reading conditions. There were, however, significant differences between students receiving intervention, either repeated reading or continuous reading, and those in the control group.

Therrien and Hughes (2008) implemented a study to compare the effects of repeated reading and question generation on students’ reading fluency and comprehension. 32 students in fourth through sixth grades with learning disabilities in reading or who were at risk for reading failure were randomly assigned to repeated reading or question generation conditions. A 2-level (repeated reading or question generation) single-factor design was used to measure correct words per minute (CWPM) and correct answers to factual and inferential comprehension questions. During the repeated reading condition, students orally reread each passage until reading a preestablished number of CWPM; regardless of criteria, each passage was read at least twice and
no more than four times. Error correction was provided during and at the end of each passage. During the question generation condition, students were first presented with a cue card with story structure questions. They read the questions and then orally read the passage once. Error correction was provided during and at the end of each passage. Then the students were asked to answer the questions orally. If the wrong answer or no answer was provided, a prompt was given to look for the information in the passage. If the wrong answer was still provided, the tutor pointed to the sentence where the answer could be found. In the event the wrong answer was provided a third time, the tutor pointed out the correct answer. “The results of the study indicate that (a) repeated reading improves students’ fluency on passages that are reread and (b) when reading instructional-level material, repeated reading is more effective at improving factual comprehension than question generation” (Therrien & Hughes, 2008, p. 1).

Vaughn et al. (2000) studied the effects of fluency and comprehension instruction on reading rate, accuracy, and comprehension outcomes. 111 students participated in the study; 16 participants qualified for special education or were identified by the school system as having dyslexia. The students were separated into two treatment groups where one group participated in partner reading (PR) while the other group participated in collaborative strategic reading (CSR). In the PR strategy, students were put into dyads with one student being a stronger reader than the other. Partners took turns reading for three min during which Partner 1 modeled fluent reading. Partner 2 then read the same passage while Partner 1 used word-correction procedures. Next, both partners were timed for 1 min and individually self-charted their total words read. There were seven students with reading disabilities in the PR treatment group. In the CSR strategy, students worked in pairs and used four comprehension strategies throughout the sessions: preview, click and clunk, get the gist, and wrap up. There were nine students with reading
disabilities in the CSR treatment group. The researchers used a pretest-posttest group comparison design to test the PR and CSR interventions on the dependent variables – fluency (correct words per minute) and comprehension as measured by the Test of Reading Fluency (Children’s Educational Services, 1987) and the Gray Oral Reading Tests-3 (Gray, 1992). Results indicated statistically significant effects for rate of reading and correct words per minute in both treatment groups for all students, including those with reading disabilities. There were not statistically significant effects for accuracy or comprehension in either treatment group.

In an alternating treatments design, Welsch (2007) investigated the use of experimental analysis for determining an intervention that best improves oral reading fluency for students with learning disabilities. Four students in the third and fourth grades diagnosed with specific learning disabilities participated in the study. Dependent variables were correct words per minute (CWPM), errors per minute, and the rate of oral recalls. Independent variables and treatment conditions included baseline at the students’ grade level of reading instruction (B-GL); baseline at the grade below the students’ grade level of reading instruction (B-EM); repeated readings (RR) in which the students read instructional passages four times; listening passage preview (LPP) in which the instructor read the instructional passage before the student read the story one time; repeated reading – easier materials (RR/EM) and listening passage preview/easier material (LPP/EM) which are the same as RR and LPP, respectively, with the exception that the reading passages were one grade level below the student’s current instructional level; and changing criterion for generalization passage where the procedures were the same as the best-treatment procedures with the exception of one change – the students were given reinforcers (sticker, pencil, extra time with the experimenter, visit to the principal, walk around the school) when they reached a target score for CWPM for the generalization passage. Probes on generalization
passages were conducted in each phase of the study. The best treatment for three of the
participants was the RR/EM condition while RR was the best treatment for the remaining
participant. During the students’ best treatment phases, CWPM and recalls per minute increased
while the rate of errors per minute steadily decreased.

Repeated Reading as Part of a Package of Interventions

Five studies employed repeated reading as part of a package of other interventions to
determine the effects on reading skills. Denton et al. (2006) used an intervention package with
Phono-Graphix (McGuiness & McGuiness, 1999) and Read Naturally (Ihnot, Mastoff, Gavin, &
instructional procedures to explicit comprehension procedures (both employing passage
rereading) and their effects on reading fluency, decoding, and reading comprehension. Tam et al.
(2006) employed an intervention consisting of vocabulary instruction, error correction, and
fluency comprehension to examine the effects on oral reading rate and comprehension. Therrien
et al. (2006) employed a reread-adapt and answer-comprehend intervention to improve reading
fluency and comprehension. Vadasy and Sanders (2008) used the Quick Reads (Hiebert, 2003)
program to measure participants’ attention, reading fluency, decoding, vocabulary, and
comprehension skills.

Denton et al. (2006) evaluated the effects of an intervention package with decoding and
fluency skills elements on the reading performance of 27 students with reading difficulties and
reading disabilities. There were 5 participants in first grade, 11 in second grade, and 11 in third
grade. A multiple-baseline between groups and between interventions design was used, but for
analysis purposes, the authors focused on within-group pre- and posttest comparisons. The
independent variable consisted of a package employing the use of the Phono-Graphix
(McGuiness & McGuiness, 1999) and Read Naturally (Ihnot et al., 2001) programs while the dependent variables were measured in four waves at 8-week intervals and included Woodcock-Johnson III Tests of Achievement (WJ-III; Woodcock, McGrew, & Mather, 2001) Word Attack, Word Identification, Spelling, and Passage Comprehension scores; Test of Word Reading Efficiency (TOWRE; Torgesen, Wagner, & Rashotte, 1999) Sight Word Fluency in words per minute and TOWRE (Torgesen et al., 1999) Phonemic Decoding Fluency in nonwords per minute; and GORT-4 (Wiederholt & Bryant, 2001) Fluency and Comprehension raw scores. Students in the two groups received identical interventions – the Phono-Graphix (McGuiness & McGuiness, 1999) program for the first 8 weeks of intervention and the Read Naturally (Ihnot et al., 2001) program for the second 8 weeks of intervention. The students received intervention outside of their normal classrooms. The Phono-Graphix (McGuiness & McGuiness, 1999) program was used as a decoding portion of the intervention. There are four stages in this program. The first stage is basic and includes objectives such as understanding that letters represent sounds, spoken words are made up of sounds, that reading is done from left to right, and being able to segment and blend sounds in spoken words. In the fourth and most advanced stage, students “learn to read and spell multisyllable words” and understand that words with more than one syllable have an accented syllable and that “many multisyllable words contain a weak vowel sound (schwa)” (Denton et al., 2006, p. 451). The Read Naturally (Ihnot et al., 2001) program was used to increase the oral reading fluency of the participants. The main components of this program are reading with a model, repeated reading of expository passages, and goal-setting and progress monitoring. In the repeated reading portion of this intervention, the student (a) independently read the passage for 1 min; (b) graphed the correct words per minute; (c) orally read the passage along with an audio model (tape, CD, or computer) and practiced with
and without the supportive modeling until a predetermined fluency criteria is mastered; (d) orally read the passage while being timed by the teacher; and (e) graphed the correct words per minute, comparing the fluency rates of the first and last readings as well as comparing the rate with a preestablished goal rate. To “pass” a reading, the student must have met the fluency goal rate, made no more than three errors, and read with appropriate phrasing. If the student didn’t “pass”, he had to practice the passage with or without the supportive modeling and complete another final timed reading. Results indicated significant improvement in reading decoding, fluency, and comprehension. Individual performances were variable, but 12 of the 27 participants illustrated a significant positive response to the package of interventions.

Using a randomized comparison group design, Manset-Williamson and Nelson (2005) compared two strategic reading interventions on the reading skills of elementary and middle school students with reading disabilities. A component of the interventions was passage rereading (i.e. repeated reading). 20 students with reading disabilities ranging in age from 9 to 14 years and in grades four through eight were randomly assigned to one of two treatment conditions – guided reading instructional procedures (PDF/GR) or explicit comprehension procedures (PDF/EC). Both treatment conditions followed the same format of a daily curriculum-based measurement (CBM) probe, phonological awareness/analysis training, instruction in decoding strategies, a comprehension component, and passage rereading. The treatments differed with regard to the “explicitness with which reading comprehension strategies were taught” (Manset-Williamson & Nelson, 2005, p. 65). In the PDF/GR procedure, comprehension strategies were introduced and modeled by tutors working with the participants. In the PDF/EC condition, direct instruction of comprehension strategies and self-regulation strategies was provided. Dependent variables consisted of standard scores on four subtests
(Letter-Word Identification, Reading Fluency, Passage Comprehension, and Word Attack) of the Woodcock-Johnson III Tests of Achievement, raw scores on informal measures of passage comprehension designed for the study (oral retell quality, number of main ideas recalled, and number of correct answers to multiple choice questions), and the number of correct words read per minute on daily CBM probes. The results yield an overall increase in the participants’ reading decoding, fluency, and comprehension. “Gains in formal measures of word attack and reading fluency after five weeks of intervention translated into grade-equivalent gains of approximately half a school year. Analysis of the trends in the daily informal fluency probes translated into a weekly gain of 1.28 correct words per minute” (Manset-Williamson & Nelson, 2005, p. 59).

In a multiple baseline across subjects design, Tam et al. (2006) evaluated the effects of a reading instruction intervention on the oral reading rate and comprehension. The reading intervention consisted of vocabulary instruction, error correction, and fluency building. Five English-language learners in third through fifth grades participated in the study. Two of the participants were identified as having a Learning Disability and were in the third grade, and one participant was classified as having a developmental disability; for the purpose of this review, only the participants with a Learning Disability will be discussed. The dependent variables were words read correctly per minute, words read incorrectly per minute, measurement of reading rate, and correct answers to comprehension questions. During baseline, each participant was asked to read a passage three times and to answer comprehension questions about the passage. During the story-telling phase, the researcher read a storybook to the participant for 15 min and asked literal comprehension questions about the story; no feedback or response prompts were provided during this phase. After the storybook, the same procedures were followed as those in baseline. The
story-telling phase was used to control for time effects since the participants received intervention for approximately the same amount of time. In the next condition, called new passage each session, the participants received a new reading passage each session. Each session consisted of vocabulary instruction, initial untimed reading of the passage with error correction, and three fluency-building reading trials. The next condition, called same passage to criterion, was implemented the same as the new passage each session condition except that the participants did not change reading passages each session. The participants read the same passage until a predetermined criterion was met, at which a new reading passage was introduced. Results indicated that both students with a Learning Disability demonstrated a marked increase in their oral reading rates and comprehension during the new passage each session and same passage to criterion conditions. One out of the two students made gains in reading rate.

Therrien et al. (2006) conducted a study to determine if a reread-adapt and answer-comprehend (RAAC) intervention improved the reading fluency and comprehension of elementary and middle school students with learning disabilities (n = 16) or who were at risk for reading failure (n = 14). There were 13 students in the fourth grade, 10 in the fifth grade, 6 in the seventh grade, and 1 in the eighth grade. In a two-level single factor pre/postexperimental design, students were assigned through stratified random assignment to a treatment or a control group. Students in the intervention group received the eight-step RAAC intervention; this intervention combines repeated readings with question generation to improve reading achievement. The eight steps of the intervention were: 1) the teacher asks the student read quickly and accurately while paying attention to the story; 2) the student read a cue card with generic story structure questions; 3) the student orally reread the passage until reading a preestablished number of correct words per minute (CWPM); 4) the teacher gave corrective
feedback on errors; 5) the teacher prompted the student to answer the questions on the cue card while providing scaffolded assistance; 6) the teacher asked comprehension questions about the story; 7) steps 1 through 6 were repeated the following session until 8) the teacher adjusted the reading material by raising or lowering the reading material by one grade level based on the student’s performance on the previous sessions. The dependent variables were pretest and posttest scores on the DIBELS Oral Reading Fluency (ORF) subtest and the Broad Reading scale on the WJ-III as well as CWPM and the number of factual and inferential questions answered correctly. The scores of students in the treatment group on the pretest/posttest measures included an average increase of 13.0 CWPM on the DIBELS ORF subtest and an average increase of 6.2 in the standard scores as measured by the WJ-III Broad Reading subtests. After the intervention, “students increased the instructional grade level of the passages read in the intervention an average of 2.07 grade levels” and read “an average of 22.16 seconds faster on the last passage readings than the first readings” (Therrien et al, 2006, p. 93). Additionally, students receiving the intervention improved their ability to answer comprehension questions that were reread.

Implementing a randomized group pretest-posttest design, Vadasy and Sanders (2008) determined the effectiveness of the Quick Reads (Hiebert, 2003) program used as a supplemental fluency intervention for fourth and fifth graders with below-level reading skills. Fifth-grade participants were assigned to dyads and randomly assigned to either the treatment group (supplemental Quick Reads [Hiebert, 2003] tutoring) or the control group (classroom instruction only without tutoring). Out of 54 participants in the treatment group, 10 received special education services. 17 out of 65 participants in the control group received special education services. During the Quick Reads (Hiebert, 2003) tutoring sessions, each passage was read three times. In the first read, the tutor activated background knowledge, and the students first
identified two challenging words, read the passage, and wrote notes about key ideas. During the second read, the tutor read aloud with the students at a target rate of 1 min and asked the students to say one thing the author wants them to remember. For the third read, the tutor told the students to try to read as much as they can in 1 min, and the students read silently for 1 min, recorded the number of words read, and reviewed the comprehension questions with the tutor. Dependent variables were attention, rapid automatized naming, word reading accuracy, word reading efficiency, vocabulary, word comprehension, fluency rate, and passage comprehension. The treatment group’s word reading accuracy increased by 89 to 92 while the control group’s scores remained 91 as measured by the Word Identification subtest on the Woodcock Reading Mastery Test-Revised/Normative Update (WRMT-R/NU; Woodcock, 1998). The treatment group’s fluency rate increased from 64 CWPM to 84 CWPM while the control group’s rate increased from 65 CWPM to 82 CWPM as measured by the DIBELS (Good & Kaminski, 2002). “At posttest, Quick Reads students significantly outperformed classroom controls in vocabulary, word comprehension, and passage comprehension. Fluency rates for both treatment and control groups remained below grade level at posttest” (Vadasy & Sanders, 2008, p. 235).

Synthesis of Studies

Table 1 provides a synthesis of the studies (N = 9) using repeated reading as the only intervention for students with learning disabilities, ADHD, reading difficulties, and students in general education. Six of the studies employed single-subject designs (Chafouleas et al., 2004; Musti-Rao et al., 2009; Nelson et al., 2004; Rashotte & Torgesen, 1985; Weinstein & Cooke, 1992; Yurick et al., 2006), and three studies employed experimental research designs (O’Shea et al., 1987; Sindelar et al., 1990; Therrien & Kubina, 2007). As can been seen in Table 1, all of the interventions were used at the elementary and early secondary school levels. Three studies
required that students repeatedly read passages three times, one study required that students repeatedly read passages four times, and one study required that students repeatedly read passages three and seven times. In three studies, students were asked to repeatedly read passages until meeting preestablished criterion. In five studies, students received corrective feedback after reading passages. In addition, researchers in four studies assigned students to dyads to participate in partner reading while repeatedly reading passages.

Table 2 provides a synthesis of the studies \((N = 7)\) comparing the effects of repeated reading to the effects of other reading interventions for students with learning disabilities, reading difficulties, and students in general education. Most of the studies \((N = 5)\) employed experimental research designs (Ellis & Graves, 1990; Mathes & Fuchs, 1993; O’Connor et al., 2007; Therrien & Hughes, 2008; Vaughn et al., 2000), while the remainder of the studies \((N = 2)\) employed single-subject designs (Begeny et al., 2006; Welsch, 2007). As can been seen in Table 2, all of the interventions were used at the elementary and early secondary school levels. Three studies required that students read passages three times in the repeated reading conditions, one study required that students repeatedly read passages four times, and one study required that students repeatedly read until they found the main idea of the passages. One study asked students to repeatedly read passages until meeting preestablished criterion. In three studies, students received corrective feedback after reading passages. In addition, two studies assigned students to dyads to participate in partner reading while repeatedly reading passages. One study assigned students to trios.

Table 3 provides a synthesis of the studies \((N = 5)\) utilizing repeated reading as part of an intervention package to increase the reading skills of students with learning disabilities, other health impairments, behavioral disorders, developmental disabilities, reading difficulties,
students in general education, and students who are English Language Learners. Three of the studies employed experimental research designs (Manset-Williamson & Nelson, 2005; Therrien et al., 2006; Vadsay & Sanders, 2008), and two of the studies employed single-subject research designs (Denton et al., 2006; Tam et al., 2006). As can been seen in Table 3, all of the interventions were used at the elementary and early secondary school levels. Two studies used published and researched reading programs as the interventions. Denton et al. (2006) used *Phono-Graphix* (McGuiness & McGuiness, 1999) and *Read Naturally* (Ihnot et al., 2001) and Vadsay and Sanders (2008) used the *Quick Reads* (Hiebert, 2003) program. One study required that students repeatedly read passages two times, two studies required that students repeatedly read passages three times, and two studies required that students repeatedly read passages until meeting preestablished criterion. In three studies, students received corrective feedback after reading passages.

*Limitations*

There are several limitations of the studies included in this literature review. First, many of the studies did not have a homogeneous group of students. Only eight studies exclusively used students with learning disabilities. Many included both participants receiving special education support and those considered as “struggling readers” but not receiving special education support. One study (Denton et al., 2006) included students with learning disabilities, student with other health impairments, students with behavioral disorders, and students without disabilities. Since participants with different educational needs were often included in one study, it was often difficult to differentiate between the results of the students with disabilities and those without. Though difficult to find, the use of homogeneous populations in repeated reading studies would be beneficial to educators wanting to replicate methods in their own classrooms.
Second, it was difficult to compare one study to another due to sample size and participant characteristics differences. In addition, characteristics of the participants were not always clarified. For example, 6 studies did not include participant ages, and 15 studies did not provide information on participant IQs. Future research should include all participant characteristics so that educators can determine which strategy may be useful for the particular population they are working with.

Third, long-term measures of the effectiveness of reading fluency interventions were not measured in any of the studies. It would be useful to know if students who benefited from the use of repeated reading interventions maintained their increased reading skills over time. Future research should include maintenance conditions to determine the long-term effectiveness of repeated reading.

Fourth, only two studies investigated the use of repeated reading with passages incorporating varying degrees of word overlap (Rashotte & Torgesen, 1985; Therrien & Kubina, 2007). The results of both studies indicated that reading contextual words increases reading speed and word recognition more than reading noncontextual words. Additionally, reading speed is positively affected by repeated reading as long as there is a high degree of word overlap among different stories. There should be more research to determine the effectiveness of contextual repeated reading with word overlap between passages.

Last, most studies did not employ the sole use of repeated readings to increase reading skills. There were often other interventions used (i.e. partner reading, intervention packages, tangible rewards, self-charting, corrective feedback, comprehension, decoding strategies) along with repeated readings. Each study employed differing interventions. It was difficult to determine which intervention was more effective. Future research should include replications.
and studies employed similar independent variables to ascertain which repeated reading interventions are most effective.

Conclusions

Overall, the results of the studies reviewed suggest that the use of repeated reading as the sole intervention or as part of an intervention package can increase the oral reading fluency and reading comprehension of elementary both students with and without learning disabilities. The findings suggest several important issues that are worth discussion. Among studies utilizing repeated reading methods as part of an intervention package, the results were unanimously positive. All studies revealed that a holistic reading intervention, using repeated reading as a component, results in increased reading skills.

Among studies utilizing repeated reading as the only intervention, the use of corrective feedback and/or systematic error correction combined with repeated reading was more effective than repeated reading alone (Chafouleas et al., 2004; Nelson et al., 2004). Second, the use of peer-mediated reading (i.e. partner reading) combined with repeated reading was successful in increasing students’ reading skills (Yurick et al., 2006). Third, students’ oral reading fluency and comprehension skills increased the more times a passage was re-read (O’Shea et al., 1987; Sindelar et al., 1990). Fourth, reading skills improved as the number of overlapping words increased over passages (Rashotte & Torgesen, 1985) and as students repeatedly read passages words in context compared to reading randomized words out of context (Therrien & Kubina, 2007).

Among studies comparing the use of repeated reading to other interventions, the results were somewhat mixed. Therrien and Hughes (2008) found that repeated reading is more effective than question generation at improving factual comprehension. In addition, Welsch
(2007) concluded that repeated reading with and without easier materials was more effective than listening passage preview methods to improve oral reading fluency. Two studies found that repeated reading was no more effective than phrase drill error correction (Begeny et al., 2006) or continuous reading (O’Connor et al., 2007) in oral reading fluency and comprehension. Two studies found that repeated reading was less effective than paraphrasing strategy instruction (Ellis & Graves, 1990) and peer-mediated sustained reading (Mathes & Fuchs, 1993) in fluency and comprehension.
Table 1: Repeated Reading as the Only Intervention

<table>
<thead>
<tr>
<th>Citation</th>
<th>Participants</th>
<th>Intervention</th>
<th>Procedures</th>
<th>Results</th>
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</thead>
<tbody>
<tr>
<td>Chafouleas, Martens, Dobson, Weinstein, &amp; Gardner (2004)</td>
<td>$N = 3$</td>
<td>Instructional packages used were Repeated Readings (RR), Repeated Readings with Performance Feedback (RR/FB), and Repeated Readings with Performance Feedback and Contingent Reward (RR/FB/REW).</td>
<td>Alternating treatments design. RR – students read each passage 3 times. RR/FB – students were told how many words they read correctly. RR/FB/REW – students were told they would receive a chosen tangible reward if they read at least one more word than the previous session.</td>
<td>Student with LD indicated RR/FB produced the largest improvement in correct words per minute followed by RR/FB/REW followed by RR alone. She displayed a decreasing trend in errors per minute.</td>
</tr>
<tr>
<td>Musti-Rao, Hawkins, &amp; Barkley</td>
<td>$N = 12$</td>
<td>Peer-mediated repeated readings to measure students’ oral reading fluency through correct words per minute.</td>
<td>Multiple-baseline across participants design. Baseline – students asked to silently read a book for 30 min. Students then asked to orally read DIBELS* Oral Reading Fluency passage. Paired Repeated Readings (RR) – 10 min of partner reading with feedback and self-correction followed by 1 min individual readings. If students met criteria on third day of RR, they received a tangible reward.</td>
<td>All students illustrated increases in fluency rates. Students able to meet criteria on practice passages, but none met end-of-year goals on spring benchmark assessments.</td>
</tr>
<tr>
<td>Nelson, Alber, &amp; Gordy (2004)</td>
<td>$N = 4$</td>
<td>Systematic error correction and systematic error</td>
<td>Multiple-baseline across participants design.</td>
<td>Minimal increase in correct words per minute with a</td>
</tr>
</tbody>
</table>
8.2 to 9.6 years  Grade 2  correction combined with repeated reading.  Systematic error correction condition – students received systematic feedback for errors made during oral reading. Systematic error correction combined with repeated reading condition – students read passages three times followed by systematic feedback for errors made during oral readings. Systematic error correction combined with repeated reading of previously read materials condition – students read passages used during baseline.

| O’Shea, Sindelar, & O’Shea (1987) | N = 32  
|-----------------------------------|---
| n = 32 LD                        |  
| 11.3 to 13.6 years               |  
| Grades 5-8                        |  
| IQ = 73-120                       |  
| Repeated reading (1, 3, and 7 times) combined with either a fluency component or a comprehension component. |  
| 2 (focus) x 3 (no. of readings) factorial design. |  
| Fluency group – students read passages 1, 3, and 7 times. When finished reading, they were praised for reading quickly and accurately, given a tangible reward, and asked to tell what they remembered from the story. |  
| Comprehension group – students read passages 1, 3, and 7 times. When finished reading, they were asked to tell what they remember from the story, praised for |  
| decrease in errors per minute when the students received systematic error correction alone. When receiving systematic error correction combined with repeated reading, all students displayed an increase in correct words per minute and a decrease in errors per minute. |  

Students read more accurately the more times they repeated a passage. Students retold a story more accurately the more times they repeated a passage. Students in the comprehension group recalled and comprehended more of the stories than students in the fluency group.
<table>
<thead>
<tr>
<th>Study</th>
<th>N =</th>
<th>n =</th>
<th>Age Range</th>
<th>Grade Range</th>
<th>Reading Conditions</th>
<th>Pretest Posttest Design</th>
<th>Treatment</th>
<th>Independent Variables</th>
<th>Fluency and Recall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rashotte &amp; Torgesen (1985)</td>
<td>12</td>
<td>12</td>
<td>8.6 to 12.0 years</td>
<td>Grades 2-5</td>
<td>2 repeated reading conditions with varying degrees of word overlap among passages. 1 nonrepetitive reading condition without word overlap among passages.</td>
<td>ABC design</td>
<td>Comparison</td>
<td>Classification (LD or nondisabled), level (instructional or corrective)</td>
<td>Significantly increased from 1 to 3 readings for all students. Errors per minute for</td>
</tr>
<tr>
<td>Sindelar, Monda, &amp; O’Shea (1990)</td>
<td>50</td>
<td>25</td>
<td>Ages not reported</td>
<td></td>
<td>2x2x2 factorial design.</td>
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</table>
Grades 3-5 mastery), and number of readings (1 or 3). LD and 1 nondisabled student.

Students were asked to read 2 stories – once and the other 3 times. Students were instructed to read the story and remember as much as possible. At the end of the reading(s) of each story, students were asked to retell the story. Then they were thanked and given a tangible reward.

Effects of repeated readings were comparable for students with and without LD.

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<tbody>
<tr>
<td>All students participated in 2 repeated reading conditions – 1 with passages with words in context and 1 with randomized words out of context.</td>
<td>2 (type of training materials) x 2 (order of training materials) factorial design.</td>
<td>Condition 1 – Students were given an easy passage to orally repeatedly read until reaching 93 CWPM. Next, students were given an experimental passage with words in context to repeatedly read until reaching 93 CWPM or until it was read 6 times. Last, students were given a transfer passage (with an average of 55% overlapped words) and asked to read it once quickly and accurately. Condition 2 – Students were given randomized words out of context to orally repeatedly read until reading 93</td>
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<tr>
<td>Reading contextual words increases reading speed and word recognition more than reading noncontextual words.</td>
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<tr>
<td>Author(s)</td>
<td>Study Details</td>
<td>Method</td>
<td>Results</td>
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<td>-----------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
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</table>
| Weinstein & Cooke (1992)                      | $N = 4$  
$n = 4$ LD  
8.1 to 10.2 years  
Grades 2, 3                                                                 | Multitreatment (ABACA) design.  
In both conditions, students first listened to a taped reading of the passage at a rate of 100 CWPM and then asked to orally read the passage by themselves.  
Fixed-rate condition – students reread the passage until meeting criterion of 90 CWPM.  
Improvements condition – students reread the passage until achieving 3 successive improvements on CWPM.  
Each session, the research plotted the CWPM on a graph and shared it with the student.  
All students made gains in their mean CWPM, regardless of the type of criterion.  
Fixed-rate condition – mean gain of 24.9 CWPM with a mean number of 8.2 rereadings.  
Improvements condition – mean gain of 20.0 CWPM with a mean number of 17.5 rereadings. | Two types of mastery criteria for repeated reading. One type required students to reread a passage until demonstrating 3 successive improvements.  
The second type required students to reread a passage until 90 CWPM was attained. |
| Yurick, Robinson, Cartledge, Lo, & Evans (2006) | Experiment 1:  
$N = 8$  
n = 2 LD  
n = 6  
General Ed.  
10.7 to 11.11 years  
Grade 5  
Experiment 2 not discussed – did not include                                                                 | Peer-mediated repeated readings to measure students’ oral reading fluency and comprehension.  
Experiment 1: Multiple-baseline across participants design.  
Sustained Silent Reading (SSR) – students asked to silently read a passage for 10min.  
Students then asked to orally read passage and were asked 5 comprehension questions.  
Overall, peer-mediated repeated reading increased students’ reading fluency and comprehension.  
Experiment 1: In SSR, the students with LD averaged 94 CWPM with 95% accuracy. In RR, they averaged 162 SWPM with 98% | Peer-mediated repeated readings to measure students’ oral reading fluency and comprehension.  
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Students then asked to orally read passage and were asked 5 comprehension questions.  
Overall, peer-mediated repeated reading increased students’ reading fluency and comprehension.  
Experiment 1: In SSR, the students with LD averaged 94 CWPM with 95% accuracy. In RR, they averaged 162 SWPM with 98% |
<table>
<thead>
<tr>
<th>students with LD.</th>
<th>Paired Repeated Readings (RR) – 10min of partner reading with feedback and self-correction followed by 1min individual readings. Students either self-graphed their score or chose to reread. When criteria (180 CWPM and 10 or less errors) were mastered, students were asked comprehension questions. If they were correct, they moved onto next level passage; if not, they continued on the passage until criteria were met. Once criteria were met, students received a tangible reward.</th>
<th>accuracy. In addition, they made .2 and 1.1 gains in grade equivalency scores on the Letter-Word Identification and Passage Comprehension subtests, respectively, on the WJ-R**. Experiment 3: The student with LD increased 32 CWPM in SSR to 42 CWPM in SS but decreased accuracy from 87% to 85%. The student made .9, .7, .5, and 1.4 gains in grade equivalency scores on the Letter-Word Reading Fluency, Passage Comprehension, and Word Attach subtests, respectively, on the WJ-III***.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment 3:</td>
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<tr>
<td>$N = 6$</td>
<td>Experiments were similar, but an additional condition was added (generalization). Generalization – 3 different generalization conditions: covertly-timed, overtly-timed, and overtly-timed and charted.</td>
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<tr>
<td>$n = 1$ LD</td>
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<tr>
<td>$n = 5$</td>
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<tr>
<td>General Ed.</td>
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<tr>
<td>9.9 to 10.11 years</td>
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<tr>
<td>Grade 4</td>
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</table>

*Note. LD = Learning Disability; OHI = Other Health Impairment; CD = Cognitive Disability; SED = Severe Emotional Disability; ADHD = Attention/Deficit Hyperactivity Disorder; IQ = intelligence quotient; CWPM = correct words per minute.*
DIBELS = Dynamic Indicators of Basic Early Literacy Skills by R. H. Good & R. A. Kaminski. Copyright 2002 by Institute for the Development of Educational Achievement, Eugene, OR.


### Table 2: Repeated Reading Compared to Other Interventions

<table>
<thead>
<tr>
<th>Citation</th>
<th>Participants</th>
<th>Intervention</th>
<th>Procedures</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Begeny, Daly, &amp; Valleley</td>
<td>$N = 1$</td>
<td>Repeated reading compared to phrase drill error</td>
<td>Alternating treatments design. Baseline – student read a passage once</td>
<td>Repeated reading and phrase drill error correction are equally effective in greatly improving the student’s CWPM. The greatest decrease in errors occurred during phrase drill error correction.</td>
</tr>
<tr>
<td>(2006)</td>
<td>$n = 1$ LD</td>
<td>correction.</td>
<td>without feedback. Repeated Reading Condition – orally read each passage 3</td>
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<tr>
<td></td>
<td>8 years</td>
<td></td>
<td>times. Data collected on third reading. Phrase Drill Error Correction</td>
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<tr>
<td></td>
<td>Grade 3</td>
<td></td>
<td>Condition – student read a passage once, practiced words read incorrectly,</td>
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<tr>
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<td></td>
<td>and read passage again. Data collected on second reading. Reward Condition</td>
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<td></td>
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<td>– student received a preferred reward if, without practice, he read the</td>
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<td></td>
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<td>passage faster or more accurately than the previous passage.</td>
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<tr>
<td>Ellis &amp; Graves (1990)</td>
<td>$N = 32$</td>
<td>4 experimental groups – control, repeated</td>
<td>Randomized group comparison design. Control Group – students given brief</td>
<td>Paraphrasing strategy was more effective than the repeated readings strategy. PSI+RR was no more effective than PSI alone.</td>
</tr>
<tr>
<td></td>
<td>$n = 32$ LD</td>
<td>readings (RR), paraphrasing strategy instruction</td>
<td>definition of main idea, then asked to read story and answer multiple-choice</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10.8 to 13.9</td>
<td>(PSI), and paraphrasing strategy instruction plus</td>
<td>questions about main idea. RR Group – students were given brief definition</td>
<td></td>
</tr>
<tr>
<td></td>
<td>years</td>
<td>repeated readings (PSI+RR).</td>
<td>of main idea, then asked to repeatedly read story to find main idea.</td>
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<td></td>
<td>Grades 5-7</td>
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</tbody>
</table>
| Mathes & Fuchs (1993) | $N = 67$  
$n = 67$ LD  
Ages not reported  
Grades 4-6 | Repeated reading and sustained reading methods as classwide peer-mediated activities while manipulating the level of text difficulty. | PSI Group – students were taught task-specific strategy for paraphrasing and then asked to read story and put main idea into their own words.  
PSI+RR – students were taught task-specific strategy for paraphrasing. They were told to repeatedly read story until they knew main idea. Students who missed main idea were asked to reread until they found main idea.  
Students in the repeated reading condition did not perform better than students in the other two conditions. Students performed better in the sustained reading condition than in the control condition on fluency but not on comprehension. | Students in the repeated reading condition did not perform better than students in the other two conditions. Students performed better in the sustained reading condition than in the control condition on fluency but not on comprehension. | 2-factor multiple-treatment pretest posttest control group design.  
Dyads of similar reading levels assigned to repeated reading condition, sustained reading condition, or control group.  
Control Group – students received normal reading instruction.  
Sustained Reading Condition – tutees read for 9 min while tutors monitored for and corrected errors. Correct sentences were awarded 2 points. Tutees and tutors switched roles after 9 min.  
Repeated Reading Condition – tutees |
<table>
<thead>
<tr>
<th>Study</th>
<th>N</th>
<th>n</th>
<th>LD</th>
<th>General Ed.</th>
<th>Ages</th>
<th>Grades</th>
<th>Repeated reading vs. continuous reading.</th>
<th>Randomized comparison group study design.</th>
<th>Students in the RR and CR groups did significantly better than those in the control group in fluency and reading comprehension. No significant differences between students in RR and CR groups.</th>
</tr>
</thead>
<tbody>
<tr>
<td>O’Connor, White, &amp; Swanson (2007)</td>
<td>37</td>
<td>15</td>
<td>LD</td>
<td>1</td>
<td>21</td>
<td>1</td>
<td>Repeated reading condition – students read each page in book 3 times for total of 15 min.</td>
<td>Students assigned to trios and randomly assigned to repeated reading (RR), continuous reading (CR), or control. Repeated Reading Condition – students read each passage 3 times, 1 each minute. Tutors monitored for and corrected errors. Correct points were awarded 2 points.</td>
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<td>Repeated Reading Condition – students given book and asked to read 15 min. without rereading.</td>
<td>Randomized comparison group study design.</td>
<td>Students in the RR and CR groups did significantly better than those in the control group in fluency and reading comprehension. No significant differences between students in RR and CR groups.</td>
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<td></td>
<td>Repeated Reading Condition – students given cue card with story</td>
<td>Randomized comparison group study design.</td>
<td>Students in the RR and CR groups did significantly better than those in the control group in fluency and reading comprehension. No significant differences between students in RR and CR groups.</td>
</tr>
<tr>
<td>Therrien &amp; Hughes (2008)</td>
<td>32</td>
<td>18</td>
<td>LD</td>
<td>14</td>
<td>9-13</td>
<td>4-6</td>
<td>Repeated reading condition – students reread until meeting criteria; each passage read 2-4 times. Error correction provided. Question Generation (QG) Condition – students given cue card with story</td>
<td>Repeated reading is more effective than question generation at improving factual comprehension.</td>
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<tr>
<td>Study</td>
<td>Participants</td>
<td>Design</td>
<td>Interventions</td>
<td>Outcomes</td>
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<td>Vaughn, Chard, Bryant, Coleman, Tyler, Linan-Thompson, &amp; Kouzekanani (2000)</td>
<td>$N = 111$ General Ed. $n = 16$ LD $n = 95$ General Ed.</td>
<td>Pretest-posttest group comparison design.</td>
<td>Partner reading vs. collaborative strategic reading.</td>
<td>Statistically significant effects for rate of reading and CWPM for both groups. There were no statistically significant effects for accuracy or comprehension in either group.</td>
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<td></td>
<td>Mean age = 8.63 years Grade 3</td>
<td>Students assigned to dyads with one stronger reader. Dyads assigned to a group. Partner Reading (PR) Condition – partners took turns reading for 3 min. Partner 1 modeled fluent reading then used word-correction procedures while Partner 2 read. Then both were timed for 1 min. and self-charted results. Collaborative Strategic Reading (CSR) Condition – students used 4 comprehension strategies during sessions: preview, click and clunk, get the gist, and wrap up.</td>
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<td>Welsch (2007)</td>
<td>$N = 4$ $n = 4$ LD 9.4 to 11.1 years Grades 3, 4</td>
<td>Alternating treatments design.</td>
<td>Repeated reading (RR) vs. listening passage preview (LPP) vs. repeated reading with easier material (RR/EM) vs. listening passage with easier materials (LPP/EM).</td>
<td>RR/EM was best treatment for 3 participants, and RR was best treatment for 1 participant. During best treatment phases, CWPM and recalls per minute increased while errors per minute decreased.</td>
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passages were 1 grade level below student’s current instructional level. LPP/EM – same as LPP, but passages were 1 grade level below student’s current instructional level.

*Note.* LD = Learning Disability; CWPM = correct words per minute; ELL = English Language Learners.
Table 3: *Repeated Reading as Part of a Package of Interventions*

<table>
<thead>
<tr>
<th>Citation</th>
<th>Participants</th>
<th>Intervention</th>
<th>Procedures</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Denton, Fletcher, Anthony, &amp;</td>
<td>$N = 27$</td>
<td>Package with decoding</td>
<td>Multiple-baseline between groups and between interventions design. Students divided into 2 groups. Both groups participated in both conditions.</td>
<td>Overall significant improvement in reading decoding, fluency, and comprehension. 12 of 27 participants illustrated a significant positive response to the package of interventions.</td>
</tr>
<tr>
<td>Francis (2006)</td>
<td>$n = 8$ LD</td>
<td><em>(Phono-Graphix</em>) and fluency (Read Naturally)**</td>
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<td></td>
<td>$n = 2$ OHI</td>
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<tr>
<td></td>
<td>$n = 1$ BD</td>
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<td></td>
<td>$n = 16$</td>
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<td></td>
<td>General Ed.</td>
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<td></td>
<td>Mean age = 8.6 years</td>
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<td>Grades 1-3</td>
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<tr>
<td>Manset-Williamson &amp; Nelson</td>
<td>$N = 20$</td>
<td>Comparison of two intervention packages – guided reading instructional procedures and explicit comprehension procedures</td>
<td>Randomized group comparison design. Both treatment conditions consisted of daily curriculum-based measurement probe, phonological awareness training, decoding instruction, comprehension instruction, and passage rereading. They differed in comprehension instruction.</td>
<td>Overall increase in participants’ reading decoding, fluency, and comprehension. After 5 weeks, word attack and reading fluency skills made grade-equivalent gains of half a school year. Each week, students gained 1.28</td>
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<td>(2005)</td>
<td>$n = 20$ LD</td>
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<td></td>
<td>9 to 14 years</td>
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<td>Grades 4-8</td>
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<tr>
<td>Tam, Heward, &amp; Heng (2006)</td>
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<td><strong>N</strong> = 5</td>
<td><strong>Guided Reading Instructional Procedures (PDF/GR)</strong> – Comprehension strategies introduced and modeled by tutors. Explicit Comprehension Procedures (PDF/EC) – Direct instruction of comprehension strategies and self-regulation strategies was provided.</td>
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<td><strong>n</strong> = 2 LD</td>
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<tr>
<td><strong>n</strong> = 1 DD</td>
<td>Multiple baseline across subjects design.</td>
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<tr>
<td><strong>n</strong> = 2 General Ed.</td>
<td><strong>Baseline Condition</strong> – students read passage 3 times and answered comprehension questions.</td>
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<td><strong>n</strong> = 5 ELL</td>
<td><strong>Story-Telling Condition</strong> – students were read a story and asked to answer comprehension questions. Next, same procedures in baseline were followed.</td>
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<td>9.4 to 11.1 years</td>
<td><strong>New Passage Each Session Condition</strong> – students read a new passage each session. Sessions consisted of vocabulary instruction, untimed reading with error correction, and 3 fluency-building readings.</td>
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<td>Grades 3-5</td>
<td><strong>Same Passage to Criterion Session</strong> – Same as New Passage Each Session except that students read the same passage until predetermined criteria</td>
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</table>

- Increase in oral reading rates and comprehension during New Passage Each Session and Same Passage to Criterion for the 2 students with learning disabilities. 1 out of the 2 students with LD made gains in reading rate.
<table>
<thead>
<tr>
<th>Study</th>
<th>Sample Size</th>
<th>Intervention Details</th>
<th>Results</th>
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</thead>
<tbody>
<tr>
<td>Vadasy &amp; Sanders (2008)</td>
<td>N = 119</td>
<td>Quick Reads*** program used as a supplemental fluency intervention.</td>
<td>Students in the treatment group significantly outperformed students in the control group in vocabulary, word comprehension, and passage comprehension. Both groups increased fluency rates, but they remained below grade level.</td>
</tr>
</tbody>
</table>

Note. LD = Learning Disability; OHI = Other Health Impairment; BD = Behavior Disorder; CWPM = correct words per minute; DD = Developmental Disability; ELL = English Language Learners.


**Read Naturally** by C. Ihnot, J. Mastoff, J. Gavin, & L. Hendrickson. Copyright 2001 by Read Naturally, St. Paul, MN.

***Quick Reads** by E. H. Hiebert. Copyright 2003 by Pearson Learning, Parsippany, NJ.
Reading Fluency Strategies for Individuals with Developmental Disabilities

**Literature Search Procedures**

The researcher conducted a literature review on developing and increasing reading fluency among individuals with developmental disabilities. Two types of searches were completed. In the first method, the researcher searched two separate databases for peer-reviewed studies: ERIC and PsychINFO. The search of databases yielded six studies. In the second method, the researcher conducted a hand search of the following peer-reviewed journals: *American Journal on Mental Retardation, Journal of Special Education, Remedial and Special Education, Education and Training in Developmental Disabilities, and Journal of Autism and Developmental Disorders*. The same criteria for inclusion were followed with the exception of the date of publication; the researcher only included journal articles from 1990 to present. This search yielded an additional four studies. The search procedures revealed 11 studies that met the criteria for inclusion in this literature review.

**Criteria for Inclusion**

The researcher searched for studies in the databases using the following guidelines. First, participants had any level of intellectual disabilities (mild, moderate, severe, and profound). Second, participants with co-morbid diagnoses were included, but developmental disabilities were the primary diagnoses. Third, all ages were included. Fourth, there was not a limit on the date of publication. Fifth, reading fluency was a dependent variable. Last, studies were carried out with English language reading only.

**Overall Study Characteristics**

There were 11 studies (see Table 4) that ranged in publication date from 1989-2010, and appeared in the following peer-reviewed journals: *Remedial and Special Education, Education and...*
and Training in Developmental Disabilities, Education and Treatment of Children, Preventing School Failure, Psychology in the Schools, Reading Research and Instruction, and Journal of Behavioral Education. A total of 610 participants (range 2 to 359) who had a mean age, of those reported, of 12.14 (range 8.5 to 15.0) and a mean IQ of 58.4, of those reported, participated in these studies. The total number of participants with developmental disabilities in these studies was 152 (range 1 to 59). Participants in the studies were in grades 1 to 11 with a mean grade level of 5.7. The majority of studies included in the review employed experimental designs.

A comprehensive reading program was the independent variable in four studies (Allor et al., 2010; Bradford, Shippen, Alberto, Houchins, & Flores, 2006; Hurst & Jolivette, 2006; Idol, 2010), peer tutoring was used in two studies (Kamps, Locke, Delquadri, & Hall, 1989; Osborn, Freeman, Burley, Wilson, Jones, & Rychener, 2007), repeated reading was the sole intervention in three studies (Devault & Joseph, 2004; Mefferd & Pettegrew, 1997; Valleley & Shriver, 2003), and a combination of strategies was used in two studies (Cooke, 1993; Musti-Rao, Hawkins, & Barkley, 2009).

Comprehensive Reading Programs

Four peer-reviewed studies investigated the effects of comprehensive reading programs on the reading skills of students with developmental disabilities (Allor et al, 2010; Bradford, Shippen, Alberto, Houchins, & Flores, 2006; Hurst & Jolivette, 2006; Idol, 2010). Bradford et al. (2006) and Hurst and Jolivette (2006) used the SRA Corrective Reading Program (Englemann, Carnine, & Johnson, 1999), Allor et al. (2010) used Early Interventions in Reading (Taylor, Frye, Short, & Shearer, 1991), and Idol (2010) used the Reading Success (Baker, 2004) program.

Bradford et al. (2006) sought to determine the effectiveness of the Corrective Reading Program on the reading skills of middle school students with moderate intellectual disabilities.
Specifically, two participants had moderate intellectual disabilities while one had a moderate intellectual disability as a result of a traumatic brain injury. The students were ages 12, 14, and 15 and had IQ scores of 46, 49, and 55 respectively. The program was implemented 45-55 min per session, three days a week. There were 65 sessions over a period of six months. The researchers measured fluency performance through a combination of reading rate and accuracy. All students completed Level A of the program. In addition, all students reached mastery on two of four measures of reading fluency. The students failed to reach mastery on four of four measures as a result of reading rate, not reading accuracy. Interestingly, the students exceeded the reading rate goals on the two measures they mastered. The first student exceeded the 1 min reading rate goal by 10 and 10 s, the second student exceeded the goal by 15 and 17 s, and the third student exceeded the goal by 10 and 19 s. They also demonstrated maintenance of reading fluency nine weeks after completion of the study. Specifically, their fluency increased from zero correct words per min to 39, 15, and 46 correct words per min. Overall, the students’ reading skills, including fluency, improved.

Hurst and Jolivette (2006) measured the effects of private versus public assessment of oral readings, often repeatedly read, on the reading fluency of three middle school students with mild disabilities. Two participants had mild intellectual disabilities while the third was classified as having an Other Health Impairment. The two participants with MID were in grades seven and eight, were ages 13 and 14, and had IQ scores of 70 and 65, respectively. Students received instruction from the SRA Corrective Reading Program (Englemann, Carnine, & Johnson, 1999) for 28 sessions. At the end of each lesson, the students participated in a timed reading probe. In an alternating treatments design, the researchers alternated private versus public assessments of the timed reading probes. In the private timed readings, the students, in random order, orally read
the passages to their teacher at a work table at the back of the classroom without other students in close proximity. In the public timed readings, the students, in random order, orally read the passages at a kidney-shaped table to their teacher and the other two students. The students’ overall reading fluency improved from the use of the *SRA Corrective Reading Program* (Englemann, Carnine, & Johnson, 1999). On the other hand, overall reading fluency performance during both conditions varied. There were no significant differences between private and public assessments of oral reading fluency. In addition, all three students preferred the public assessments as long as they didn’t have to read first.

Allor et al. (2010) employed a longitudinal study over two to three years to investigate the effectiveness of the *Early Interventions in Reading* (Taylor, Frye, Short, & Shearer, 1991) program on the reading progress of students with mild to moderate intellectual disabilities. Participants were in grades one through four with a mean chronological age of 7.83. Their IQ scores ranged from 40 to 69. Every participant was considered to be “verbal.” The participants were randomly assigned to a treatment group (*n* = 34) or a control group (*n* = 25). *Early Interventions in Reading* (Taylor, Frye, Short, & Shearer, 1991) is a comprehensive reading intervention that integrates the concepts of print, phonological and phonemic awareness, oral language, letter knowledge, word recognition, vocabulary, fluency, and comprehension. Participants in the treatment group participated in *Early Interventions in Reading* (Taylor, Frye, Short, & Shearer, 1991) for 40 to 50 min every day for a minimum of two years. Participants in the control group received routine special education instruction provided by their own schools. Results indicate that students in the treatment group made great progress on multiple standardized measures of reading. Significant differences between the treatment and control groups were found on the progress-monitored measures of phoneme segmentation, phonics, and
oral reading fluency. Specifically, after 105 weeks of instruction, the average student in the treatment group scored 44.296 correct words per min on the DIBELS *Oral Reading Fluency* (Good & Kaminski, 2002) measure compared to 26.668 correct words per min for the average student in the control group. Allor et al. (2010) concluded that students with IQs between 40 and 69 responded positively to an intensive and comprehension reading program that included multiple dimensions of reading development.

Over a span of 29 years and five projects, Idol (2010) implemented the *Reading Success* (Baker, 2004) program, an individualized teacher-guided literacy program that teaches literacy skills and emphasizes word recognition, reading speed, and reading comprehension, to 663 students at risk for school failure, transitioning from speaking Spanish to English, with learning disabilities, mild intellectual disabilities (MID), or behavior challenges. Projects 1 and 2 included students with MID, but the results from Project 2 ($n = 1$ with MID) were inconclusive. Therefore, only Project 1 is discussed. There were 24 total students, 17 elementary and 7 secondary, with MID in Project 1 ($N = 159$). For 30 to 45 min each session, two to five times per week, each student received steps 4 through 10 in the basic lesson. During this sequence, the student read the passage to the instructor while the instructor applied the model-lead-test error correction procedure for misread and unknown words. Next, the instructor took a timed sample of oral reading followed by a series of oral comprehension questions. The instructor corrected any comprehension and accuracy errors through positive oral discussion. The student then wrote a summary of the lesson. Together, the instructor and student calculated and recorded the data for oral reading accuracy, oral reading speed, and oral reading comprehension. Finally, the instructor analyzed the data to determine if specialized interventions were needed. Students received further individualized instruction for word recognition, rate, or comprehension based on
their individual needs. Findings indicate that elementary students with MID had a mean gain of 1.5 months of curricular progress per month of instruction. Secondary students with MID had a mean gain of 2.4 months of curricular progress per month of instruction. As expected, students with MID made improvements in their reading skills, but they averaged less than the overall group mean across all subgroups and across elementary and secondary students.

**Peer Tutoring**

Two studies measured the effects of tutoring on the academic achievement of students with developmental disabilities (Kamps et al., 1989; Osborn et al., 2007). Kamps et al. (1989) measured the effects of peer tutoring on the academic skills of students with Autism. Osborn et al. (2007) measured the effects of supplemental tutoring on the reading achievement of students with cognitive disabilities, specific learning disabilities, and students receiving Title I services.

Kamps et al. (1989) used 5th grade peer tutors to provide supplemental tutoring in the areas of money skills, expressive language, and oral reading and comprehension skills. Two students, ages 9 and 11, diagnosed with Autism and moderate intellectual disabilities (IQ = 50 for both students) engaged in 30 min tutoring sessions three times per week for six total weeks. The first 20 min were allotted for specific academic tutoring, and the last 10 min were spent in social play with their partners. During the oral reading/comprehension tasks, the students orally read from readers on their grade level and responded to comprehension questions. 2-min oral reading samples were taken following tutoring sessions. Correct words per min, incorrect words per min, and correct number of comprehension responses were recorded. The study yielded positive results from peer tutoring. Both students increased their reading rates ($M = 19.6$ and 30.2 at baseline to $M = 34.2$ and 39.7), decreased their errors per min ($M = 3.7$ and 1.9 at baseline to
Osborn et al. (2007) utilized volunteer tutors (high school and college students, retirees, professionals, parents, laborers, etc.) to provide one-on-one supplemental reading instruction to students with cognitive disabilities, specific learning disabilities, and students receiving Title I services. The intervention, named Project MORE, included guided reading instruction, spelling and vocabulary instruction, and specific skill development. Thirty-one students with intellectual disabilities (ID) participated in Project MORE while 22 students with ID remained in the comparison group. Students with ID were in 2nd grade, had chronological ages of 8-5 to 9-3, and had IQ scores equal to or less than 70. A coordinator developed lesson plans, and the mentors delivered individualized instruction 30 min per session three to four days each week. The first 10 min of each lesson consisted of guided reading using an appropriately leveled book or basal reader. The next 10 min were spent on spelling and vocabulary activities including word recognition (fluency and comprehension) and vocabulary development (meanings, structure, and relationships). The final 10 min were used to focus on specific skill development such as word analysis, vocabulary, comprehension, study skills, and writing. The researchers concluded that students in the treatment group ($M = 35$ CWPM) statistically significantly ($F$-test statistic = 5.0, $p = .03$) outperformed the control students ($M = 29$ CWPM) on the DIBELS Oral Reading Fluency measure. In addition, the reading achievement gains for the students who received the Project MORE intervention averaged more than one month gain for every month of intervention.

Repeated Reading

Three studies examined the effects of repeated reading on the reading skills of students with reading difficulties (Devault & Joseph, 2004; Mefferd & Pettegrew, 1997; Valleley &

Devault and Joseph (2004) included one high school student with MID (IQ = 57) in their study to determine the effectiveness of a combination of repeated readings and the word boxes phonics technique on the reading fluency of high school students with severe reading delays (N = 3). The students received individual administration of the intervention for 15 to 25 min daily, five days per week. During each session, the students were presented with and asked to orally read a curriculum-based reading passage probe written at a level beyond their independent reading level. They were given one min to read while the instructor recorded all errors, omissions, and words read correctly. Incorrect and omitted words were printed on index cards and taught to the students using a word boxes technique. At the end of the session and after the word boxes lesson, the students were given one min to re-read the passage while the instructor recorded all errors, omissions, and words read correctly. A new passage was provided at every session. The student with MID demonstrated a mean increase of 33 correct words per min from initial to repeated reading across all passages. In addition, this intervention had high social validity among all three students.

In a study conducted by Mefferd and Pettegrew (1997), assisted reading with predictable trade books was implemented using a combination of teaching modeling of fluent reading, repeated and choral reading of predictable text, and the use of multiple cues in written language. Students with MID (n = 3) in grades four and five and ages 9 to 11 with IQs ranging from 63 to
72 participated in the study. Instruction lasted 20 to 30 min per session, five days a week, for five months. The intervention consisted of a five-day plan. On Day 1, the teacher introduced and read a book, pointing out story elements. Student responses and discussion were encouraged. After the reading, students selected five words they didn’t know but wanted to learn. The teacher wrote each word on an index card with a sentence, dictated from the student, on the back of the card. The students filed the word cards in their personal “word banks.” On Day 2, the students first shared their words. Then the teacher reread the book while the students followed along in their own copies. The teacher required that the students track the words with their fingers as they read. The teacher paused where the language was predictable and asked the students to supply the words. Student responses and discussion were encouraged. A second reading was conducted as necessary. Students chose five more words to add to their word banks. They were given a copy of the book and their words cards to read at home. On Day 3, students shared their words. The teacher and students then chorally read the story. Students were allowed to read a page independently if they requested it. The teacher continued to provide feedback and assistance in reading and identifying unknown words. Again, students were given a copy of the book and their word cards to read at home. On Day 4, the teacher led a choral reading of the book, allowed students to take turns reading independently, and called attention to and positively commented on the readers’ use of effective reading strategies. The students were also encouraged to share about the cues they used to help figure out unknown words. On Day 5, each student met one-on-one with the teacher to read and discuss the book and review the words in their “word bank.” During the conferences, the pair talked about the personal response and enjoyment of the story. In addition, the teacher monitored student progress, positively reinforced the student’s cueing system, and encouraged self-monitoring and self-correction behaviors. Extension activities
involving composing and writing followed the reading of each book. Results indicated that the students made gains in reading fluency and comprehension, sight vocabulary, and effective use of reading strategies. Specifically, one student more than doubled his fluency rate, another student nearly doubled his fluency rate, and the third student showed a moderate increase in fluency rate.

Valleley and Shriver (2003) measured fluency and comprehension as a result of repeated readings. Instruction was provided 20 min per session, three times a week, for 10 total weeks. Four students participated in the study, but only one, Greg, had a diagnosis of MID. Greg was 18 years old and in 11th grade; an IQ score was not provided. During intervention, participants read a 4th grade passage repeatedly until they demonstrated three consecutive fluency improvements of at least one additional correct word. Participants read a massage at least four times and no more than 10 times. Error correction was provided only if the students did not orally provide a word within three s. Every third passage, the participants were asked to read the entire 400-word passage without being timed for the initial reading so that they could read for comprehension. All other readings, including initial readings, were timed for one min. Reinforcement for participation was provided in the form of earning points consistent with the reinforcement program utilized by the residential treatment facility where the participants resided. Even though he dropped out of the intervention after only three weeks of intervention, Greg demonstrated improvements in his reading fluency from baseline to intervention. From baseline to intervention, he increased 70 CWPM to 85 CWPM and increased errors from 2.80 to 3.08. There were no major changes in correct comprehension skills from baseline to intervention (8.87 to 9.2 out of 10 questions).
Combination of Strategies

Two studies utilized a combination of strategies to determine the effects of interspersal of known items (Cooke, 1993) and peer-assisted repeated readings (Musti-Rao et al., 2009) on fluency gains. In Cooke’s (1993) study, two participants with MID in grades four and five, ages 10 and 11, and IQ scores of 55 and 59 spent 20 min each day in the intervention. Using an alternating treatments design, the researcher compared 100% new words to a ratio of 30% new words and 70% known words. The procedures involved a combination of peer tutoring, interspersal of known items, and repeated readings of words in isolation and passages. Each participant was paired with a peer tutor. The peer tutor would show nine flashcards to the tutee, one at a time. If the tutee correctly identified the word, the tutor would place a check on the back of the card. If the words was misread or not read within two s, the tutor said the word and asked the tutee to read it. This continued until three checks were on the back of each word. Next, the tutor went over unknown words (previously underlined by the teacher) in an assigned passage. The tutee was then asked to read the passage during which errors were recorded by the tutee. At the end of the reading, errors were reviewed. If no errors were made, a happy face was recorded. The tutee read the passage until three happy faces were recorded. At that time, the tutee was ready for the posttest. In the first condition, the above procedures took place with 100% new words. In the second condition, the above procedures took place with 30% new words and 70% known words. Maintenance tests were also given before beginning a new passage. Five previously learned words were randomly selected and presented to the tutee by the tutor on flash cards. Findings indicate that the participants increased their correct words per min on reading passages in both conditions. There was high variability in both conditions. The two students had mean gains of 46.2 CWPM and 29.9 CWPM in the 30/70% condition and mean gains of 39.4
CWPM and 37.1 CWPM in the 100% condition, respectively. More words met mastery criterion each session in the 100% condition. Specifically, the two students mastered means of 4.05 words per s (WPS) and 3.4 WPS in the 30/70% condition and means of 9.0 WPS and 6.6 WPS in the 100% condition, respectively. Maintenance of words was high in both conditions. Overall, interspersal of known items was not more effective than all new items.

Utilizing a multiple baseline across participants design, Musti-Rao (2009) measured the effects of peer-mediated repeated readings on the oral reading fluency of fourth grade students with and without disabilities. A total of 12 students (three with learning disabilities, one with an eligibility of Other Health Impairment, one with an intellectual disability, and one with a severe emotional disability) participated in the study. The dependent variable was the number of correct words per minute (CWPM). During baseline, students independently and silently read books for 30 min after which the researcher administered a DIBELS oral reading fluency (DORF; Good & Kaminski, 2002) passage. Prior to the paired repeated readings intervention, students were provided training about the correction procedure and the role of reader and listener. During each session, each student in the pair sat across from each other and placed their reading passage, good tutor card, and correction card in front of them. The good tutor card was stamped by the circulating teacher if appropriate tutoring behavior was observed. The students took two turns reading the passage for 10 min, however, the student with an intellectual disability did not participate in reciprocal reading. A correction procedure was used. After the repeated readings of the passage, the students individually read the passage for 1 min and recorded their correct words per minute in their reading logs. Tangible rewards were given if a student met his or her goal on the third day of repeated readings. Overall results indicated an increase in oral reading rate from baseline to intervention for all students. On the other hand, none of the students met their end-of-
year goals on the end of year DIBELS benchmark (Good & Kaminski, 2002). Effect size estimates indicated that the intervention had a moderate to large effect on students’ oral reading fluency. Specifically, the student with an intellectual disability increased her mean CWPM scores of 13.3 during baseline to 24.9 during intervention. Her DIBELS (Good & Kaminski, 2002) benchmark raw scores increased from 19 to 32. This participant started with passages on the second grade level and, at the end of the study, read 110 CWPM on three passages at the third-grade level.

**Synthesis of Studies**

Table 4 provides a synthesis of the studies ($N = 11$) using different instructional strategies to increase the reading fluency of students with developmental disabilities. Five of the studies employed experimental designs (Bradford et al., 2006; Devault & Joseph, 2004; Idol, 2010; Kamps et al., 1989; Mefferd & Pettegrew, 1997), one study utilized a longitudinal experimental study design (Allor et al., 2010), two studies employed an alternating treatments design (Cooke, 1993; Hurst & Jolivette, 2006), and two studies utilized group comparison designs (Osborn et al., 2007; Vallely & Shriver, 2003). Seven studies included participants at the elementary level, two studies included participants at the middle school level, and three studies included participants at the high school level. A comprehensive reading program was the independent variable in four studies, peer tutoring was used in three studies, repeated reading was the sole intervention in three studies, and a combination of strategies was used in two studies.

**Limitations**

The number of empirically-based research methods of increasing reading fluency among students with developmental disabilities is severely lacking. There is a shortage of studies that include both reading fluency as a dependent variable and participants with developmental
disabilities. As a result of the shortage of information about how to teach reading fluency to students with developmental disabilities, special educators have been using reading instruction techniques for students with intellectual developmental disabilities that were actually meant to be used with students with different types of disabilities.

There is a great need for reading research that includes students with developmental disabilities and reading fluency as a dependent variable. Generally speaking, future reading research should include individuals with developmental disabilities. Specifically, there is a need for research among participants with different types of intellectual and developmental disabilities (i.e. mild intellectual disabilities, moderate intellectual disabilities, Autism, etc.) as well as different age groups (primary, secondary, and post-secondary). For example, techniques typically found to be effective with elementary students showed promise for helping high school students with severe reading delays (Devault & Joseph, 2004). Second, studies including a larger number of participants would increase internal validity. Third, it would be beneficial if more interventions were conducted over a substantial period of time (at least six months) with reading samples and assessments taken at regular intervals. Fourth, more research should be conducted among students with developmental disabilities while implementing and varying the fluency strategies described earlier in this paper. Fifth, researchers should measure the relationship of fluency and comprehension among students with developmental disabilities. Sixth, future research should focus on comparing outcomes of different criterion for fluency.

Conclusions

Although studies examining the reading fluency of students with developmental disabilities are minimal, the results are encouraging and support the belief that individuals with developmental disabilities can benefit from reading instruction beyond basic functional sight
word instruction. Overall, comprehensive reading programs that include a combination of literacy skills instruction not only improve reading fluency but reading skills in general (Allor et al., 2010; Bradford et al., 2006; Hurst & Jolivette, 2006; Idol, 2010; Osborn et al., 2007). Interventions employing peer tutoring significantly increase reading fluency among students with developmental disabilities (Cooke, 1993; Kamps et al., 1989; Musti-Rao et al., 2009; Osborn et al., 2007). As with other populations, repeated reading improves reading fluency among students with developmental disabilities (Cooke, 1993; Devault & Joseph, 2004; Mefferd & Pettegrew, 1997; Musti-Rao et al., 2009; Osborn et al., 2007; Valleley & Shriver, 2003).
Table 4: Studies that Included Reading Fluency among Students with Developmental Disabilities

<table>
<thead>
<tr>
<th>Study/total sample</th>
<th>Instruction type</th>
<th>Disability label/n</th>
<th>CA/grade</th>
<th>IQ</th>
<th>Frequency/duration of instruction</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allor et al., 2010 <em>(N = 59)</em> Early Interventions in Reading* – comprehensive reading intervention integrating concepts of print, phonological and phonemic awareness, oral language, letter knowledge, word recognition, vocabulary, fluency, and comprehension</td>
<td>MID, MOID</td>
<td>Treatment group <em>(n = 34)</em></td>
<td>Mean CA = 7.83</td>
<td>40-69</td>
<td>40-50 min/daily, 2-3 years</td>
<td>Treatment group increased overall reading scores, especially phoneme segmentation, phonics, and oral reading fluency</td>
</tr>
<tr>
<td>Bradford et al., 2006 <strong>Corrective Reading Program</strong> – fluency performance measured through combination of reading rate and reading accuracy</td>
<td>MOID <em>(n = 2)</em></td>
<td>CA = 12, 14, 15</td>
<td>46, 49, 55</td>
<td>45-55 min/session, 3 days/week, 65 sessions over 6 months</td>
<td>All students completed Level A of the program; all students reached mastery on 2/4 measures of reading fluency; lack of all students reaching mastery due to reading rate, not reading accuracy; strong maintenance of reading fluency</td>
<td></td>
</tr>
<tr>
<td>Cooke, Peer tutoring.</td>
<td>MID <em>(n = 20)</em></td>
<td>CA = 10, 55, 59</td>
<td></td>
<td></td>
<td>Students</td>
<td></td>
</tr>
<tr>
<td>1993 Experiment 3 ($N = 3$)</td>
<td>interspersal of known items, and repeated readings of words in isolation and passages; comparison of 100% new words to 30% (new words)/70% (previously learned words)</td>
<td>11 Grades 4, 5</td>
<td>min/daily</td>
<td>increased CWPM on reading passages in both conditions; more words met mastery criteria in 100% (new words) condition; maintenance of words high in both conditions; overall, interspersal of known items not more effective than all new items</td>
<td></td>
<td></td>
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<tr>
<td>Devault &amp; Joseph, 2004 ($N = 3$)</td>
<td>Repeated readings combined with word boxes</td>
<td>MID ($n = 1$) High school</td>
<td>57 15-25 min/daily, 5 days/week</td>
<td>Student increased mean increase of 33 words across all passages from initial to repeated reading; high social validity</td>
<td></td>
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</tr>
<tr>
<td>Hurst &amp; Jolivette, 2006 ($N = 3$)</td>
<td>Private versus public assessment of timed assessment readings with Corrective Reading Program</td>
<td>MID ($n = 2$)</td>
<td>CA = 13, 14 Grades 7, 8</td>
<td>70, 65 28 sessions</td>
<td>Overall reading skills improved; variable results in overall reading fluency during both public and private reading assessments; students</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Intervention Description</td>
<td>Sample Size</td>
<td>Duration</td>
<td>Initial &amp; Final Gains</td>
<td>Additional Findings</td>
<td></td>
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<tr>
<td>Idol, 2010 Project 1 (N = 159)</td>
<td><em>Reading Success</em>** program – individualized teacher-guided literacy program teaching literacy skills and emphasizing word recognition, reading speed, and reading comprehension*</td>
<td>Mid (n = 24)</td>
<td>Not reported</td>
<td>30-45 min/session, 2-5 times/week</td>
<td>Not reported</td>
<td></td>
</tr>
<tr>
<td>Kamps et al., 1989 (N = 2)</td>
<td>Supplemental peer tutoring</td>
<td>AUT/MOD (n = 2)</td>
<td>CA = 9, 11</td>
<td>30 min/session, 3 times/week, 6 total weeks</td>
<td>Mean reading rates increased (M = 19.6 and 30.2 at baseline to M = 34.2 and 39.7); Mean errors decreased (M = 3.7 and 1.9 at baseline to M = 1.3 and 0.9); number of correct responses to factual comprehension questions increased (1.9 and 1.3 at baseline to 3.8 and 3.5)</td>
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<tr>
<td>Mefferd &amp; Pettegrew, 1997 (N = 3)</td>
<td>Repeated, assisted reading with predictable</td>
<td>MID (n = 3)</td>
<td>CA = 9-11 Grades 4, 5</td>
<td>20-30 min/session, 5 days/week,</td>
<td>One student more than doubled fluency rate,</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Intervention</td>
<td>Group</td>
<td>CA</td>
<td>Time</td>
<td>Results</td>
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<tr>
<td>Musti-Rao, Hawkins, &amp; Barkley, 2009 (N = 12)</td>
<td>Peer-assisted repeated reading</td>
<td>ID (n = 1)</td>
<td>9.3-12.5</td>
<td>20 min/session, 5 days/week, 17 total weeks</td>
<td>One student nearly doubled fluency rate, one student showed moderate increase in fluency rate</td>
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<tr>
<td></td>
<td></td>
<td>LD (n = 3)</td>
<td>Grade 4</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>OHI (n = 1)</td>
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<td></td>
<td></td>
<td>SED (n = 1)</td>
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<tr>
<td>Osborn et al., 2007 (N = 359)</td>
<td>Project MORE – supplemental guided reading instruction, spelling and vocabulary instruction, and specific skill development implemented by tutors</td>
<td>ID</td>
<td>8-5 to 9-3</td>
<td>30 min/session, 3-4 days/week</td>
<td>Students in treatment group statistically significantly outperformed control students in DIBELS Oral Reading Fluency measure (treatment M = 35 CWPM, control M = 29 CWPM)</td>
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<td></td>
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<td>Project MORE (n = 31)</td>
<td>Grade 2</td>
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<tr>
<td></td>
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<td>Compariso n group (n = 22)</td>
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<td>Valleley &amp; Repeated MID (n = 18)</td>
<td></td>
<td></td>
<td>20</td>
<td>Increase in</td>
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<tr>
<td>Shriver, 2003 (N = 4)</td>
<td>readings with error correction only when student did not pronounce word within 3s</td>
<td>Grade 11 min/session, 3 times/week, 10 total weeks</td>
<td>reading fluency from baseline to intervention (70 CWPM to 85 CWPM); increase in errors from baseline to intervention (2.80 errors to 3.08 errors); no major changes in correct comprehension questions from baseline to intervention</td>
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</table>

*Note. CA = chronological age; IQ = intelligence quotient; MID = Mild Intellectual Disability; MOID = Moderate Intellectual Disability; TBI = Traumatic Brain Injury; CWPM = correct words per minute; AUT = Autism; “—” = information not reported; ID = Intellectual Disability; LD = Learning Disability; OHI = Other Health Impairment; SED = Severe Emotional Disability. Adapted from “Differences in Performance Between Students with Learning Disabilities and Mild Mental Retardation: Implications for Categorical Instruction,” by E. Caffrey and D. Fuchs, 2007, p. 122. Copyright 2007 by The Division for Learning Disabilities of the Council for Exceptional Children.*

*Early Interventions in Reading* by B. M. Taylor, B. J. Frye, R. Short, & B. Shearer. Copyright 1991 by University of Minnesota, Center for Urban and Regional Affairs and Office of the Vice President of Academic Affairs, Minneapolis, MN.

**Corrective Reading Program** by S. Englemann, L. Carnine, & G. Johnson. Copyright 1999 by SRA/McGraw-Hill, Columbus, OH.

***Reading Success*** by K. Baker. Copyright 2004 by Hawker Brownlow Education, Moorabbin, VIC.

****DIBELS = Dynamic Indicators of Basic Early Literacy Skills*** by R. H. Good & R. A. Kaminski. Copyright 2002 by Institute for the Development of Educational Achievement, Eugene, OR.
Repeated Reading Strategies for Elementary Students with Intellectual Disabilities

**Literature Search Procedures**

The researcher conducted a literature review on the use of repeated reading methods to increasing the reading fluency of individuals with intellectual disabilities. Two types of searches were completed. In the first method, the researcher searched two separate databases for peer-reviewed studies: ERIC and PsychINFO. In the second method, the researcher conducted a hand search of the following peer-reviewed journals: *American Journal on Mental Retardation, Journal of Special Education, Remedial and Special Education, Education and Training in Developmental Disabilities*, and *Journal of Autism and Developmental Disorders*. The same criteria for inclusion were followed with the exception of the date of publication; the researcher only included journal articles from 1990 to present. The searches yielded four studies that met the criteria for inclusion in this literature review.

**Criteria for Inclusion**

The researcher searched for studies in the databases using the following guidelines. First, participants had any level of intellectual disabilities (mild, moderate, severe, and profound intellectual disabilities). Second, participants with co-morbid diagnoses were included, but intellectual disabilities were the primary diagnoses. Third, all ages were included. Fourth, there was not a limit on the date of publication. Fifth, repeated reading was the only or main independent variable. Last, studies were carried out with English language reading only.

**Overall Study Characteristics**

There were four studies (see Table 5) that ranged in publication date from 1997-2009, and appeared in the following peer-reviewed journals: *Preventing School Failure, Reading Research and Instruction*, and *Journal of Behavioral Education*. A total of 22 participants (range
3 to 12) who had a mean age, of those reported, of 13.5 (range 9.0 to 18.0) and a mean IQ of 62.3, of those reported, participated in these studies. The total number of participants with intellectual disabilities in these studies was six (range 1 to 3). Participants in the studies were in grades 4 to 11 with a mean grade level of 7.5. The studies included in the review employed experimental designs.

In one study, the independent variable was a combination of repeated readings and word boxes (Devault & Joseph, 2004). Repeated, assisted reading with predictable trade books was utilized in another study (Mefferd & Pettegrew, 1997). In a third study, repeated readings were paired with error correction (Valleley & Shriver, 2003). In a fourth study, the independent variable was peer-assisted repeated readings (Musti-Rao, Hawkins, & Barkley, 2009).

Repeated Reading among Individuals with Intellectual Disabilities


Devault and Joseph (2004) included one high school student with MID (IQ = 57) in their study to determine the effectiveness of a combination of repeated readings and the word boxes phonics technique on the reading fluency of high school students with severe reading delays (N = 3). The students received individual administration of the intervention for 15 to 25 min daily,
five days per week. During each session, the students were presented with and asked to orally read a curriculum-based reading passage probe written at a level beyond their independent reading level. They were given one min to read while the instructor recorded all errors, omissions, and words read correctly. Incorrect and omitted words were printed on index cards and taught to the students using a word boxes technique. At the end of the session and after the word boxes lesson, the students were given one min to re-read the passage while the instructor recorded all errors, omissions, and words read correctly. A new passage was provided at every session. The student with MID demonstrated a mean increase of 33 correct words per min from initial to repeated reading across all passages. In addition, this intervention had high social validity among all three students.

In a study conducted by Mefferd and Pettegrew (1997), assisted reading with predictable trade books was implemented using a combination of teaching modeling of fluent reading, repeated and choral reading of predictable text, and the use of multiple cues in written language. Students with MID ($n = 3$) in grades four and five and ages 9 to 11 with IQs ranging from 63 to 72 participated in the study. Instruction lasted 20 to 30 min per session, five days a week, for five months. The intervention consisted of a five-day plan. On Day 1, the teacher introduced and read a book, pointing out story elements. Student responses and discussion were encouraged. After the reading, students selected five words they didn’t know but wanted to learn. The teacher wrote each word on an index card with a sentence, dictated from the student, on the back of the card. The students filed the word cards in their personal “word banks.” On Day 2, the students first shared their words. Then the teacher reread the book while the students followed along in their own copies. The teacher required that the students track the words with their fingers as they read. The teacher paused where the language was predictable and asked the students to supply the
words. Student responses and discussion were encouraged. A second reading was conducted as necessary. Students chose five more words to add to their word banks. They were given a copy of the book and their words cards to read at home. On Day 3, students shared their words. The teacher and students then chorally read the story. Students were allowed to read a page independently if they requested it. The teacher continued to provide feedback and assistance in reading and identifying unknown words. Again, students were given a copy of the book and their word cards to read at home. On Day 4, the teacher led a choral reading of the book, allowed students to take turns reading independently, and called attention to and positively commented on the readers’ use of effective reading strategies. The students were also encouraged to share about the cues they used to help figure out unknown words. On Day 5, each student met one-on-one with the teacher to read and discuss the book and review the words in their “word bank.” During the conferences, the pair talked about the personal response and enjoyment of the story. In addition, the teacher monitored student progress, positively reinforced the student’s cueing system, and encouraged self-monitoring and self-correction behaviors. Extension activities involving composing and writing followed the reading of each book. Results indicated that the students made gains in reading fluency and comprehension, sight vocabulary, and effective use of reading strategies. Specifically, one student more than doubled his fluency rate, another student nearly doubled his fluency rate, and the third student showed a moderate increase in fluency rate.

Valleley and Shriver (2003) measured fluency and comprehension as a result of repeated readings. Instruction was provided 20 min per session, three times a week, for 10 total weeks. Four students participated in the study, but only one, Greg, had a diagnosis of MID. Greg was 18 years old and in 11th grade; an IQ score was not provided. During intervention, participants read
a 4th grade passage repeatedly until they demonstrated three consecutive fluency improvements of at least one additional correct word. Participants read a passage at least four times and no more than 10 times. Error correction was provided only if the students did not orally provide a word within 3 s. Every third passage, the participants were asked to read the entire 400-word passage without being timed for the initial reading so that they could read for comprehension. All other readings, including initial readings, were timed for 1 min. Reinforcement for participation was provided in the form of earning points consistent with the reinforcement program utilized by the residential treatment facility where the participants resided. Even though he dropped out of the intervention after only three weeks of intervention, Greg demonstrated improvements in his reading fluency from baseline to intervention. From baseline to intervention, he increased 70 CWPM to 85 CWPM and increased errors from 2.80 to 3.08. There were no major changes in correct comprehension skills from baseline to intervention (8.87 to 9.2 out of 10 questions).

Utilizing a multiple baseline across participants design, Musti-Rao et al. (2009) measured the effects of peer-mediated repeated readings on the oral reading fluency of fourth grade students with and without disabilities. A total of 12 students (three with learning disabilities, one with an eligibility of Other Health Impairment, one with an intellectual disability, and one with a severe emotional disability) participated in the study. The dependent variable was the number of correct words per minute (CWPM). During baseline, students independently and silently read books for 30 min after which the researcher administered a DIBELS oral reading fluency (DORF; Good & Kaminski, 2002) passage. Prior to the paired repeated readings intervention, students were provided training about the correction procedure and the role of reader and listener. During each session, each student in the pair sat across from each other and placed their reading passage, good tutor card, and correction card in front of them. The good tutor card was
stamped by the circulating teacher if appropriate tutoring behavior was observed. The students took two turns reading the passage for 10 min, however, the student with an intellectual disability did not participate in reciprocal reading. A correction procedure was used. After the repeated readings of the passage, the students individually read the passage for 1 min and recorded their correct words per minute in their reading logs. Tangible rewards were given if a student met his or her goal on the third day of repeated readings. Overall results indicated an increase in oral reading rate from baseline to intervention for all students. On the other hand, none of the students met their end-of-year goals on the end of year DIBELS benchmark. “Effect size estimates indicated that the intervention had a moderate to large effect on students’ oral reading fluency” (Musti-Rao et al., 2009, p. 17). Specifically, the student with an intellectual disability increased her mean CWPM scores of 13.3 during baseline to 24.9 during intervention. Her DIBELS (Good & Kaminski, 2002) benchmark raw scores increased from 19 to 32. This participant started with passages on the second grade level and, at the end of the study, read 110 CWPM on three passages at the third-grade level.

Synthesis of Studies

Table 5 provides a synthesis of the studies ($N = 4$) utilizing repeated reading interventions with students with intellectual disabilities. One of the studies employed a single-subject design (Musti-Rao et al., 2009), one study utilized a group comparison design (Valleley & Shriver, 2003), and two studies employed experimental research designs (Devault & Joseph, 2004; Mefferd & Pettegrew, 1998). Two studies were conducted at the elementary level and two studies were conducted among high school students. In one study, students were asked to repeatedly read passages as many times as possible for 10 min. Another study required students to read passages twice and practice incorrect words between the two readings. In another study,
there were an unlimited number of repeated readings over the course of one week. In one study, students were asked to repeatedly read passages until meeting preestablished criterion. In three studies, repeated readings were either peer-mediated or combined with word boxes or teacher modeling. In another study, error correction was provided only when students did not pronounce the correct word within 3 s.

**Limitations**

The amount of empirically-based research utilizing repeated reading among students with intellectual disabilities is minimal. There is a shortage of studies that include repeated reading as the independent variable, reading fluency as the dependent variable, and participants with developmental disabilities. The lack of research-based information about how to utilize repeated reading strategies to increase reading fluency among students with intellectual disabilities has resulted in either ineffective applications of repeated reading instruction or the altogether omission of effective repeated reading instruction in classrooms for individuals with developmental disabilities. The small amount of research in this area makes it difficult for one to discern what interventions were the most effective in studies with a combination of strategies. For example, Musti-Rao et al. (2009) combined peer tutoring and repeated reading to determine the effects on reading fluency. It is possible that peer tutoring was the heavier influence on the participant’s reading fluency than repeated reading was.

In general, there needs to be future research incorporating repeated reading strategies that includes individuals with intellectual disabilities. Specifically, there is a need for research among participants with different types of intellectual disabilities (i.e. mild, moderate, etc.) as well as different age groups (primary, secondary, and post-secondary). Second, studies including a larger number of participants would increase internal validity. Third, it would be beneficial if more
interventions were conducted over a substantial period of time (at least six months) with reading samples and assessments taken at regular intervals. Fourth, more research should be conducted among students with developmental disabilities while implementing and varying the available repeated reading strategies. Fifth, future research should compare repeated reading interventions to other interventions to determine which strategy or combination of strategies is most effective at increasing the reading fluency and comprehension of students with developmental disabilities. Sixth, researchers should measure the relationship of fluency and comprehension among students with developmental disabilities. Finally, future research should focus on comparing outcomes of different criterion for fluency.

Conclusions

Although studies examining the reading fluency of students with intellectual disabilities through implementation of repeated reading interventions are severely limited, the results are encouraging. All studies reported above illustrated increases in reading fluency among students with developmental disabilities. Repeated reading instruction alone improved the reading fluency of one high school student with a mild intellectual disability (Valleley & Shriver, 2003). Repeated reading combined with word boxes increased the reading fluency of another high school student with a mild intellectual disability (Devault & Joseph, 2004). Repeated, assisted reading with predictable trade books increased the fluency rates of elementary students with mild intellectual disabilities (Mefferd & Pettegrew, 1997). Peer-assisted repeated reading increased reading fluency rates of one student with an intellectual disability (Musti-Rao et al., 2009)
<table>
<thead>
<tr>
<th>Study/total sample</th>
<th>Instruction type</th>
<th>Disability label/n</th>
<th>CA/grade</th>
<th>IQ</th>
<th>Frequency/duration of instruction</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Devault &amp; Joseph, 2004 (N = 3)</td>
<td>Repeated readings combined with word boxes</td>
<td>MID (n = 1)</td>
<td>High school</td>
<td>57</td>
<td>15-25 min/daily, 5 days/week</td>
<td>Student increased mean increase of 33 words across all passages from initial to repeated reading; high social validity</td>
</tr>
<tr>
<td>Mefferd &amp; Pettegrew, 1997 (N = 3)</td>
<td>Repeated, assisted reading with predictable trade books</td>
<td>MID (n = 3)</td>
<td>Grades 4, 5</td>
<td>63-72</td>
<td>20-30 min/session, 5 days/week, 5 total months</td>
<td>One student more than doubled fluency rate, one student nearly doubled fluency rate, one student showed moderate increase in fluency rate</td>
</tr>
<tr>
<td>Musti-Rao, Hawkins, &amp; Barkley, 2009 (N = 12)</td>
<td>Peer-assisted repeated reading</td>
<td>ID (n = 1)</td>
<td>CA = 9.3-12.5</td>
<td>—</td>
<td>20 min/session, 5 days/week, 17 total weeks</td>
<td>Student with ID increased mean CWPM score from 13.3 to 24.9; DIBELS* benchmark raw scores increased from 19 to 32; started with passages on second grade level and finished at 110 CWPM on three passages at third grade level</td>
</tr>
<tr>
<td>Valleley &amp; Shriver, 2003 (N = 4)</td>
<td>Repeated readings with error correction only when student did not pronounce word</td>
<td>MID (n = 1)</td>
<td>CA = 18</td>
<td>—</td>
<td>20 min/session, 3 times/week, 10 total weeks</td>
<td>Increase in reading fluency from baseline to intervention (70 CWPM to 85 CWPM); increase in errors from baseline to intervention (2.80</td>
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</table>
within 3s

errors to 3.08
errors); no major changes in correct comprehension questions from baseline to intervention

Note. CA = chronological age; IQ = intelligence quotient; MID = Mild Intellectual Disability; CWPM = correct words per minute; “—” = information not reported; ID = Intellectual Disability; LD = Learning Disability; OHI = Other Health Impairment; SED = Severe Emotional Disability. Adapted from “Differences in Performance Between Students with Learning Disabilities and Mild Mental Retardation: Implications for Categorical Instruction,” by E. Caffrey and D. Fuchs, 2007, p. 122. Copyright 2007 by The Division for Learning Disabilities of the Council for Exceptional Children.

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CHAPTER 3

METHODS

This chapter delineates the methodology developed for this investigation.

Experimental Design

In a multiple probe design, after introducing the independent variable in the first tier, there should be an immediate and abrupt change in the dependent variable while data in the other tiers remain stable and unchanged (Gast, 2009). When stable criteria are met in the first tier and baseline data is stable in the second tier, the independent variable is introduced to the second tier, and so on. In this way, a functional relation can be established (Gast, 2009).

Experimental control of history threats to internal validity were demonstrated by collecting pre-intervention data across three tiers (i.e. participants). Multiple tiers manage maturation and history effects. In addition, the participants were functionally similar given their age, IQ scores, and achievement measures. The researcher clearly defined criteria for moving from baseline to intervention phases following stable baseline data. In this study, multiple probes during baseline and continuous measures of data collection during intervention controlled for maturation threats to internal validity.

In this research study, facilitative and inhibitive testing effects were controlled through intermittent probes as opposed to prolonged baselines; students were less likely to get accustomed to the reading passages or get tired or bored from reading short passages on a daily basis. The threat of instrumentation was controlled by developing a measurement system prior to the onset of the study. Proper interobserver agreement collection by two people also controlled
for instrumentation effects. Mortality and attrition threats and threats to external validity were controlled through intersubject replication since there were three participants in the study.

The threat of multiple treatment interference was controlled by introducing only the repeated reading intervention as a new method of instruction during reading instruction for the entire length of the study. Since the researcher and classroom teacher were the same person, adaptation threats were minimized since the students were not learning in a new setting or with a new teacher.

Many researchers prefer to use a traditional group design for a variety of different reasons. However, in traditional group design research methodology, individual responses are often averaged to obtain results, obscuring significant information about individual participants (McCormick, 1995). In turn, the effectiveness of an intervention is often judged by the mean performance of all participants. Unfortunately, outliers can skew group data and misrepresent the data being presented; students in special education often contribute to outlier scores. “Mean results do not tell us much about the effects of the treatment on specific pupils who are not represented by the mean” (McCormick, 1995, p. 4); students receiving special education services do not represent the mean of the general population.

McCormick (1995) recommends using single-subject research when large numbers of individuals in certain populations are not readily available. Unfortunately, the very nature of the single-subject research design can make it difficult to find a comparable control group. It is also hard to control for differences among individuals participating in a study. Due to the nature of the participants’ disabilities in the researcher’s study, only a small number of participants met criteria. For this reason and other reasons stated below, the researcher chose to employ single-subject research methodology to answer her research questions.
Single-subject research methodology allows for repeated and frequent measurement of responses throughout intervention. As a result, data is analyzed on an individual and personalized basis (McCormick, 1995). In this way, researchers can make immediate changes as needed. In addition, researchers can conclude that an intervention may work for one student but not for another. “A basic tenet is that decisions about results are made by expressly delineating what has occurred with each individual in the investigation” (McCormick, 1995, p. 1).

In single-subject research methodology and especially in multiple baseline designs, participants may serve as their own controls. Therefore, target behaviors during baseline are compared to those during intervention. Serving as one’s own control decreases many threats to internal validity compared to other experimental designs. Finally, single-subject methodology is popular among teacher researchers since it can be embedded in ongoing instruction (McCormick, 1995). The researcher was also a full-time classroom teacher, and this design fit easily into her daily routine without altering or taking away from her students’ education.

The researcher utilized a multiple probe across participants design (Cooper, Heron, & Heward, 1987; Horner & Baer, 1978; Tawney & Gast, 1984) to employ the intervention, evaluate the data, and answer the research questions. The three phases of the study were baseline, intervention, and maintenance. During the baseline and maintenance conditions, students read a passage once without error correction. Baseline probes were conducted at least once each week for each student, and at least three consecutive probes were conducted for each student prior to the intervention condition. During the intervention condition, students repeatedly read a passage three times while receiving error correction from the data collector. After reading the passage, the students answered comprehension questions. Data analysis was conducted by comparing
correct words per minute, errors per minute, and percentage of correct answers to comprehension questions during the baseline, intervention, and maintenance phases.

Participants

Three students with intellectual disabilities, ranging in age from 11 years 1 month to 12 years 1 month, participated in this study. The students attended a suburban elementary school with approximately 700 students. Each student had received special education services upon entering elementary school. Table 6 displays the demographic and educational information for each student to supplement the descriptions below. Table 7 displays psychometric descriptions of the participants. Table 8 displays speech and language information about the participants.

Table 6: Participant Demographic and Educational Information

<table>
<thead>
<tr>
<th>Student</th>
<th>Gender</th>
<th>Age</th>
<th>Ethnicity</th>
<th>Grade</th>
<th>Eligibility</th>
<th>STAR* Reading Level</th>
<th>QRI** Reading Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom</td>
<td>Male</td>
<td>12 -1</td>
<td>Caucasian</td>
<td>5</td>
<td>MID, SLI</td>
<td>1.1 GE</td>
<td>Primer</td>
</tr>
<tr>
<td>Chad</td>
<td>Male</td>
<td>11 -1</td>
<td>Caucasian</td>
<td>5</td>
<td>MID, SLI</td>
<td>0.8 GE</td>
<td>Pre-Primer</td>
</tr>
<tr>
<td>Brian</td>
<td>Male</td>
<td>11 -2</td>
<td>Caucasian</td>
<td>4</td>
<td>MID, SLI</td>
<td>1.6 GE</td>
<td>1</td>
</tr>
</tbody>
</table>

Note. MID = Mild Intellectual Disability; SLI = Speech and Language Impairment; GE = grade equivalency; ORF = Oral Reading Fluency; CWPM = correct words per minute.
*STAR = Standardized Test for the Assessment of Reading by Renaissance Learning. Copyright 2009 by Renaissance Learning.
**QRI = Qualitative Reading Inventory (5th Ed.) by L. Leslie & J. S. Caldwell. Copyright 2011 by Pearson, Boston, MA.
Table 7: Psychometric Description of Participants

<table>
<thead>
<tr>
<th>Student</th>
<th>Achievement measures</th>
<th>Adaptive Behavior Scales</th>
<th>Cognitive measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom</td>
<td>WJ-III*</td>
<td>VABS-II**</td>
<td>DAS-II***</td>
</tr>
<tr>
<td></td>
<td>Broad Reading: 2.0 GE; 57 SS</td>
<td>Parent Interview</td>
<td>GCA: 71</td>
</tr>
<tr>
<td></td>
<td>Letter-Word Identification: 2.3 GE; 67 SS</td>
<td>Composite: 70</td>
<td>Verbal Reasoning: 71</td>
</tr>
<tr>
<td></td>
<td>Reading Fluency: 2.0 GE; 66 SS</td>
<td>Teacher Form Composite: 66</td>
<td>Nonverbal Reasoning: 76</td>
</tr>
<tr>
<td></td>
<td>Passage Comprehension: 1.6 GE; 63 SS</td>
<td></td>
<td>Spatial Reasoning: 76</td>
</tr>
<tr>
<td>Chad</td>
<td>WJ-III*</td>
<td>VABS-II**</td>
<td>WISC-IV****</td>
</tr>
<tr>
<td></td>
<td>Broad Reading: 1.3 GE; 42 SS</td>
<td>Composite: 35</td>
<td>Full Scale IQ: 59</td>
</tr>
<tr>
<td></td>
<td>Letter-Word Identification: 1.2 GE; 45 SS</td>
<td>Communication: 45</td>
<td>Verbal Comprehension</td>
</tr>
<tr>
<td></td>
<td>Reading Fluency: 1.6 GE; 59 SS</td>
<td>Daily Living: &lt;20</td>
<td>Comprehension Index: 61</td>
</tr>
<tr>
<td></td>
<td>Passage Comprehension: 1.4 GE; 57 SS</td>
<td>Socialization: 51</td>
<td>Perceptual Reasoning: 82</td>
</tr>
<tr>
<td>Brian</td>
<td>WJ-III*</td>
<td>ABAS-II*****</td>
<td>DAS-II***</td>
</tr>
<tr>
<td></td>
<td>Broad Reading: 2.2 GE; 71 SS</td>
<td>Conceptual: 59</td>
<td>GCA: 63</td>
</tr>
<tr>
<td></td>
<td>Letter-Word Identification: 2.6 GE; 80 SS</td>
<td>Social: 70</td>
<td>Verbal Reasoning: 70</td>
</tr>
<tr>
<td></td>
<td>Reading Fluency: 2.2 GE; 77 SS</td>
<td>Practical: 63</td>
<td>Nonverbal Reasoning: 69</td>
</tr>
<tr>
<td></td>
<td>Passage Comprehension: 1.8 GE; 74 SS</td>
<td>GCA: 61</td>
<td>Spatial Reasoning: 58</td>
</tr>
</tbody>
</table>

Note. GE = grade equivalency; SS = standard score; GCA = General Conceptual Ability; IQ = intelligence quotient.


**VABS-II = Vineland Adaptive Behavior Scales (2nd ed.) by S. Sparrow, D. Cicchetti, & D. Balla. Copyright 2005 by Pearson Assessment, Minneapolis, MN.

***DAS-II = Differential Ability Scale (2nd ed.) by C. D. Elliott. Copyright 2007 by The Psychological Corporation, San Antonio, TX.
Table 8: Participant Speech and Language Information

<table>
<thead>
<tr>
<th>Student</th>
<th>OWLS* Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom</td>
<td>Listening Comprehension: 57 SS</td>
</tr>
<tr>
<td></td>
<td>Oral Expression: 57 SS</td>
</tr>
<tr>
<td></td>
<td>Oral Composite: 55 SS</td>
</tr>
<tr>
<td>Chad</td>
<td>Listening Comprehension: 67 SS</td>
</tr>
<tr>
<td></td>
<td>Oral Expression: 63 SS</td>
</tr>
<tr>
<td></td>
<td>Oral Composite: 63 SS</td>
</tr>
<tr>
<td>Brian</td>
<td>Listening Comprehension: 51 SS</td>
</tr>
<tr>
<td></td>
<td>Oral Expression: 62 SS</td>
</tr>
<tr>
<td></td>
<td>Oral Composite: 54 SS</td>
</tr>
</tbody>
</table>

Note. SS = standard score.
*OWLS = *Oral and Written Language Scale* by E. Carrow-Woolfolk. Copyright 1995 by ProEd, Austin, TX.

Tom

Tom had diagnoses of Autism, Attention Deficit Hyperactivity Disorder, Seizure Disorder, and migraines. He took Depakote and Levetiracetam. He received speech and language therapy services. Academically, he had relative strengths in mathematical calculation and mathematical reasoning. He had academic weaknesses in reading decoding, reading comprehension, reading fluency, listening comprehension, and written expression. He was easily distracted, inattentive, and often complained of being sleepy. He often “stared off into space”; his doctors felt that this was most likely the result of absence seizures. He had poor social skills but got along well with his teachers and peers. He was extremely friendly and enjoyed verbal and physical reinforcement.

Chad

Chad had diagnoses of Attention Deficit Hyperactivity Disorder, Mild Intellectual Disability, and Tourette’s Syndrome. He took medication to specifically address his ADHD and
Tourette’s Syndrome. He became eligible to receive speech and language therapy services after
the conclusion of this study. Academically, Chad had strengths in reading comprehension and
listening comprehension. He had academic weaknesses in reading decoding, reading fluency,
written expression, mathematical calculation, and mathematical reasoning. Chad was outgoing,
friendly, and cooperative. He was easily distracted and had a habit of playing with pencils,
erasers, and books during routine classroom instruction.

*Brian*

Brian had a diagnosis of Goldenhar Syndrome, which is a congenital birth defect that
involves deformities of the face, manifesting in incomplete development of the ear, nose, soft
palate, lip, and jaw. He received speech and language therapy services. Ben’s average rate of
conversational speech was approximately 22 words per min. His average rate of conversational
speech was computed by dividing the number of words (n=132) he produced during a normal
conversation lasting 6 min. He had academic strengths in reading decoding. He had academic
weaknesses in reading fluency, reading comprehension, written expression, mathematical
calculation, mathematical reasoning, and oral expression. He enjoyed reading and was friendly
and cooperative. He was easily distracted and had habits of rocking, tapping his pencil, and
flipping pages of his book. When he was asked to perform certain academic tasks such as
reading or math, Brian would occasionally exhibit whole-body spasms that were stress-induced.
His spasms only occurred at the onset of the task and generally stopped once he began the task.
To individuals unaccustomed to speaking with Brian, speech intelligibility was often difficult to
understand as a result of facial malformations due to birth defects as well as low speaking
volume. On the other hand, the researcher had been his teacher for almost two years, and she was
familiar with his speech; the paraprofessional who was responsible for interobserver reliability checks had worked with him for several years and was also familiar with his speech.

These particular students were selected to participate because they were in the researcher’s self-contained class, and they demonstrated difficulties in reading performance, especially reading fluency. In the past academic year, they had only minimally increased their reading fluency. There were three additional self-contained students and eight resource students in the researcher’s class, but they had disabilities and eligibilities other than intellectual disabilities (i.e. Attention Deficit Hyperactivity Disorder, Learning Disabilities, Autism, and Emotional and/or Behavioral Disorders). Even though the participants’ teacher had routinely implemented instruction that included informal repeated reading and error correction, they did not have experience with systematic repeated readings combined with error correction prior to this study. All of the participants had less than 15 absences during the first part of the school year; students who were absent more than 15 days would not have been chosen for the study to control for mortality or attrition threats to internal validity. Based on teacher observation, each of the participants met the criteria for necessary prerequisite skills identified by the researcher and listed in Table 9.

Table 9: Participant Prerequisite Skills

<table>
<thead>
<tr>
<th>Skill</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Follow one-step oral direction with no more than three prompts</td>
<td>Within 5 s</td>
</tr>
<tr>
<td>2. Maintain attention to a task with no more than three prompts</td>
<td>15 min</td>
</tr>
<tr>
<td>3. Comprehend information presented orally</td>
<td>All information</td>
</tr>
<tr>
<td>4. Orally respond to teacher with no more than 1 prompt</td>
<td>Within 5 s</td>
</tr>
<tr>
<td>5. Sit in a seat or stand at same place next to table</td>
<td>15 min</td>
</tr>
<tr>
<td>6. Track words while reading</td>
<td>With or without finger or with use of bookmark</td>
</tr>
</tbody>
</table>
Parental permission to participate in this study was obtained through a Parental Consent Form (see Appendix G). The researcher sent a form home with each student and verbally spoke with each student’s parents to explain the intervention and to ask them if there were additional questions that could be answered. Student permission to participate in this study was obtained through a Minor Assent Form (see Appendix H). The researcher individually read the forms to the students, explained the intervention, and asked them if they had any questions. Permission to conduct the study was obtained from the Human Subjects Office through the University of Georgia, the elementary school’s board of education, and the elementary school’s principal prior to the beginning of the study.

Setting and Arrangements

The students participating in this study received academic instruction in a self-contained and resource classroom for third, fourth, and fifth graders with mild disabilities. They participated in lunch and specials (P.E., art, music, and computer) with students in the general education setting. Two out of the three participants also received a half-hour of social studies and science instruction in the general education setting with paraprofessional support. The remainder of their instruction took place in the special education classroom. There were three other self-contained students who were in the special education classroom all day. There were also eight resource students who came into the classroom throughout the day for reading, language arts, math, and social skills instruction. One special education teacher and one paraprofessional were present in the classroom all day with the exception of science and social studies instruction. The special education teacher, researcher, and primary data collector were the same person.

During baseline, intervention, and maintenance conditions, the researcher worked with each participant individually. They sat at a kidney-shaped table at the front of the classroom with
the researcher sitting across from the participant. Non-participants either worked with the paraprofessional or completed independent work while being supervised by the paraprofessional.

The classroom was approximately 36 ft by 22 ft. There were 15 student desks arranged around the classroom, two teacher desks, a large kidney-shaped table in the front of the room, and two large rectangular tables in the middle of the room. A dry-erase board and student cubbies were along the wall at the front of the classroom; a bulletin board, the classroom library, and 2 bookshelves were along the second side of the classroom; and two large windows with bookshelves and cabinets between them were along the third side of the classroom. There were three computers, a bookshelf, a sink, and a counter along the back wall.

Materials

Reading Passages

Prior to the beginning of the study, each student’s reading level was obtained using the Qualitative Reading Inventory, 5th ed. (QRI; Leslie & Caldwell, 2011). The QRI (Leslie & Caldwell, 2011) is a reading inventory that assesses the oral and silent reading and listening ability of students from the pre-primer through the high school levels. An educator can use graded word lists to determine a student’s approximate independent, instructional, and frustration levels for each grade level. Leslie and Caldwell (2011) developed the QRI word lists by choosing words from the passages that represented the most common words. Common words are those with the highest Standard Frequency Index (SFI) from the Word Frequency Book (Carroll, Davies, & Richman, 1971). For each grade level (ranging from pre-primer through high school), students reading 90-100% correct words are at the independent level, those reading 70-85% correct words are at the instructional level, and those reading below 70% are at the frustration level. The researcher used the same reading levels as measured by the QRI (Leslie & Caldwell,
2011) when pulling passages and accompanying comprehension questions from other informal reading inventories.

Reading passages were obtained from seven different informal reading inventories: QRI (Leslie & Caldwell, 2011); Analytical Reading Inventory, 8th ed. (Woods & Moe, 2007); Classroom Reading Inventory, 10th ed. (Silvaroli & Wheelock, 2004); Basic Reading Inventory, 4th ed. (Johns, 1988); Informal Reading Inventory, 7th ed. (Roe & Burns, 2007); Developmental Literacy Inventory (Temple, Crawford, & Gillet, 2009); and Bader Reading and Language Inventory, 2nd ed. (Bader & Wiesendanger, 1994).

Alternate form reliability of different reading passages on the QRI (Leslie & Caldwell, 2011) ranged from .75 to 1.00. Criterion-related validity scores for first grade level passages on the QRI (Leslie & Caldwell, 2011) were .85 ($p < .01$); there were not enough children (in the pre-primer or primer levels) reading expository text to reliably obtain a measure of criterion-related validity scores.

Passages used in the Bader Reading and Language Inventory, 2nd ed. (Bader & Wiesendanger, 1983) were tested for reliability. Forty elementary students and 40 secondary and adult students orally read the passages, yielding correlation coefficients of .80 and .83, respectively. In addition, an unpublished study by Pearce (1981) examined the validity of the graded passages as an instrument for determining reading level by comparing the graded passages to assigned basal reader materials. Pearce (1981) found that 60% of the students were given identical placement, 23% were placed one level higher in their basal readers than the reading inventory passages had placed them in, 3% were two levels higher, and 13% were one level lower. Bader and McIntyre (1986) compared assigned reading levels from the Bader Reading and Language Inventory, 2nd ed. (Bader & Wiesendanger, 1983) to estimated reading
levels by reading specialists and classroom teachers and published a criterion-related validity score of .93.

Although the authors described the development of their reading inventories and included information about readability formulas, specific reliability and validity information was not provided in the Basic Reading Inventory, 4th ed. (Johns, 1988), Classroom Reading Inventory, 10th ed. (Silvaroli & Wheelock, 2004), Analytical Reading Inventory, 8th ed. (Woods & Moe, 2007), Informal Reading Inventory, 7th ed. (Roe & Burns, 2007), or Developmental Literacy Inventory (Temple et al., 2009)

Tom read passages on the primer level. He scored 70% on the QRI’s (Leslie & Caldwell, 2011) first grade level word list. Since 70% was on the borderline between instructional and frustration levels, the researcher chose to place him on primer level passages; he scored 95% (independent level) on primer level passages. Collective primer passages from the seven reading inventories ranged from 52 to 176 words in length. There was a range of four to ten comprehension questions on the primer passages.

Chad read passages on the pre-primer level. He scored 76% (instructional level) on the QRI’s (Leslie & Caldwell, 2011) pre-primer 1 word list. Collective pre-primer passages ranged from 27 to 84 words in length. There was a range of five to eight comprehension questions on the pre-primer passages.

Brian read passages on the first grade level. He scored 70% on the QRI’s (Leslie & Caldwell, 2011) second grade level word list. Since 70% was on the borderline between instructional and frustration levels, the researcher chose to place him on first grade level passages; he scored 90% (independent level) on first grade level passages. Collective first grade
passages ranged from 41 to 266 words in length. There was a range of three to ten comprehension questions on the level 1 passages.

To be included in the study, passages were either pre-primer, primer, or level 1; in addition, they had to be accompanied by comprehension questions. Passages from the different reading inventories were pooled and then presented in random order. A different passage was presented for each session.

Before presenting the reading passages to the students, all passages were re-typed with 15-point Times New Roman font and double-spaced on white paper (8 ½ by 11 in.) with 1-inch margins (see Appendix A for an example). To control for testing threats to internal validity, re-typed passages did not include illustrations, even if illustrations accompanied passages in the informal reading inventories.

The Data Collector copy (see Appendix B for an example) of the reading passage had three copies of the story (to be used during the intervention condition) and also included basic information including the student’s name, date, session number, phase of the study, data collector’s name, and space for relevant or important comments.

Comprehension Questions

Pages with each passage’s comprehension questions (see Appendix C for an example) were photocopied or re-typed verbatim and attached to the Data Collector Copy. The researcher marked each student’s answers to the comprehension questions as correct or incorrect and made notes as necessary. Then she calculated and recorded the percentage of correct responses.

Reinforcers

Frequent verbal praise and physical praise (e.g. high-fives) were given throughout the study. During the baseline and maintenance phases, the data collector provided praise at the end
of the reading passage and after the student answered the comprehension questions (e.g., “Good work today.”). During the error correction procedure in the intervention phase, praise was provided if the participant correctly read a previously incorrect word. In addition, praise was also provided after each of the three repeated readings and after the students answered the comprehension questions.

A classroom token economy system, established prior to the study, was also used during this intervention. In this token economy, students earned and lost “fuzzies” (pom-pom balls used in arts and crafts projects) based on clearly defined behaviors. Fifty fuzzies were, in turn, exchanged for preferred reinforcers such as free time, computer time, lunch in the classroom, one homework pass, or the opportunity to pick a treat from the classroom treasure box. Throughout and after every session in this study, students were given fuzzies to increase motivation, cooperation, and preferred behavior.

Other Materials

Other materials that were used in the study included pencils, a stopwatch, a privacy divider, bookmarks for students to use as place markers, an audio-tape recorder, audio tapes, the CWPM/EPM/Comprehension Recording Sheet (see Appendix D), and the Procedural Checklist for Data Collector (see Appendix E). In the event the data collector needed to review the oral readings and for interobserver reliability checks, all sessions were audio recorded to facilitate data collection and to control for instrumentation threats to internal validity.

Procedures

General Procedures

The study took place over a total of 42 sessions. There were at least three probes for each student during the baseline condition. There was one maintenance probe each week for each
student following the intervention condition. To control for instrumentation threats to internal validity, the sessions took place the same time each day for each student. The maximum length of each session was 15 min. There was no more than one session per day for each participant during all phases to control for testing threats (i.e. test fatigue) to internal validity. During the intervention phase, there was one session every day for each participant. Due to all participants’ attention deficits and one participant’s body spasms related to performance-induced stress, the researcher did not start timing passages until each student began reading the first word of the passage.

While the researcher conducted readings with the individual participants, the special education paraprofessional assigned to the classroom supervised and worked with the other students in the classroom.

Prior to the study, the researcher decided on the following procedures for deciding the order of students entering the intervention phase. The student with the most stable baseline probe data in a non-therapeutic trend moved to the intervention phase first. If there was more than one student with stable, non-therapeutic baseline probe data, the researcher would use her best judgment based on overall classroom performance, attention, and behavior when choosing who moves to the intervention phase first. The second and third students were chosen following the same procedures.

Baseline, intervention, and maintenance were the three conditions in the study. During baseline probes, multiple probes were staggered over sessions for the three participants before the independent variable of repeated readings combined with error correction was introduced during the intervention condition. Maintenance probes began one week after the intervention phase ended.
Experimental Procedures

Baseline. The purpose of the baseline condition was to collect data on the students’ reading fluency prior to the introduction of the independent variable. During baseline, each student individually met with the researcher at the kidney-shaped table in the classroom. The student read one reading passage one time during each probe. There was at least one probe for each student per week during baseline.

During each baseline session, the researcher presented a reading passage and asked the student to read the passage out loud (e.g. “I want to listen to you read this story, and then I want you to answer questions about it. Try to do your best.”). As the student read for 1 min, the data collector recorded each word as correct or incorrect. The researcher coded the following three types of errors – word read incorrectly, word omitted, and word not read within 3 s. After 1 min, the researcher placed a mark (/) after the last word read and prompted the student to finish reading the passage. The number of correct words per minute (CWPM) and errors per minute (EPM) were recorded for the first minute only. When the student finished reading the passage, the researcher provided verbal praise (e.g. “Great job reading!”) and gave him a fuzzy. Then she asked the student to answer comprehension questions (e.g. “Now I’m going to ask you some questions about what you just read.”). After the student verbally answered the questions, she provided verbal praise (e.g. “Great job today! Thank you.”) and gave him a fuzzy. During the baseline condition, the researcher followed the procedures on the Procedural Checklist for Data Collector (see Appendix E).

Before each student entered the intervention phase, he was probed at least three consecutive times until a stable pattern of responding could be established. Reviewed studies were unclear in their criteria of moving from baseline to intervention phases. Therefore, the
researcher felt that a stable pattern of responding occurred when a student exhibited a non-therapeutic trend in CWPM during baseline. The researcher also established criteria for staggering the introduction of the intervention due to the possibility of variability in data and trend and the potential of an increasing trend in data from testing effects; students did not move from baseline to intervention until the student before them had established intervention criteria.

*Intervention.* The researcher implemented repeated readings supplemented by systematic error correction during the intervention phase. Students began intervention after at least three days of stable, non-therapeutic baseline data. The implementation of the intervention condition closely followed the repeated readings procedures implemented in the study conducted by Alber-Morgan et al. (2007).

Students with intellectual disabilities make slow and gradual academic gains. For this reason, the researcher chose successive improvements as the criteria for mastery during intervention. Weinstein and Cooke (1992) found that both methods of fixed-rate criterion and successive improvements criterion were effective at producing gains in reading fluency. Even though the participants in this study read a different passage each day, they were required to demonstrate three consecutive sessions of improvement. More specifically, each participant was required to read a minimum of one additional correct response (i.e. CWPM) for three consecutive sessions. After each student met overall criteria for intervention, he entered the maintenance phase, and the next student began the intervention phase.

Rashotte and Torgesen (1985) recommend that students reread a passage up to four times per session. O'Shea et al. (1987) compared the effectiveness of rereading passages one, three, and seven times and found that students read more fluently when passages were read seven versus three times and three times versus one time. In each session during intervention, each
passage was read three times by the student. The researcher chose three repeated readings to give the students a sufficient number of repeated readings while keeping the sessions at a length that would keep their attention.

The researcher presented a reading passage and asked the student to read the passage out loud (e.g. “I want to listen to you read this story. Try to do your best.”). The first reading of the passage was untimed so that the student did not feel pressure to read quickly and could concentrate on reading the words accurately. As the student read, the data collector recorded and coded errors on the first copy of the passage (see Appendix B).

Each time the student made a reading error, the following error correction procedure was used. The researcher pointed to and read the word correctly, prompting the student to repeat the word, and provided verbal praise if the student was correct. After the student read the entire reading passage (approximately 1-10 min), the researcher gave the student a fuzzy. Then she reviewed each error by pointing to the word and saying, “What’s this word?” If the student read the word correctly, the researcher delivered verbal praise (e.g. “Good.” or “Great!” or “Yes.”). If the student read the word incorrectly or did not read it within 3 s, the researcher stated the word, asked the student to repeat it, and delivered verbal praise. At the end of the error correction procedure, the researcher gave the student a fuzzy.

After the first reading of the passage and error correction, the researcher told the student he was going to be timed to see how many words he could read in 1 min. The researcher did not correct errors during this time but recorded and coded errors. At this time, however, the researcher told the student the correct word if 3 s went by without reading the word. After the second reading, the researcher gave the student a fuzzy and delivered verbal praise. Next, the researcher told the student he would read the passage a third time for 1 min. She followed the
same procedures as in the second reading. When the student finished reading the passage for the third time, the researcher provided verbal praise (e.g. “Great job reading!”) and gave him a fuzzy. Then she asked him to answer comprehension questions (e.g. “Now I’m going to ask you some questions about what you just read.”). After the student verbally answered the questions, she provided verbal praise (e.g. “Great job today! Thank you.”) and gave him a fuzzy. During the intervention condition, the researcher followed the procedures on the Procedural Checklist for Data Collector (see Appendix E).

**Maintenance.** Maintenance probes were conducted for each student once each week following the conclusion of the intervention phase. Maintenance probes lasted the remainder of the study. At least three maintenance probes were conducted for each student. The same procedures that were utilized in the baseline phase were used in the maintenance phase (see Appendix E).

**Dependent Variables**

**Correct Words per Minute.** A word was counted as correct if it was independently pronounced within 3 s of the previous word read. A word was also counted as correct if the student first pronounced it incorrectly but independently corrected it within 3 s (Alber-Morgan et al., 2007). Correct words per minute were recorded for the first minute only of each reading. If a student read a passage in less than 60 s, the researcher computed the correct words per minute by using the following formula: (total number of words read – number of words read incorrectly) / reading time in seconds) x 60.

**Errors per Minute.** A word was counted as an error if it was stated incorrectly, mispronounced, omitted, or not stated within 3 s of the previous word read. If a student hesitated for more than 3 s, the researcher provided the word for the student so that he could continue
Reading (Alber-Morgan et al., 2007). Errors per minute were recorded for the first minute only of each reading. If a student read a passage in less than 60 s, the researcher did not alter the number of errors read.

Reading Comprehension. After the students read each passage for the final time, the researcher orally administered comprehension questions and recorded the students’ responses. The comprehension questions along with correct responses were included in the reading inventories; the researcher did not omit or add questions. The number of questions ranged from three to ten questions. The comprehension questions consisted of both literal and inferential questions. The researcher did not separate results by the types of comprehension questions; instead, she pooled student responses to all comprehension questions to obtain an overall comprehension score for each passage. Even though the researcher repeated the questions or rephrased the questions to ensure understanding, she did not prompt the students in any way during the presentation of the comprehension questions. Responses were counted as correct if they matched one of the possible responses listed in the reading inventories. All other responses including unanswered or partially answered questions were scored as incorrect (Alber-Morgan et al., 2007).

Reliability

Interobserver Agreement for CWPM, EPM, and Comprehension. The primary data collector was the teacher researcher in the classroom. The researcher asked a paraprofessional who was familiar with the participants to become the secondary data collector and provide interobserver agreement. This paraprofessional was not the same paraprofessional who worked with the students on a daily basis. On the other hand, she had been assigned to their classroom
the previous year. Therefore, she was familiar with the participants’ speech, reading, and mannerisms.

Before the study began, the researcher trained the paraprofessional. During the training, the paraprofessional was provided with a copy of the Procedural Checklist (see Appendix E) for the baseline, intervention, and maintenance conditions of the study. The paraprofessional was only responsible for steps 8, 9, 13, 16, and 17 during the baseline and maintenance conditions; the researcher had highlighted these steps for the paraprofessional. For the intervention condition, the researcher asked her to repeat those steps for the third reading and comprehension questions only; she was not asked to record data for the first two readings. After the researcher explained and modeled each step, the paraprofessional role-played the required steps and received feedback from the researcher. The paraprofessional role-played until achieving 100% accuracy in the required steps.

The researcher conducted all sessions, collected data for every session, and audio taped all sessions. The secondary data collector did not conduct the sessions, nor did she attend the sessions. Instead, she independently listened to the taped sessions. This provided her with the same opportunity as the researcher; they were both able to review or rewind the tapes as needed to get the most accurate data collection. To control for observer bias and observer drift (instrumentation threats to internal validity), the researcher asked the paraprofessional to explicitly follow the steps provided on the highlighted procedural checklist. The paraprofessional independently recorded errors and comprehension data on her own Data Collector Copy (see Appendix B).

Reliability probes were conducted once per week per student and at least once per condition. A total of 34 out of 70 (49% of all sessions) reliability probes were randomly chosen
and conducted. Interobserver agreement (IOA) was assessed for fluency (CWPM and EPM) and comprehension. The researcher’s Data Collector Copies were compared to the paraprofessional’s marked copies to determine IOA. For fluency IOA, the researcher highlighted differences in the errors marked by each data collector to mark them as disagreements. If one data collector marked a word as an error but the other data collector counted it as correct, the researcher marked it as a disagreement. If the data collectors marked the same word as an error but coded it as a different type of error, the researcher counted it as an agreement and did not mark it. For comprehension IOA, the researcher marked an answer as a disagreement if one data collector marked it as correct but the other data collector marked it as incorrect.

The point-by-point agreement of calculating IOA was used to gather reliability data for both fluency and comprehension. To calculate point-by-point agreement, the following formula was used: \( \frac{\text{agreements}}{\text{agreements} + \text{disagreements}} \times 100 \) (Alberto & Troutman, 2006; Tawney & Gast, 1984). The researcher did not use gross agreement of calculating IOA because it can easily mask problems in specific items and can portray an elevated percentage of IOA. The gross method of calculating IOA would have been inappropriate for this study since there were permanent products to use; the researcher could easily compare how each person scored each word.

*Procedural Fidelity.* Procedural fidelity was assessed 9 times (13% of the total number of sessions). It was assessed one time for each student per session during the baseline, intervention, and maintenance phases. During these sessions, the secondary data collector (paraprofessional not assigned to the classroom) used the Procedural Checklist for Data Collector (see Appendix E) to assess the researcher’s adherence to the procedures in the correct order. She placed a check next to each completed step of the procedure and an “x” next to each missed step of the
procedure. Procedural reliability was calculated by determining the mean percentage of steps observable (Sheridan, Swanger-Gagne, Welch, Kwon, & Garbacz; 2009); more specifically, it was calculated by dividing the number of steps followed correctly divided by the total number of steps and multiplying by 100.

**Social Validity**

At the conclusion of the study, the researcher individually interviewed the participants to determine their opinions of the repeated readings combined with error correction (see Appendix F). They were asked the following six questions: 1) Do you think repeated readings affected your reading skills; 2) What did you like about doing the repeated readings; 3) What did you NOT like about doing repeated readings; 4) Did repeated readings help you remember the story; 5) Did repeated readings help you to understand what happened in the story; and 6) Would you use repeated readings in social studies, science, or when reading your A.R. books? The researcher had to re-word some of the questions to help the students better understand what she was asking. Data is reported through anecdotal reports in the data analysis section.

**Data Analysis Procedures**

Results from the study were reported and organized into graphs (see Figures 1 and 2). The figures depict correct words per minute, errors per minute, and the percentage of comprehension questions answered correctly. Data in the graphs were analyzed through visual analysis. The mean and range of data in each condition were reported for additional data analysis. Within condition analysis focused on factors such as level stability, absolute level change, and trend factors such as trend direction, and trend stability. Level stability is determined by finding the range of data point values in a series or set of data. Generally, if 80%-90% of the data points in a condition fall within a 15% range of the mean level of all the data points in that
condition, researchers will consider the data stable (Tawney & Gast, 1984). The researcher of the present study considered the level to be stable if 80% of the data points fell within a 20% range of the mean level of all the data points. The mean level of a condition was calculated by adding the values of all data points, dividing the sum by the number of data points, and drawing a mean line parallel to the abscissa at that value (Tawney & Gast, 1984). Absolute level change within a condition was computed by identifying the values of the first and last data points of a condition, subtracting the smallest value from the largest value, and noting whether the change in level was accelerating or decelerating (Tawney & Gast, 1984).

Trend refers to the overall direction of the data path. Trend direction refers to the steepness of the data path over time and is referred to as accelerating/increasing, decelerating/decreasing, or zero celeration/zero trend (Cooper, Heron, & Heward, 1987; Tawney & Gast, 1984). Two methods of estimating the trend line are the freehand method and the split-middle method. In the freehand method, one visually inspects the graphed data and draws a straight line that bisects the data points (Cooper et al., 1987; Tawney & Gast, 1984). In the split-middle method, described by White and Haring (1980) and illustrated by Tawney and Gast (1984), one divides the data into two equal parts, finds the intersections of the mid-rate and mid-date for each half, draws a line through the data which passes through both of the intersections, and counts the number of data points which fall above and below the drawn line. If there is not a balanced number of data points above and below the line, one should move the line up or down until the data points are balanced. A trend could be considered stable if 80%-90% of the data points in the condition fall within a 15% range of the trend line (Tawney & Gast, 1984). The researcher of the present study considered the trend to be stable if 80% of the data points fell within a 20% range of the mean of all the data points. Cooper et al. (1987) noted that trend lines
should be used and interpreted with care because they can obscure important trends and variability in the data.

In this study, between conditions analysis focused on absolute level change, trend differences, changes in data stability/variability, the percentage of overlapping data points, and the participants’ overall performance across replications. Absolute level change between adjacent conditions was computed by identifying the values of the last data point of the first condition and the first data point in the second condition, subtracting the smallest value from the largest value, and noting whether the change in level was accelerating or decelerating (Tawney & Gast, 1984). When a large difference in the level occurs immediately following the introduction of a new condition, the level change is considered “abrupt”, which can be an indication of an effective intervention (Tawney & Gast, 1984). The percentage of overlap of data point values was calculated by determining the range of data values in the first condition, counting the number of data points in the second condition that fall within the range of values in the first condition, and dividing the number of data points which fall within the range of the first condition by the total number of data points in the second condition and multiplying this number by 100 (Tawney & Gast, 1984). As a general rule, the lower the percentage of overlap, the more effect the intervention has on the dependent variable(s). However, variability must be considered. For example, unusual data points (outliers) and ceiling or floor level effects in the data may cause a high percentage of overlap even though there is a direct relationship between the independent and dependent variables.
CHAPTER 4
RESULTS

This study sought to examine the effects of repeated readings paired with error correction on the reading fluency and comprehension skills of elementary-age students with intellectual disabilities. The purpose of this chapter is to report the effects of the independent variable, repeated readings with error correction, on the dependent variables of correct words per minute, errors per minute, and the percentage of comprehension questions answered correctly. Raw data and subsequent interpretation of the raw data are provided. In addition, study reliability (interobserver agreement and procedural fidelity) and social validity results are reported. Discussion of the results, limitations, and implications for practice and future research are presented in the next chapter.

Sessions

Table 10 includes the number of sessions for each participant during each condition. Participants remained in the intervention phase until they demonstrated three consecutive sessions in which there were improvements of at least one additional correct word per minute. The study was concluded after the researcher collected three maintenance probes for the last participant. With the exception of a series of repeated baseline measures prior to intervention for each participant, probe sessions were conducted on the same days for the participants throughout the study. Spring Break occurred during the study, and the students did not attend school for a period of one week. Spring Break occurred during the maintenance condition for all participants and did not affect results gathered during the intervention condition.
Table 10: *Number of Sessions Participants Spent in Each Condition*

<table>
<thead>
<tr>
<th>Student</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Maintenance</th>
<th>Total Sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom</td>
<td>3</td>
<td>12</td>
<td>8</td>
<td>23</td>
</tr>
<tr>
<td>Chad</td>
<td>10</td>
<td>8</td>
<td>5</td>
<td>23</td>
</tr>
<tr>
<td>Brian</td>
<td>10</td>
<td>10</td>
<td>3</td>
<td>23</td>
</tr>
</tbody>
</table>

Analysis of Research Results

In a multiple baseline across subjects design, predictions based on one participant’s behavior must be verified by the behavior of other participants, and replication of effect is dependent on the behavior of other participants (Cooper et al., 1987). Visual analysis of the data in this study reveals that there was a functional relationship between the intervention and the reading fluency of all participants. Visual analysis of the data does not support that there was a functional relationship between the intervention and the reading comprehension of the participants. Figure 1 displays the correct words per minute and errors per minute for baseline, intervention, and maintenance conditions across all three of the participants. Figure 2 illustrates the percentage of comprehension questions answered correctly during all conditions for all participants.

*Correct Words per Minute*

*Tom.* Trend direction during baseline was decelerating with an absolute change of -12 CWPM. There was low variability in the range of values; 100% of the data points fell within 20% of the median, indicating a stable trend and level during baseline. From the last session during baseline to the first session during intervention, there was an immediate increase in the CWPM read by Tom. The absolute level change between conditions was 29 CWPM. Trend
direction went from decelerating to zero celeration. In addition, there was 0% overlapping data from baseline to intervention. Tom’s CWPM during intervention resulted in a flat trend as evidenced by the split-middle and quarter intersect method of estimating trend; therefore, the trend was neither accelerating or decelerating. There was an absolute change of 3 CWPM during intervention. There was low variability in the range of values; 92% of the data points fell within 20% of the median, indicating a stable trend and level during intervention. From the last session during intervention to the first session during maintenance, there was an immediate increase in CWPM. In fact, the highest CWPM measured throughout the study occurred during the first session in the maintenance condition. The absolute level change between conditions was 17 CWPM. The level increased slightly while level stability decreased from intervention to maintenance. Trend direction went from zero celeration to decelerating. There was 75% overlapping data from intervention to maintenance. There was an absolute change of -32 CWPM within the maintenance condition. There was some variability in the range of values; 75% of the data points fell within 20% of the median, illustrating an unstable trend during maintenance.

Chad. Trend direction during baseline was accelerating with an absolute change of -10 CWPM. There was high variability in the range of values; 50% of the data points fell within 20% of the median, demonstrating an unstable trend and level during baseline. From the last session during baseline to the first session during intervention, there was an increase in the CWPM with an absolute level change of 20 CWPM. Trend direction remained accelerating between conditions, but there was an immediate increase in the slope of the trend line during intervention. Trend variability decreased from baseline to intervention, and there was 13% overlapping data. There was an absolute change of 37 CWPM within the intervention condition. Although there was some variability in the level and range of values (75% of the data points fell within 20% of
the median), there was an overall upward trend in the data during intervention. From the last session during intervention to the first session during maintenance, there was an immediate decrease in the CWPM with an absolute level change of -54 CWPM. Trend direction went from accelerating to decelerating. There was 0% overlapping data from intervention to maintenance. Level stability increased from 75% during intervention to 100% during maintenance. There was low variability in the range of values; 100% of the data points fell within 20% of the median, illustrating a stable trend during maintenance. There was an absolute change of 1 CWPM within the maintenance condition.

_Brian._ Trend direction during baseline was decelerating with an absolute change of -5 CWPM. There was some variability in the range of values; 70% of the data points fell within 20% of the median, demonstrating somewhat of a stable trend and level during baseline. From the last session during baseline to the first session during intervention, there was an immediate increase in the number of correct words read with an absolute level change of 46 CWPM. Trend direction went from decelerating to accelerating from baseline to intervention. In addition, there was 0% overlapping data from baseline to intervention. There was an absolute change of 13 CWPM within the intervention condition. There was low variability in the range of values; 90% of the data points fell within 20% of the median, illustrating a stable trend and level during intervention. From the last session during intervention to the first session during maintenance, there was an immediate decrease in CWPM with an absolute level change of -37 CWPM and 33% overlapping data. Even though there was a decrease in the level, the trend direction remained accelerating from intervention to maintenance. There was an absolute change of 16 CWPM within the maintenance condition. There was some variability in the range of values;
66% of the data points fell within 20% of the median, illustrating an unstable trend and level during maintenance.

Table 11: *Mean Correct Words per Minute for Participants during Each Condition*

<table>
<thead>
<tr>
<th>Students</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom</td>
<td>35 (range 29-41)</td>
<td>50.5 (range 43-65)</td>
<td>52.4 (range 40-72)</td>
</tr>
<tr>
<td>Chad</td>
<td>22 (range 13-42)</td>
<td>54 (range 39-76)</td>
<td>26.2 (range 22-31)</td>
</tr>
<tr>
<td>Brian</td>
<td>47.7 (range 34-60)</td>
<td>81.1 (range 66-103)</td>
<td>61.7 (range 56-72)</td>
</tr>
</tbody>
</table>

*Errors per Minute*

*Tom.* Trend direction during baseline was accelerating with an absolute change of 2 EPM. There was variability in the range of values; 66% of the data points fell within 20% of the median, demonstrating an unstable trend and level during baseline. From the last session during baseline to the first session during intervention, there was an immediate decrease in the number of errors read with an absolute level change of -8 EPM. Trend direction went from accelerating to decelerating. Although there was an increase in trend and level variability from baseline to intervention, there was only 8% overlapping data. There was an absolute change of 8 EPM within the intervention condition. There was high variability in the range of values; 25% of the data points fell within 20% of the median, demonstrating an unstable level and trend line. From the last session during intervention to the first session during maintenance, the absolute level change was -1 EPM. Trend direction went from decelerating to accelerating. There was 88% overlapping data from intervention to maintenance. There was an absolute change of 1 EPM during maintenance. There was an unstable level and trend line; 50% of the data points fell within 20% of the median.
Chad. Trend direction during baseline was accelerating with an absolute change of 0 EPM. There was some variability in the range of values; 70% of the data points fell within 20% of the median, demonstrating somewhat of an unstable trend and level during baseline. There was an immediate decrease in EPM from baseline to intervention with an absolute level change of -12 EPM. Trend direction went from accelerating to decelerating. There was 13% overlapping data from baseline to intervention. Chad’s EPM during intervention resulted in a decelerating direction with an absolute change of -3 EPM. There was variability in the range of values; 50% of the data points fell within 20% of the median, illustrating an unstable level and trend during intervention. From the last session during intervention to the first session during maintenance, there was an immediate increase in the data with an absolute level change of 22 EPM. Trend direction went from decelerating to accelerating with 0% overlapping data from intervention to maintenance. There was an absolute change of 13 EPM during the maintenance condition. There was variability in the range of values; 60% of the data points fell within 20% of the median, illustrating an unstable level and trend during maintenance.

Brian. Since the number of errors Brian read was low across all conditions, Brian demonstrated an overall floor effect in the number of errors he read per minute. Trend direction during baseline was decelerating with an absolute change of -2 EPM. There was high variability in the range of values; 40% of the data points fell within 20% of the median, illustrating an unstable level and trend line. From baseline to intervention, the absolute level change was 0 EPM, illustrating that the intervention was not immediately effective for Brian in decreasing EPM. On the other hand, trend direction went from accelerating to decelerating. There was 100% overlapping data from baseline to intervention with no change in trend variability and level stability. Brian’s EPM during intervention resulted in a decelerating trend with an absolute
change of -1 EPM. High variability resulted since 40% of the data points fell within 20% of the median. From the last session during intervention to the first session during maintenance, the absolute level change was 3 EPM. Trend direction remained decelerating from intervention to maintenance. Trend variability increased slightly from intervention to maintenance, and level stability decreased. There was 100% overlapping data from intervention to maintenance. There was an absolute change of -1 EPM during intervention. 33% of the data points fell within 20% of the median, resulting in an unstable trend and level.

**Table 12: Mean Errors per Minute for Participants during Each Condition**

<table>
<thead>
<tr>
<th>Students</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom</td>
<td>7.7 (range 5-10)</td>
<td>2.6 (range 0-7)</td>
<td>5 (range 3-8)</td>
</tr>
<tr>
<td>Chad</td>
<td>13.1 (range 5-18)</td>
<td>2.1 (range 0-6)</td>
<td>17.8 (range 10-36)</td>
</tr>
<tr>
<td>Brian</td>
<td>1.9 (range 0-6)</td>
<td>0.7 (range 0-3)</td>
<td>1.7 (range 0-3)</td>
</tr>
</tbody>
</table>

**Comprehension**

*Tom.* Trend direction during baseline was decelerating with an absolute change of 33. There was high variability in the range of values with an unstable trend and level; 33% of the data points fell within 20% of the median. It should be noted that the second highest percentage of comprehension questions answered correctly throughout the study by Tom occurred during the first session in baseline. From the last session during baseline to the first session during intervention, there was an increase in the data with an absolute level change of 16. Trend direction remained decelerating from baseline to intervention with 67% overlapping data. Tom’s comprehension during intervention was decelerating with an absolute change of -15. There was an unstable level and trend with high variability in the range of values; 17% of the data points
fell within 20% of the median. From the last session during intervention to the first session during maintenance, there was an increase in the data with an absolute level change of 15 and 50% overlapping data. There was an absolute change of 7 within the maintenance condition. 50% of the data points fell within 20% of the median, illustrating an unstable trend and level with high variability during maintenance. Actually, two trend directions were observed during maintenance; at first the trend was decelerating, and then it began to accelerate. Interestingly, data illustrates that the highest percentage of correct answers to comprehension questions occurred during maintenance.

*Chad.* Trend direction during baseline was decelerating with an absolute change of 38. There was an unstable level and trend with high variability in the range of values; 40% of the data points fell within 20% of the median. From baseline to intervention, the absolute level change was 37 with 88% overlapping data. Even though the level increased, trend direction continued to be decelerating from baseline to intervention. Chad’s comprehension during intervention resulted in a slightly decelerating trend with an absolute change of -15. 75% of the data points fell within 20% of the median, indicating some instability in the trend and level. From intervention to maintenance, the absolute level change was -20 with 20% overlapping data. Trend was more variable during maintenance than it was during intervention, and trend direction went from decelerating to accelerating. Level stability decreased from 75% during intervention to 60% during maintenance. There was an absolute change of 0 within the maintenance condition. 60% of the data points fell within 20% of the median, illustrating variability with an unstable trend during maintenance.

*Brian.* Trend direction during baseline was accelerating with an absolute change of 50. There was variability in the range of values; 40% of the data points fell within 20% of the
median, demonstrating an unstable trend and level during baseline. There was a decrease in the data from the last session during baseline to the first session during intervention with an absolute level change of -17, but there was 70% overlapping data. Trend direction remained accelerating from baseline to intervention. There was an increase in trend variability while level stability decreased. Brian’s comprehension during intervention resulted in an accelerating trend with an absolute change of 34. The level and trend during intervention had high variability due to the range of values; 0% of the data points fell within 20% of the median. From intervention to maintenance, there was an abrupt decrease in the data with an absolute level change of -67 and 100% overlapping data. Trend direction remained accelerating from intervention to maintenance. Although there was variability in the range of values, level and trend stability increased from 0% during intervention to 66% during maintenance. There was an absolute change of 50 during maintenance.

Table 13: Mean Comprehension Scores for Participants during Each Condition

<table>
<thead>
<tr>
<th>Students</th>
<th>Baseline</th>
<th>Intervention</th>
<th>Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom</td>
<td>33.3 (range 17-50)</td>
<td>15.4 (range 0-33)</td>
<td>30 (range 0-60)</td>
</tr>
<tr>
<td>Chad</td>
<td>34.4 (range 0-80)</td>
<td>65.6 (range 50-100)</td>
<td>39.4 (range 17-60)</td>
</tr>
<tr>
<td>Brian</td>
<td>22.8 (range 0-50)</td>
<td>33.3 (range 0-83)</td>
<td>33.3 (range 0-50)</td>
</tr>
</tbody>
</table>
Figure 1. Correct Words per Minute and Errors per Minute for Baseline, Intervention, and Maintenance Conditions.
Figure 2. Comprehension for Baseline, Intervention, and Maintenance Conditions.
Reliability

Interobserver reliability data was gathered for 33 out of 69 total sessions (48%) for all participants for both fluency and comprehension. The point-by-point agreement of calculating interobserver agreement was used (Tawney & Gast, 1984). Reliability data was calculated for Tom during 1 out of 3 baseline sessions, 4 out of 12 intervention sessions, and 6 out of 8 maintenance sessions with a total number of 11 out of 23 sessions (48%). For Chad, reliability data was calculated for 4 out of 10 baseline sessions, 2 out of 8 intervention sessions, and 5 out of 5 maintenance sessions with 11 out of 23 sessions (48%). Reliability data was calculated for Brian during 6 out of 10 baseline sessions, 3 out of 10 intervention sessions, and 2 out of 3 maintenance sessions with a total number of 11 out of 23 (48%) sessions for Brian. Table 10 displays interobserver reliability for fluency and comprehension for each participant for each condition as well as the overall mean interobserver reliability across all conditions for each participant. The total mean interobserver reliability for the entire study was 94.1% (range 40%-100%). In other words, the researcher and the secondary data collector (a paraprofessional familiar with the students) agreed 94.1% of the time that the target behaviors of CWPM, EPM, and correct answers to the comprehension questions occurred or did not occur.

Table 14: Interobserver Reliability Results

<table>
<thead>
<tr>
<th>Student</th>
<th>Fluency</th>
<th>Comprehension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tom</td>
<td>Baseline = 94%</td>
<td>Baseline = 100%</td>
</tr>
<tr>
<td></td>
<td>Intervention = 95.5% (range 92%-98%)</td>
<td>Intervention = 100%</td>
</tr>
<tr>
<td></td>
<td>Maintenance = 95% (range 92%-100%)</td>
<td>Maintenance = 95.5% (range 83%-100%)</td>
</tr>
<tr>
<td></td>
<td>Overall = 95% (range 92%-100%)</td>
<td>Overall = 97.6% (range 83%-100%)</td>
</tr>
<tr>
<td></td>
<td>Baseline = 93.5% (range 89%-100%)</td>
<td>Baseline = 100%</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td></td>
<td>Intervention = 98.5% (range 97%-100%)</td>
<td>Intervention = 100%</td>
</tr>
<tr>
<td></td>
<td>Maintenance = 84.6% (range 66%-97%)</td>
<td>Maintenance = 77.4% (range 40%-100%)</td>
</tr>
<tr>
<td></td>
<td>Overall = 90.4% (range 66%-100%)</td>
<td>Overall = 89.7% (range 40%-100%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overall = 90.4% (range 66%-100%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Overall = 89.7% (range 40%-100%)</td>
</tr>
<tr>
<td>Chad</td>
<td>Baseline = 96.5% (range 91%-100%)</td>
<td>Baseline = 96.5% (range 89%-100%)</td>
</tr>
<tr>
<td></td>
<td>Intervention = 98.3% (range 95%-100%)</td>
<td>Intervention = 100%</td>
</tr>
<tr>
<td></td>
<td>Maintenance = 94% (range 91%-97%)</td>
<td>Maintenance = 83.5% (range 67%-100%)</td>
</tr>
<tr>
<td></td>
<td>Overall = 96.6% (range 91%-100%)</td>
<td>Overall = 95.1% (range 67%-100%)</td>
</tr>
</tbody>
</table>

Procedural fidelity data was gathered for 9 out of 69 sessions (13%) for all participants for both fluency and comprehension. It was assessed one time for each student per session during the baseline, intervention, and maintenance conditions. Procedural fidelity was 100% for this study. In other words, the researcher accurately and consistently followed the steps provided on the Procedural Checklist for Data Collector (see Appendix E). 100% procedural fidelity demonstrates that the procedures of this study were conducted as planned.

Social Validity Survey

According to Wolf (1978), there are three levels of social validity. First, the goals of the study should be socially significant; the goals should be something that society wants. Second, the procedures should demonstrate social appropriateness; stakeholders should consider the procedures to be acceptable. Third, the participants should be satisfied with the results of their performance; the effects should be socially important.
The researcher developed a questionnaire to gather social validity information from the participants. The questionnaire consisted of six questions that the researcher orally administered to the participants: 1) Do you think repeated readings affected your reading skills; 2) What did you like about doing the repeated readings; 3) What did you NOT like about doing repeated readings; 4) Did repeated readings help you remember the story; 5) Did repeated readings help you to understand what happened in the story; and 6) Would you use repeated readings in social studies, science, or when reading your A.R. books? She re-worded the questions in the event the participant did not understand what she was asking. The researcher recorded verbatim what the participants said in response to the questions.

Tom said he thinks that repeated readings affected his reading skills; he said repeated reading made him feel happy. When asked what he liked about repeated readings, he said, “I love it.” When asked if there was something he didn’t like about repeated readings, he said, “No, not exactly.” He did not feel that repeated readings helped him remember the stories; however, he did reply that he thought repeated readings helped him to understand what happened in the stories. When asked if he would use repeated readings when reading his A.R. books, he said, “sometimes, a couple, yeah.”

Chad said that he does not think that repeated readings affected his reading skills. When asked what he liked and didn’t like about repeated readings, he replied, “I didn’t like nothing about it. It wasn’t fun. I don’t like reading.” He did not feel that repeated readings helped him remember the stories. On the other hand, he did say that repeated readings helped him to understand what happened in the story. He also said that he would use repeated readings in social studies, science, and when reading his A.R. book.
Brian said that repeated readings made him a better reader. He liked working on the words, but he did not like having the privacy folder between himself and the researcher. He felt that repeated readings helped him to both remember the story and understand what happened in the story. When the researcher asked him if he would use repeated readings when reading his A.R. books, he said yes.
CHAPTER 5
DISCUSSION, LIMITATIONS, AND IMPLICATIONS

The purpose of this study was to examine the efficacy of repeated reading and error correction on the reading fluency and comprehension skills of elementary-age students with intellectual disabilities. The intervention was developed to measure the number of correct words per minute, errors per minute, and percentage of comprehension questions answered correctly after repeatedly reading passages three times at students’ independent and/or instructional reading levels. The overall results suggest that the intervention was effective in increasing the participants’ correct words read per minute. The results do not suggest that the intervention was effective in decreasing errors read per minute or increasing the participants’ reading comprehension. Two out of the three participants responded positively to the intervention based on results of the social validity survey. This chapter presents a discussion of the results from the intervention and survey. This chapter also conveys the study limitations, implications for practice in the classroom, and suggestions for future research.

Discussion

The present study was intended to investigate the effects of repeated readings combined with error correction on the reading fluency and reading comprehension. Four questions were addressed by this study: 1) Will the combined effects of repeated readings and error correction increase the number of words read correctly per minute of elementary-age students with intellectual disabilities; 2) Will the combined effects of repeated readings and error correction decrease the number of reading errors per minute of elementary-age students with intellectual
disabilities; 3) Will the combined effects of repeated readings and error correction increase the reading comprehension of elementary-age students with intellectual disabilities; and 4) What are the students’ opinions of repeated readings combined with error correction?

In studies with the multiple baseline across participants design, a functional relationship between the independent and dependent variables is dependent on two occurrences: (1) the behaviors in baseline remain the same while behaviors interacting with the independent variable change, and (2) each behavior changes when the independent variable is applied to it (Cooper et al., 1987). In other words, one can be confident of a functional relationship when there is a marked change in level and/or trend in the data once the independent variable is introduced, yet data from those in the baseline condition remain constant. As the number of replications of the effects of the treatment increases, confidence of a functional relationship increases. Without replications of the effects of the treatment across the tiers, there is a low level of confidence that a functional relationship between the independent and dependent variables exists.

Correct Words per Minute

The first question addresses the effects of the intervention on the number words read correctly per minute. When baseline performance was stable, the intervention of repeated readings combined with error correction was introduced to Tom. Baseline conditions were maintained for Chad and Brian. When Tom demonstrated three successive improvements in CWPM, the intervention was introduced to Chad. Baseline conditions were maintained for Brian, and Tom entered the maintenance condition. When Chad demonstrated three successive improvements in CWPM, the intervention was introduced to Brian. Maintenance conditions were maintained for Tom, and Chad entered the maintenance condition. When Brian demonstrated three successive improvements in CWPM, he entered the maintenance condition.
As illustrated in Figure 1, each student increased the number of words correctly per minute from baseline to intervention. Tom went from a mean score of 35 CWPM during baseline to a mean score of 50.5 CWPM during intervention with 0% overlapping data. His trend line went from decelerating to zero acceleration with an absolute level change of 29 CWPM. Though stability was observed in both conditions, trend stability decreased slightly from baseline to intervention. Chad went from a mean score of 22 CWPM during baseline to a mean score of 54 CWPM during intervention with 13% overlapping data. His trend line was accelerating in both conditions, but the slope of the trend line during intervention was much steeper. Trend stability increased from 50% to 75%. There was an absolute level change of 20 CWPM between conditions. Brian went from a mean score of 47.7 CWPM during baseline to a mean score of 81.1 CWPM during intervention with 0% overlapping data. His trend line went from decelerating to accelerating with an absolute level change of 46 CWPM. Trend stability increased from 70% to 90%. Even though there was variability within the baseline condition for Chad and Brian, Tom’s success with the intervention in increasing CWPM was replicated with Chad and again with Brian. The researcher can conclude that there was a functional relationship between the intervention and the number of words read correctly per minute.

In the maintenance condition, the intervention was withdrawn, and baseline procedures were applied. If the participants’ fluency was truly influenced by the intervention of repeated reading combined with error correction, one would expect results to diminish during maintenance probes. From intervention to maintenance, Tom’s data demonstrated a slight increase in the level change (absolute level change of 17 CWPM). On the other hand, Tom’s trend went from zero acceleration to decelerating with stability decreasing from 92% to 75%. There was 75% overlap in the CWPM between conditions. During the first day of maintenance,
54 fewer CWPM were observed when compared to the last day of the intervention condition. In the maintenance condition, Chad’s data demonstrated a stable, slightly decelerating trend following a variable, accelerating trend during intervention. There was 0% overlap between intervention and maintenance. Brian’s data demonstrated a decreased level change from intervention to maintenance. Brian’s trend went from a stable, accelerating trend during intervention to a variable, accelerating trend during maintenance. There was 33% overlap between the two conditions.

Tom read more mean correct words per minute during maintenance than either baseline or intervention. Chad and Brian had mean maintenance CWPM scores that were lower than those during intervention, but they were higher than those during baseline. Overall, the researcher can conclude that the withdrawal of the intervention caused an immediate contratherapeutic effect on number of correct words per minute read by Chad and Brian. Tom’s CWPM did not immediately decrease upon maintenance probes, but the data trend became unstable.

Interestingly, Brian’s overall fluency rate in oral reading is better than in oral conversation. The researcher theorizes this is in part because Brian has deficits in executive functioning that affect his rate of conversational speech. She also feels like Brian has a combination of low self-esteem in conversation (as a result of his facial malformation and speech impediment) and learned helplessness; both his family members and peers frequently answer and speak for Brian.

**Errors per Minute**

The second question addresses the effects of the intervention on the number of errors read per minute. As illustrated in Figure 1, Tom and Chad decreased the number of errors they read per minute from baseline to intervention. Tom went from a mean score of 7.7 EPM during
baseline to 2.6 EPM during intervention with 8% overlapping data. His trend line went from accelerating to decelerating with an absolute level change of -8 EPM. Variability in trend increased from 66% to 25%. Chad went from a mean score of 13.1 EPM during baseline to a mean score of 2.1 EPM during intervention with 13% overlapping data. His trend line changed from accelerating to decelerating with an absolute level change of -12 EPM. Variability in trend increased from 70% to 50%. Brian demonstrated a floor effect with a mean score of 1.9 EPM during baseline to a mean score of 0.7 EPM during intervention with 100% overlapping data. His trend line was accelerating to decelerating with an absolute level change of 0 EPM. Trend variability (40%) remained the same from baseline to intervention for Brian.

The intervention may have been successful in decreasing the number of errors Tom and Chad read per minute, but the researcher cannot be sure since the trend variability was high. Brian demonstrated floor effects, so the researcher cannot conclude that the intervention caused Brain’s EPM to decrease. Even though trend stability was not present, there was only one replication demonstrating the possible decrease in EPM after the introduction of the intervention. The researcher cannot conclude that there was a functional relationship between the intervention and the number of errors read per minute.

From intervention to maintenance, all students demonstrated an increase in the level change for EPM. Tom’s trend went from decelerating to accelerating with stability increasing from 25% to 50%. There was 88% overlap in the EPM between conditions. In the maintenance condition, Chad’s data demonstrated an unstable accelerating trend following a somewhat variable, decelerating trend during intervention. There was 0% overlap between intervention and maintenance. Brian’s trends were decelerating in both conditions, but trend variability increased from intervention to maintenance. There was 100% overlap between the two conditions. As
mentioned previously, Brian demonstrated a floor effect in the number of errors per minute. Tom and Brian had the lowest mean number of errors during intervention, followed by maintenance and then baseline. Chad had the lowest mean number of errors during intervention, followed by baseline and then maintenance. Overall, the researcher can conclude that the withdrawal of the intervention caused a contratherapeutic effect on number of errors read per minute by Tom and Chad.

It should be noted that during most maintenance probes, Chad no longer tried to sound out words he did not know. Instead, he skipped words he didn’t know; this automatically increased the number of errors he read per minute. This could have been the result of test fatigue, multiple treatment interference (ex. being told to skip words he doesn’t know how to read during a timed test), or decreased motivation to accurately read the words in the passages.

**Comprehension**

The third question addresses the effects of the intervention on the percentage of correct responses to comprehension questions. An analysis of the information in Figure 2 demonstrates that the intervention did not cause a significant change in comprehension among the participants. Tom’s mean comprehension scores decreased from 33.3% during baseline to 15.4% during intervention with 67% overlapping data. The trend line remained decelerating from baseline to intervention with an absolute level change of 16%. Chad’s mean comprehension scores increased from 34.4% during baseline to 65.6% during intervention, but there was 88% overlapping data between conditions. His trend lines for baseline and intervention were both decelerating with an absolute level change of 37%. Brian’s mean comprehension scores increased from 22.8% during baseline to 33.3% during intervention, but he had 70% overlapping data between conditions. The
trend lines during baseline and intervention were both accelerating with an absolute level change of -17%. Tom’s comprehension actually decreased from baseline to intervention.

With 88% overlapping data between baseline and intervention and trend instability in both conditions, there is a lack of evidence to prove there is a functional relationship between the intervention and Chad’s comprehension skills. With increasing variability from baseline to intervention and 70% overlapping data, there is a lack of proof that the intervention was successful in increasing Brian’s reading comprehension skills. In summary, there were not any gains in percentage of correct responses to comprehension questions that could be attributed to the intervention. Therefore, the researcher cannot conclude there was a functional relationship between the intervention and the participants’ reading comprehension.

From intervention to maintenance, Tom’s data demonstrated an increase in the level change (absolute level change of 16). There were two noticeable trend lines during the maintenance conditions; the first trend line was decelerating, and the second trend line was accelerating. Even so, trend and level stability increased from 17% to 50% from intervention to maintenance with 50% overlap. In the maintenance condition, Chad’s data demonstrated a variable, accelerating trend following a somewhat variable, decelerating trend during intervention. There was 20% overlap between intervention and maintenance. Even though Brian’s data resulted in an absolute level change of -67, the mean level line remained the same from intervention to maintenance. Brian’s trends from intervention to maintenance remained variable and accelerating. There was 100% overlap between the two conditions. Chad was the only student whose comprehension seemed negatively affected by the withdrawal of the intervention.
Social Validity

The fourth question addresses how the participants felt about the intervention. A survey included six questions that the researcher individually orally read to each student and then recorded their answers. Two of the students felt that repeated reading positively affected their reading skills. Two of the students enjoyed the intervention while the third student claimed he didn’t like anything about it because it wasn’t fun. When asked what they didn’t like about the intervention, one student said he didn’t like the privacy folder; one student didn’t mention anything that he didn’t like; and one student said he just didn’t like to read. One out of three students felt that the intervention helped him to remember the story. All students felt that the intervention helped them to understand what happened in the story. In addition, all students indicated they would use repeated readings in the future when they read social studies, science, and A.R. (library) books.

Results in Relation to Research

This study supplements and extends the literature regarding students with intellectual disabilities and repeated reading as a strategy to increase reading fluency and comprehension. The researcher could locate only four studies that included repeated reading among students with intellectual disabilities (Devault & Joseph, 2004; Meffed & Pettegrew, 1997; Musti-Rao et al., 2009; Valleley & Shriver, 2003). Only the studies conducted by Mefferd and Pettegrew (1997) and Musti-Rao et al. (2009) included participants that were elementary-age; even then, there were only a combined number of four participants in those studies with intellectual disabilities. This study included three elementary students with intellectual disabilities.

Out of the four published studies, repeated reading (along with error correction) was the sole intervention in only one study (Valleley & Shriver, 2003). To limit the risk of multiple
treatment interference, this study implemented repeated readings combined with error correction only. Only one study explicitly measured reading comprehension in addition to oral reading fluency as a result of the singular intervention of repeated reading (Valleley & Shriver, 2003). The present study added to the existing research by measuring correct words per minute, errors per minute, and the percentage of comprehension questions answered correctly during each session. Overall, the results from this study confirmed that repeated readings with error correction increases overall oral reading fluency but does not necessarily improve the reading comprehension of elementary-age students with intellectual disabilities.

Limitations

As with any study design, there are naturally-occurring limitations within single-subject methodology. Tawney and Gast (1984) outlined three major constraints of the multiple baseline across subjects design. First, at least three participants with similar learning histories and functioning levels should be identified. This can be problematic with students with intellectual disabilities since it is hard to generalize with any population of students due to individual differences, diagnoses, medications, co-morbid diagnoses, etc. Second, target behavior should be monitored concurrently and continuously across each subject; this can be time-consuming, impractical, and distracting (Tawney & Gast, 1984), especially if the researcher and classroom teacher are the same person. Third, participants in prolonged baselines may exhibit extinction, a data path resulting from a lack of reinforcement. There are also ethical concerns about delaying interventions for individuals who could otherwise be receiving interventions that may increase desired skills, behaviors, and overall functioning.

The multiple probe design is a variation of the multiple baseline design. Tawney and Gast (1984) delineate two additional limitations that occur within multiple probe designs. First, if
there is variability across data series, the researcher should extend the measurement of the dependent variable under baseline conditions. If the researcher does not extend data collection until stability across level and/or trend is established, study results may be confounded due to potential history, maturation, and/or adaptation threats to internal validity (Tawney & Gast, 1984). Second, by conducting intermittent probes as opposed to continuous data collection, it may be difficult to immediately identify possible response generalization or multiple treatment interference.

The present study had limitations that should be noted. Only three participants, the minimum number of participants recommended by Tawney and Gast (1984), were included in this study. In general, it is very difficult to find similar participants among this population due to individual differences, diagnoses, medications, co-morbid diagnoses, and other factors. There were a limited number of students in the researcher’s school that met criteria for inclusion in the study. External validity is always a limitation in single-subject studies.

Even though the multiple-probe across participants study design inherently decreases the severity of history threats to internal validity, history threats to internal validity were present in this study. For example, Tom’s attention levels fluctuated greatly throughout the school day due to absence seizures, medication to address his medical needs, and sensory needs. Chad’s parents frequently misplaced his medication; thus, he was on and off his prescribed medication to address attention deficits. Brian was sick several times throughout the study and did not feel well during several sessions. In addition, Brian often displayed whole-body spasms at the onset of stress-inducing activities such as reading or math. When this occurred, the researcher would not start timing his oral reading until the whole-body spasms subsided; occasionally, though, he would exhibit the spasms in the middle of a reading passage.
With the research taking place in a classroom, there were naturally-occurring interruptions. Some examples of these took place during timed readings and included an announcement from the office, a participant’s father coming into the classroom while he was reading, and the researcher having to stop data collection in order to address the negative behaviors of another student in the classroom. In these instances, the researcher either made note of the interruption and continued the session or cancelled the session altogether, eliminating the particular passage from the study.

There was an amount of variability in the data. Variability in data can indicate many things, including multiple treatment interference. While some variability is expected, the researcher feels the data variability in this study was a direct result of several things. First and most significantly, the researcher had to pull passages from seven different informal reading inventories. As a result, the passages were not uniform. In particular, the passage length, content, type of comprehension questions, and number of comprehension questions varied considerably; this added a testing threat to internal validity. Subject content directly influenced the participants’ comprehension; if the participants appeared more interested in the story, their comprehension scores logically increased.

Comprehension questions were either literal or inferential, but they were not always labeled as such by the authors of the informal reading inventories used in the study. As a result, the researcher measured and reported overall passage comprehension. She did not separate comprehension scores by literal or inferential questions. Reporting overall comprehension scores instead of specifying scores by the type of comprehension questions may have masked important information and limited the results of the intervention on the participants’ comprehension.
The variability in data was also attributed to each participant’s attention levels and medical needs. For example, during the course of the study, Tom’s doctors were monitoring him for an increase in absence seizures; there were quite a few instances that he may have been having absence seizures during the repeated readings sessions. Chad did not regularly take his prescribed medication for ADHD; this also affected data stability. Third, student attitudes and moods greatly influenced their performances on a daily basis. Tom is by nature a very emotional person. During some sessions, he was tearful and upset; this negatively impacted his ability to read fluently and comprehend what was being read. Students 2 and 3 often made negative comments if they were reading one of the longer passages on their reading levels.

The researcher was unable to assess the generalization of reading fluency and comprehension to other settings using the intervention combination of repeated readings and error correction. She was also unable to assess the effects of the intervention on the fluency and comprehension of other types of reading materials (e.g. subject content, pleasure reading).

Multiple treatment interference may have been present during this study with the tangible reinforcers – the fuzzies. The researcher presented a fuzzy to each participant every time he read a passage (timed and not timed) and after he answered comprehension questions. In other words, participants earned 2 fuzzies during baseline sessions, 4 fuzzies during intervention sessions, and 2 fuzzies during maintenance sessions. Since participation in intervention sessions yielded more tangible reinforcers, it is possible that the participants were more motivated to do well and try harder during the intervention sessions than they were during baseline and maintenance sessions.

Another threat to internal validity that may have been present is maturation. Brian remained in baseline for 29 sessions (n=10 probes). He demonstrated an upward trend in comprehension during baseline. Even though high rates of interobserver reliability and
procedural fidelity data were reported, observer bias was an additional threat to internal validity that may have been present.

A final limitation is one that often takes place in single subject studies – the teacher serves as the lead researcher. Teacher research is a long-debated topic. Many opponents feel that teacher researchers can potentially (intentionally or unintentionally) manipulate the participants or the data. Critics also feel that teacher research methods are messy, unpredictable, and complicated (Baumann, Shockley, & Allen, 1996). University researchers often condone teacher research because it does not follow a “routinized, prescriptive paradigm” (Baumann et al., 1996, p. 8) as does scientific inquiry or routine educational research.

On the other hand, Baumann et al. (1996) feel that teacher research is an “evolving philosophical orientation toward practical theory” (p. 8). In fact, advocates of teacher research claim that teacher researchers bridge the gap between formal research and real-life applications. Talbott, Lloyd, and Tankersley (1994) feel that effective teacher research has greater external validity than interventions delivered by study authors, who may produce research with large effects and implications for practice that can be impossible for teachers to apply. In addition, the teacher researcher perspective allows a teacher to live in a research experience in a manner an outside researcher cannot (Cochran-Smith & Lytle, 1993), acting upon what is seen and learned first-hand, evaluating the impact of one’s actions, and initiating new actions (Baumann et al., 1996). The teacher researcher also has a unique perspective in that he or she is able to have a daily, intimate relationship with the students as well as gain insight into behaviors that may be otherwise unknown or overlooked by outside researchers.

The teacher researcher in this study sympathizes with some of Baumann’s reflections after conducting his teacher research (Baumann et al., 1996). She felt like the research
experience was refreshing and provided insight into her students’ reading skills. She also enjoyed the one-on-one reading time with the participants. On the other hand, she felt that this teacher research study was time-consuming and added “a layer to an already hectic professional work schedule” (Baumann et al., 1996, p. 19). She also believes that this study somewhat interfered with her primary instructional responsibilities. For example, she used up to 30 min of instructional time on days when she probed all three participants; this was time taken away from routine instruction that affected the entire class.

Implications for Practice and Future Research

Results from this study lead to implications for practice and suggestions for future research. The researcher makes the following recommendations based on the results of this study and the results of other studies involving repeated reading research. Repeated reading should be paired with error correction, performance feedback, and/or self-monitoring. Repeated reading can and should be used as a supplement to an evidence-based reading program. Classroom teachers should utilize different comprehension strategies (e.g. questioning, retelling, paraphrasing, and cloze) with repeated readings for optimal comprehension. Since repeated reading interventions are relatively easy to implement and add to daily classroom routines, teachers should recruit and utilize parents, paraprofessionals, volunteers, or peer tutors to aid in the implementation of repeated readings.

Compared to other populations, there is a gap in the research-base about how to increase the reading fluency and comprehension of individuals with intellectual disabilities. Thus, there is a need for additional research about different interventions to increase reading fluency and comprehension among participants with intellectual disabilities. Broader generalizations and
increased external validity could be achieved if the findings of this study were replicated with other elementary students with intellectual disabilities.

Researchers should compare the effects of different numbers of repeated readings on reading fluency and comprehension among participants with intellectual disabilities; these studies could replicate and extend the findings of studies conducted among participants with learning disabilities (O’Shea et al., 1987; Sindelar et al., 1990). Researchers could also implement and compare the effectiveness of different criteria for mastery (e.g. successive improvements, fixed rate, and fixed number of repeated readings). Since technology is becoming increasingly important in today’s classroom, future researchers should implement repeated reading interventions utilizing technology (e.g. word processor, SMART Board, and ActivBoard) to assess reading fluency and comprehension with this population.

Future research should also combine and compare repeated readings with varying methods of error correction, performance feedback, and self-monitoring among those with intellectual disabilities. Future research should also examine the effects of combining repeated readings with other reading programs or methods. Another suggestion for future researchers is to compare questioning after repeated readings to other ways of assessing reading comprehension. Future research should compare the effects of repeated readings on literal comprehension to the effects of repeated readings on inferential comprehension. Finally, future researchers could ascertain the effectiveness, practicality, and efficiency of the repeated readings method for classroom teachers and/or paraprofessionals working with students with intellectual disabilities.

Summary

This research study has expanded the research reporting the effects of repeated readings on elementary-age students with intellectual disabilities. This study measured the effects of two
crucial skills for successful reading – the ability to accurately decode words in a timely manner and the ability to gain understanding from what is read. Repeated reading is often naturally incorporated into reading curricula, and students often naturally repeatedly read passages. Even so, the importance of specifically implementing repeated readings in one’s classroom is beneficial and will most likely have positive long-term effects on one’s reading habits. This can be said for students of all ages, abilities, and disabilities. With that being said, much more research documenting the short-term and long-term effects of repeated reading among different disability subgroups is needed.
REFERENCES


Available from http://dibels.uoregon.edu


Air is all around us. But we can’t see it. How do we know it is there? There are many ways. We can see what air does. Moving air is called wind. Wind moves plants. Wind moves dirt. Strong winds can move heavy things. Strong winds can even move a house. We can weigh air. We can weigh two balloons. The one with a lot of air weighs more. We can see what air does. We can weigh air. Then we know it is there.

Note. *Passage #5(1) means the fifth passage chosen from Level 1; reading passage from the QRI (Leslie & Caldwell, 2011).
APPENDIX B

Sample of Data Collector Copy of Reading Passage

Passage #5(1)*

Student Name ___________________________________ Date ________________________
Session # __________ Phase (circle one): Baseline Intervention Maintenance
Data Collector ____________________________________

Air is all around us. But we can’t see it. How do we know it is there? There are many ways. (21)
We can see what air does. Moving air is called wind. Wind moves plants. Wind moves dirt. (38)
Strong winds can move heavy things. Strong winds can even move a house. We can weigh (54)
air. We can weigh two balloons. The one with a lot of air weighs more. We can see what (73)
air does. We can weigh air. Then we know it is there. (85)

CWPM _____
EPM _____

Air is all around us. But we can’t see it. How do we know it is there? There are many ways. (21)
We can see what air does. Moving air is called wind. Wind moves plants. Wind moves dirt. (38)
Strong winds can move heavy things. Strong winds can even move a house. We can weigh (54)
air. We can weigh two balloons. The one with a lot of air weighs more. We can see what (73)
air does. We can weigh air. Then we know it is there. (85)

CWPM _____
EPM _____

Air is all around us. But we can’t see it. How do we know it is there? There are many ways. (21)
We can see what air does. Moving air is called wind. Wind moves plants. Wind moves dirt. (38)
Strong winds can move heavy things. Strong winds can even move a house. We can weigh (54)
air. We can weigh two balloons. The one with a lot of air weighs more. We can see what (73)
air does. We can weigh air. Then we know it is there. (85)

CWPM _____
EPM _____

Comments _________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________
_____________________________________________________________________________

Note. *Passage #5(1) means the fifth passage chosen from Level 1; reading passage from the
QRI (Leslie & Caldwell, 2011).
APPENDIX C

Sample of Reading Comprehension Questions

Passage #5(1)*

1. How do we know air is there?
   *Explicit*: we can see what air does; *or* air moves things (reader can answer things, dirt, plants, or houses); *or* we can weigh air

2. How else do we know air is there?
   *Explicit*: any other of the above answers

3. What does air move?
   *Explicit*: plants or dirt or houses

4. What else does air move?
   *Explicit*: any other of the above answers

5. How do we know that wind could move a car?
   *Implicit*: it can move heavy things; *or* it can move a house

6. Why does a flat tire weigh less than a tire that is not flat?
   *Implicit*: the flat tire does not have as much air

| Percentage of Correct Responses: _______ |

*Note.* *Passage #5(1) means the fifth passage chosen from Level 1; reading passage from the QRI (Leslie & Caldwell, 2011).*
APPENDIX D

CWPM/EPM/Comprehension Recording Sheet

<table>
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<th>Session #</th>
<th>Phase (B, I, or M)</th>
<th>Passage #</th>
<th>CWPM</th>
<th>EPM</th>
<th>Comprehension - % correct</th>
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<td>B/M-____ or I-#1;#2;#3</td>
<td>B/M-____ or I-#1;#2;#3</td>
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<td>B/M-____ or I-#1;#2;#3</td>
<td>B/M-____ or I-#1;#2;#3</td>
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<td>B/M-____ or I-#1;#2;#3</td>
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<td>B/M-____ or I-#1;#2;#3</td>
<td>B/M-____ or I-#1;#2;#3</td>
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<td></td>
<td>B/M-____ or I-#1;#2;#3</td>
<td>B/M-____ or I-#1;#2;#3</td>
<td></td>
</tr>
</tbody>
</table>

Note. B = baseline; I = intervention; M = maintenance; CWPM = correct words per minute; EPM = errors per minute; B/M = baseline or maintenance; #1 = first timed reading during intervention; #2 = second timed reading during intervention; #3 = third timed reading during intervention.

Comments ____________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
____________________________________________________________________________
APPENDIX E

Procedural Checklist for Data Collector

### Procedural Checklist for Data Collector

<table>
<thead>
<tr>
<th>Baseline and maintenance conditions</th>
<th>Intervention condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gather the necessary materials.</td>
<td>1. Gather the necessary materials.</td>
</tr>
<tr>
<td>a. Student Copy of reading passage</td>
<td>a. Student Copy of reading passage</td>
</tr>
<tr>
<td>b. Data Collector copy of reading passage</td>
<td>b. Data Collector copy of reading passage</td>
</tr>
<tr>
<td>c. stopwatch – set to 1-min intervals</td>
<td>c. stopwatch – set to 1-min intervals</td>
</tr>
<tr>
<td>d. pencil</td>
<td>d. pencil</td>
</tr>
<tr>
<td>e. clipboard</td>
<td>e. clipboard</td>
</tr>
<tr>
<td>f. privacy divider</td>
<td>f. privacy divider</td>
</tr>
<tr>
<td>g. audio tape recorder</td>
<td>g. audio tape recorder</td>
</tr>
<tr>
<td>2. Ask the student to join you at the table.</td>
<td>2. Ask the student to join you at the table.</td>
</tr>
<tr>
<td>3. Sit across the table from the student.</td>
<td>3. Sit across the table from the student.</td>
</tr>
<tr>
<td>4. Say, “You will be reading a story today. Please read as quickly as you can without making mistakes.”</td>
<td>4. Say, “I want to listen to you read this story. Try to do your best.”</td>
</tr>
<tr>
<td>5. Present Student Copy to the student.</td>
<td>5. Present Student Copy to the student.</td>
</tr>
<tr>
<td>6. Place the privacy divider between yourself and the student.</td>
<td>6. Place the privacy divider between yourself and the student.</td>
</tr>
<tr>
<td>7. Tell the student to “begin” and start the stopwatch.</td>
<td>7. Tell the student to begin reading and allow the student to read the entire passage.</td>
</tr>
<tr>
<td>8. Note errors on Data Collector copy while student is reading.</td>
<td>8. Note errors during the first reading on the first copy of the reading passage on Data Collector copy.</td>
</tr>
<tr>
<td>a. word read incorrectly – mark an “x” above the word</td>
<td>a. word read incorrectly – mark an “x” above the word</td>
</tr>
<tr>
<td>i. A word is considered incorrect if it is pronounced ANY differently than the correct pronunciation.</td>
<td>i. A word is considered incorrect if it is pronounced ANY differently than the correct pronunciation.</td>
</tr>
<tr>
<td>ii. A word is considered incorrect if the student replaces the word with a different word that</td>
<td>ii. A word is considered incorrect if the student replaces the word with a different word that</td>
</tr>
</tbody>
</table>
makes sense. (ex. saying “big” instead of “large”)

iii. If the student reads a word incorrectly and does not correct himself/herself, do not comment on it.
iv. Count the word as correct if the student mispronounces the word but corrects himself/herself within 3s – place a check next to the “x” above the word.

b. word omitted – draw one line through word

c. word not read within 3 s – circle the word

i. If the student does not read the word within 3 s of completing the previous word, tell the student the word.

9. When 1 min is up, mark a slash (/) after the last word read.

10. Allow the student to continue reading the passage until the end.

11. When the student is finished, provide verbal praise such as, “Thank you. Good reading today.”

12. Give the student a tangible reinforcer.

13. Ask the student the comprehension questions and note their answers. Do not tell the student if he got the answer right or wrong.

14. After the student answers the comprehension questions, provide verbal praise such as, “Good job answering the questions.”

15. Give the student a tangible reinforcer.

16. Count the number of correct words per minute and errors per minute and record these on the Data Collector copy.
<table>
<thead>
<tr>
<th>17. Record the number and percentage of correct explicit and implicit comprehension questions on the Data Collector copy.</th>
<th>14. Tell the student he will now be timed for 1 min to see how far he can read.</th>
</tr>
</thead>
<tbody>
<tr>
<td>18. Transfer the number of CWPM, EPM, and % of explicit and implicit comprehension questions to the CWPM/EPM/Comprehension Recording Sheet.</td>
<td>15. Place the privacy divider between yourself and the student.</td>
</tr>
<tr>
<td>19. Do not allow the student to continue reading the rest of the passage.</td>
<td></td>
</tr>
<tr>
<td>20. Give the student verbal praise and a tangible reinforcer.</td>
<td></td>
</tr>
<tr>
<td>19. Ask the student the comprehension questions and note their answers. Do not tell the student if he got the answer right or wrong.</td>
<td></td>
</tr>
<tr>
<td>20. After the student answers the comprehension questions, provide verbal praise such as, “Good job answering the questions.”</td>
<td></td>
</tr>
<tr>
<td>21. Give the student a tangible reinforcer.</td>
<td></td>
</tr>
<tr>
<td>22. Count the number of CWPM and EPM for each reading and record these on the Data Collector copy.</td>
<td></td>
</tr>
<tr>
<td>23. Record the number and percentage of correct explicit and implicit comprehension questions on the Data Collector copy.</td>
<td></td>
</tr>
<tr>
<td>22. Transfer the number of CWPM, EPM, and % of correct explicit and implicit comprehension questions to the CWPM/EPM/Comprehension Recording Sheet.</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX F

Social Validity Survey

Student Name ______________________________ Date ___________________
Completed by __________________________________________________________________

Directions – Orally interview each student and write their responses in the spaces provided.

1. Do you think repeated readings affected your reading skills?

______________________________________________________________________________

2. What did you like about doing the repeated readings?

______________________________________________________________________________

3. What did you NOT like about doing repeated readings?

______________________________________________________________________________

4. Did repeated readings help you remember the story?

______________________________________________________________________________

5. Did repeated readings help you to understand what happened in the story?

______________________________________________________________________________

6. Would you use repeated readings in social studies, science, or when reading your A.R. books?

______________________________________________________________________________
APPENDIX G

Parental Consent Form

The University of Georgia
Department of Communication Sciences and Special Education
537 Aderhold Hall
Athens, GA 30602
706-542-4561


Parental Permission Form

January 7, 2011

Dear ________________________________,

As part of my doctoral program at the University of Georgia, I will be conducting a research study in my classroom and would like for your child to participate in the intervention. This study will begin in January and end in March. The purpose of this intervention is to increase the number of words read correctly, to decrease the number of errors read, and to increase the reading comprehension by your child. I will be measuring the effects that a combination of repeated readings with error correction has on your child’s reading fluency and comprehension. This intervention will not interfere with other subjects or classes your child participates in.

You do not have to allow your child to be in this study if you do not want to. You have the right to withdraw your child from the study at any time. Your child’s participation is voluntary. Your child may refuse to participate or withdraw from the study at any time and for any reason without loss of benefits to which your child is otherwise entitled. This would not affect his grade, and there is no penalty for withdrawing or not participating. While your child may improve his ability to read more fluently and efficiently as a result of this study, there is no guaranteed benefit to participation in this research study. There are no foreseeable risks or discomforts to your child during this study. If your child becomes uncomfortable from being asked to read words that are too difficult, easier reading passages will be chosen. Benefits of your child’s participation in this study include a possible increase in reading fluency and comprehension as well as the advancement of educators’ knowledge and research base regarding teaching strategies for students with disabilities.

Your child’s name and individually identifiable information will be kept confidential. The information from this study will be discussed with Mrs. Strickland’s professors and classmates at the University of Georgia and will also be used to write a dissertation for her course of study at UGA. The study will be submitted for possible publication in a professional journal, but this is not guaranteed. All individually identifiable data (names, school, school...
district, school location) will be coded and kept confidential. Potential identifiers will be removed from the data at the conclusion of the study.

During this study, I will be working with your child every day for two months. Each day, I will give your child a short story to read and ask him to read this story three different times. While your child is reading, I will count and record the number of words read correctly and incorrectly. I will also ask him to answer comprehension questions about the story he reads. I will correct the words your child reads incorrectly. I will work with your child during homeroom or during reading. Each session will not last more than 15 minutes.

Upon your request, I will review your child’s performance with you when the study has been completed. I will not share information about other students’ performances as this is confidential information.

If you have any questions, please contact me at strickland.whitney@newton.k12.ga.us or 770-784-2969. You may also contact my advisor and professor, Dr. Richard Boon, in The University of Georgia’s Department of Communication Sciences and Special Education, at (706) 542-4561. Thank you.

Sincerely,

Mrs. Whitney Strickland

Please check one, sign, and date.

_____ I do give my consent for _______________________________ (your child’s name) to participate in this study.

_____ I do not give my consent for _______________________________ (your child’s name) to participate in this study.

Signature __________________________________________ Date __________________

Please sign both copies, keep one and return one to Mrs. Whitney Strickland.

Additional questions or problems regarding your child’s rights as a research participant should be addressed to The Chairperson, Institutional Review Board, Human Subjects Office, University of Georgia, 612 Boyd Graduate Studies Research Center, Athens, Georgia 30602-7411; Telephone (706) 542-3199; E-Mail Address IRB@uga.edu
APPENDIX H

Minor Assent Form

The University of Georgia
Department of Communication Sciences and Special Education
537 Aderhold Hall
Athens, GA 30602
706-542-4561

Student Assent Form

January 7, 2011

Dear Student,

I would like to ask you to be in a project I’m doing for a class I’m in at school. By helping me with this project, you will show teachers how they can help students like you learn how to read better. In this project, you will be reading stories several times in a row with my help. By doing this, I think you can become a faster and better reader.

We will be working on this project every day for two months. Each day, I will give you a short story to read. You will read this story three times. I will help you fix the words you read wrong. I will also ask you questions about the story. I will work with you during homeroom or during reading. I will listen to you read, take notes, and help you. Sometimes Ms. McCrorey will listen to you read and take notes.

This study won’t have anything to do with your grades. I will use what I learn to write a paper for a class I am in at school. I will share what I learn with other teachers. I will not use your real name. No one will know who you are. I want to learn something about the way you read so that I can help other students that I will have. Finally, even though your reading may get better after being in this study, there is a chance that your reading will not get better.

I want you to know that you can stop being in my project any time you want. If you have any questions, you can always ask me.

Sincerely,

Mrs. Strickland
I understand the project talked about above. My questions have been answered, and I want to be a part of this project. I will get a copy of this paper.

_______________________________________________
Signature of Participant

_______________________________________________
Date