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Reading fluency instruction of students with cognitive disabilities using a multiple
probe methodology

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Dedication

I want to dedicate this project to all of my students: past, present, and future. I started this journey to better myself as a teacher and to open new doors. Without this process, I never would have discovered my interest in reading instruction and how I can use my knowledge to impact the lives of my students. I promise to keep learning and to never stop working to better the education and lives of those with disabilities.

Abstract

Despite making up less than one percent of the student population, students with significant cognitive disabilities have the right to receive the best education possible. There is currently a paucity of research regarding effective reading instruction within a comprehensive approach, especially in the area of fluency. The purpose of this investigation was to determine if there was a functional relation between repeated reading and choral reading and the word correct per minute oral reading of six high school students with significant cognitive disabilities. Additionally, the extent to which fluency impacts reading comprehension was also examined. Five of six participants demonstrated an increase of words correct per minute from baseline to treatment. Non-parametric measures of effect indicate no effect as a whole and weak to medium effect for each participant. Four of six participants improved their mean reading comprehension score during treatment.

Keywords: reading fluency, significant cognitive disabilities

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Chapter 1 Introduction

Literacy instruction for students with significant cognitive disabilities has historically focused solely on sight word identification (Bock & Erickson, 2015; Browder, Wakeman, Spooner, Ahlgrim-Dezell, & Algozzine, 2006; Browder et al., 2009) rather than the five key skills of reading as determined by the National Reading Panel in 2000: phonemic awareness, phonics, vocabulary, fluency, and comprehension. This practice of solely learning words in isolation limits students with significant cognitive disabilities from accessing comprehensive literacy instruction, which enables students to become fluent readers with the necessary tools for comprehension (Bock & Erickson, 2015; Keefe & Copeland, 2011). Browder et al. (2009) suggested that reading instruction has not been a priority for students with significant cognitive disabilities because of stereotypical assumptions about the achievement capabilities of students with such low intelligence quotients (IQs). This sentiment is echoed in additional studies, in which researchers state that students with significant cognitive disabilities are often thought of as incapable of acquiring the skills needed to become fluent and skilled readers (Bock & Erickson, 2015; Kliever & Biklen, 2001). Contrary to these perspectives, experts agree that literacy instruction for all students should be systematic, explicit, and tailored to the individual using ongoing assessments and appropriate materials (National Reading Panel, 2000)

Ruppar, Gaffney, and Dymond (2015) used observations to study the literacy instruction in classrooms serving students with significant cognitive disabilities, which revealed that current instructional practices are generally not reflective of research recommendations. Browder et al. (2009) suggests teachers identify skills that students can use currently as well as in the future. The authors also present a model of literacy for students with significant cognitive disabilities with foundational skills leading to two general outcomes: increased access to literature and

increased independence as a reader. Fluency is highlighted as one of those critical foundational literacy skills and is comprised of three main components: rate, accuracy, and prosody (Al Otaiba & Rivera, 2006; Hudson, Lane, & Pullen, 2005; Montgomerie, Little, & Akin-Little, 2014). Fluent readers are able to read at an appropriate pace, read accurately with automaticity, and use expression in their voice (Swain, Leader-Janssen, & Conley, 2013). Knight-McKenna (2008) found that fluency and decoding are the foundational skills that allow for improvements in vocabulary and comprehension.

Statement of the Problem

While the understanding of a text is often enhanced through fluent reading (Paige, Rasinski, & Magpuri-Lavell, 2012), a lack of decoding skills typically leads to a slow, arduous reading of a passage, obstructing the ability to comprehend appropriately (Paige et al., 2012).

Rasinski (2012) uses the term “cognitive energy” to describe the amount of attention and effort readers have available (p.517). He suggests that if a reader uses all of their cognitive energy to decode words, they have little left to actually comprehend the text. The importance of reading words automatically is critical as it frees up some of that cognitive energy for readers to fully understand the text (Al Otaiba & Rivera, 2006; Rasinski, 2012). Readers who struggle with prosody often mistakenly group words together, also hindering their ability to comprehend effectively (Paige et al., 2012). Despite the importance of fluency and its’ impact on comprehension, middle and high school teachers rarely make fluency instruction a priority in their classrooms (Paige et al., 2012).

Ruppar et al. (2015) examined the literacy activities of middle and high school students with significant cognitive disabilities in regards to the content, materials, student engagement, and instructional context. The authors found that teachers underemphasized written and spoken

expressive communication instruction and commonly used worksheets and picture symbols. Reading instruction was the literacy activity observed most often, which typically focused on vocabulary development. Overall, there was a narrow focus concerning literacy activities, with phonemic awareness, phonics, and fluency rarely observed, leading one to believe that teachers are not cognizant of research-based literacy practices and how to implement them on a daily basis with students with significant disabilities.

Lewis-Lancaster and Reisener (2013) specifically examined the struggles of older students with a specific learning disability in reading. They found that consistent poor reading performance led to an intense lack of motivation in school. As students move through grades, the work load increases as well as the reading requirements, thus putting students with reading problems at a disadvantage that continues and is exacerbated over time. The decrease in motivation to read significantly limits the chances for struggling readers to improve their fluency and comprehension, build vocabulary, and identify and practice effective reading strategies. Wexler, Vaughn, Roberts, & Denton (2010) confirmed the lack of fluency instruction for older students, citing that between 1980 and 2005, only six empirical studies examined fluency instructional practices with secondary school students either with or without disabilities.

Purpose of the Study

The purpose of the current study is to investigate the potential relationship between a research-based treatment regimen consisting of repeated reading and choral reading, and the fluency and comprehension of students with significant cognitive disabilities. Individually, each of these interventions have been successful improving fluency in students in the general population and with students with mild disabilities (Noltemeyer, Joseph, & Watson, 2014; Staudt, 2009; Swain et al., 2013). It is predicted that the intervention will not only increase the

words correct per minute (WCPM), but possibly increase the participants' comprehension during the intervention period measured by percent accuracy on specific questions. Two research questions will guide this study:

1. Is there a functional relation between using repeated reading and choral reading implemented by paraprofessionals and the WCPM of students with significant cognitive disabilities?
2. To what extent does fluency intervention impact reading comprehension?

It is hypothesized that repeated reading and choral reading will positively impact the participants' fluency as indicated by higher WCPM. It is also hypothesized that improved fluency will positively impact reading comprehension accuracy.

Significance of the Study

As adults, individuals with significant cognitive disabilities encounter poorer outcomes in employment, independence, social situations, and well-being, when compared to their typical peers (Queiros, Wehby, & Halpern, 2015; Ruppert et al., 2015). Keefe and Copeland (2011) suggested that access to literacy activities and thus improved literacy skills may be the means to combat obstacles students will face as adults with disabilities. Reading is a life skill used every day in a variety of ways, whether it is reading a newspaper, a sign on a building, a menu at a restaurant, or a news crawl on the television. Some people also find reading for pleasure to be an important component of a meaningful life and those with significant cognitive disabilities should not be excluded that experience. This study is necessary as it assesses if instructional practices found to be effective for typical students, also yields positive outcomes for students with significant cognitive disabilities.

In particular, the education of students in middle and high school with significant cognitive disabilities has been a topic of debate with stakeholders disputing between emphasizing academic skills or functional living skills (Ruppar, 2015). Often, it is at this point that a transition to functional sight words and learning how to apply these in real life settings occur (Browder et al., 2009). Browder et al. (2009) also found that any literacy instruction a student with cognitive disabilities was receiving, such as phonemic awareness, diminished as the student progressed through grade levels.

In addition, there is a gap in the literature regarding fluency interventions and students with significant cognitive disabilities. If the findings indicate a functional relation, this study has the potential to be very influential for special education teachers as a literacy treatment option as it is simple to implement and time efficient. Despite results being difficult to generalize due to the single case design and unique specifics associated with the participants, the research investigated two interventions that can easily be used together or separately depending on the needs of individual students.

Lastly, over 400,000 paraprofessionals (U.S. Department of Education, 2010) play a significant role in special education programs across the country, but most are not adequately trained in evidence-based instructional strategies (Brock & Carter, 2015). With students with significant cognitive disabilities being included in state assessments and legal mandates promoting access to the general curriculum, it is particularly important for instruction, provided by any individual, to be rooted in research (Brock & Carter, 2015).

Three specific theories will guide this investigation as it relates to fluency and reading with automaticity. La Berge and Samuels (1974) were the first to address how people perform activities without having to devote attention to the task through their automatic information

processing theory. Next, Perfetti (1985) built on previous knowledge by introducing his verbal efficiency theory. This theory emphasized the importance of lower level lexical skills before higher order processing can be used efficiently. Lastly, Logan's instance theory of automatization (1988) offered a different viewpoint, suggesting that reading with automaticity comes from a reliance on memory retrieval.

Assumptions

A significant assumption of this study is the belief that the skill of fluency can be accurately measured only using WCPM as a measure. Prosody, while an important component of fluency, was not directly related to the current study's research questions. Rather, it was decided to focus primarily on rate and accuracy as measures throughout the intervention and report prosody as a pre/post measure only.

In regards to the sample, the participants have multiple disability category labels and diagnosed disabilities, seemingly providing a broad picture into the overall population of students with significant cognitive disabilities. However, these six participants provide only a limited insight into a complex world of diverse abilities and challenges.

Key Terms

The following key terms will be used throughout this study and are critical in fully understanding this study. The definitions for each were developed and created to allow the reader to gain an understanding of these terms as they will be used in the study.

Fluency. Fluency has consistently been defined as the ability to read text with speed, accuracy, and appropriate expression (Kuhn & Stahl, 2003, Montgomerie et al., 2014, National Reading Panel, 2000). This study will focus heavily on the participants' rate and accuracy during

the intervention phase, but will also report a measure of prosody before and after the intervention to provide rich data on the impact of the treatment for each participant.

Automaticity. Also referred to as automatic processing, automaticity is defined as reading text without decoding individual words or sounds (LaBerge & Samuels, 1974; Rashotte & Torgesen, 1985). Being able to perform things with automaticity means not having to think about the steps or small details during the process of completing the task. Skills such as catching a ball, walking, driving, and reading are all things that become automatic through practice and repetition. While this is true for most people, students who struggle with reading often lack the ability to decode and read with automaticity (Samuels, 1987).

Significant Cognitive Disabilities. This term will be used throughout the study in reference to a population of students, characterized by significant cognitive deficits as well as deficits in adaptive behavior. On a national level, this population can have a range of disability labels according to the Individuals with Disabilities Education Act (IDEA, 2004), but common disability categories include multiple disabilities, intellectual disability, and speech/language impairments and autism spectrum disorder. Making up less than 1% of the total student population, those with significant cognitive disabilities often encounter profound challenges that prevent them from reaching grade level standards (Gong & Marion, 2006).

Summary

Reading is a dynamic and complex skill that students with significant cognitive disabilities often encounter and have difficulty fully developing a sufficient reading repertoire for functioning in daily life activities. Teachers often rely on sight word teaching in isolation or focus solely on comprehension, neglecting fluency instruction. However, literacy researchers have detected an obvious link between fluency and comprehension so appropriate fluency

instruction and goals should not be ignored (Kuhn & Stahl, 2003; Wagner & Espin, 2015). In fact, the National Reading Panel (2000) suggest that fluency be measured regularly using both informal and standardized measures. There have been several studies that note interventions that have empirical support to improve student fluency with the general population and with students with mild disabilities (Hawkins, Marsicano, Schmitt, MaCallum, & Musti-Rao, 2015; Robson, Blampied, & Walker, 2015; Young, Valadez, & Gandara, 2016). However, the intention of this study was to make a correlation between repeated reading and choral reading and improved fluency for participants with significant cognitive disabilities.

Chapter 2 Literature Review

Students with significant cognitive disabilities present a challenge to educators throughout the world in that they are not a homogeneous group. Each student, despite a possible common diagnosis, enters the classroom with different background knowledge, varying cognitive abilities, levels and modes of communication, healthcare needs, and emotional states (Koppenhaver, Hendrix, & Williams, 2007). Researchers and teachers have been trying to determine what and how students with disabilities should be taught ever since they were included and given access to a free and appropriate public education by federal law PL 94-142 in 1975 (Browder et al., 2003). This literature review will begin by examining the past education trends for children with significant cognitive disabilities, followed by a thorough examination of what comprises fluent reading.

The theoretical and conceptual models that served as a platform for the study will be enumerated. And finally research regarding current fluency interventions and assessments is included. Information on the roles and responsibilities of paraprofessionals will be covered followed by a conclusion.

Trends in Education of Students with Significant Cognitive Disabilities

Without a set curriculum for students with disabilities, the developmental model was established, creating an approach that used a modified version of infant and early childhood materials (Browder et al., 2003). The justification for the use of the developmental model was that instruction should match the mental age of students obtained from assessment, suggesting that people with significant cognitive disabilities were comparable in ability and behavior to infants and toddlers. In the early 1980s, a new philosophy known as normalization was introduced and focused on creating a life for people with disabilities that was similar to their

typical peers, particularly in education. During this time students with disabilities were removed from institutions and a curriculum was designed to emphasize skills needed in everyday life. It was at this time that the term “functional” was introduced and skills were categorized according to their use in community, recreational, domestic, and vocational settings (Browder et al., 2003).

Several additional curricular and philosophical trends have been proffered special education after the emergence of normalization. Social inclusion was an idea developed by educators and rooted in ideas from Vygotsky (1978). Additional researchers have also found peer relationships and interactions to be a positive way for children to learn (Peterson & Miller, 2004; Shimazoe & Aldrich 2010; Tsay & Brady 2010).

Supporters cited the benefits for all children when students with disabilities were included in general education settings and peer interactions were promoted (Idol, 2006). The social inclusion philosophy was encouraged for use alongside the functional curriculum in an effort to create a comprehensive approach (Browder et al., 2003). In the 1990s self-determination skills gained primacy in the instruction of students with disabilities in hopes that those skills would assist students to take charge of their lives. Goal setting, problem solving, and decision making were among the necessary targets identified by supporters of this movement (Browder et al., 2003).

Curriculum overlapping was a technique designed to allow teachers to embed specific skills into academic content. For example, a student with a disability might work on their social goal of speaking on topic during a social studies lesson. A second approach, a multi-level curriculum, was introduced, which focused on teaching the same content but expecting different results from different students (Browder et al., 2003). During a lesson on American government, a student with a disability might be expected to match who is in each branch of government,

while typical students would have to describe how a bill goes through the branches to become a law.

Many would argue that special education is still has a functional curriculum mindset today (Browder et al., 2006; Roberts, Leko, & Wilkerson, 2013). Functional literacy instruction creates a limited range of skills the student can obtain, resulting in restricted opportunities later in life (Keefe & Copeland, 2007). Despite recommendations for using a comprehensive approach to literacy, many students with significant cognitive disabilities lack this type of literacy instruction, which Keefe and Copeland (2007) attribute to beliefs that this population does not have the prerequisites to acquire literacy skills. Special education teachers are charged with the task of designing and delivering instruction across settings and in a variety of formats, all with each individual student's strengths and needs in mind (Ruppar et al., 2015). Research suggests there are multiple beliefs that shape how teachers make decisions. Some teachers may use their beliefs about their students' cognitive levels and ability to communicate to help guide pedagogical decisions, leading to either a functional or an academic path (Ruppar, Dymond, & Gaffney, 2011). Some teachers have doubt about their own teaching abilities. Those teachers with a positive outlook on their teaching are more likely to feel positive about the learning of their students with significant cognitive disabilities (Soto & Goetz, 1998).

How teachers are prepared also influences the education of students with significant cognitive disabilities. This population of students is at a higher risk of failure if teachers are not properly instructed in current literacy practices (Copeland, Keefe, Calhoon, Tanner, & Park, 2011). Copeland, Calhoon, and de Valenzuela (2008) found that only 3 out of 28 special education teachers surveyed indicated that they completed a single course dedicated to literacy for students with disabilities requiring extensive support needs at their college or university. A

single three hour course might seem insufficient in comparison for instructors who will teach reading, particularly students who will require extensive interventions. Most excellent general education reading teacher preparation programs require up to 15 credit hours of reading instruction (Maloch et al., 2003).

Additionally, the classroom setting may also play a role in what type of instruction is delivered. Academic literacy skills were more likely to be taught in a self-contained classroom than an inclusive classroom (Ruppar et al., 2011). Spillane, Reiser, & Reimer (2002) also found that teacher decisions are frequently influenced by classroom, school, department, and district attitudes and policies. Teachers might also feel restricted from making certain decisions based on outside pressures. Often these curricular decisions have long-lasting effects on the lives and futures of students with significant cognitive disabilities (Rainforth & Kugelmass, 2003).

The United Nations Educational, Scientific, and Cultural Organization (2016) identifies literacy as a basic human right that should be available to all as well as a cornerstone to lifelong learning. Access to literacy skills allows for more participation in society, choice making, and reduced dependence on others (Keefe, 2007). A comprehensive approach to literacy would include increased access to the general curriculum and instruction in phonics, phonemic awareness, vocabulary, fluency, and comprehension. Research supports the fact that teachers are able to provide instruction using strategies, such as constant time delay, to teach repetitive skills such as sight word identification (Erickson, Clendon, Roy, Van de Carr, 2005). However, teachers fail to provide comprehensive literacy instruction to students with significant cognitive disabilities (Agran, 2011; Keefe & Copeland, 2007). Specifically, one of the components of comprehensive literacy instruction that is neglected in both regular and special education classrooms is fluency (Allington, 1983; Ruppar, 2015).

What is Fluency?

Fluency is often and easily defined as the ability to read accurately at the appropriate speed and with the correct expression (Deeney, 2010; Hosp & Suchey, 2014). Accuracy seems an obvious component of fluent reading, but its importance should not be overlooked. Misreading words in a passage, even one critical word, can have a detrimental effect on comprehension (Deeney, 2010). The rate at which one reads is significant because it relates to the automaticity of reading. Reading quickly and without much effort allows for more attention to be allocated towards comprehension. Prosody requires the reader to change the pitch and stress of their voice as well as demonstrate an understanding of grammar and punctuation (Keefe, 2007). Many researchers have noted that prosody is the main component of fluency that has a direct relationship with comprehension, though it remains unclear how they work together (Deeney, 2010; Kuhn, 2009; Miller & Schwanenflugel, 2008).

While accuracy, rate, and prosody are typically included in definitions of fluency, Deeney (2010) argues that endurance, or stamina, should also be added to the equation. Endurance involves reading with appropriate accuracy, rate, prosody, and comprehension over a period of time. For example, some students start reading well but then start to fade, disrupting their fluency. Conversely, some students begin the task struggling and improve over time.

Fluent readers are required to demonstrate numerous complex skills at once. Rasinski (2004) compared the skills necessary to be a fluent reader to those demonstrated by a fluent public speaker. An accomplished public speaker will use their voice, changing volume, emphasizing specific words, and appropriate phrasing to help facilitate the comprehension of the audience. In contrast, a less fluent speaker, who speaks slowly and monotone, requires the audience to pay closer attention in order to try and understand. This analogy is an apt

introduction to fluent reading because the similar skills are needed and the link to comprehension is apparent. Like speaking, fluent reading requires one to use multiple skills at once, which Rasinski (2004) refers to as multidimensional, with attention given to accuracy, rate, and prosody simultaneously.

Samuels (2002) also found reading to be multidimensional and pinpointed three basic processes that all readers engage in while reading a text: decoding, comprehension, and attention. Decoding is simply pronouncing the words on the page. Comprehension is the awareness of the intended meaning of the text using your understanding of the words and previous knowledge (Samuels, 2002). Attention can be thought of as the level of engagement a reader has with the text (Samuels, 2002).

The term cognitive energy is often associated with fluency and is defined as the mental effort it takes to decode and comprehend (Samuels, 2002; Rasinski, 2012). Struggling readers often have difficulty decoding, leading to deficits in comprehension (Rasinski, 2009). In terms of cognitive energy, beginning or struggling readers have to spend too much of their energy on decoding, leaving little left for comprehension (Rasinski, 2012). Samuels (2002) first described this concept, explaining that fluent readers can decode and comprehend at the same time, whereas beginning or struggling readers cannot.

Chomsky (1964) identified two levels of language that can be associated with the components of fluent reading. Surface level language includes the text threaded along to produce words and the sounds produced when read orally. The comprehension of those words is referred to as the deep level structure. There is a clear connection between fluency and surface level language because the reader must recite the words as they are written. Rasinski (2009)

suggests that fluency can be linked to deep level language when considered a gateway to comprehension.

Fluency is also associated with comprehension based on the definition found in *The Literacy Dictionary: The Vocabulary of Reading and Writing*, which views fluency as “freedom from word recognition problems that might hinder comprehension” (Harris & Hodges, 1995, p. 85). Perhaps one of the most critical aspects of fluent reading is the ability to identify words and comprehend at the same time (Samuels, 2002). Incidentally, many reading series identify word recognition, vocabulary, and comprehension as the main components of their instructional programs for children. Rarely is fluency instruction a goal, but rather a hopeful outcome of increased word recognition (Zutell & Rasinski, 1991).

Zutell and Rasinski (1991) found five oral reading behaviors to be indicative of a fluency problem: (a) inappropriate breaks and lengthy pauses that disrupt the natural flow and pace of reading, (b) sounding out words that are unfamiliar in a letter by letter format, (c) trying to pronounce a word multiple times or repeating the word, (d) readers does not pause or phrase correctly leading to a run-on, and (e) inconsistent relationships between stress and intonation and sentence structure (p.213). In addition, the authors found word by word reading in a monotone voice throughout the passage to indicate trouble with fluency.

While there are numerous research articles regarding fluency and students without disabilities and those with mild disabilities, there is a lack of research on the impact of fluency interventions on students with significant cognitive disabilities (Therrien & Kubina, 2006).

However, this special population requires fluency instruction not only to become better readers, but because of the direct effect on their abilities to live independently in the future. Quick and accurate reading is required daily, whether reading a news crawl across the bottom of the

television, the weather forecast, or information on a passing billboard or road sign. It is estimated that roughly 73% of individuals with disabilities are illiterate (Riley, 1996). Forts and Luckasson (2011) noted that every person has the right to feel the empowerment and value associated with being literate in society.

The link between fluency and comprehension also might be a factor in students with significant cognitive disabilities experiencing success later in life (Fuchs, Fuchs, & Hosp, 2001). Ann Forts, an adult with Down syndrome co-wrote an article in 2011 about how literacy impacts her life. The most important aspect of her life that she directly connects to literacy is relationships with others. Reading is a required part of her volunteer position as kindergarten aid, with students often requesting her to read aloud. She also mentioned how reading the newspaper was an everyday occurrence for people in her family and how her participation in this activity made her feel included. Another aspect of Ann's life is writing and receiving cards from friends and family, which she described as being her motivation to become a better reader and writer (Forts & Luckasson, 2011). As Ann described, reading also provides a leisure activity for those with disabilities to enjoy. Working to improve the reading ability of students with cognitive disabilities will hopefully allow for more enjoyment across settings, including work and home life.

It is not only students with significant cognitive disabilities for whom instruction in fluency is lacking. Students in older grades who struggle with fluent reading are often neglected as fluency is typically viewed as an issue addressed by teachers of younger students (Fuchs, Fuchs, & Kazdan, 1999; Rasinski, Rilki, & Johnston, 2009). Therrien and Kubina (2006) noted that repeated reading, a common fluency intervention, had only been used with students up to eighth grade. Those struggling teens become adults who encounter higher rates of

unemployment, incarceration, poor civic involvement, and high levels of poverty (Hughes & Avoke, 2010; U.S. Department of Labor, 1989). High schools students who struggle with reading typically experience poor self-esteem, encounter more discipline problems, and are more likely to drop out early (Juel, 1996; Thurlow, Sinclair, & Johnson, 2002). It is clear that adolescents and students with significant cognitive disabilities are subgroups of a greater population who face reading challenges and the lack of current research only intensifies the problem. For this reason, high school students with significant cognitive disabilities were purposely chosen to serve as participants in this study.

Assessing Fluency

The National Reading Panel (2000) reported that teachers should conduct both informal and standardized assessments of fluency regularly throughout the school year. There are multiple ways to assess the accuracy, rate, and prosody associated with fluent reading. Stanley Deno (1985) developed the curriculum-based measurement (CBM) of reading, also referred to as an oral reading fluency (ORF) assessment, which is a way to measure rate and accuracy. The quick approach takes 60 seconds and requires a grade level passage. While the student reads, the administrator tallies reading miscues and records the total words read correctly (WCPM) during the time frame. Hasbrouck and Tindal (1992) developed ORF target rate norms to be used as a means to gauge the rates at which students should be reading in first through eighth grades. Norms are provided for three collection periods throughout the school year: fall, winter, and spring. Rasinski (2004) notes that students who fall significantly below the norm for their age will require explicit fluency instruction.

While WCPM is a common method to assess fluency, it can be misleading as evidenced by a 2015 study conducted by Guerin and Murphy. Three struggling adolescent readers were presented with a repeated reading intervention, which required them to reread a text more than once, but it was their decision on how many times to reread. Ultimately, after the program, one student's WCPM decreased. This result was attributed to her reading words more accurately, but reading fewer words in the given time frame. Additionally, post program scores indicated that two of three students were reading slower, but with a higher level of accuracy. The researchers noted that the slower pace could be a result of increased attention to comprehension, which was supported by both higher oral and silent reading comprehension scores. By learning to control speed and accuracy, the students were thought to have become more strategic readers because they had moved past surface fluency to increased comprehension (Guerin & Murphy, 2015).

Because WCPM does not measure the prosodic element of fluency, a different tool needs to be used to obtain this measure. Prosody or using appropriate expression, stress, intonation, and phrasing is when readers move beyond automaticity to make meaning of text as they read (Rasinski, 2004). Qualitative rubrics are the most common way to assess prosody since measuring expression is not concrete in nature, but open to interpretation (Rasinski, 2004). Rasinski (2004) adapted a previous multidimensional fluency scale (MDFS), originally developed by Zutell and Rasinski (1991), which compartmentalizes fluency into four areas: expression and volume, phrasing, smoothness, and pace. This rubric allows for the reader to be rated in each area using numbers 1 (poor) to 4 (good). Scores can range from a low of 4 to a maximum of 16 and Rasinski suggests that a score below 8 indicates a fluency issue. This rubric allows both the teacher and student to monitor fluency development over time and can be embedded into classroom reading instruction readily.

In 2013, Bolanos et al. examined the effectiveness of using a speech recognition and machine learning techniques to assess the fluency of elementary students. All three areas associated with fluency were assessed: accuracy, rate, and prosody. Using one minute readings of grade level passages, the computer program was within 3-4 words of expert human scores calculating WCPM. Additionally, the computer-generate expressiveness scores matched better to the human scores than the humans did with each other using the National Assessment of Education Progress Expressiveness Scale. These results suggest that the computer program was able to produce a clear multidimensional assessment of student fluency (Bolanos et al., 2013).

Additional reading measures will be used to provide a better picture of the participants' current reading abilities. To determine their sight word knowledge, a preassessment of Fry's high frequency words, 1-500, will be assessed then used to develop the reading passages used throughout the study (2004). In 1980, Fry stated that his first 100 words comprised half of all written English language. Fry believed each student should be able to recognize the words on his list instantly so as to read fluently and comprehend text.

The Gray Oral Reading Test- Fifth Edition (GORT-5; Wiederholt & Bryant, 2012) was chosen to assess each participants' oral reading fluency and comprehension due to the high rate of reliability and validity associated with the test. The participant is required to read developmentally sequenced passages and answer five questions while the administrator records time and miscues. Scores for rate, accuracy, fluency (combination of rate and accuracy), and comprehension were able to be achieved and converted to scaled scores and percentiles (Wiederholt & Bryant, 2012).

To assess sight word efficiency and phonemic decoding efficiency, the Test of Word Reading Efficiency-Second Edition (TOWRE-2; Torgesen, Wagner, & Rashotte, 2012) is used. This assessment has been cited as a common tool within the research field since 1999 to provide accurate and reliable measures of fluency (Torgesen, Wagner, & Rashotte, 2012). The specific subtests on sight word efficiency and phonemic decoding require participants to read a many sight words and decodable non-words as they can in 45 seconds, resulting in raw scores which are then converted to percentiles.

Theoretical Framework

Automatic information processing. The automatic information processing theory concerning reading with automaticity was developed in 1974 by LaBerge and Samuels. They explained that one achieved a level of automaticity when a skill could be completed despite attention being elsewhere. In terms of reading, decoding should be automatic in order for attention to focus on comprehension. Young children are not automatic because they are in the process of learning fundamental reading skills, such as letter-sound relationships required in decoding (Samuels, 1979). Most adults are at the automatic level, where decoding is done without having to take the time to decode words (Rasinski, 2004). The cognitive energy difference spent on the reading task is apparent. The automatic decoding and ability to read words without expending much effort permits for the reallocation of attention to comprehension. Today, automaticity and fluency are often used interchangeably (National Reading Panel, 2004).

Information moves from visual, phonological, and episodic memory until it reaches semantic memory (LaBerge & Samuels, 1974; Schrauben, 2010). Samuels (2002) identified three stages of word recognition that leads to automaticity. Beginning readers start in the

nonaccurate stage. At this point, the student struggles to accurately identify words. While this is typically observed when a child is just learning to read, struggling older readers can often get trapped in this stage. The next stage features students who are able to read accurately, but not yet with automaticity. Through phonics instruction, students are able to decode words, but generally read at a slow pace with little expression and limited comprehension. Finally, accurate and automatic readers reach the fluent stage in which they are able to read with accuracy, speed, and expression, while simultaneously being able to comprehend the text (Samuels, 2002).

Samuels (1979) suggested two ways that teachers could help students reach levels of automaticity, including delivering instruction on how to recognize words accurately and allowing time and providing motivation for students to practice their skills. McRae and Guthrie (2009) also detailed the importance of five specific motivations to encourage reading achievement: interest, ownership, self-efficacy, social interaction, and mastery.

Samuels (2002) estimates that automaticity in reading becomes easier when a student “is able to recognize the roughly 300 common words that make up approximately 85% of the words encountered in day-to-day reading” (p.170). A key to identifying if a child is automatic in reading is their ability to read words as a holistic unit rather than letter by letter. This concept questions whether or not we should continue the practice of phonics instruction or start by teaching whole words from the beginning. The answer to that question can be found within multiple research studies that found the size of the visual unit used in word recognition was determined by the reading experience of the student rather than the teaching method (Samuels, LaBerge, & Bremer, 1978; Samuels, Miller, Eisenberg, 1979). Second graders identify words based on letter-by-letter processes while sixth graders and college students with much more practice reading used the word as whole in recognition. These results suggest that students with

more reading practice are able to more effectively decode and comprehend simultaneously. In addition, those who read more are likely to be exposed to more words, which Jenkins, Stein, and Wysocki (1984) identify as key to developing more word knowledge. Specifically, the repetition of a word ten times increases word knowledge when compared to two repetitions (Horst, 2013; Jenkins, Stein, & Wysocki, 1984)

Reading is only one of many skills in life that requires automaticity. Both music and sports also require the participants to perform at high levels based on automatic understanding in the respective fields (Samuels, 1979). Similar to reading in that symbols denote letters and words, music compositions feature specific notes. The musician must first be able to have the prerequisite skill of reading the notes individually before they can put in the practice needed to reach automaticity. Automatic reading of the notes allows for the musician to play freely and with the emotion needed in the piece. The same can be said for athletes. In basketball for example, one must first learn to dribble, pass, drive, and shoot. Consistent practice allows for these movements to become automatic, creating a high level of play. Like in the examples mentioned, automaticity applies to skills that require significant training rather than a skill that does not require any prior experience. For example, eye blinking when something is coming towards your face would not be an example of automaticity (National Reading Panel, 2000).

Automatic information processing is not confined only to word recognition in terms of reading. It is also related to comprehension. Samuels (2002) noted that skilled readers can automatically make inferences based on a text, even if provided only a brief passage. The automatic information processing theory has been influential in the field of reading and fluency for over forty years.

However, as more research has been completed, it is worth considering how prosody could play into the current theory (Schrauben, 2010). Fluency is no longer solely defined as accuracy and rate; prosody plays a meaningful role (Dowhower, 1991; Kuhn, 2004). Schrauben (2010) suggests prosody be included in the automatic information processing theory based on the success of his repeated reading intervention at improving all aspects of fluency. Lastly, the link between prosody and comprehension is further evidence that the automatic information processing theory should be reevaluated to examine how prosody plays into the complex skill of reading (Schrauben, 2010).

Verbal efficiency theory. In 1985, Perfetti introduced the verbal efficiency theory, which emphasizes that lower level skills, such as word identification must reach a specific level before one can perform higher order process, such as comprehension, simultaneously while reading. Similar to the automatic information processing theory by LaBerge and Samuels (1974), Perfetti identifies the importance of attention and the two types of skills needed to read fluently. If a reader is unable to complete the lower level lexical processes then the higher level process are going to suffer (Chard, Ketterlin-Gellar, Baker, Doabler, & Apichtabutra, 2009). LaBerge and Samuels (1974) stressed the importance of the automaticity of decoding in order to free attention to comprehension. Verbal efficiency “refers to the degree to which readers’ subcomponents of reading are exercised with speed and accuracy” (Taguchi, Gorsuch, & Sasamoto, 2006, p. 3). It is noted that letter identification and word recognition are the foundations of lexical access while higher level processes not only include comprehension, but activating background knowledge and using cognitive strategies. It is theorized that even these higher level process can become automatic through exposure and practice (Taguchi, Gorsuch, & Sasamoto, 2006).

The individual differences in reading comprehension can be attributed to the individual differences in the efficiency of processes at the orthographic, phonological, and semantic levels (Perfetti, 1985). Tracy and Morrow (2006) suggest that the verbal efficiency theory was developed based on three assumptions. First, it is assumed that one's ability to read a word is based on their internal hearing of the word, which is referred to speech access. As the reader sees the word, the sound is activated. Second, it is assumed that the time it takes the reader to read a word is related to how well they know the word. Referred to as vocalization latency, the time between seeing and saying the word, is an indicator of the automaticity of word recognition. Lastly, it is assumed that a reader's vocalization latency is directly related to their ability to decode. Tracy and Morrow (2006) suggest that reading nonsense words is an effective method to assess decoding skills because it removes context and holistic word recognition.

Instance theory of automatization. Logan (1988) provides a different perspective on automaticity in his instance theory of automatization. Instead of relating automaticity to limitations of attention, Logan views automaticity as a memory phenomenon based on memory retrieval. He suggests that each person starts out with a general algorithm used to perform a task when put in a new situation. With experience, people develop specific solutions to certain problems. When presented with those problems again, they are able to retrieve those solutions from memory or continue to use the algorithm. It is not until they encounter the problem enough that they can answer solely based on memory. It is at this point, that automaticity occurs.

The instance theory of automatization can be further explained by the method that children learn simple mathematics. When presented addition problems of single digits, children start by counting marbles or using their fingers each time. After more experience, children are able to abandon the counting process and retrieve answers from memory only (Logan, 1988).

This theory is also based on three main assumptions. First, it is assumed that attending to a stimulus encodes it to memory. This does not guarantee the quality of encoding. The quality is dependent on the amount and quality of the attention given to the stimulus. Second, the theory assumes that memory retrieval is also a consequence of attention. Like encoding, memory retrieval is dependent on multiple factors. While it will occur, it might not be easy and the time it takes someone to retrieve a memory varies. Lastly, it is assumed that each memory is encoded, stored, and retrieved separately when presented with a stimulus (Logan, 1988).

While previous theories were process-based, instance theory is items-based, suggesting that automatization “involves learning specific responses to specific stimuli” (Logan, 1988, p.494). One is not able to generalize responses because automaticity is specific to the situation. This is contrasting to process-based views of automaticity, which should transfer skills to novel situations through efficient processes, such as letter identification or semantic access. For example, LaBerge and Samuels (1974) suggest that the connection between decoding and comprehension was based on the level of attention needed to complete each process. Instance theory views automaticity as quick and effortless because memory retrieval is faster than having to think and reason your way to a solution. Using this perspective, automaticity is based on only one process, memory retrieval.

Logan’s instance theory of automatization provides a broader viewpoint of skills, but can certainly be applied to reading. The obligatory encoding assumption mentioned above allows for learning based on the attention paid to stimuli and the buildup of those in memory. The obligatory retrieval allows for automaticity during performance. When presented with the same stimulus multiple times, the knowledge based grows each time, making more information available for retrieval in a quickly. In terms of reading, it is important that the reader encodes the

various components of reading, such as letters, words, etc. and retrieves them when they come across them again later (Logan, 1997). Since reading consists of multiple levels from the letters, words, and phrases, a trace is encoded at each level. Readers encounter letters and high-frequency words more often than high order structure, but there is still a benefit across levels with each exposure (Kuhn, Schwanenflugel, & Meisinger, 2010). The theory suggests that automatization can possibly occur after a single exposure to a stimulus. However, the amount of practice increases the number of relevant instances recorded in memory, which allows for automatic memory retrieval (Chard et al., 2009).

Research Based Fluency Practices

Repeated reading. To combat the fluency difficulties often associated with struggling readers, research supports several intervention options. In 2003, Kuhn and Stahl found an overall effect size of .44 on measure of reading fluency across multiple reading practices, including one of the most commonly cited instructional strategies: repeated reading (Hawkins, Marsicano, Schmitt, MaCallum, & Musti-Rao, 2015; Lewis-Lancaster & Reisener, 2013; Rasinski, 2012). Introduced in 1979 by Samuels, repeated reading is a simple strategy to promote fluency of students with special reading needs, but can be used to benefit all readers. Repeated reading grew from the automatic information processing theory developed by LaBerge and Samuels in 1974, which emphasizes that readers decode text automatically allowing their attention to focus solely on comprehension. Repeated reading aims to increase the automaticity with which a student reads the passage as they gain more sureness during each repetition (Reutzel & Cooter, 2015). Chard et al. (2009) recommends the use of repeated reading as a fluency intervention based on information from both the verbal efficiency theory and instance theory. In addition to an increase in fluency, Chomsky (1978) noted extra benefits to include a

surge in student confidence and motivation when encountering new text after utilizing this strategy.

Sometimes referred to as deep reading, repeated reading involves reading the same passage multiple times (Lewis-Lancaster & Reisener, 2013). Using text composed of 50-200 words, students read and reread the passage until they reach a predetermined satisfactory level of fluency (Reutzel & Cooter, 2015). Research suggests that repeated reading is most beneficial for students who are between a first and third grade instructional level or those who read in a slow, laborious manner (Therrien & Kubina, 2006; Vadasy & Sanders, 2008). Attempting repeated reading with students below a first grade level would be a moot point based on their lack of foundational reading skills. The intervention should be implemented 3-5 times per week with sessions lasting between 10-20 minutes each (Therrien & Kubina, 2006). Samuels (1979) cited the importance of speed and accuracy while reading, setting eighty five words per minute as criterion before the student moved on to a new text. With each new passage, the student made fewer errors and his number of rereadings needed to reach the target speed decreased, suggesting an overall improvement and ability to generalize the developed skills (Samuels, 1979).

Repeated reading of one text was identified in 1989 by Rasinski as one of six key principles used to guide fluency instruction in classrooms. In addition to repeated reading, modeling, direct instruction and feedback, adult support, proper phrase cueing, and appropriate selection of text were cited as important components of effective fluency instruction. Repeated reading also was selected as an important step in developing fluency by Pikulski and Chard (2005). In their nine step program, repeated reading was specifically mentioned as an intervention aimed at helping struggling readers. Paige et al., (2012) emphasized the benefit of repeated reading, stating that if a struggling reader only reads a passage once they are put in a

situation where they are simply practicing disfluent reading. Multiple reads provides the student with the opportunity to improve their fluent reading, focusing on appropriate speed, accuracy, and expression.

Samuels' model of repeated reading is viewed as the traditional format. However, other educators and researchers have developed variations of this method, often by embedding repeated reading into interventions that contain multiple strategies aimed to address reading fluency (Lo, Cooke, & Starling, 2011). Recent research of repeated reading also examines the participants' ability to fluently read two types of passages. Nontransfer passages are those that the student has read multiple times throughout the repeated reading instructional session.

Transfer passages consist of text new to the student (Lo et al., 2011). Research suggests that repeated reading produces a moderate to large effect size on the fluency of nontransfer passages, while providing a less significant effect on those unfamiliar transfer passages (Lo et al., 2011). However, across reviews of repeated reading, there is a general consensus that it does lead to improved fluency on both nontransfer and transfer passages (Wagner & Espin, 2015).

Repeated reading also has been linked to improvements in comprehension. While Samuels did not measure comprehension in his initial repeated reading study, shortly afterwards, Knupp (1988) included it in her study on fluency with eight fourth through sixth grade students. In addition to improvement in words and errors per minute, six of the students increased their comprehension score by 17% or more. Therrien (2004) conducted a meta-analysis examining the impact of repeated reading on student fluency and comprehension. Repeated reading improved the fluency and comprehension of both students with and without learning disabilities. A moderate mean increase was noted for fluency, while a slightly smaller mean increase was found for comprehension. Their findings suggested also found that a passage should be read

three to four times during the intervention, evidenced by a 30% larger fluency effect size than when only read twice and that significant improvement in comprehension ended after the third read (Therrien, 2004).

Repeated reading also has been used in combination with other fluency strategies to address the fluency of readers. Lewis-Lancaster and Reisener (2013) used a single subject design to examine the fluency of a middle school student in a self-contained classroom. Using repeated reading with immediate corrective feedback plus phonics/phonemic awareness instruction was found to be the most effective intervention to improve the student's WCPM and errors per minute (EPM). However, the data was high in variability, which the authors explained was due to his lack of motivation. This study is of particular relevance to the current study because it is the only available literature on fluency instruction for a student with a significant cognitive disability. Begeny and Martens (2006) found that using a combination of evidence-based fluency interventions including repeated reading, passage previewing, and phrase-drill error correction, was an effective approach for small groups of students with various reading levels. Swain et al. (2013) compared the effectiveness of multiple fluency interventions including repeated reading, audio listening passage preview, and listening passage preview. While all three interventions improved student performance, audio listening passage preview was the most effective in terms of student growth (Swain et al., 2013).

All of the above mentioned repeated reading studies focused on rate and accuracy. There are only a small number of studies that include prosody in their assessments. In 1987, Dowhower found that repeated reading led to fewer pausal intrusions, greater phrase length, and greater final pitch declinations. Later studies that incorporate prosody measures generally used subjective rating scales. To assess the effects of repeated reading on prosody using objective

measures, such as pause lengths and pitch declination, Ardoin, Morena, Binder, and Foster (2013) used a software program to analyze the readings of third and fourth grade students in two groups. Both groups participated in repeated reading, but one group was given directions and feedback regarding their reading rate, while the second group was given directions and feedback on prosody. Consistent with previous findings, the WCPM of the rate group increased. However, the rate of the prosody group did not increase, likely due to their attention to punctuation and pauses while reading. The prosody group did show improvement in all prosodic measures except for pauses between paragraphs. The directions given to the rate group negatively impacted their expression while reading, evidenced by their lack of acknowledgement of grammar and punctuation (Ardoin, Morena, Binder, & Foster, 2013).

Clearly there are many repeated reading studies completed with different populations that feature different variables. Chard et al. (2009) reviewed repeated reading studies that used participants with or at risk for learning disabilities (LD). Their goal was to determine if repeated reading was an evidence based strategy for this population using rigor standards developed by Horner et al. (2005) for single subject studies and Gersten et al. (2005) for experimental or quasi-experimental research. Of the six single subject studies reviewed, zero met the standards of rigor, indicating that repeated reading is not an evidence-based practice for students with or at risk of LD. Likewise, only one experimental/quasi-experimental study met the rigor standards, also indicating that repeated reading was not an evidence-based practice. Chard et al. (2009) did not suggest teachers stop using repeated reading. They are clearly in favor of the approach based on the theoretical framework and effect sizes identified in Therrien's 2004 meta-analyses. Rather they interpret their results to reveal more about how research studies are being conducted

and written in the special education field. They encourage researchers to strive to meet the high-quality and rigor standards set forth by Horner et al. (2005) and Gersten et al. (2005).

Choral reading. While repeated reading traditionally requires the student to read independently multiple times before reading to staff for data collection, Rasinski, Homan, and Biggs (2009) recognized that young readers and older struggling readers might have difficulty monitoring themselves without the presence of adult feedback. They suggest repeated reading be completed under the supervision and guidance of staff, providing instruction specific to fluency, similar to that of an athlete working with their coach or instructor (Rasinski et al., 2009). Paige (2011) suggests the use choral reading to build fluency among students. This strategy calls for the whole class or small group to read the text at the same time. Depending on the group, the whole text or parts of the passage can be read in unison (Keffe, 2007). Strengths associated with choral reading include its flexibility, use with both large and small groups, and the anonymity it provides for struggling readers since everyone is reading aloud (Paige, 2011; Paige et al., 2012). Choral reading can be completed with any age group and across genres of texts. Previous studies have found that having teacher support through choral reading leads to growth in reading fluency (Kuhn & Stahl, 2003).

Choral reading also allows to students to listen and respond to prosodic cues (Miccinati, 1985). Prosody, or reading with expression, can be a difficult thing to teach students so modeling the skill through choral reading enables students to listen for sound, duration, stress, and pitch (Miccinati, 1985). Despite the benefits associated with reading aloud to students, Kuhn (2004) found it best that students be included and actively engaged, specifically through choral reading, to improve their word recognition and prosody.

Research on choral reading is limited, but Paige (2011) examined the effects of whole class choral reading on the oral reading fluency and phonological decoding process of sixth graders. In both areas, students in the treatment group demonstrated improvement with moderate effect sizes. The implementing teachers found the strategy to be simple and effective while the students also seemed to like the strategy and make note of their own improvement. Choral reading is a simple strategy that has been used multiple times within treatment packages comprised by multiple intervention strategies. Combining interventions or using interventions that address multiple components of reading have been found to be the most effective for older students who struggle with reading (Roberts, Torgesen, Boardman, & Scammacca, 2008). In 1994, choral reading was used within a fluency development lesson created by Rasinski, Padak, Linek, and Sturtevant. They found significant progress in reading rate was made by a large group of fourth graders. Morra and Tracey (2006) also used choral reading within a treatment package that improved the WCPM of a third grade struggling reader. Peer Coaching Fluency Building (PCFB) was used as a fluency intervention used by Marr, Algozzine, Nicholson & Dugan (2011) with second grade students. Through this approach which combines choral reading with peers coaching each other, students in the treatment group had significantly higher oral reading fluency scores on the winter and spring assessments.

Reader's Theater. The term Reader's Theater refers to a fluency intervention method that requires students to perform using a written script (Young & Rasinski, 2009). This intervention requires students to concentrate on their expression while reading and requires repeated reading in order to learn their lines. Reader's Theater does not typically make use of props, costumes, or even a stage in order for the complete focus to be on the student's voice and how they use it to convey meaning (Clark, Morrison, & Wilcox, 2009). While the main goal of

Reader's Theater is improvement in prosody, both accuracy and rate are improved through the repeated reading and rehearsal processes. Both motivating and engaging in nature, Reader's Theater has been a strategy for students to grow in their accuracy, rate, and prosody, as well as comprehension (Garrett & O'Connor, 2010; Young & Rasinski, 2009). Reader's Theater also was found to increase both students' interest in reading and their confidence (Clark, Morrison, & Wilcox, 2009; Corcoran & Davis, 2005; Worthy & Prater, 2002).

The flexibility in Reader's Theater has been found to be a strength based on the variability in the scripts. Teachers can modify passages to develop their own script or separate stanzas of a poem to best fit the reading group. Scripts are readily available online as well so any topic across any content area can be adapted to fit the needs of the class. Additionally, scripts can be developed or adapted to fit the size of the group that will use it. Worthy and Broaddus (2001) noted that students who are typically hesitant to read aloud or those who struggle can be given parts of varying lengths, corresponding to their comfort or instructional level. Typically the group will practice their Reader's Theater for 10-20 minutes per day during school and it is recommended that students take their scripts home to practice as well (Garrett & O'Connor, 2010).

Peer tutoring/coaching. Placing students in groups to complete work together has been a strategy used by teachers for years (Johnson & Johnson, 1999). It is a simple strategy that focuses on students working together on an instructional task that allows for immediate feedback and numerous opportunities to respond (Dufrene et al., 2010). Topping (1987) first introduced paired reading as a way for parents to provide assistance to their children. Using this format, the parent and child would read a text together unless the child gave a specific signal for the parent to stop reading. In 1989, Topping explored the integration of paired reading with peer tutoring.

Using the paired reading format, the parent role was simply changed to a more proficient reading peer. However, pairs do not have to be on differing abilities, but need to be able to work together well and be willing to assist each other (Keefe, 2007). Allington (2006) noted that peer tutoring is an effective method for struggling older readers, especially when placed in the role as a tutor to a younger student, where they are able to read at a proficient level without the embarrassment of reading a lower grade-level book.

The peer coaching model developed by Marr and Dugan (2007) was comprised of five key elements: (a) modeling fluent reading, (b) giving support and feedback, (c) repeated reading of text, (d) monitoring progress, and (e) setting a goal to reach. Second grade students who participated in this method had significant gains in reading fluency, improving from a mean oral reading fluency score of 51 in the winter to a mean score of 91 in the spring. Using peer tutors to implement a listening preview and repeated reading intervention, Dufrene et al. (2010) found that all four participants improved their oral reading rate while the tutors demonstrated a high level of integrity in their intervention implementation. At the high school level, peer-assisted learning strategies were found to be significant in improving comprehension.

Paraprofessionals

As of 2010, there were over 400,000 full time paraprofessionals providing services to students with special needs (U.S. Department of Education). Guidelines for appropriate use of paraprofessionals clearly state that all instruction should be supplementary to the primary instruction delivered by a highly qualified special education teacher, who also makes pedagogical decisions for each student (Brock & Carter, 2013). Paraprofessionals play a pivotal role in the education of students with disabilities by providing one on one instruction as well as

behavioral, social, and vocational support (Study of Personnel Needs in Special Education, 2002). Additional duties may include modifying materials, collecting data, and providing personal care assistance, such as feeding, positioning, and toileting. Despite their overwhelming influence on students' education and lives, most paraprofessionals receive little training on instructional practices.

Each state and school district is able to determine the qualifications and requirements need to become a paraprofessional. In the state where this study took place, potential paraprofessionals are either required to have completed 48 college credit hours, obtained an associate degree or higher degree, or take the state paraeducator assessment, which addresses literacy, mathematics, and instructional strategies (Kentucky Department of Education, 2009). Based on these varying requirements, paraprofessionals enter the job with varying degrees of experience and knowledge. Questions have been raised as to why the least trained people in a school are often providing support and instruction to those students with the most intensive needs (Carter, O'Rourke, Sisco, & Pelsue, 2009). Carter et al. (2009) found both experience and training to be significant factors related to self-reported higher levels of knowledge on paraeducator standards.

Brock and Carter conducted a 2013 review of the literature on paraprofessional training and found that the most commonly used method of training came in the form of a single-event training workshop. During these events, paraprofessionals received a one day training on a specific idea, concept, or intervention without follow up instruction or accountability to properly implement the strategy. While most professional developments follow this method, studies suggest this format has a very limited impact on paraprofessional and teacher behavior (Barnes, Dunning & Rehfeldt, 2011). In addition, most supervising teachers responsible for instructing

paraprofessionals are not clear on proper techniques to provide such training (Barnes, Dunning & Rehfeldt, 2011).

Brock and Carter (2013) found three commonalities among studies that specifically aimed to improve generalization of skills learned in workshops to everyday implementation: modeling, performance feedback, and accountability. Modeling allowed for the trainee to view a live demonstration of the intervention. After seeing the model, the trainee was able to practice the intervention and receive corrective feedback from the trainer about their performance. Finally, researchers would require the paraprofessionals to deliver the interventions and follow up to ensure that the intervention was actually implemented (Brock & Carter, 2013). These skills have become part of a technique called behavior skills training (BST). BST is a way to teach others a new skill using four main components: instructions, modeling, rehearsal, and feedback (Fazal, 2015). Using BST, three teaching assistants were taught to conduct paired stimulus preference assessments. The mean baseline scores were 16%, 23%, and 20%, which quickly improved to intervention scores of 98% , 100% , and 100% steps completed correctly during the preference assessment (Lavie & Sturmey, 2002). Behavior skills training also was used in 2004 by Sarokoff and Sturmey to train teachers to implement discrete-trial teaching. Teachers improved an average of 53% from baseline to post training on percentage of correct steps implemented during discrete-trial teaching. In addition to the improvement in accurate implementation, the participants learned the procedure quickly using behavior skills training.

Not only are classroom teachers often responsible for providing training to paraprofessionals, but must supervise them as well. Morgan (1997) found that many teacher preparation programs lack appropriate training on supervising paraprofessionals, leading to teachers to be hesitant to supervise (French, 1998). Teachers failed to set aside time to

specifically meet with paraprofessionals and said they preferred paraprofessionals to work without specific directions (French, 1998). Consistent with previous findings, one third of surveyed teachers give their paraprofessionals oral directions throughout the day rather than giving them written plans (French, 2001). In the same study, verbal trainings on teaching techniques were the most frequently used method and topic reported by teachers. Despite the lack of time to meet and plan, both paraprofessionals and special education teachers indicated that providing instructional assistance was the most important task completed by paraprofessionals (French, 2001; Patterson, 2006).

An apt analogy can be created for the roles and responsibilities of the certified classroom teacher and classified paraprofessional, it is much like the relationship between an executive chef and a sous chef (Causton-Theoharis, Giangreco, Doyle, & Vadsay, 2007). The executive chef takes control to design and execute a beautiful offering while the sous chef assists in preparing the various contents of the meal. In the same way, the classroom teachers works to design instruction based on each child's needs while the paraprofessionals work to implement parts of the plan after receiving instructions from the lead teacher. Cuaston-Theoharis et al. (2007) outlined the following as five ways to best utilize paraprofessionals for literacy instruction: (a) use paraprofessionals solely as supplements to your lead teaching, (b) use evidence-based reading strategies, (c) train the paraprofessionals in the reading strategy, (d) train the paraprofessionals to manage student behavior, and (e) provide continuous feedback.

Single Subject Research

Single subject research as first introduced into the research field in 1960 by Sidman. This particular methodology is used to examine basic components of behavior and establish evidence-based practices (Horner et al., 2005). The goal of single subject research is to determine if a

functional relationship exists between independent and dependent variables (Horner et al., 2005). Single subject research has been especially crucial to special education due to the focus on behavior for individual learners. A defining principal of single subject research is the ability to demonstrate control of a behavior through a detailed analysis.

Contrary to its name, single subject research typically includes between three and five participants. By examining participant performance before and after an intervention is implemented, each participant serves as his own control or unit of analysis (Horner et al., 2005). In terms of measurement, the dependent variable is usually an observable and measureable behavior that is assessed across conditions. It is important that the measures of the dependent variable are measured for consistency throughout the study using a second observer. It is also significant that the dependent variable be of value to the participant through a measure of social validity (Horner et al., 2005). The intervention (the independent variable), being applied to impact the behavior is manipulated by the researcher and the fidelity of treatment execution is documented to ensure accurate implementation.

Single subject study typically begins with a baseline condition that provides a means for comparison after the intervention is implemented. During baseline, performance should be stable so as to allow for a clear comparison. A demonstration of control is evident when the “dependent variable covaries with manipulation of the independent variable,” (Horner et al., 2005, p.168). That is the dependent variable behavior increases or decreases only when the treatment is introduced. For example, if a researcher is trying to increase student independence during morning routine, she might introduce a treatment of providing a visual checklist. Control would be established if the student increased his independence, measured according to a prompt system, only when given the visual checklist.

Interpretation of single subject research is rooted in visual analysis, but statistical analysis is also commonly used. Visual analysis includes looking at the (a) level, which is the mean performance during each phase, (b) trend, which refers to the rate of increase or decrease or slope of the performance, and (c) variability, which refers to how much the data fluctuates during each phase (Horner, et al., 2005). There are also multiple measures of effect, which can be calculating based on overlap of data points between baseline and treatment phases.

Cakiroglu (2012) identifies single subject research as one of the most frequently used methodologies within special education. Single subject research specifically works well within the special education field because it also focuses on the individual student and using interventions to change behavior. Since special education students demonstrate various neurological and cognitive deficits, using the participant as the unit of analysis, establishes a more effective method to determine the efficacy of an intervention for a similar population. Single subject research works well with students with significant cognitive disabilities because the sample does not have to representative of the general population, which is often the case for group research.

Another advantage of single subject research in special education is the range of questions that can be asked and the wide variety in behaviors that can be addressed. Single subject research can answer questions about specific intervention, academic performance, social behavior, communication, and behavior problems. Single subject research works well within schools and can be teacher initiated (Cakiroglu, 2012). It is likely that teachers are already completing single subject research without awareness as they identify a problem or behavior, collect data, introduce an intervention, collect additional data, and analyze the data for effectiveness (Cakiroglu, 2012).

A single subject design was chosen for this study in that this design can examine the performance of a small group. There is also no requirement of a control group in single subject research since each participant acts as their own control; this fits the individual needs of students with significant cognitive disabilities. Specifically, a multiple probe across participants design was chosen for this study because it does not require the continuous baseline measures, reducing the internal validity threat of testing effects (Murphy & Bryan, 1980).

Chapter 3 Methodology

Setting

The study took place at a public high school in a district located just outside a large urban city in the Southeast region of the United States. The district educates over 12,000 students and consistently places among the top in state assessment performance. Participants were selected from two self-contained classrooms within the school, labeled as highly structured and focusing on functional academics. Daily sessions were completed one on one with a paraprofessional in a small testing room with minimal distractions.

Participants

Student participants were identified by two classroom teachers based on their ability to read aloud and have a sound sight word base. Upon receiving a signed informed consent form (see Appendix A-C), each participant was then assessed by the researcher to confirm they had the necessary skills to participate in the study. Three boys and three girls were selected to participate in this study, ranging from 15 to 17 years old and in 10-12th grade. Two paraprofessionals were nominated by the classroom teachers based on their experience with the students and ability to collect accurate data, as well as their consistent attendance and work ethic.

Students.

Kyle. Kyle is a fifteen year-old boy with Autism in the tenth grade. He also receives special education services under the category Functional Mental Disability. Occupational and speech therapies are also noted on his individual education program (IEP). Kyle achieved a full scale I.Q. score of 50 on the Wechsler Intelligence Scale for Children-Fourth Edition (WISC-IV; Wechsler, 2003), a score that falls in the extremely low range. When the Kaufman Test of Educational Achievement, Second Edition (KTEA-II; Kaufman & Kaufman, 2004), was

administered, Kyle scored in the below average range in basic reading and lower extreme reading comprehension skills.

Kyle ranked in the third percentile in sight word efficiency (SWE) and in the fifth percentile in phonemic decoding efficiency (PDE) when he was administered the Test of Word Reading Efficiency-Second Edition (TOWRE-2; Torgesen, Wagner, Rashotte, 2012). In addition, Kyle's current fluency state was calculated and he determined to be in the fourth percentile based on his performance on the Gray Oral Reading Test- Fifth Edition (GORT-5; Wiederholt & Bryant, 2012). Using Hasbrouck and Tindal's (2006) fluency norms, Kyle would be in the 50th percentile of those in third grade during the fall testing window.

Reid. Reid is a 16 year-old boy in tenth grade. He currently receives services under the categorical headings of Functional Mental Disability and Speech/Language Impairment. He also receives occupational therapy services twice a month. On the reading subtests of the KTEA-II, Reid achieved scores within the lower extreme range. Reid had a full scale I.Q. score of 44 on the WISC-IV. Reid is in the less than one percentile for both SWE and PDE using the TOWRE-2. Similarly, he is in the less than one percentile of oral reading when measured using the GORT-5, described as a very poor performance. Based on the available norms, Reid would be in the 50th percentile of first graders during the winter testing window.

Cullen. Cullen is a seventeen year-old boy with Autism. He is currently receiving special education services under the categorical headings of Autism, Functional Mental Disability, and Speech/Language Impairment. He is described as having an easy going temperament, but engages in stereotypical behaviors, such as resistance to changes in routine. When administered the Wechsler Individual Achievement Test-Third Edition (WIAT-III; Wechsler, 2009), in which he achieved well below average scores on both the basic reading

skills and reading comprehension subtests. In addition, he achieved an I.Q. Composite score of 44, which is classified as well below average on the Kaufman Brief Intelligence Test, Second Edition (KBIT-2; Kaufman & Kaufman, 2004). Cullen tested within the less than first percentile on SWE and the fifth on PDE using the TOWRE-2. Cullen also falls in the less than first percentile when oral reading, indicating a very poor performance. His performance on a grade level passage indicates that he has the fluency rate in the 50th percentile of second graders during the fall testing window.

Bonnie. Bonnie is a seventeen year-old with Down syndrome in eleventh grade. She is currently being served under the category Functional Mental Disability while receiving speech and occupational therapy as well. Bonnie enjoys coloring, music, and participating in Special Olympics. Bonnie achieved scores in the extremely low range on letter and word recognition, reading comprehension, and reading fluency when administered the KTEA-II. Bonnie achieved a Nonverbal Index (NVI) of 50 when administered the Kaufman Assessment Battery for Children, Second Edition (KABC-II; Kaufman & Kaufman, 2004). Bonnie tends to demonstrate work refusal behaviors, often trying to change the topic of conversation or start playing with her hair. Similar to Reid, Bonnie's performance on the assessments conducted prior to the study fell in the less than first percentile, signifying a very poor performance in each of the specific areas. Bonnie also would be considered to be in the 50th percentile of first graders in the winter.

Katie. Katie is a sixteen year-old in eleventh grade. She currently receives special education services under the category of Functional Mental Disability alongside speech/language impairment. Katie's composite IQ score on the KBIT-2, is classified in the well below average range when compared to her typical peers. While she is normally described as friendly and outgoing, Katie demonstrates some refusal behaviors when she perceives a task to be too

difficult, which was evidenced by her refusing to read paragraphs on a basic reading skills test from the WIAT-III. Frequently during the pre-assessments given prior to this study, Katie tried to procrastinate or delay the start of reading by initiating a conversation or insisting that each task was too difficult. Katie also scored in the less than one percentile on both the PDE and SWE when administered the TOWRE-2. Based on performance during the GORT-5, Katie is in the first percentile on overall oral reading, denoting a very poor performance. Using the norms suggested by Hasbrouck and Tindal (2006), Katie would be between the 50th and 75th percentile of first graders in the winter.

Lola. Lola is a fifteen year-old in tenth grade receiving services under the eligibility category of Specific Learning Disability for reading comprehension and reading fluency. The additional category of Other Health Impairment was added when Lola was diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) and seizure disorder as a fourth grader. A recurring issue associated with Lola and her education is her numerous absences, often exceeding 25 per year and upwards of 60 in recent years. Lola received a full scale I.Q. score of 57 on the WISC-IV, which falls in the low range. She also scored in the below average to low average range on all of the reading subtests of the KTEA-II. Lola scored in the less than first percentile on the SWE and in the first percentile on the PDE subtest on the TOWRE-2. In addition, when administered the GORT-5, Lola ranked in the first percentile, indicating a very poor performance. Lastly, Lola would be the 50th and 75th percentile of first graders in the winter when assessed based on fluency norms.

Paraprofessionals.

Ms. Kim. Ms. Kim has been working in special education for fourteen years, all of which has been as an assistant in a self-contained classroom for students with significant cognitive

disabilities. She left school after ninth grade but completed her GED thirty years later. Kim has never had any previous training on reading instruction. She was happy to participate in this study and said her favorite thing about her job is watching students learn something new for the first time.

Ms. Sally. Ms. Sally has worked in special education for over ten years. She started working at her current school six years ago in the self-contained room for students with significant cognitive disabilities. She graduated from high school, but has not received any formal training on reading instruction. Karen was more hesitant to participate in the study but she was recommended by the classroom teacher for her skills. She notes assisting the students in general as the favorite part of her job.

Materials

Prior to baseline and treatment, a pre-assessment was administered using the first 500 words from the Fry high frequency word list (Fry, 2004) using a tablet with the words presented one at a time on a Powerpoint presentation (see Appendix D). Additionally, the GORT-5 and the TOWRE-2 were administered. A copy of the record booklet, student booklets, and a stopwatch were necessary to complete these tasks.

The researcher developed reading passages were created using the bank of sight words read correctly on the Fry word pre-assessment (see Appendix G for sample passage). Some passages could be used for multiple participants due to their common knowledge of certain words. The researcher also created comprehension questions to correspond with each reading passage. These questions focused on simple recall (who?, what?, when?) rather than questions that would require more complex skills such as inferencing. For each passage, a copy was made for the participant and paraprofessional. The participant copy had the passage in a larger font

size, which Rello, Pielot, and Marcos (2016) found students to prefer and have a positive impact on readability and comprehension. The adult copy allowed for space to mark errors as well as spots to record time and total deviations from print. The comprehension questions and a designated area for the participant responses were also on the researcher page. An audio recorder and stopwatch also were required throughout the baseline and treatment phases.

Data Collection

To promote an optimal data collection setting, the paraprofessionals placed the audio recorder close enough to accurately record the student, but at a distance designed to minimize the potential distraction. A stopwatch was also in proximity to allow quick access but not so as to create a potential distraction to the participant. The time was critical in calculating the dependent variable, words read correctly per minute (WCPM). Hasbrouck and Tindal (2006) identified WCPM to be an overall accurate and significant indicator of reading competency. The recorder began once the student started the first word of the passage and stopped the device when the student finished the last word of the passage. Data was rounded to the nearest whole second. The paraprofessionals recorded reading miscues on a separate copy of the passage as the student read. The researcher calculated WCPM by subtracting the number of errors from the total number of words read, resulting in the number of words read correctly. Self-corrections were not marked as errors. Next, the number of words read correctly was divided by the total time it took the student to read the passage, in seconds. Finally, the words read correctly per second were multiplied by 60, resulting in the final WCPM. Comprehension measures were collected according to accuracy and the percentage correct was calculated.

Experimental Design

A multiple probe design (Horner & Baer, 1978) across participants was used to assess the effectiveness of repeated reading with choral reading on the reading fluency of six participants with significant cognitive disabilities. Consistent with this design, the intervention was introduced to the first participant with each paraprofessional then followed the by the second and third once a change was observed in the previous participants' data. A multiple probe design was chosen because it reduces the amount of testing during baseline conditions and is well suited for irreversible behaviors, such as fluency. The ability to collect data intermittently prior to introducing the intervention reduces the possibility of testing effects as a threat to internal validity.

Procedures

Paraprofessional Training. Both paraprofessionals received one on one training with the researcher prior to the start of the study. Using a four-step process associated with behavior skills training (BST), the researcher was able to secure confidence in the preparedness of the paraprofessional to complete the necessary duties required of their role in the study. The paraprofessionals were introduced to the study using a brief description. In terms of the intervention, the paraprofessionals were first given verbal instructions with the researcher referring to a list of steps for both the baseline and intervention phases. Next, the researcher modeled the paraprofessional role exactly as it was how to be done with student participants. Upon completion of the demonstration, each paraprofessional was given the opportunity to practice during a rehearsal period. The last step was for the researcher to provide feedback to each paraprofessional on their practice performance. Any mistakes were noted and corrected.

Pre-assessment. Prior to the start of the research study, a sight word assessment was conducted with each participant to establish a bank of words they knew. During this process, the

researcher worked one on one with each participant, presenting one word at a time from the Fry high frequency word list, on a tablet using a blank, white background with the word in a simple, black font. The first 500 words from the list were assessed across two sessions. The researcher had a copy of the words and marked each incorrect reading. Participants were given the choice to maneuver the tablet and click through the words themselves or have the researcher do this for them. This resulted in the total number of Fry words read correctly by the student.

In addition to the sight word assessment, two standardized reading assessments were used to gain more information on the participants' present skill level. First, each participant was administered the GORT-5, Form B. This assessment features sixteen stories, increasing in complexity and length. Each participant was presented one story at a time starting with number one and their time and deviations from print were recorded by the researcher. Those numbers were converted into rate and accuracy scores, ranging from 0-5, which were then combined to produce an overall fluency score (0-10). Each story also featured five comprehension questions and a score out of five was obtained based on the participant responses. The participants continued to read the stories chronologically until they reached a ceiling level where their overall fluency score was equal or less than two. At that point, the scores were calculated to achieve a summative score for rate, accuracy, fluency (a combination of rate and accuracy), and comprehension. Those totals were used to identify age and grade level equivalents as well as a percentile rank. Lastly, one of seven descriptive terms was associated with each participant's performance in accordance with their scaled and index scores, ranging from very poor to very superior.

The TOWRE-2 was administered to each participant in order to determine their sight word efficiency (SWE) and phonemic decoding efficiency (PDE). Each participant was

presented with a standard letter size piece of paper. On the front side was eight practice words in a single column. The scripted verbal directions encouraged the participant to read fast and skip words they were not familiar with, reading from top to bottom. Once the practice session was completed, the paper was turned over and 108 words were listed in four columns, increasing in difficulty. The directions were to read each word top to bottom as fast as possible until told to stop at the expiration of 45 seconds. A mark was made where each participant stopped and incorrect words were recorded during the reading. The same process was used for phonemic decoding efficiency. Instead of actual words being presented, decodable nonwords were used. The verbal directions encouraged the participants to blend the sounds together to make a made-up word. For each subtest, the total number of words read correctly in the time allowed was the measure of analysis. Those SWE and PDE scores were then converted into age and grade level equivalents, percentile rank, and a scaled score. A descriptive term and total word reading efficiency score were also determined.

Other student screening tools were used to gain more in depth knowledge of their current fluency levels. An oral reading fluency assessment (Deno, 1985) was administered as well as a score based on the Multidimensional Fluency Scale (MDFS) (Zutell & Rasinski, 1991). During the oral reading fluency assessment, the student read a grade level passage consisting of 250 words. The researcher again calculated the WCPM after the student read for 60 seconds. After the WCPM were determined, the researcher compared each participant's score against target rate norms, generated by Hashbrouck and Tindal (2006). While the norms are specifically for grades 1-8, they provide a means for comparison to gauge where students with significant cognitive disabilities fall considering they are generally multiple grade levels behind their peers.

Lastly, each participant's expression and volume, phrasing, smoothness, and pace was assessed using the MDFS. The Likert scaled rubric allowed the researcher to assign a specific number (1-4) to each of the above mentioned areas after listening to audio recordings of the participants' reading. The scores assigned to each dimension were then totaled to gain an overall score, with the minimum being four and the maximum being 16.

Baseline. Passages used throughout the study were developed by the researcher using the words read correctly by each participant from the Fry sight word assessment. Each passage typically consisted of 50-55 words and ranged in Lexile level based on each participant. The decision on appropriate Lexile level was based the results of the standardized assessments conducted prior to the intervention. During the baseline phase, a preference assessment was administered before each participant was presented a passage without instruction. The only direction given was to read the passage aloud. The researcher had their own copy of the passage and marked deviations from print and recorded the time. The passage was then taken from the participant and four comprehension questions were asked. Each verbal response was recorded by the researcher. No feedback was provided at this time. The words correct per minute (WCPM) was calculated and the comprehension score was determined for each baseline passage as the total number of questions answered correctly with possible scores ranging between 0 and 4 (see Appendix E for baseline instructions).

Treatment. At the beginning of each treatment session, a quick preference assessment was given to each participant to increase their motivation to participate. Prior to the study, the researcher requested a list of three to five items each participant typically enjoyed on their free time from their teachers. Using those lists, the researcher generated pictures to represent these activities/items. Using a choice board, the paraprofessional presented three picture options the

student could receive once the treatment session was complete along with the prompt, “What do you want to work for?”

A variation of the repeated reading (Samuels, 1979) method was used throughout this study in hopes of improving the participants’ reading fluency. While repeated reading served as the foundation, the introduction of choral reading provided an additional cue for fluent reading. Each treatment session began with the participants doing a cold read of a probe passage developed by the researcher containing only words read correctly from the sight word assessment. A different passage was created for each daily session and typically consisted of 50-55 words. Prior to the cold read, the paraprofessional instructed the student to read the passage. There were no prompts about speed, accuracy, or expression given at that time. The paraprofessional and student both had a copy of the passage, allowing the paraprofessional to keep record of miscues. Additionally, the paraprofessional used the audio recorder provided by the researcher to record each participant’s daily session. The paraprofessional was also trained to keep time, starting a stopwatch when the student started reading and stopping it when the final word was read. After the initial reading of the probe passage, the paraprofessional recorded the time it took the student to read the passage and the total number of miscues, which was then used by the researcher to determine WCPM. Before moving on to the repeated reading portion of the treatment, the paraprofessional asked each participant four comprehension questions created by the researcher. These questions were simple recall questions about the probe passage. The paraprofessional recorded each answer, which was then determined correct or not by the researcher. An overall accuracy percentage was noted.

Once the data was recorded, the paraprofessional then explained to each participant that they would be doing a choral read of the probe passage. A choral read was described as reading

together out loud. Before the choral read began, the paraprofessional prompted the student to pay attention to rate, accuracy, and expression as she lead the choral read. To meet the cognitive level of each participant, rate, accuracy, and expression were explained in simpler terms. For example, rate was explained as how fast or slow something is read while an accurate read was described as saying all of the words correctly. Lastly, a change in your reading voice was equivalent to speaking with expression. Using a countdown from three, the paraprofessional cued the student to start reading in unison with her. The paraprofessional set the tone throughout the choral read, using appropriate phrasing and speed in a louder voice volume compared to the student.

At the completion of the choral read, the paraprofessional offered general verbal praise, such as “good job” or “nice reading.” The student then completed two additional independent reads of the passage with the paraprofessional again providing a prompt of rate, accuracy, and expression beforehand (see Appendix F for treatment instructions).

Interobserver Agreement and Treatment Fidelity

A second independent observer monitored and recorded data on 30% of the total treatment sessions across all six participants. Focusing on participant miscues during the probe read, point-by-point interobserver agreement was used to assess data reliability by dividing the number of agreements by agreements plus disagreements then converting that to a percentage. An agreement was defined as both the observer and paraprofessional marking the same miscues throughout the passage. The agreement across all six participants was 75%.

Using a procedural checklist (see Appendix H), a second independent observer monitored the treatment fidelity for 26% of the total treatment sessions across all six participants, reporting a procedural integrity of 98%.

Social Validity

Subjective evaluation was used to assess the social validity of using repeated reading plus choral reading to increase the reading fluency of students with significant cognitive disabilities (Wolfe, 1978). Both the paraprofessionals and participants were given a brief survey featuring a 5-point Likert scale for the adults (see Appendix I) and a 4-point smiley face visual scale for the student participants (see Appendix J). The paraprofessional survey examined (a) the perceived level of difficulty in learning the treatment procedure, (b) the perceived level of difficulty implementing the procedure, (c) the perceived level of treatment effectiveness, (d) the perceived level of student enjoyment of the treatment, and (e) the perceived likelihood that they would suggest continued use of the treatment in the classroom. The student survey gauged their thoughts on (a) the level of difficulty completing the treatment, (b) the feeling toward the treatment, (c) the feeling of working with the paraprofessionals, (d) the level of difficulty in reading the passages, (e) the perceived effectiveness of the treatment on their reading, and (f) the likelihood that they would want to continue using the treatment. Additionally, both surveys left space for the participants to leave comments about the intervention.

Both paraprofessionals agreed that the repeated reading and choral reading intervention was both easy to learn and implement with students. They both felt that the intervention was effective at improving the fluency for all of the students. It is interesting to note that while one paraprofessional strongly agreed that the students enjoyed the intervention, the other disagreed, which could be credited to student differences in attitude or paraprofessional-student relationships and rapport. The paraprofessionals disagreed with each other once again when asked about recommending continued use of the intervention to the classroom teacher, with one feeling neutral and one agreeing that she would like to see the intervention continue. One

paraprofessional commented that with the busyness of the classroom and daily routines, it made it difficult to devote time to this study; this was evidenced by missed sessions.

Only five of the six participants were able to complete the social validity survey due to illness. Each survey featured six questions with a range of four colored smiley faces to reflect their feelings. Three of five participants had positive responses about the ease of completing the intervention with their assigned paraprofessional. The same two who disagreed with the above mentioned statement also indicated that they did not like completing the intervention despite the fact that they were the two most efficient readers. All five students liked working with their assigned paraprofessional. Forty percent of the participants did not feel that they were able to read the passages without help, but 100% felt their reading improved because of the intervention. Lastly, two students had positive reactions when asked if they would want to keep using the intervention to work on their reading.

Chapter 4 Findings

Using visual analysis, five of the six participants demonstrated a change in level (see Figures 1.1 and 1.2), increasing their mean WCPM from baseline to treatment. Additionally, four of the six participants improved their comprehension accuracy from baseline to treatment phases (See Table 1). In each paraprofessional’s group, the participant reading at the lowest Lexile level was the one whose comprehension scores decreased. There was no change in prosody scores using the MDFS.

Table 1

Participant	Baseline Comprehension	Intervention Comprehension	Pre MDFS	Post MDFS
Reid	75%	66%	4	4
Lola	63%	69%	4	4
Katie	81%	90%	5	5
Cullen	8%	36%	4	4
Bonnie	50%	22%	4	4
Kyle	41%	57%	6	6

Comprehension and Prosody Scores Before and After Instruction

Ms. Kim

Reid. Using passages that fell between 430 and 510 in Lexile levels, Reid averaged a fluency level of 43 WCPM during baseline. That average improved to 50 WCPM (range 37-65) during the treatment phase. Prior to intervention, Reid averaged 75% on his comprehension assessments. Following treatment, his average was 66%.

Lola. While reading passages that fell between 510 and 590 in Lexile level, Lola

Figure 1.1. Ms. Kim’s Group Results

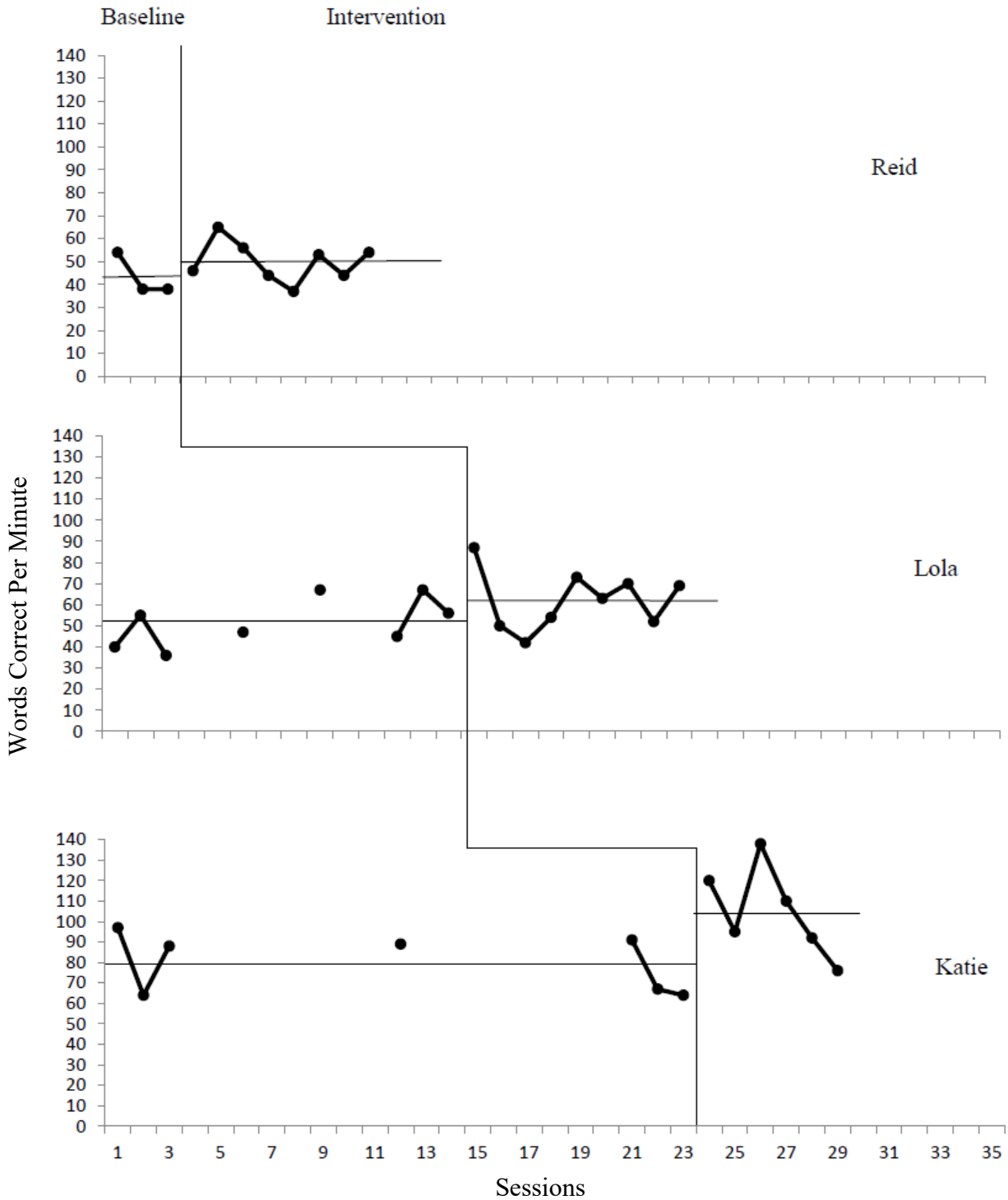


Figure 1.1. Fluency results using WCPM across participants before and after implementing a repeated reading and choral reading intervention strategy with Ms. Kim’s group.

averaged a WCPM score of 52 during baseline and improved that score to 62 WCPM (range 42-87). Lola's highest WCPM, 87, came on her first intervention session. While Lola did improve her comprehension scores, progressing from an average of 63% accuracy during baseline to 69% accuracy throughout the treatment phase.

Katie. Reading passages that varied in Lexile between 560 and 740, Katie averaged 80 WCPM during baseline and improved that score to 105 WCPM (range 76-138) during the treatment phase. Katie also increased her comprehension average of 81% accuracy during baseline to 90% during treatment. She achieved the highest accuracy percentage out of all six participants in both phases of the study.

Ms. Sally

Cullen. Based on averages, Cullen did not demonstrate any improvement between phases while reading his passages that were between 510 and 590 Lexile levels. During baseline, Cullen averaged 93 WCPM. After the first ten intervention sessions, Cullen averaged 80 WCPM, a significant decrease from his baseline performance. Starting at that point, Cullen was prompted to read quickly and correctly with only one repeat read at the end of the session rather than two. Once that change was made, Cullen improved to his original average of 93 WCPM (range 66-120). Cullen improved his comprehension scores from an average of 8% accuracy during baseline to 36% during the treatment phase.

Bonnie. Using passages with Lexile levels between 400 and 510, Bonnie averaged 51 WCPM during the baseline phase and improved that to 60 WCPM (range 47-66). While she averaged 50% accuracy during the baseline phase, Bonnie only averaged 22% accuracy during the treatment phase.

Figure 1.1. Ms. Sally’s Group Results

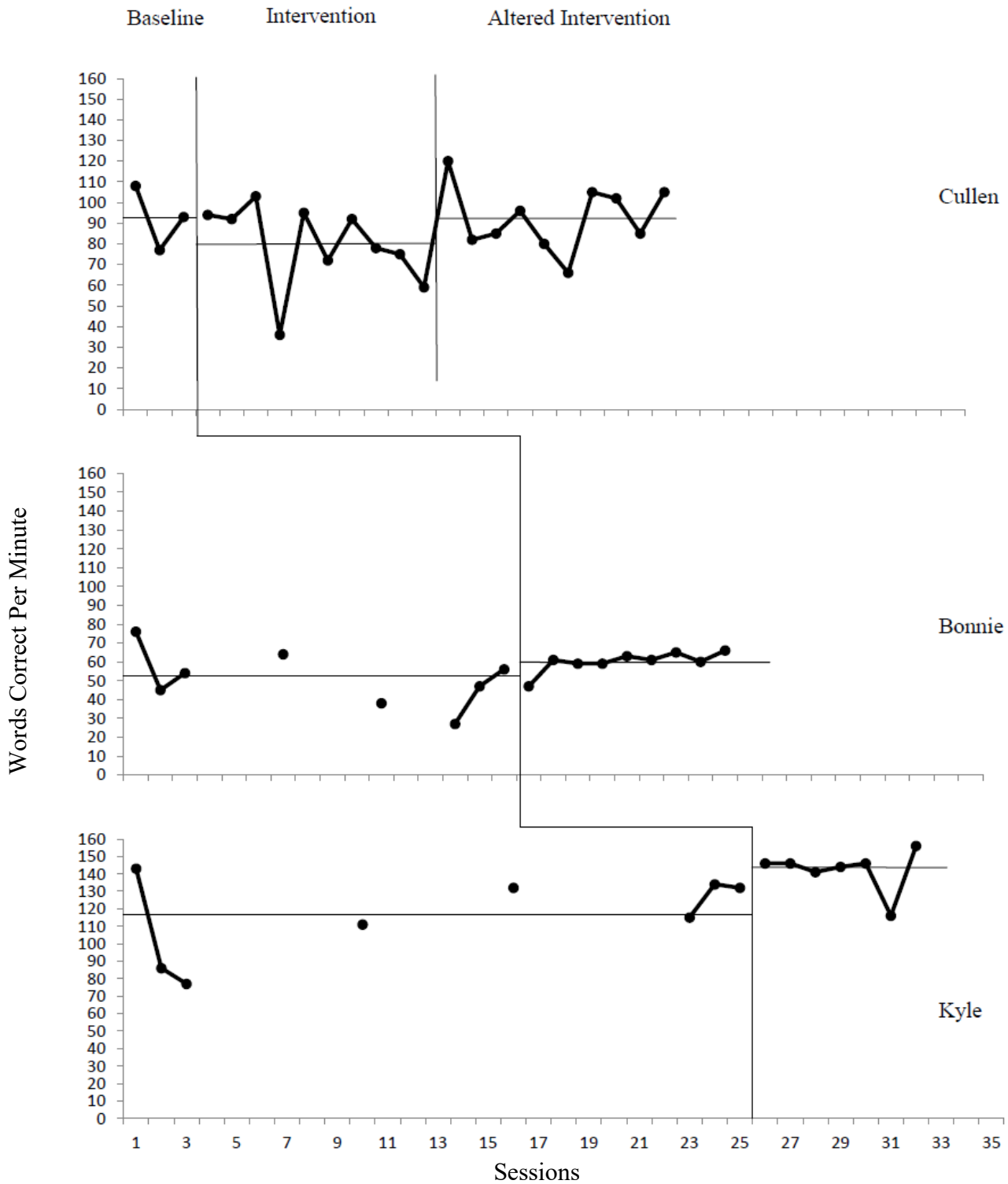


Figure 1.2. Fluency results using WCPM across participants before and after implementing a repeated reading and choral reading intervention strategy with Ms. Sally’s group.

Kyle. Kyle's reading passages had highest Lexile levels, ranging from 680 to 900. He also performed the highest, averaging 117 WCPM during baseline and increasing that to 142 WCPM (range 116-156) during the intervention phase, which accounts for the best improvement in fluency among all six participants. His highest score was 156 WCPM and came on the seventh and final intervention session. Kyle produced the second highest increase in average comprehension scores from baseline to treatment, improving sixteen points from 41% to 57% accuracy.

Non-parametric Measure of Effect

Two methods for calculating effect were used for this study. The percentage of nonoverlapping data (PND; Scruggs, Mastropieri, & Casto, 1987) was calculated by identifying all of the treatment data points above the highest baseline data point then dividing that number by the total number of treatment data points. Using this method, it was determined that fifteen out of a possible 59 data points were above the highest baseline data points for each participants, resulting in 25% nonoverlapping data, indicating that the treatment was not effective.

In addition, nonoverlap of all pairs (NAP; Parker & Vannest, 2009) was computed, which provides a percentage of all point comparisons across both baseline and treatment phase. Each baseline data point is compared to each treatment data point, and classified as overlaps, nonoverlaps, and ties. This procedure was completed for each participant. A weak effect was determined for Cullen when his NAP was calculated to be .40. For Reid and Lola, NAP was calculated to be .69 and .72 respectively, both of which corresponds to a medium effect. The NAP was determined to be .74 for Bonnie and .86 for Katie, again falling into the medium effect category. Lastly, the NAP for Kyle was computed at .91, just missing the large effect category.

Chapter 5 Discussion

While there have numerous studies conducted on various fluency interventions demonstrating their efficacy with general education students and those with mild disabilities (Lingo, 2014; Morgan, McLaughlin, Webe, & Bolich, 2016; Strong Hillsmier, Wehby, Falk, 2016), only one study has been completed using student an in a self-contained special education classroom. The overarching question surrounding this study concerns the applicability of these strategies to a new population, one which is often assumed to lack the skills needed to be successful. Students with significant cognitive disabilities have all but been omitted from studies that examined the effects of pedagogical strategies, specifically in terms of fluency. Using a multiple probe design, where each participant serves as their own control, students completed treatment sessions featuring repeated reading and choral reading with a paraprofessional.

This study sought to assess the effectiveness of repeated reading and choral reading practice with high school students with significant cognitive disabilities. Specifically, two research questions guided this investigation. The first considered the possibility of a functional relation between an intervention using repeated reading and choral reading and WCPM of students with significant cognitive disabilities when implemented by a trained paraprofessional. Through visual analysis, gains appear minimal in regards to WCPM, though data for each participant indicated a positive change in levels to varying degrees. No effect was found using PND, but weak and medium effects were found for each participant using NAP. Overall, a clear functional relation cannot be confirmed. These findings conflict with results from Therrein's 2004 meta-analysis, which found that students without disabilities and those with learning disabilities (LD) achieved a moderate mean increase in fluency (.76 for non-disabled; .77 for students with LD) when using repeated reading.

There were several notable findings within the study in regards to specific participant performances. For example, Cullen's treatment had to be modified due to his negative response to the original design. Following the 10th session, the researcher intervened and altered the intervention sessions by adding a verbal prompt to read quickly and correctly as well as reducing the number of required independent reads by one. As a result, Cullen improved his performance. Cullen's failure to respond to the original design could be attributed to Cullen viewing the intervention as too difficult as he mentioned how tough the reading was repeatedly. That may have been due to fading attention during instruction despite the fact that the intervention was a thirty minute session. The initial decision to omit explicit directions to read quickly and correctly was intentional so as to allow for results free from influence, creating a more natural result based solely on the reading strategies. With previous research finding up to four repeated reads optimal (Therrien, 2004), the researcher chose to have each participant to read the passage twice after the choral read due to time constraints and attention issues. Perhaps that decision hindered the participants' performance due to their lack of reading stamina.

Additionally, it is important to note that Katie and Kyle, who were reading at the highest levels among the group, had the highest levels of effect according to their NAP percentages of .86 and .91, respectively. This result would indicate that fluency instruction benefits students with stronger reading abilities more than those who lack necessary skills. This finding is consistent with previous literature that found students who did not have prerequisite skills or who were below a specific reading level did not benefit from fluency instruction (Kuhn & Stahl, 2003).

These fluency findings indicate that multiple exposures do not guarantee automaticity for students with significant cognitive disabilities and that LaBerge and Samuels' information

processing theory (1974) may have limitations in applicability for this population. Although the students recognized the Fry words during preassessment when presented in isolation, recontextualizing those words in complete sentences may have impacted their ability read them accurately and the passage quickly. Data were purposefully collected on the independent first read prior to the intervention because it would provide more meaningful results. It is assumed that participants would increase their fluency reading the same passage repeatedly. The data are more applicable in the classroom because students are required to read different texts, but often they have overlapping words, increasing exposure. Exposure to any text, whether sight words, directions on a worksheet, or paragraphs from a textbook, is important considering all three theories mentioned previously emphasize the fact that multiple exposures lead to automaticity.

The second research question considered to what extent fluency instruction would impact the reading comprehension of the participants. Four of the six participants demonstrated an increase in their mean reading comprehension scores. The two participants showed decreases in performance on comprehension measures following intervention (ie. Reid, Bonnie). Interestingly, both were reading at similar Lexile levels, which happened to be the lowest among all participants. This decrease in reading comprehension might be explained by Rasinski's conception of cognitive energy (2012): this theory postulates that for some readers, their task of trying to read the words correctly and quickly leaves little energy to focus on comprehension of the text itself. The gains in comprehension for the four participants are notable as they were provided instruction only on reading fluency during the research period.

Researchers have often noted that link between fluency and comprehension (Basaran, 2013; Klauda & Guthrie, 2008; Veenendaal, Groen, & Verhoeven, 2015), but the variation in reading comprehension results in this study raises new questions for students with significant

cognitive disabilities in particular. Both accurate decoding and prosody have been seen as the link between fluency and comprehension (Breen, Kaswer, Van Dyke, Krivokapic, & Land, 2016; Pikulski & Chard, 2005) and considered lower level lexical skills according to the verbal efficiency theory (Perfetti, 1985). Based on this theory, it is easier to understand the decrease in reading comprehension scores for Reid and Bonnie due to their lack of foundational reading skills, such as decoding, hindering their comprehension, a higher level lexical process.

According to verbal efficiency theory, it would be suspected that Kyle, who reads at the highest level, would also have the most significant improvement in comprehension. Despite his average reading performance compared to his peers, Cullen demonstrated the largest increase in reading comprehension. As mentioned, Cullen's intervention was altered after an initial decrease in fluency. This change led to him completing almost twice the number of treatment sessions than the other participants. Katie's comprehension performance ranked the highest with a mean of 90% accuracy during treatment. Katie's performance in terms of fluency and WCPM is surprising considering she was the most vocal about her dislike of both study sessions.

Despite the homogeneity of placement and categorization educationally, the students in the study are a heterogeneous group with substantive neurological and cognitive variations, leading to variability in the data. This is consistent with the only other fluency study that involved a student with significant cognitive disabilities (Lewis-Lancaster & Reisener, 2013), which found the data to also be highly variable and difficult to interpret with confidence. Within the current group of participants, there were numerous diagnosed disabilities and varying degrees of reading ability as evidenced by the range of target Lexile levels. The appropriate Lexile level for each student was determined based on the last passage read successfully on the GORT-5. For example, the last passage that Cullen successfully read was at a Lexile level of 540 so that was

identified as his target level when the researcher was writing his passages. A free online Lexile leveler was used to measure the complexity of all passages. Due to the challenges associated with attempting to reach a specific level, the researcher made the decision to use a range for each participant. For example, while Kyle was assessed to be reading at a Lexile level of 890, his passages used during the study ranged from 680 to 900. The researcher attempted to keep the range of Lexile levels within 100 above or below the target level for each participant. Using the determined Lexile levels, Reid was reading at 430 while Kyle was at 890. Kyle demonstrated the largest improvement in fluency, suggesting that his superior reading skills played a factor in the results. The lack of homogeneity among the participants also restricts the ability to generalize the results of this study. It is common ideology that no two students with severe disabilities are alike and the variety of reading ranges and results in this confirm that notion. So while the findings of this study indicated only minimal effect for the participants with significant cognitive disabilities, it is plausible that students with stronger reading skills would see more of a benefit.

This study supports a current trend gaining popularity in the special education field: neurodiversity. First developed in the 1990s by Harvey Blume, a journalist, and Judy Singer, a autism activist, neurodiversity embraces the variation of neurological differences (Armstrong, 2015). This term suggests that people not be identified as having a disability, but rather a difference neurologically. Originally associated solely with autism spectrum disorder (ASD), this way of thinking has expanded to include students with additional disorders, such as specific learning disabilities, attention deficit disorder, or intellectual disabilities (Rothstein, 2012). Supporters of this concept argue that there are unique advantages to having a brain that work differently and that educators should maximize these strengths (Rothstein, 2012).

Armstrong (2017) advocates that educators should assess students with special needs for their strengths and talents rather than their deficits. He also emphasizes teaching all students about the value of individual differences through Gerald Edelman's model of the brain as an ecosystem. By using this brain forest metaphor, educators can help students identify the differences among life in the forest, explain how nutrients help grow the forest, and teach how resiliency allows for regrowth after damage (Armstrong, 2017). Using this mindset, a secondary purpose for this study emerges because it embraces a population of students ignored in previous research. Students with significant cognitive disabilities should be given the same opportunities to learn by researched based practices despite their neurodiversity.

Limitations

There are multiple limitations associated with the current study that are noteworthy. While many assessments were performed prior to the study, rapid letter naming was not assessed. Since this skill is a precursor to reading fluency, it would have provided a better understanding of each participant and their level of reading development. This particular skill would take into consideration processing time, an essential aspect of fluency. Rapid letter naming involves multiple processes including one's verbal, visual, and motor systems.

The most challenging aspect of the intervention appeared to be the choral reading based on the recorded audio evaluated by the researcher. All of the participants demonstrated struggle with all or some of the components of fluent reading, particularly smoothness or rate, which lead to difficulty reading in unison with the paraprofessional. While the paraprofessionals attempted to accurately model fluent reading, the participants had a difficult time, often falling behind by a word or two. One potential issue with the choral exercise is that the paraprofessional slowed

down and changed their reading speed to more closely align with the needs of the students rather than focusing on providing a fluent model of reading. Therefore, the participants were not able to complete the strategy as originally conceptualized by the researcher. The familiarity between the paraprofessionals and students could have impacted the results. In addition to the challenge during the choral reading, the paraprofessionals marked fewer miscues compared to the second observer. Again, this could be attributed to the paraprofessional being too familiar with the reading of the students. Using a trained teacher with a better understanding of fluency may have led to differing results.

Having a later start than anticipated due to delays in obtaining the proper permissions, had a domino effect on the schedule, leading to multiple study modifications. There were breaks in the school calendar and additional student holidays that altered the pace of the research. There were also several occasions when the research sessions had not been completed either due to a participant or paraprofessional absence or unforeseen changes in the class' daily schedule. The lack of adherence to the schedule set by the researcher creates concerns regarding the dosage of the intervention. Having sessions take place after initially planned also impacted the allowance for stability to be established during the baseline phase for all of the participants. Using the 80/20 stability envelope (Gast & Ledford, 2014), only Cullen's baseline data qualifies as stable. That means 80% of the baseline data points fell within 20% of the median baseline. The treatment could have resulted in better gains had it been applied over a longer period of time and more consistently by the paraprofessionals. However, the researcher had her own deadline for completion of the study, which required specific cutoff points for each participant.

Future Research

Further research in this area would lend itself to longitudinal studies on the reading instruction of students with significant cognitive disabilities. As research shows, students with disabilities often need repetition and extended time to achieve desired results (Brabeck, Jeffrey, & Fry, 2016; Grinblat & Rosenblum, 2016). A longitudinal study would allow for more time to establish a stable baseline as well as secure proper dosage. This study was conducted over a short period of time, possibly limiting the potential for even greater results across time.

While this study utilized paraprofessional to implement the study, future research could examine the same strategies but implemented by another figure, such as the certified special education teacher or a peer tutor. Both of these options could produce different results based on the relationships established with the students. For example, peer tutors would need more training, but their relationship with the student as a peer rather than authority figure could lead to positive results. In addition, participants might feel the need to impress their peer or perform better to reduce any embarrassment. Both Topping (1989) and Allington (2006) used more proficient reading partners to improve the reading of struggling readers. In addition, Lingo (2014) found that the fluency of middle schoolers with mild disabilities was improved when the Great Leaps fluency program was implemented by high school tutors. No studies using peers to address the fluency of students with significant cognitive disabilities were found.

Many research articles identify fluency as a neglected area of reading (Allington, 1983; Heitin, 2015; Rasinski & Zimmerman, 2011), but specifically addressing fluency with students with significant cognitive disabilities is almost nonexistent. This study was only the beginning in the potential for this population to improve their speed, accuracy, and prosody while reading. Repeated reading and choral reading are only two approaches to improving fluency. While those methods were chosen for this specific study, there are other interventions that could potentially

produce positive results. For example, reader's theater, listening passage preview, and variations of repeated reading and choral reading, have all been used to successfully improve the fluency of students in the general population or with mild disabilities just to name a few (Clark, Morrison, & Wilcox, 2009; Corcocran, 2005; O'Shea, McQuiston, & McCollin, 2009; Begeny, Krouse, Ross, & Mitchell, 2009).

Conclusion

The current study was the first step in addressing reading fluency in students with significant cognitive disabilities. Due to the lack of current research, it was critical to examine the components of fluency in regards to this specific population as fluency plays a vital role in education and daily living. Among fluency interventions, repeated reading has been well-documented in terms of its effectiveness, while choral reading has also been researched, but less so. Combining these two strategies into one fluid treatment session allowed the students to be exposed to each method, leading to positive results: five of the six students increased their WCPM and four of the six improved their reading comprehension. The findings also indicate that these two strategies that have been well researched in regards to general education students and those with mild disabilities does not hold the same value for students with significant cognitive disabilities. However, this study can lead to future research and hopefully encourages further study of fluency training for students with significant cognitive disabilities.

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Appendix A: Subject Informed Consent: Paraprofessional**Reading fluency instruction of students with cognitive disabilities using a multiple probe methodology****Subject Informed Consent: Paraprofessional****Introduction and Background Information**

You are invited to participate in a research study. The study is being conducted by Dr. Kathleen Cooter and Sarah Merimee. This study is a dissertation research project for Bellarmine University and is sponsored by the Department of Education. The study will take place at Oldham County High School. Six students and two paraprofessionals will be invited to participate. Your participation in this study will last for up to 8 weeks, featuring one to three 15-20 minute session per day.

Purpose

The purpose of this research study is to determine if there is a relationship between using an intervention package consisting of repeated reading and choral reading on the reading fluency of six participants with significant cognitive disabilities. The research questions for this project are as follows:

Three research questions will guide this study:

1. Is there a functional relation between using repeated reading, modeling, and choral reading and the WCPM of students with significant cognitive disabilities?
2. How does this treatment package impact the comprehension of these students?
3. Are these students with significant cognitive disabilities able to generalize fluency skills gained through the intervention to novel passages?

Procedures

In this study, you will be asked to work with participants, leading a choral read of a passage and listening as the student participant reads the passage independently, marking errors and time taken to complete, and recording the reading. This study should last no more than 15-20 minutes per day. The study as a whole will likely last up to 8 weeks. The researcher provide detailed instruction for each day and will schedule times to come and watch to make sure the process is being implemented as designed. The purpose of this process is to determine if using these reading strategies increase the participants' words read correctly per minute.

The audio recordings will be used to ensure accuracy in the data collected. Upon completion of the study, these recordings will be deleted. The data collected in this study may be used at scholarly conferences and workshops or published. However, at no point will the participants' identities be revealed and pseudonyms will be used throughout the process.

Potential Risks

There are no reasonably foreseeable risks to your participation in this study.

Benefits

The possible benefits of this study include an improvement in reading fluency for the student. The information collected would also benefit teachers as they plan their instruction.

Confidentiality

Although absolute confidentiality cannot be guaranteed, confidentiality will be protected to the extent permitted by law. The study sponsor or the Institutional Review Board may inspect your research records. Should the data collected in this research study be published, your identity will not be revealed.

Voluntary Participation

Your participation in this research study is voluntary. You may refuse to participate or withdraw your consent at any time without penalty or losing benefit to which you are otherwise entitled.

Your Rights as a Research Subject and Contact Persons

If you have any questions about your rights as a research subject, you may call the Bellarmine University Institutional Review Board Office at 502.272.7963. You will be given the opportunity to discuss any questions, in confidence, with a member of the Board. This is an independent committee composed of members of the University community and lay members of the community not connected with this institution. The Board has reviewed this study.

You acknowledge that all your present questions have been answered in language you can understand. If you have any questions about the study, please contact Dr. Kathleen Cooter, Bellarmine University, 2001 Newburg Road, Louisville, KY, U.S.A., 502-272-8191, kcooter@bellarmine.edu.

Consent

You have discussed the above information and hereby consent to voluntarily participate in this study. You have been given a signed copy of this consent form.

Signature of Parent or Legal Guardian

Date Signed

Signature of Investigator

Date Signed

Signature of Person Explaining Consent if other than Investigator

Date Signed

Appendix B: Parent/Guardian Permission Form

Reading fluency instruction of students with cognitive disabilities using a multiple probe methodology**Parent/Guardian Permission Form****Introduction and Background Information**

Your child is invited to participate in a research study. The study is being conducted by Dr. Kathleen Cooter and Sarah Merimee. This study is a dissertation research project for Bellarmine University and is sponsored by the Department of Education. The study will take place at Oldham County High School. Six students will be invited to participate. Your child's participation in this study will last for up to 8 weeks, featuring one 15-20 minute session per day.

Purpose

The purpose of this research study is to determine if there is a relationship between using an intervention package consisting of repeated reading and choral reading on the reading fluency of high school students with significant cognitive disabilities. The research questions for this project are as follows:

Three research questions will guide this study:

1. Is there a functional relation between using repeated reading and choral reading and the WCPM of students with significant cognitive disabilities?
2. How does this treatment package impact the comprehension of these students?
3. Are these students with significant cognitive disabilities able to generalize fluency skills gained through the intervention to novel passages?

Procedures

In this study, the student will be asked to complete some standardized assessments to gain a better understanding of their current performance level. In addition, they will be assessed on current sight words and be required to independent and choral read a passage consisting of approximately 50 words. Then they will be asked to read the passage independently again. The whole process will be audio recorded. This process should last no more than 15-20 minutes per day. The study as a whole will likely last up to 8 weeks. The purpose of this process is to determine if using these reading strategies increases the number of words that your child reads correctly per minute.

The audio recordings will be used to ensure accuracy in the data collected. Upon completion of the study, these recordings will be deleted. The data collected in this study may be used at scholarly conferences and workshops or published. However, at no point will the student's identity be revealed and pseudonyms will be used throughout the process.

Potential Risks

There are no reasonably foreseeable risks to your child’s participation in this study.

Benefits

The possible benefits of this study include an improvement in reading fluency for your child. The information collected would also benefit teachers as they plan their instruction.

Confidentiality

Although absolute confidentiality cannot be guaranteed, confidentiality will be protected to the extent permitted by law. The study sponsor or the Institutional Review Board may inspect your research records. Should the data collected in this research study be published, your child’s identity will not be revealed.

Voluntary Participation

Your child’s participation in this research study is voluntary. Your child may refuse to participate or withdraw consent at any time without penalty or losing benefit to which they are otherwise entitled.

Your Rights as a Research Subject and Contact Persons

If you have any questions about your child’s rights as a research subject, you may call the Bellarmine University Institutional Review Board Office at 502.272.7963. You will be given the opportunity to discuss any questions, in confidence, with a member of the Board. This is an independent committee composed of members of the University community and lay members of the community not connected with this institution. The Board has reviewed this study.

You acknowledge that all your present questions have been answered in language you can understand. If you have any questions about the study, please contact Dr. Kathleen Cooter, Bellarmine University, 2001 Newburg Road, Louisville, KY, U.S.A., 502-272-8191, kcooter@bellarmine.edu.

Consent

You have discussed the above information and hereby consent to voluntarily participate in this study. You have been given a signed copy of this consent form.

Signature of Parent or Legal Guardian

Date Signed

Signature of Investigator

Date Signed

Signature of Person Explaining Consent if other than Investigator

Date Signed

Appendix C: Subject Informed Assent: Student

Reading fluency instruction of students with cognitive disabilities using a multiple probe methodology**Subject Informed Assent: Student****What is a research study?**

Research studies help us learn new things. We can test new ideas. First, we ask a question. Then we try to find the answer.

This paper talks about our research and the choice that you have to take part in it. We want you to ask us any questions that you have. You can ask questions any time.

Important things to know...

- You get to decide if you want to take part.
- You can say 'No' or you can say 'Yes'.
- No one will be upset if you say 'No'.
- If you say 'Yes', you can always say 'No' later.
- You can say 'No' at any time.

Why are we doing this research?

We are doing this research to find out more about ways to teach students how to read better.

What would happen if I join this research?

If you decide to be in the research, we would ask you to do the following:

- Read some sight words
- Answer some questions
- Listen to a teacher model
- Read a passage together
- Read a passage on your own

Could bad things happen if I join this research?

You might think some of the words will be hard to read or the questions difficult to answer, but no bad things will happen.

Could the research help me?

This research will hopefully help you be a better reader. It will help your teachers to know what works and what didn't work so well. We hope that this research helps others kids in the future who needs special help reading.

What else should I know about this research?

If you don't want to be in the study, you don't have to be. It is also OK to say yes and change your mind later. You can stop being in the research at any time. If you want to stop, please tell your teacher.

You can ask questions any time. You can talk to your teacher, assistant, or Ms. Sarah, who will be working with you at times. Ask us any questions you have. Take the time you need to make your choice.

Assent

The explanation of the study to the participant will consist of a brief description of the purpose, tools to be used, and procedure in clear, simple language. For example: "You have been chosen to be part of group to help me learn about how students read. If you want to participate, I would come to your school once or twice and ask you some questions. Then your teacher will have you do some reading and she will record it so I can listen to it too. It won't take too long, maybe 15 minutes each day for a few weeks. Does this sound like something you would like to do?" Students will be reminded before each session that their participation is voluntary.

Student Assent

Date Signed

Appendix D: Fry’s High Frequency Word Lists (1-500)

Fry’s First 100 Words

1. the	21. at	41. there	61. some	81. my
2. of	22. be	42. use	62. her	82. than
3. and	23. this	43. an	63. would	83. first
4. a	24. have	44. each	64. make	84. water
5. to	25. from	45. which	65. like	85. been
6. in	26. or	46. she	66. him	86. called
7. is	27. one	47. do	67. into	87. who
8. you	28. had	48. how	68. time	88. am
9. that	29. by	49. their	69. has	89. its
10. it	30. words	50. if	70. look	90. now
11. he	31. but	51. will	71. two	91. find
12. was	32. not	52. up	72. more	92. long
13. for	33. what	53. other	73. write	93. down
14. on	34. all	54. about	74. go	94. day
15. are	35. were	55. out	75. see	95. did
16. as	36. we	56. many	76. number	96. get
17. with	37. when	57. then	77. no	97. come
18. his	38. your	58. them	78. way	98. made
19. they	39. can	59. these	79. could	99. may
20. I	40. said	60. so	80. people	100. part

Fry’s Second 100 Words

101. over	121. name	141. boy	161. such	181. change
102. new	122. good	142. following	162. because	182. off
103. sound	123. sentence	143. came	163. turn	183. play
104. take	124. man	144. want	164. here	184. spell
105. only	125. think	145. show	165. why	185. air
106. little	126. say	146. also	166. asked	186. away
107. work	127. great	147. around	167. went	187. animals
108. know	128. where	148. farm	168. men	188. house
109. place	129. help	149. three	169. read	189. point
110. years	130. through	150. small	170. need	190. page
111. live	131. much	151. set	171. land	191. letters
112. me	132. before	152. put	172. different	192. mother
113. back	133. line	153. end	173. home	193. answer
114. give	134. right	154. does	174. us	194. found
115. most	135. too	155. another	175. move	195. study
116. very	136. means	156. well	176. try	196. still
117. after	137. old	157. large	177. kind	197. learn
118. thing	138. any	158. must	178. hand	198. should
119. our	139. same	159. big	179. picture	199. America
120. just	140. tell	160. even	180. again	200. world

Fry's Third 100 Words

201. high	221. light	241. life	261. sea	281. watch
202. every	222. thought	242. always	262. began	282. far
203. near	223. head	243. those	263. grow	283. Indians
204. add	224. under	244. both	264. took	284. really
205. food	225. story	245. paper	265. river	285. almost
206. between	226. saw	246. together	266. four	286. let
207. own	227. left	247. got	267. carry	287. above
208. below	228. don't	248. group	268. state	288. girl
209. country	229. few	249. often	269. once	289. sometimes
210. plants	230. while	250. run	270. book	290. mountains
211. last	231. along	251. important	271. hear	291. cut
212. school	232. might	252. until	272. stop	292. young
213. father	233. close	253. children	273. without	293. talk
214. keep	234. something	254. side	274. second	294. soon
215. trees	235. seemed	255. feet	275. later	295. list
216. never	236. next	256. car	276. miss	296. song
217. started	237. hard	257. miles	277. idea	297. being
218. city	238. open	258. night	278. enough	298. leave
219. earth	239. example	259. walked	279. eat	299. family
220. eyes	240. beginning	260. white	280. face	300. it's

Fry's Fourth 100 Words

301. body	321. usually	341. hours	361. five	381. cold
302. music	322. didn't	342. black	362. step	382. cried
303. color	323. friends	343. products	363. morning	383. plan
304. stand	324. easy	344. happened	364. passed	384. notice
305. sun	325. heard	345. whole	365. vowel	385. south
306. questions	326. order	346. measure	366. true	386. sing
307. fish	327. red	347. remember	367. hundred	387. war
308. area	328. door	348. early	368. against	388. ground
309. mark	329. sure	349. waves	369. pattern	389. fall
310. dog	330. become	350. reached	370. numeral	390. king
311. horse	331. top	351. listen	371. table	391. town
312. birds	332. ship	352. wind	372. north	392. I'll
313. problem	333. across	353. rock	373. slowly	393. unit
314. complete	334. today	354. space	374. money	394. figure
315. room	335. during	355. covered	375. map	395. certain
316. knew	336. short	356. fast	376. busy	396. field
317. since	337. better	357. several	377. pulled	397. travel
318. ever	338. best	358. hold	378. draw	398. wood
319. piece	339. however	359. himself	379. voice	399. fire
320. told	340. low	360. toward	380. seen	400. upon

Fry's Fifth 100 Words

- | | | | | |
|--------------|-----------------|-----------------|-----------------|---------------|
| 401. done | 421. front | 441. stay | 461. warm | 481. object |
| 402. English | 422. feel | 442. green | 462. common | 482. bread |
| 403. road | 423. fact | 443. known | 463. bring | 483. rule |
| 404. halt | 424. inches | 444. island | 464. explain | 484. among |
| 405. ten | 425. street | 445. week | 465. dry | 485. noun |
| 406. fly | 426. decided | 446. less | 466. though | 486. power |
| 407. gave | 427. contain | 447. machine | 467. language | 487. cannot |
| 408. box | 428. course | 448. base | 468. shape | 488. able |
| 409. finally | 429. surface | 449. ago | 469. deep | 489. six |
| 410. wait | 430. produce | 450. stood | 470. thousands | 490. size |
| 411. correct | 431. building | 451. plane | 471. yes | 491. dark |
| 412. oh | 432. ocean | 452. system | 472. clear | 492. ball |
| 413. quickly | 433. class | 453. behind | 473. equation | 493. material |
| 414. person | 434. note | 454. ran | 474. yet | 494. special |
| 415. became | 435. nothing | 455. round | 475. government | 495. heavy |
| 416. shown | 436. rest | 456. boat | 476. filled | 496. fine |
| 417. minutes | 437. carefully | 457. game | 477. heat | 497. pair |
| 418. strong | 438. scientists | 458. force | 478. full | 498. circle |
| 419. verb | 439. inside | 459. brought | 479. hot | 499. include |
| 420. stars | 440. wheels | 460. understand | 480. check | 500. built |

Appendix E: Baseline Steps

Step	Direction	Check ()
1	Gather materials: audio recorder _____ timer (stopwatch on phone) _____ binder (teacher/student passages) _____ writing utensil _____ choice chart _____ student _____	
2	Start audio recorder once you sit down with student. Into recorder-“ <i>(Name of student, date)</i> ”	
3	When sitting at work area, “ <i>Okay, (name of student), we are going to do some reading today.</i> ” (Present choice board) “ <i>What do you want to work for when we are finished?</i> ” (Student makes choice, repeat if no choice is made. If no choice is made, read options)	
4	When choice is made, “ <i>Great, you are working for _____! We are going to start now with you reading this passage.</i> ” (Present passage) <i>I am going to start the timer when you start reading the first word. Try your best!</i> ”	
5	Start the timer when the student reads the first word in the passage.	
6	While the student is reading the passage, staff is marking miscues on the teacher copy of the passage. This includes mispronunciations, insertions, deletions, substitutions, etc. Self-corrections should not be marked as errors.	
7	When the student finished the last word, stop the timer. Leave the audio recorder running.	
8	“ <i>That was great reading! Now we have just a few questions to answer.</i> ”	
9	Take the student copy away from the student so they have to recall information from memory.	
10	Read the comprehension questions one at a time. Record the student’s answer in the space provided. Praise correct answers verbally with “ <i>Good job or Nice answer!</i> ”. Do not correct wrong answers.	
11	After all the questions are answered and recorded, “ <i>Thanks for your hard work (name of student), we are finished today and you earned (choice activity/item).</i> ”	

Appendix F: Intervention Steps

Step	Direction	Check ()
1	Gather materials: audio recorder timer binder writing utensil choice chart dry erase marker Student	
2	Start audio recorder once you sit down with student. Into recorder-“(Name of student, date)”	
3	When sitting at work area, “Okay, (name of student), we are going to do some reading today.” (Present choice board) “What do you want to work for when we are finished?” (Student makes choice, repeat if no choice is made. If no choice is made, read options)	
4	When choice is made, “Great, you are working for _____! We are going to start now with you reading this passage. (Present passage) I am going to start the timer when you start reading the first word. Try your best!”	
5	Start the timer when the student reads the first word in the passage.	
6	While the student is reading the passage, staff is marking miscues on the teacher copy of the passage. This includes mispronunciations, insertions, deletions, substitutions, etc. Self-corrections should not be marked as errors.	

7	When the student finished the last word, stop the timer. Leave the audio recorder running.	
8	<i>“That was great reading! Now we have just a few questions to answer.”</i>	
9	Take the student copy away from the student so they have to recall information from memory.	
10	Read the comprehension questions one at a time. Record the student’s answer in the space provided. Praise correct answers verbally with <i>“Good job or Nice answer!”</i> . Do not correct wrong answers.	
11	<i>“That was wonderful! Now we are going to read the passage together. Think about how many voices come together to sound like one in a choir. We want our reading to sound like one voice. I will do a countdown to get us started. When I say go, we start reading”</i>	
12	<i>“3, 2, 1, Go”</i> Choral read begins. Teacher voice should set the tone, modeling appropriate speed and phrasing.	
13	<i>“Great job. As we practice, our choral reads will get even better and hopefully start to sound like one voice.”</i>	
14	<i>“(Name of student), we are going to practice again, with you reading the passage two more times.”</i>	
15	<i>“When you are ready, you can start reading.”</i>	
16	There is no data to collect during the final two reads. Just listen and prompt on words the student has trouble with.	

<p>17</p>	<p>In between the final two reads, praise the effort, <i>“Great job reading. I can tell you are getting better with each read. We only have one more read then we are finished!”</i></p>	
<p>18</p>	<p>After the final read, <i>“Thank you (name of student)! That was some great reading today. We will work together again tomorrow with a new passage! You can now go enjoy (their choice from the beginning)”</i></p>	
<p>19</p>	<p>Press stop on the audio recorder and dismiss student to their choice time activity.</p>	

Appendix G: Sample Passage-Paraprofessional Copy

There was an old man who lived by the sea near two large trees, who walked into the city each day to find a few things to keep at home. He would walk a mile each way, even at night, to look for a book to read, food for him and his animals, and white material. He brought several special things home carefully from a building in town.

Time: _____

Deviations: _____

68 words

	Question	Student Response
1	Where does the old man live? (<i>By the sea</i>)	
2	How many trees are by his house? (<i>Two</i>)	
3	How does the old man get to the city? (<i>Walks</i>)	
4	What is one thing he looks for in the city? (<i>Books, food, lights</i>)	

Comprehension Score: _____

Lexile: 510L

Appendix I: Social Validity-Repeated Reading and Choral Reading Intervention

Teacher Questionnaire

Please indicate the extent to which you agree or disagree with the following statements regarding the repeated reading and choral reading intervention you implemented by circling a number that reflects your opinion.

Strongly Disagree 1	Disagree Somewhat 2	Neutral 3	Agree Somewhat 4	Strongly Agree 5
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1. I feel the repeated reading and choral reading intervention was easy to learn how to implement.

1 2 3 4 5

2. I feel the repeated reading and choral reading intervention was easy to implement with students.

1 2 3 4 5

3. I believe the repeated reading and choral reading intervention was effective in improving reading fluency for all of my students.

1 2 3 4 5

4. I feel the students enjoyed the repeated reading and choral intervention.

1 2 3 4 5

5. I would suggest continuing the use of the repeated reading and choral reading intervention to my classroom teacher.

1 2 3 4 5

(Turn over)

Did you feel the intervention was a good use of student and staff time? YES NO

Did you feel the reading passages were appropriate for all of the students? YES NO

Do you have any suggestions to improve the repeated reading and choral reading intervention?

Appendix J: Social Validity-Repeated Reading and Choral Reading Intervention: Student Questionnaire

Circle the smiley face that best tells me your feelings towards each statement.

1. I feel the repeated reading and choral reading intervention was easy to do with my paraprofessional.



2. I liked completing the repeated reading and choral reading intervention.



3. I liked working with Ms. Karen or Ms. Sandy during the repeated reading and choral reading intervention.



4. I was able to read the reading passages on my own without help.



5. I think my reading got better because of the repeated reading and choral reading intervention.



6. I would want to keep working on reading using the repeated reading and choral reading intervention.



Do you have any ideas on how to make the repeated reading and choral reading intervention better?