MURRAY STATE UNIVERSITY

Kentucky Teacher Education Journal: The Journal of the Teacher Education Division of the Kentucky Council for Exceptional Children

Volume 4
Issue 1 *MSU First KTEJ Issue*

Article 3

2017

Addressing Reading Fluency of Students with Intellectual Disabilities Using A Multiple Probe Design

Sarah N. Merimee
Murray State University, smerimee@murraystate.edu

Addressing Reading Fluency of Students with Intellectual Disabilities Using A Multiple Probe Design

Abstract
Despite making up less than one percent of the student population, students with significant intellectual disabilities have the same rights to receive the best education possible as their typical peers. There is currently a paucity of research regarding effective reading instruction within a comprehensive approach, particularly in the area of reading fluency. The purpose of this study was to investigate if there was a functional relation between repeated reading and choral reading and the words correct per minute of six high school students with significantintellectual 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
fluency, automaticity, repeated reading, choral reading

Introduction

Despite the National Reading Panel (2000) recognizing phonemic awareness, phonics, vocabulary, fluency, and comprehension as the five key skills of reading, literacy instruction for students with significant intellectual disabilities has predominantly focused on sight word identification (Bock & Erikson, 2015; Browder, Wakeman, Spooner, Ahlgrim-Deizell, & Algozzine, 2006; Browder et al., 2009). It is this practice of limiting access to comprehensive literacy instruction that prohibits students with significant intellectual disabilities from becoming fluent readers able to comprehend text (Bock & Erikson, 2015; Keefe & Copeland, 2011). While students with significant intellectual disabilities have not historically been taught the foundational skills needed to become competent readers, experts agree that literacy instruction for all should be systematic, explicit, and tailored to each individual through continuous assessment and specifically selected materials (Bock & Erikson, 2015; Browder et al., 2009; Kliewer & Biklen, 2001; National Reading Panel, 2000). In this study will focus on the aspect of fluency and how an emphasis on fluent reading can impact a reader.

Fluency has long been highlighted as a fundamental reading skills leading to enhanced comprehension of a text for all readers (Knight-McKenna, 2008; Paige, Rasinski, & Magpuri-Lavell, 2012). However, there is a substantial gap in the available research examining the effects of fluency instruction on students with significant intellectual disabilities. Comprised of three components: rate, accuracy, and prosody, fluent readers are able to read at an appropriate pace, read text accurately with automaticity, and use expression in their voice (Swain, Leader-Janssen, & Conley, 2013). Rasinski (2004) emphasized the complex nature in skills required to become a fluent reader. Samuels (2002) echoed this sentiment by identifying three processes all readers engage in while reading a text: decoding, comprehension, and attention. Decoding is simply pronouncing the words and comprehension is understanding the intended meaning within the passage. The level of engagement the reader has with the text is related to their level of attention (Samuels, 2002). While Samuels (2002) first described the concept, it was Rasinski (2012) who coined the term "cognitive energy" to describe the mental effort it takes to decode and comprehend text. Struggling readers often spend too much of their energy decoding the text, leaving little left for the comprehension aspect (Rasinski, 2012).

LaBerge and Samuels' (1974) automatic information processing theory emphasized the importance of reading with automaticity. This was only achieved when one could complete a skill while their attention was focused elsewhere. Reading becomes automatic when words are read as holistic units and not decoded letter by letter (Samuels, 2002). Age and experience certainly plays a pivotal role in the level of automaticity within reading. For example, a typical second grader recognizes words based on the individual letters. On the other hand, college students recognize the whole word while reading (Samuels, LaBerge, & Bremer, 1978).

Perfetti's (1985) verbal efficiency theory also emphasizes the importance of basic lexical skills, such as word identification, in order to accomplish higher order processes like comprehension. Verbal efficiency "refers to the degrees to which readers' subcomponents of reading are exercised with speed and accuracy" (Taguchi, Gorsuch, & Sasamoto, 2006, p.3). Letter and word recognition are identified as lower level lexical skills, while comprehension, activating background knowledge, and using cognitive strategies are higher level processes. Perfetti (1985) explained that even these higher level processes can become automatic through exposure and practice.

In order to build automaticity through exposure and practice, Samuels (1979) introduced the practice of repeated reading. Sometimes referred to as deep reading, repeated reading involves reading the same passage multiple times (Lewis-Lancaster & Reisener, 2013). Research suggests that repeated reading is most beneficial for those between a first and third grade instructional level or those who read in a slow, laborious manner (Therrien & Kubina, 2006; Vadasy & Sanders, 2008). Typically using a text composed of 50-200 words, students read and reread the passage until they reach a predetermined satisfactory level of fluency (Reutzel & Cooter, 2014). It is also recommended that the strategy be implemented 3-5 times per week with sessions lasting between 10-20 minutes each (Therrien & Kubina, 2006). During Samuels' initial study, the participant made fewer errors with each repetition and was able to reach the criterion in fewer attempts as the study progressed (1979).

Repeated reading has also been linked to improvements in comprehension. Less than 10 years after Samuels' 1979 study, Knupp (1988) replicated the study, but added a comprehension component. In addition to students increasing their words correct per minute (WCPM), they also improved their comprehension by 17% or more. Therrien (2004) conducted a met-analysis examining the impact of repeated reading on fluency and comprehension. He found that repeated reading improved both the fluency and comprehension of students with and without learning disabilities. He found that a passage should be read three to four times, evidenced by a 30% larger fluency effect size when compared to two repetitions (Therrien, 2004).

Choral reading is another instructional strategy that has been used to improve fluency. While repeated reading uses an individual approach, choral reading involves a small or whole class reading text at the same time (Paige, 2011). Choral reading provides flexibility for the instructor as well as anonymity for struggling readers as they are concealed within a group of voices (Paige, 2011; Paige et al., 2012). In addition, choral reading can be completed with any age group, across genres of text, and facilitated by teacher support, a critical component leading to growth in reading fluency (Kuhn & Stahl, 2003).

Choral reading also addresses a frequently neglected aspect of fluency: prosody. Miccinati (1985) noted how reading with appropriate expression can be difficult to teach so the modeling within choral reading enables students to listen for sound, duration, stress, and pitch. Unlike reading aloud to students, choral reading actively engages the students and encourages their participation, leading to improvements in word recognition and prosody (Kuhn, 2004).

There is limited research available on choral reading, but Paige (2011) examined the effects of whole class choral reading on the fluency and phonological decoding process of sixth graders. Both areas were improved with moderate effect sizes. Teachers and students were both fond of the strategy with teachers noting the effectiveness and simplicity of the strategy and students noticing their own improvement. Choral reading has also been used in combination with other strategies. Rasinski, Padak, Linek, and Sturevant (1994) embedded choral reading in their fluency development lesson, which resulted in significant improvements in the reading rate of fourth graders.

The purpose of this study was to investigate the potential relationship between a research-based treatment package consisting of repeated reading and choral reading, and the fluency and comprehension of students with significant intellectual disabilities. Individually, each of these strategies have been successful in improving the fluency of students in the general population and with students with mild disabilities. (Noltemeyer, Joseph, & Watson, 2014; Staudt, 2009;

Swain, 2013). It was predicted that the intervention would not only increase the words correct per minutes (WCPM), but also increase the participants' comprehension during the intervention period measured by percent accuracy on specific researcher developed questions. Two specific research question guided 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 intellectual disabilities?
2. To what extent does fluency intervention impact reading comprehension?

As adults, individuals with significant intellectual disabilities encounter poorer outcomes in terms of employment, independence, socialization, and overall well-being, when compared to their typical peers (Queiros, Wehby, & Halpern, 2015; Ruppar et al., 2015). It has been suggested that through a comprehensive literacy education, improved literacy skills can help combat those potential obstacles students with significant intellectual disabilities will face as adults (Keefe & Copeland, 2011). This study is necessary as it assess whether instructional practices found to be effective for typical students also yield positive results for students with significant intellectual disabilities.

Methodology

Setting and Participants

This study took place at a public high school 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 the state assessment performance. Participants were selected from two self-contained units, labeled as highly structured classrooms, focusing on functional academics. Student participants were identified by two classroom teachers based on their ability to read aloud and sight word knowledge. Upon receiving a signed informed consent, each participant was then assessed by the researcher to confirm they had the necessary skills needed to join the study. Three boys and three girls, ranging in age from 15 to 17 years and in grades 10-12, were selected. Two paraprofessionals were nominated by the classroom teachers based on their experience, ability to collect accurate data, and their consistent attendance and positive work ethic.

Students.

Kyle. Kyle is a 15 year-old boy with Autism in the tenth grade. He 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 service under the categorical headings of Functional Mental Disability and Speech/Language Impairment. He also receives occupational services twice a month. On the reading subtest of the KTEA-II, Reid achieved a score within the lower extreme range. Reid has a full scale I.Q. score of 44 on the WISC-IV. Reid is in the less than first percentile for both SWE and PDE using the TOWRE-2. Similarly, he is in the less than first 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 17 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), he achieved well below average scores on both the basic reading skills and reading comprehension subtests. Additionally, he achieved an I.Q. 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 the SWE and in the fifth percentile 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 17 year-old with Down syndrome in the eleventh grade. She is currently being served under the category Functional Mental Disability while receiving speech and occupational therapy. 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 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 twirling her hair around her finger. Similar to Reid, Bonnie's performance on the assessment 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 testing window.

Katie. Katie is a 16 year-old in the eleventh grade. She currently receives special education and speech therapy services under the category of Functional Mental Disability. Katie's composite I.Q. 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, Katie tried to procrastinate reading by initiating a conversation. Katie scored in the less than first percentile on both the PDE and SWE on the TOWRE-2. Based on her GORT-5 performance, Katie is in the first percentile on overall

reading. Katie would be between the 50th and 75th percentile of first graders in the winter according to fluency norms.

Lola. Lola is a fifteen year-old girl in the tenth grade receiving services under the eligibility category of Specific Learning Disability for reading comprehension and fluency. Other Health Impairment was added when she was diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) and seizure disorder in the fourth grade. 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 subtests on the TOWRE-2. In addition, she ranked in the first percentile when given the GORT-5. According to fluency norms, Lola would be between the 50th and 75th percentile of first graders in the winter.

Paraprofessionals.

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

Ms. Sally. Ms. Sally has worked in special education for over ten years. She started at her current school six years ago in the self-contained classroom. She graduated from high school, but has not received any formal training on reading instruction. Sally was more hesitant to participate in the study but was encouraged by her classroom teacher based on her skills. She finds assisting students in general the favorite part of her job.

Materials

The researcher, having taught students with significant intellectual disabilities for numerous years, created reading passages that were developed using a bank of Fry (1980) sight words recognized by the students during the pre-assessment. Some passages could be used by multiple participants due to their common knowledge of certain words. Each passage typically consisted of 50-55 words and ranged in Lexile (MetaMetrics, Inc., 2017) level based on pre-assessment scores. Simple recall comprehension questions were also developed by the researcher for each passage. A copy of each passage was made so the participant and paraprofessional could both have the text in front of them. The participant copy had the passage in larger font, which Rello, Pielot, and Marcos (2016) found that students prefer and led to positive impacts on readability and comprehension. The paraprofessional copy allowed for space to mark errors as well as designated space to record the time and total deviations from print. The comprehension questions and a specific area for the participant responses were also on the paraprofessional page. An audio recorder and stopwatch were also required throughout the baseline and treatment phases to record each session and allow for a second observer to also collect data.

Data Collection

To encourage an optimal data collection setting, the paraprofessionals placed the audio recorder close enough to accurately record the student, but at a safe distance to minimize the possibility of being a distraction. A stopwatch was also in proximity to allow quick access. The time was critical in calculating the dependent variable, WCPM. Hasbrouck and Tindal (2006)

identified WCPM to be an overall accurate and significant indicator of reading competency. The recording was initiated once the student started to read the first word of the passage and was stopped when the last word was read. Data were rounded to the nearest whole second. The paraprofessionals also recorded reading miscues on a separate copy of the passage. 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, producing the final WCPM. Comprehension scores were collected according to accuracy and the percentage correct was computed.

Experimental Design

A multiple probe across participants design (Horner & Baer, 1978), a variation of the multiple baseline design, was used to assess the effectiveness of repeated reading paired with choral reading on improving the fluency and comprehension of six participants with significant intellectual disabilities. Consistent with the design, the intervention was initially introduced to the first participant in each paraprofessionals' group, followed by the second and third once a change was noticed in the previous participants' data. A multiple probe design was selected for this particular study because it reduces the amount of testing during the baseline condition and is tailored 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

After the researcher consulted with the certified classroom teachers about the intervention, the first step was to efficiently train the paraprofessionals to implement the intervention. The four step-process of behavior skills training (BTS) was used by the researcher to ensure the paraprofessionals were confident in their duties. The researcher began the training process by giving verbal directions, followed by a detailed model of the process. Afterwards, the paraprofessionals were able to rehearse the procedures and the researcher provided feedback. This process was repeated until all parties felt satisfied with the performance.

In addition to training the paraprofessionals, the researcher completed several pre-assessments with each participant to gain a deeper insight into their current level of performance in regards to reading fluency and comprehension. Each participant was given a sight word assessment using the first 500 high frequency Fry words (Fry, 1980), which resulted in a bank of words read correctly, from which the reading passages would be created. Standardized assessments administered included the GORT-5 and TOWRE-2, which measured overall fluency and sight word efficiency and phonemics decoding efficiency, respectively. Lastly, each student was given a grade level oral reading fluency assessment (Deno, 1985) which lead to WCPM score, which was then compared to target rate norms. During the oral fluency probe, each participant's smoothness, expression and volume, phrasing, and pace were scores using a Multidimensional Fluency Scale (MDFS; Zutell & Rasinski, 1991), a four-point Likert scaled rubric.

During the baseline phase, each participant was presented a passage without any instruction. The only given direction was to read the passage aloud. Deviations from print and

the time were recorded by the paraprofessionals. The passage was then removed from the student and four comprehension questions were asked. The participants' verbal responses were recorded and feedback was withheld at this time. The researcher calculated the WCPM and number of comprehension questions answered correctly.

At the beginning of each treatment session, a quick preference assessment was conducted to determine what each participant would work for in order to increase their motivation. After the preference assessment, each participant was prompted to do a cold read of a passage. It was during this cold read that the paraprofessional would keep time and record deviations from print. The comprehension questions were then asked, answered, and recorded. After the initial reading, the paraprofessionals introduced the concept of choral reading, referencing the analogy of voices of a choir coming together to sound like one voice. 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 slightly louder voice compared to the student. The session ended after two additional independent reads by the student.

Interobserver Agreement and Treatment Fidelity

A second independent observer monitored and recorded data on 30% of the total treatment sessions. Using the 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 paraprofessional and second observer marking the same miscue. The agreement across all six participants was 75%. Using a researcher developed checklist, a second observer monitored the treatment fidelity for 26% of the total treatment sessions, resulting in a procedural integrity of 98%.

Social Validity

Subjective evaluation was used to assess the social validity of using repeated reading in conjunction with choral reading to increase the reading fluency of students with significant intellectual disabilities. Both the paraprofessionals and participants were given a survey featuring a 5-point Likert scale for the adults and a 4-point smiley face visual scale for the students. Both were developed to assess how the participants felt about the treatment, including their perceived level of difficulty implementation, perceived level of effectiveness, and more. There was also space for additional comments. The certified classroom teachers' opinions of the study were not formally collected. However, through conversation, they both appreciated the short session time and thought it made good use of their paraprofessionals.

Both paraprofessionals strongly agreed that the treatment was both easy to learn and implement with the student participants. In addition, they both felt it was effective at improving the fluency for all of the students. In terms of student enjoyment of the treatment, one strongly agreed that students enjoyed the sessions and one did not, which could be attributed to the differences in student attitudes as well as previously established student-paraprofessional relationships. One paraprofessional agreed that she would like to see the intervention continue and the other did not feel strongly one way or the other. As far as comments, one revealed that the busyness of the classroom and their daily routines made it difficult to set aside the time for the study, which was evidenced by missed sessions.

Five of the six student participants completed the social validity survey. Three of the five indicated a positive response about the ease of completing the intervention. It is worth noting that the two who disagreed also revealed that they did not enjoy completing the intervention despite being the two most efficient readers. All five students responded positively to working with their assigned paraprofessional. All of the participants felt their reading improved because of their participation in this study.

Findings

Five of the six participants increased their mean WCPM from baseline to treatment and four of the six improved their reading comprehension accuracy from baseline to treatment (See Table 1). In each paraprofessionals' 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. Using visual analysis, the effect of the treatment in unclear due to the variability in the data (See Figures 1.1 and 1.2).

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

Table 1 *Comprehension and Prosody Scores Before and After Instruction*

Ms. Kim

Reid. Using passages that ranged between 430 and 510 Lexile levels, Reid averaged a fluency level of 43 WCPM during baseline. During treatment, his fluency scores improved to 50 WCPM (range 37-65). Prior to the intervention, Reid averaged 75% on his comprehension assessment, which actually decreased to 66% accuracy during treatment.

Lola. With reading passages ranging from 510 and 590 in Lexile levels, Lola averaged 52 WCPM during baseline and improved to 62 WCPM during treatment. Lola's maximum WCPM, 87, came on her first intervention session. Lola improved her comprehension scores, progressing from an average of 63% accuracy during baseline to 69% during treatment.

Katie. Katie's reading passages varied in Lexile level from 560 to 740 and she averaged 80 WCPM during baseline and improved to 105 WCPM during the treatment phase. Katie also

increased her reading comprehension scores from an average 81% accuracy in baseline to 90% accuracy in 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 passages 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 performance during baseline. Starting at intervention session eleven, Cullen was prompted to read quickly and correctly with only one repeat read at the end of the session instead of two. After implementing that change, Cullen returned to his original average of 93 WCPM. In terms of reading comprehension, Cullen improved from 8% accuracy in baseline to 36% during treatment.

Bonnie. Using passages with Lexile levels between 400 and 510, Bonnie averaged 51 WCPM during her baseline phase and improved to 60 WCPM during treatment. While she averaged 50% accuracy on her reading comprehension questions during baseline, she only averaged 22% accuracy during treatment.

Kyle. Kyle's reading passages had the highest Lexile levels, ranging from 680-900. He also performed the highest, averaging 117 WCPM during baseline and further increasing that to 142 WCPM during the treatment phase, which accounts for the best improvement among all participants. Kyle produced the second highest increase in average reading comprehension scores from baseline to treatment, going from 41% accuracy 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, & Castro, 1987) was calculated by identifying all of the treatment data points above the highest 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 participant, 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 phases. 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 found for Cullen with a NAP of .40. For Reid and Lola, NAP was determined to be .69 and .72 respectively, both of which correspond to a medium effect. Also within the medium effect range was Bonnie and Katie, whose NAP was .74 and .86 respectively. Lastly, the NAP for Kyle was .91, just missing the large effect category.

Figure 1.1

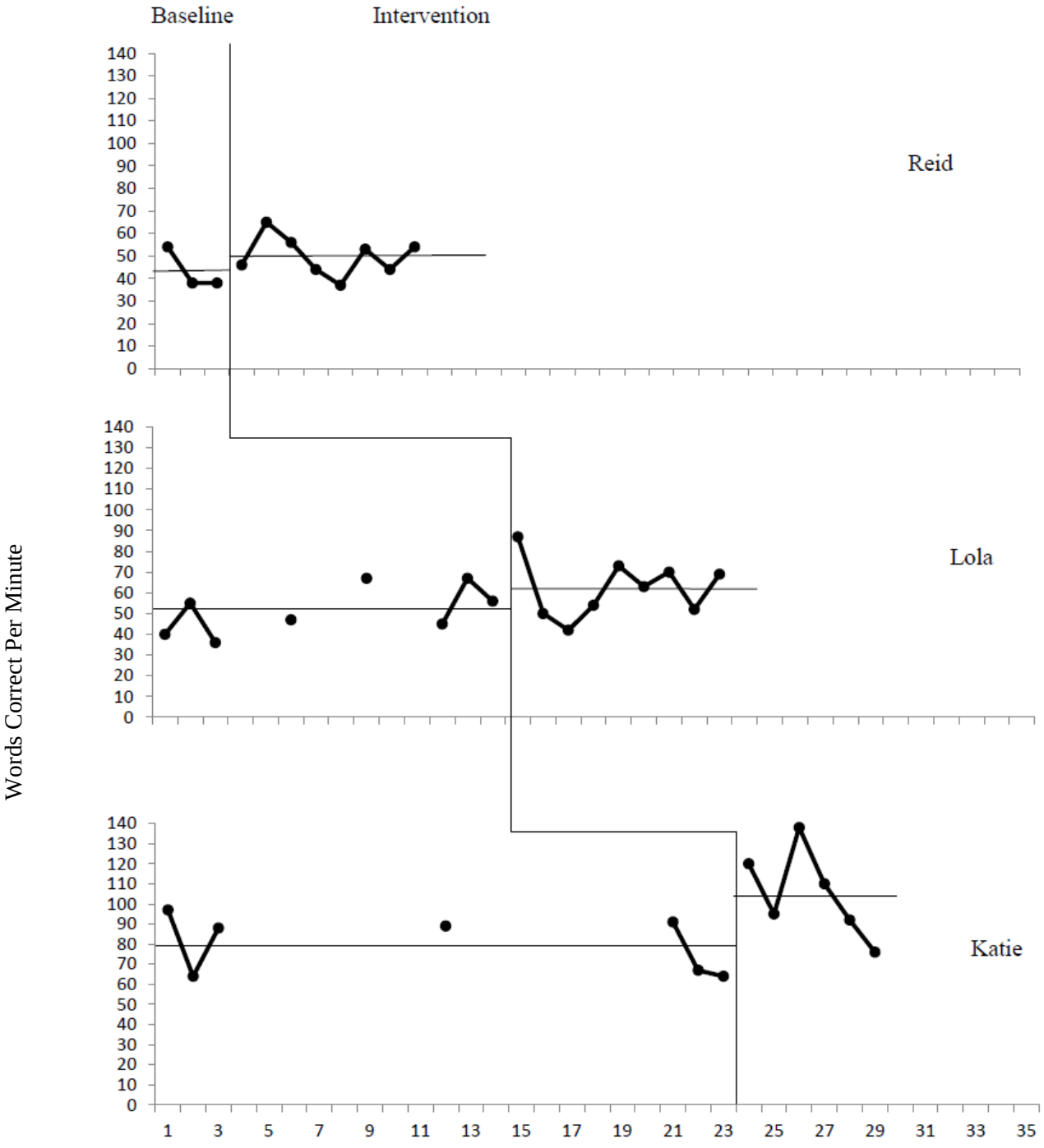

Figure 1.1 Fluency results using WCPM across participants before and after implementing a repeated reading and choral reading intervention strategy with Ms. Kim's group

Figure 1.2

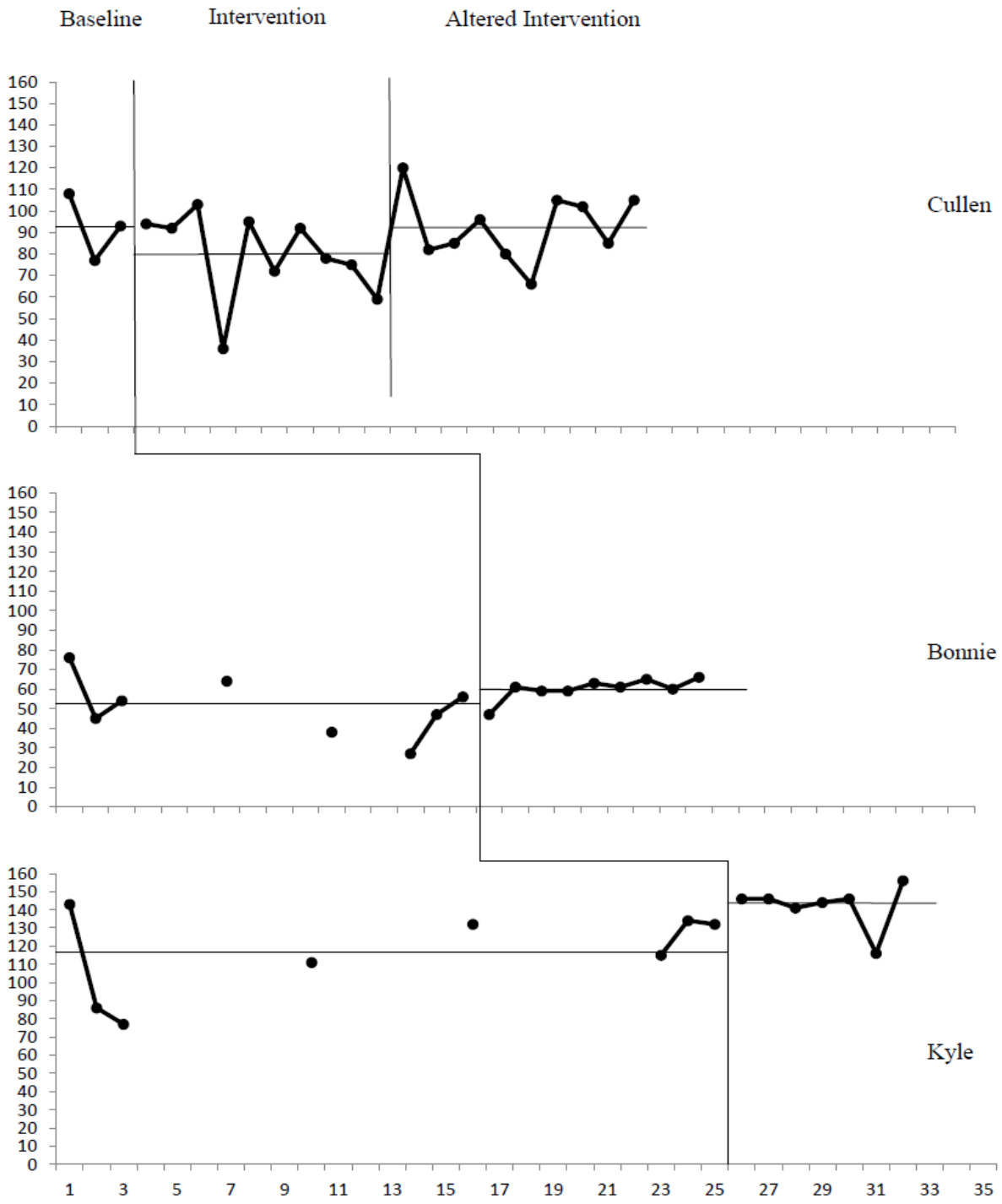

Figure 1.2 Fluency results using WCPM across participants before and after implementing a repeated reading and choral reading intervention strategy with Ms. Sally's group.

Discussion

While there have been numerous studies conducted on various fluency interventions demonstrating their efficacy with the general education population and students with mild learning disabilities (Lingo, 2014; Morgan, McLaughin, Webe, & Bolich, 2016; Strong Hilsmier, Wehby, Palk, 2016), only one study has been completed using students in a self-contained special education classroom. The essential 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 a successful reader. Students with significant intellectual disabilities have all but been omitted from studies that examine the effects of pedagogical strategies, specifically in regards to fluency. Using a multiple probe design, where each participant serves as their own control, students completed treatment sessions composed of 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 intellectual 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 intellectual disabilities. 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 differ 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.

However, there were several notable findings as a result of this study in terms of specific participant performance. For example, Cullen's treatment had to be modified due to his negative response to the original design. Following the 10th session, the researcher decided to alter the intervention sessions by adding a verbal prompt to read quickly and correctly as well as reducing the required number of independent reads. As a result, Cullen improved his performance. Cullen's failure to respond to the initial design could be attributed to his viewing the task as too difficult. 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 (Therrein, 2004), the researcher chose to have each participant read the passage twice after the choral read, due to time restraints and deficits maintaining attention. It is possible the decision hindered the participants' performance due to their lack of reading stamina.

Additionally, it is important to note 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 capabilities more than those who lack specific 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 to a text do not guarantee automaticity for students with significant intellectual 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 the preassessment when they were presented in isolation, recontextualizing those words in complete sentences may have impacted their ability to read them accurately and the passage quickly. Data were purposefully collected on the independent first reading prior to the intervention because it would provide more meaningful results. It is assumed that participants would increase their fluency by reading the same passage repeatedly. These data were more applicable in the classroom because students are required to read different texts, but often then 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 emphasized 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 who showed a decrease in their scores were both reading at similar Lexile levels, which were the lowest among all of the participants. This decrease in comprehension could possibly be explained by Rasinski's concept of cognitive energy (2012): this theory postulates that for some readers, the 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 the link between fluency and reading 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 intellectual disabilities. 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 Bonnie and Reid due to their lack of functional 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 great improvement in comprehension. As mentioned, Cullen's intervention was changed after his 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% despite her being the most vocal about her dislike of intervention.

Despite the homogeneity of placement and categorization educationally, the students in this study are a heterogeneous group with substantive neurological and cognitive variation, leading to variability in the data. This is consistent with the only other fluency study that involved a single student with a significant intellectual disability (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 wide range of target Lexile levels. The appropriate Lexile level for each students was determined based on the last passage read successfully on the

GORT-5. For example, the last passage Cullen read successfully was 540 so that became his target level when the researcher was writing his passages. A free online Lexile leveler (MetaMetrics, 2017) was used to measure the complexity of all passages. Due to the challenge of reaching a specific Lexile level while using a predetermined bank of words, the researcher decided to use a range for each participant. The lack of homogeneity among the participants also restricts the ability to generalize the results. It is common ideology that no two students with severe disabilities are alike and the variety of reading ranges and results in this study confirm that notion. While the findings of this study indicated only a minimal effect for the participants, it is plausible that students with stronger reading skills would see more of a benefit.

Limitations

There are multiple limitations associated with the current study that are noteworthy. 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 fluency 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 often fell behind. One issue with the choral reading was the paraprofessional slowing down and changing 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.

Due to delay in obtaining the proper permissions, the study had a later start date than expected, which resulted in a domino effect. Additionally, the breaks in the school calendar and holidays altered the anticipated pace of the research. There were also several instances when the research sessions were not completed either due to a participant or paraprofessional absence or unforeseen change in the class schedule. The lack of adherence to the schedule set by the researcher creates concern about 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 six participants. Using the 80.20 stability envelope (Gast & Ledford, 2014), only Cullen's baseline data qualifies as stable. The treatment could have resulted in better gains had it been applied over a longer period of time and more consistently as intended by the researcher. Lastly, one could view the lack of involvement of the certified classroom teachers as a limitation as they are ultimately responsible for the specially designed instruction of students as well as providing the supplementary aids and services.

Future Research

Further research in this area would lend itself to longitudinal studies on the reading instruction of students with significant disabilities. As research shows, students with disabilities often need repetition and extended time to achieved 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. Additionally, using the same design with materials that have been tested for reliability and validity could make for a future research study.

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 intellectual 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 (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 intellectual 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 intervention, 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 for 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 terms of general education students and those with mild disabilities, do not hold the same value for students with significant intellectual disabilities. However, this study can lead to future research and hopefully encourages the further study of fluency training for students with significant intellectual disabilities.

References

Allington, R. L. (1983). Fluency: The neglected reading goal. *The reading teacher*, *36*(6), 556-561.

Basaran, M. (2013). Reading Fluency as an Indicator of Reading Comprehension. *Educational Sciences: Theory and Practice*, *13*(4), 2287-2290.

Begeny, J. C., & Martens, B. K. (2006). Assisting low-performing readers with a group-based reading fluency intervention. *School Psychology Review*, *35*(1), 91.

Begeny, J. C., Krouse, H. E., Ross, S. G., & Mitchell, R. C. (2009). Increasing elementary-aged students' reading fluency with small-group interventions: A comparison of repeated reading, listening passage preview, and listening only strategies. *Journal of Behavioral Education*, *18*(3), 211-228.

Browder, D. M., Wakeman, S. Y., Spooner, F., Ahlgrim-Delzell, L., & Algozzine, B. (2006). Research on reading instruction for students with severe cognitive disabilities. *Exceptional Children*, *72*, 392-408.

Browder, D., Gibbs, S., Ahlgrim-Delzell, L., Courtade, G., Mraz, M., & Flowers, C. (2009). Literacy for students with severe developmental disabilities. *Remedial and Special Education*, 30, 269-282.

Bock, A. K., & Erickson, K. A. (2015). The influence of teacher epistemology and practice on student engagement in literacy learning. *Research and Practice for Persons with Severe Disabilities, 40*, 138-153.

Clark, R., Morrison, T. G., & Wilcox, B. (2009). Readers' theater: A process of developing fourth-graders' reading fluency. *Reading Psychology*, *30*(4), 359-385.

Copeland, S. R., & Keefe, E. B. (2007). *Effective Literacy Instruction for Students with Moderate or Severe Disabilities*. Brookes Publishing Company. Baltimore, MD.

Copeland, S. R., Keefe, E. B., Calhoon, A. J., Tanner, W., & Park, S. (2011). Preparing teachers to provide literacy instruction to all students: Faculty experiences and perceptions. *Research and Practice for Persons with Severe Disabilities*, *36*(3-4), 126-141.

Deno, S. L. (1985). Curriculum-based measurement: The emerging alternative. *Exceptional Children*, 52, 219–232.

Fry, E. (1980). The new instant word list. *The Reading Teacher*, *34*(3), 284-289.

Gast, D. L., & Ledford, J. R. (2014). *Single case research methodology: Applications in special education and behavioral sciences*. Routledge.

Grinblat, N., & Rosenblum, S. (2016). Why are they late? Timing abilities and executive control among students with learning disabilities. *Research in Developmental Disabilities, 59*, 105-114.

Hasbrouck, J. E., & Tindal, G. (1992). Curriculum-based oral reading fluency norms for students in grades 2 through 5. *Teaching Exceptional Children*, *24*(3), 41-44.

Hasbrouck, J., & Tindal, G. A. (2006). Oral reading fluency norms: A valuable assessment tool for reading teachers. *The Reading Teacher, 59*, 636-644.

Horner, R. D., & Baer, D. M. (1978). Multiple-probe technique: A variation on the multiple baseline. *Journal of Applied Behavior Analysis, 11*, 189-196.

Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional children*, *71*(2), 165-179.

Individuals With Disabilities Education Act, 20 U.S.C. § 1400 (2004).

Kaufman, A. S., & Kaufman, N. L. (2004). *Kaufman brief intelligence test*. John Wiley & Sons, Inc..

Kaufman, A. S. (2004). *KABC-II: Kaufman Assessment Battery for Children*. AGS Pub..

Kaufman, A.S. & Kaufman, N. L. (2004). *Kaufman Test of Education Achievement, Second Edition.* Pearson.

Keefe, E. B., & Copeland, S. R. (2011). What is literacy? The power of a definition. *Research and Practice for Persons with Severe Disabilities, 36*, 92-99.

Klauda, S. L., & Guthrie, J. T. (2008). Relationships of three components of reading fluency to reading comprehension. *Journal of Educational psychology*, *100*(2), 310.

Kliewer, C. & Biklen, D. (2001). “School's not really a place for reading”: A research synthesis of the literate lives of students with severe disabilities. *Research and Practice for Persons with Severe Disabilities*, *26*, 1-12.

Knight-McKenna, M. (2008). Syllable types: A strategy for reading multisyllabic words. *Teaching Exceptional Children*, *40*(3), 18.

Kuhn, M. R., & Stahl, S. A. (2003). Fluency: A review of developmental and remedial practices. *Journal of educational psychology*, *95*(1), 3.

Kuhn, M. (2004). Helping students become accurate, expressive readers: Fluency instruction for small groups. *The Reading Teacher*, *58*(4), 338-344.

Kuhn, M. R., Schwanenflugel, P. J., & Meisinger, E. B. (2010). Aligning theory and assessment of reading fluency: Automaticity, prosody, and definitions of fluency. *Reading Research Quarterly*, *45*(2), 230-251.

Knupp, R. (1988). Improving Oral Reading Skills of Educationally Handicapped Elementary School-Aged Students through Repeated Readings.

LaBerge, D., & Samuels, S. J. (1974). Toward a theory of automatic information process in reading. *Cognitive Psychology*, *6*, 293-323.

Lewis-Lancaster, A., & Reisener, C. (2013). Examining the results of a brief experimental analysis and reading fluency intervention with a middle school student. *Reading Improvement*, *50*, 166-174.

Lingo, A. S. (2014). Tutoring middle school students with disabilities by high school students: Effects on oral reading fluency. *Education and Treatment of Children*, *37*(1), 53-76.

MetaMetrics, Inc. (2017). *The Lexile Analyzer.* Retrieved October 1, 2017, from http://lexile.com/educators/tools-to-support-reading-at-school/tools-to-determine-a-books-complexity/the-lexile-analyzer/

Miccinati, J. L. (1985). Using prosodic cues to teach oral reading fluency. *The Reading Teacher*, 206-212.

Morgan, B. (2004). Teacher identity as pedagogy: Towards a field-internal conceptualisation in bilingual and second language education. *International Journal of Bilingual Education and Bilingualism*, *7*(2-3), 172-188.

Morgan, S. V., McLaughlin, T. F., Webe, K. P., & Bolich, B. (2016). Increasing Reading Fluency using Read Naturally® with Two Third Grade Students with Specific Learning Disabilities: A Replication of Erickson et al., 2015. *Educational Research Quarterly*, *40*(1), 37.

National Reading Panel (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. Washington, DC: U.S. Department of Health and Human Services.

Noltemeyer, A., Joseph, L. M., & Watson, M. (2014). Improving reading prosody and oral retell fluency: A comparison of three intervention approaches. *Reading Improvement*, *2*, 221-232.

O'Shea, D. J., McQuiston, K., & McCollin, M. (2009). Improving fluency skills of secondary-level students from diverse backgrounds. *Preventing School Failure: Alternative Education for Children and Youth*, *54*(1), 77-80.

Paige, D. D. (2011). Engaging struggling adolescent readers through situational interest: A model proposing the relationships among extrinsic motivation, oral reading proficiency, comprehension, and academic achievement. *Reading Psychology*, *32*(5), 395-425.

Paige, D. D. (2011). That Sounded Good: Using whole-class choral reading to improve fluency. *The Reading Teacher*, *64*, 435-438.

Paige, D. D., Rasinski, T. V., & Magpuri-Lavell, T. (2012). Is fluent, expressive reading important for high school readers? *Journal of Adolescent & Adult Literacy*, *56*, 67-76.

Parker, R. I., & Vannest, K. (2009). An improved effect size for single-case research: Nonoverlap of all pairs. *Behavior Therapy*, *40*(4), 357-367.

Perfetti, C. A. (1985). *Reading ability*. Oxford University Press.

Pikulski, J. J., & Chard, D. J. (2005). Fluency: Bridge between decoding and reading comprehension. *The Reading Teacher*, *58*(6), 510-519.

Queirós, F. C., Wehby, G. L., & Halpern, C. T. (2015). Developmental disabilities and socioeconomic outcomes in young adulthood. *Public Health Reports*, *130*(3), 213-221..

Rasinski, T. V. (1989). Fluency for everyone: Incorporating fluency instruction in the classroom. *The Reading Teacher*, *42*(9), 690-693.

Rasinski, T. V., Padak, N., Linek, W., & Sturtevant, E. (1994). Effects of fluency development on urban second-grade readers. *The Journal of Educational Research*, *87*(3), 158-165.

Rasinski, T. (2004). Creating fluent readers. *Educational Leadership*, *61*(6), 46-51.

Rasinski, T., Homan, S., & Biggs, M. (2009). Teaching reading fluency to struggling readers: Method materials, and evidence. *Reading & Writing Quarterly*, *25*, 192-204.

Rasinski, T., & Zimmerman, B. (2011). Fluency: The Misunderstood Goal of the School Reading Curriculum. *School Library Journal*.

Rasinski, T. V. (2012). Why reading fluency should be hot. *The Reading Teacher*, *65*, 516-522.

Rello, L., Pielot, M., & Marcos, M. C. (2016, May). Make it big!: The effect of font size and line spacing on online readability. In *Proceedings of the 2016 CHI Conference on Human Factors in Computing Systems* (pp. 3637-3648). ACM.

Reutzel, D. R., & Cooter, R. B. (2014). *Teaching children to read: The teacher makes the difference* (7 ed.). Boston, MA: Pearson.

Ruppar, A. L., Dymond, S. K., & Gaffney, J. S. (2011). Teachers' perspectives on literacy instruction for students with severe disabilities who use augmentative and alternative communication. *Research and Practice for Persons with Severe Disabilities*, *36*(3-4), 100-111.

Ruppar, A. L. (2015). A preliminary study of the literacy experiences of adolescents with severe disabilities. *Remedial and Special Education*, *36*(4), 235-245.

Ruppar, A. L., Gaffney, J. S., & Dymond, S. K. (2015). Influences on teachers' decisions about literacy for secondary students with severe disabilities. *Exceptional Children*, *81*(2), 209-226.

Samuels, S. J., LaBerge, D., & Bremer, C. D. (1978). Units of word recognition: Evidence for developmental changes. *Journal of Verbal Learning and Verbal Behavior*, *17*(6), 715-720.

Samuels, S. J. (1979). The method of repeated reading. *The Reading Teacher*, 32, 403-408.

Samuels, S. J., Miller, N. L., & Eisenberg, P. (1979). Practice effects on the unit of word recognition. *Journal of Educational Psychology*, *71*(4), 514.

Samuels, S. J. (1987). Information processing abilities and reading. *Journal of Learning Disabilities*, *20*(1), 18-22.

Samuels, S. J. (2002). Reading fluency: Its development and assessment. *What research has to say about reading instruction*, *3*, 166-183.

Scruggs, T. E., Mastropieri, M. A., & Casto, G. (1987). The quantitative synthesis of single-subject research: Methodology and validation. *Remedial and Special education*, *8*(2), 24-33.

Soto, G., & Goetz, L. (1998). Self-efficacy beliefs and the education of students with severe disabilities. *Journal of the Association for Persons with Severe Handicaps*, *23*(2), 134-143.

Staudt, D. H. (2009). Intensive word study and repeated reading improves reading skills for two students with learning disabilities. *The Reading Teacher*, *63*(2), 142-151.

Strong Hilsmier, A., Wehby, J. H., & Falk, K. B. (2016). Reading fluency interventions for middle school students with academic and behavioral disabilities. *Reading Improvement*, *53*(2), 53-64.

Swain, K. D., Leader-Janssen, E. M., & Conley, P. (2013). Effects of repeated reading and listening passage preview on oral reading fluency. *Reading Improvement*, *50*, 12-18.

Taguchi, E., Gorsuch, G. J., & Sasamoto, E. (2006). Developing second and foreign language reading fluency and its effect on comprehension: A missing link. *Reading Matrix: An International Online Journal*, *6*(2).

Torgesen, J. K., Wagner, R. K., & Rashotte, C. A. (1999). *TOWRE: Test of word reading efficiency*. Psychological Corporation.

Therrien, W. J., & Kubina, R. M. (2006). Developing reading fluency with repeated reading. *Intervention in school and clinic*, *41*(3), 156-160.

Vadasy, P. F., & Sanders, E. A. (2008). Repeated reading intervention: Outcomes and interactions with readers' skills and classroom instruction. *Journal of Educational Psychology*, *100*(2), 272.

Veenendaal, N. J., Groen, M. A., & Verhoeven, L. (2015). What oral text reading fluency can reveal about reading comprehension. *Journal of Research in Reading*, *38*(3), 213-225.

Wagner, D. L., & Espin, C. A. (2015). The reading fluency and comprehension of fifth-and sixth-grade struggling readers across brief tests of various intervention approaches. *Reading Psychology*, *36*(7), 545-578.

Wechsler, D. (2001). *Wechsler individual achievement test, Second Edition, WIAT-II.* Psychological Corporation.

Wechsler, D. (2003). *Wechsler intelligence scale for children-WISC-IV*. Psychological Corporation.

Wexler, J., Vaughn, S., Roberts, G., & Denton, C. A. (2010). The efficacy of repeated reading and wide reading practice for high school students with severe reading disabilities. *Learning Disabilities Research & Practice*, *25*(1), 2-10.

Wiederholt, J. L., & Bryant, B. R. (2012). *Gray oral reading tests.*

Wolf, M. M. (1978). Social validity: The case for subjective measurement or how applied behavior analysis is finding its heart. *Journal of applied behavior analysis*, *11*(2), 203-214.

Zutell, J., & Rasinski, T. V. (1991). Training teachers to attend to their students' oral reading fluency. *Theory Into Practice, 30*(3), 211-217.