

ABSTRACT

DEVANEY, ASENATH ANNE. Effects of a Reading Fluency Intervention on Reading Skills of Students at a Residential Treatment Center for Youth with Emotional and Behavioral Disorders. (Under the direction of Dr. Mary Haskett & Dr. John Begeny.)

Students who have been identified as having emotional and behavioral disorders (EBD) are at risk for reading difficulties due to their problematic behaviors being the focus of attention rather than their academic deficits. Reading difficulties that are slight in the early elementary grades often become more pronounced as a student progress into the upper elementary and middle school grades. Students who are placed in residential treatment centers are at further risk due to multiple school and other placements. In this study, six students who were attending a residential treatment center in the southeast were administered a reading fluency intervention. The intervention components were chosen from best practice and elements found to be effective for EBD students placed in less restrictive educational placements. A multiple baseline across participant design was used to examine whether these best practice components would also help improve the fluency of students in a residential treatment center who were reading at or below grade level. Significant improvement was not found on the standardized tests (WJ-III, TOWRE, GORT-4) from pretest to posttest. However, significant improvement on the curriculum based measures was found for all students.

Effects of a Reading Fluency Intervention on Reading Skills of Students
at a Residential Treatment Center for Youth with Emotional
and Behavioral Disorders

by
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EFFECTS OF READING FLUENCY INTERVENTION ON READING SKILLS AND ON-TASK BEHAVIOR AT A RESIDENTIAL TREATMENT CENTER FOR YOUTH WITH EMOTIONAL AND BEHAVIORAL DISORDERS

Introduction

The importance of reading within American society cannot be underestimated. “No Child Left Behind” legislation focuses much of its budget on developing literacy skills of children in early elementary school. However, there are still many children who are “left behind” and are not able to read well enough to meet the academic demands of schooling. One group of students who often has been left behind both literally and figuratively is adolescents identified as having reading difficulties and serious behavioral problems. If the academic needs of these children continue to be ignored, the results can be deleterious (Wagner, Newman, Cameto, & Levine, 2006). However, with educational intervention it is possible these students can begin to catch up and reach the goals that are at the heart of the NCLB legislation (Ed.gov) all children attaining proficiency or better in reading/English and language arts. The implementation of a reading intervention focusing on young adolescents with serious emotional and behavioral problems who were in a residential treatment center was the focus of this study. Educators’ attitudes toward children and adolescents identified either formally or informally as having significant behavior and/or emotional problems are often quite negative. Within the academic setting, some of these students are identified as

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Emotionally and Behaviorally Disturbed (EBD), while others are considered to be “delinquent” or just “aggressive”. Regardless of the label, these are the children who most often are perceived as the “troublemakers” and their educational needs are often disregarded in favor of maintaining behavioral control (Rivera, Al-Otaiba, & Koorland, 2006).

This focus on behavior in lieu of academics contributes to poor outcomes for students with EBD. Nearly half of students with EBD fail one class (Wagner, 1995) and 70% fail at least one of the high stakes exams (National Longitudinal Transition Study-2, 2003). The National Longitudinal Transition Study of Special Education Students (Wagner, 1995) found that more than twice the numbers of students with EBD were retained in a high school grade compared to students with other disabilities and the general school population. However, the most deleterious effect is that 44% of youth identified as having emotional or behavioral disorders choose, or are forced through expulsion, to drop out (Wagner, Newman, Cameto, & Levine, 2006; Wagner, Marder, Blackorby, Cameto, Newman, Levine, & Davies-Mercier, 2003). A large percentage of these EBD youth drop out around the time they would have graduated if they had maintained a steady progression through school. On average, EBD youth who dropped out when they were 18 years old had earned 8.5 credits, while their peers who graduated had earned an average of 22 credits (Wagner, 1995).

Individuals who drop out or do not complete school often are relegated to unstable jobs, limited opportunities for advancement, and substandard employee benefits. Not

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completing secondary education also is correlated with unplanned pregnancy, imprisonment, troubles with the law, and generally reduced earnings (Archer, Gleason & Vachon, 2003; Kortering, Braziel & Tompkins, 2002). High-School drop-outs are less able to support themselves and their families and are more likely to have social-emotional challenges. Drop outs are often less able to participate in post-high school training programs (Archer, Gleason & Vachon, 2003). The link between dropping out and criminal behavior is quite troubling. EBD youth are already at increased risk for involvement with the criminal justice system. Several outcome studies (National Adolescent & Child Treatment Study, 1996; National Transition Studies, 1995, 2006) have found that more than half of students identified as EBD have at least one legal incident within five years after leaving school.

A lack of competency with basic skills such as math and reading is one of the best predictors of drop out or failure to return to school after incarceration (juvenile or adult) (Jolivette, Stichter, Nelson, Scott & Liaupsin, 2000). As stated before, the focus within EBD classrooms is frequently not on academics, and therefore reading instruction is often not a priority within EBD classrooms (Levy & Chard, 2001). This lack of focus has manifested itself through reports that students who have been identified as EBD are, on average, reading between 1.5 and 2 grade levels below their peers in elementary school and often at a level even lower once they enter high school (Trout, Epstein, Mickelson, Nelson, & Lewis, 2003). These differences in reading abilities become accentuated as students who have been identified as EBD progress through school.

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The reading load increases significantly when students reach late elementary through secondary school. There is an expectation that these older students have adequate reading skills to be able to read and understand the materials presented to them (Ivey, 1999). Grammar and literature, rather than reading fluency and comprehension, become the primary focus of the language arts/English curriculum. Also, unlike in elementary school where students with EBD are served in self-contained classrooms and resource rooms, the vast majority of youth who have been identified as EBD are served in regular classrooms within their middle and high schools. These students are expected to perform academically at a level on par with their peers. Ninety-eight percent of teachers surveyed for the National Longitudinal Transition Study-2 (Wagner et al., 2003) stated that they expected students with EBD to keep up academically; however, only 65% of these students were actually able to stay even with their classmates. The students who could not sustain the expected levels and continued to have reading difficulties experienced significant struggles with secondary schoolwork and were more likely to drop out at the first opportunity (Archer, Gleason & Vachon, 2003).

Due to the central role of reading in academic and vocational success and the requirements that students demonstrate strong reading comprehension skills to pass the gateway exams, it is important that late elementary and secondary students identified as having severe emotional and/or behavioral disorders and poor reading skills receive intensive remediation. This remediation must facilitate the development or improvement of reading

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comprehension. There are two major requisite skills for the development of efficient reading comprehension. These two areas are Alphabetic (phonics) and Fluency (rate of reading) (National Reading Panel, 2000). Improvement of fluency and its relation to reading comprehension are the focus of this study.

Review of Literature

There is a dearth of literature that directly addresses effective methods to improve reading skills for students with severe emotional and behavior disorders. However, there is a wealth of information surrounding effective reading interventions for children at risk of reading problems and for youth who have been identified as having learning disabilities in reading. This literature will be reviewed. However, first, a general overview of current research on core components of reading and the most frequently used reading fluency interventions will be discussed.

Reading as a discipline. What is reading? What seems like such a simple question is really quite complicated. The ability to read is a complex skill that still can be considered to have a core mystery to it. Reading involves verbal and language abilities, perceptual motor skills, and higher-order cognition. Reading requires an orchestration of skills, motivation by the learner, and a multitude of other factors. Learning to read requires conscious effort from the learner and a guide or a teacher. Teaching children to read can be considered a school's most important task (Gillet, Temple, Crawford, & Cooney, 2004).

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Over the course of the last 50 years, the understanding of reading as a discipline has developed. Reading did not become a separate area of research until the 1950's (Alexander & Fox, 2004). Psychological theories and the sociopolitical events of the past 50 years are reflected in the development of theories of reading. The two major "schools" of reading instruction, which have waxed and waned in their popularity over time, are "phonics" and "whole language".

In the 1950's the onslaught of the baby boom children and the beginning of the "space race" brought to the forefront the number of children who had difficulties reading. Multiple schools of psychological thought developed theories addressing both how one learns to read and the reasons some people have difficulties (Alexander & Fox, 2004). At that time, the most popular reading series was the *Dick and Jane* reading series by Scott Foresman. This reading series included a controlled vocabulary that often was of little interest to children. Words were repeated frequently and students were expected to remember these repeated words as "whole words" (Reyhner, 2003). In Rudolph Flesh's 1955 book *Why Johnny Can't Read*, Flesh criticized reading series such as *Dick and Jane* because they did not prepare children to read words other than those to which they were exposed in their basal reader. He recommended the use of systematic phonics instruction (Reyhner, 2003).

Phonics instruction refers to teaching learners that written letters represent specific sounds (Stahl, Duffy-Hester, & Stahl, 1998). Initially, children learn to recognize the

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beginning sound in familiar words, but as they develop awareness of the relationship between letters and sounds they learn that words are made up of combinations of single and blended sounds. In many languages, there is a one-to-one correspondence between letters and sounds. English is not one of these one-to-one correspondence languages; however phonics skills can be used to decipher most words. In systematic phonics, children are directly taught letter-sound relationships and are asked to produce these sounds in isolation prior to blending sounds to make words. These lessons are taught directly and a curriculum is chosen that supports the particular phonics lesson (Stahl et al., 1998).

Systematic phonics instruction fits very well into the behavioral learning paradigm. As was popular in all of psychology in the 1950's and early 1960's, one of the primary methods of approaching reading and reading problems was by utilizing behavioral principles. Learning to read was seen as a bottom-up activity and the act of reading was broken down into its component skills and each skill taught as a link in the chain of learning. Reading problems were perceived as problems in skill attainment. Reading was seen as a perceptual activity, and the direct relationships between the perception of sounds and symbols were examined. Phonics lent itself easily to this conceptualization, and thus became a preferred method for teaching reading (Alexander & Fox, 2004).

Behaviorism was not the only psychological theory that was being applied to reading in the 1950's. Gestalt theory, the constructivist learning theory of Lev Vygotsky, and psycholinguistic theory of Noam Chomsky were also applied to reading in the 1950's.

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Gestalt theory with its emphasis on holistic concepts and top-down processing led to reading proponents who focused on whole word recognition and the importance of context for comprehension and word understanding (Alexander & Fox, 2004). The constructivist learning theory is based on the concept that children learn new knowledge by connecting it to information they already know. Therefore, children learn to read by being exposed to vocabulary, literature, and reading that reflects his or her own culture and prior experiences (Reyhner, 2006). Psycholinguistic theory states that reading is an inherent ability developed through exposure in meaningful situations (Alexander & Fox). The concepts embedded in these three theories as well as others provided the basis for reading theory identified as “whole language”.

A clear definition of the whole language approach to reading instruction is very difficult to obtain. Watson (1989) presents multiple authors’ definitions but admits that there is not a formal definition of whole language. Rather than a system, whole language can be described as a philosophy which has at its base the belief that literacy learning should occur through the integration of content curriculum and the four language processes of reading, writing, listening and speaking in naturalistic settings. Rather than basal readers with controlled vocabularies, whole language teachers use children’s (or adults, depending on the learner) literature to develop appreciation and enjoyment within the language curriculum (Zucker, 1993).

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The Great Reading Debate or the Reading Wars have been used as labels for the controversy between the advocates of phonics based instruction and whole language programs. Between the 1950's and the late 1990's, there was considerable disagreement about which type of reading instruction was the most efficacious and how each contributed to the reading difficulties of some young children. However, as in most "either/or" debates, more recent research and surveys of teachers indicated that a mixture of both types of reading instruction can be used to teach reading. It is essential that students be taught the alphabetic principles of phonics; however, there are multiple words which are frequently used that do not follow the phonics "rules" and thus require being learned as sight words. Children need to be exposed to a literature-rich environment where they are read children's literature, and they should be exposed to a curriculum that teaches methods of word attack (Baumann, Hoffman, Mood, & Duffy-Hester, 1998). One attempt to address the Great Reading Debate in the United States was the establishment of the National Reading Panel in the late 1990's

The National Reading Panel

In 1997, The National Reading Panel was given a Congressional Charge to assess the status of current educational research to determine the most effective methods to teach reading. After much discussion and debate in regional hearings it was decided that members of the National Reading Panel would examine five areas of reading. These areas were Alphabeticity, (2) Fluency, (3) Comprehension, (4) Teacher Education and Reading Instruction, and (5) Computer Technology and Reading Instruction. Alphabeticity was further

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divided into phonemic awareness instruction and phonics, and Comprehension was divided into vocabulary instruction, test comprehension instruction, teacher preparation, and comprehension strategies instruction. Three of these five areas are most relevant to the proposed research [i.e., Alphabeticity (phonemic awareness), Fluency, and Comprehension] and will be discussed herein.

Alphabeticity: Phonemic awareness. The National Reading Panel (2000a) defined phonemic awareness (PA) as the ability to focus on and manipulate phonemes in spoken words. Phonemes are the smallest units constituting spoken language. The English language has 41 phonemes. Phonemes are represented in writing by graphemes. The most common instructional activities that are used to teach phonemic awareness are phoneme isolation, phoneme identity, phoneme categorization, phoneme blending, phoneme segmentation, and phoneme deletion. The isolation and identity tasks focus on identification of a specific sound in a word. Examples of questions which target phoneme isolation would be “what is the first sound in bird?” while a question regarding “what is the sound that is alike in saw, sand, and sea?” would be an identity task. Phoneme categorization tasks require the student to recognize the presence of a different sound in a list of words (Example: Which word does not belong with the same letter?: bell, bat, rat, bite). Phoneme blending and segmentation tasks require the student to recognize the presence of multiple sounds within a word. In blending tasks, the student is given each sound in isolation and asked to combine the sounds into a word (“sh” “i” “p” = ship). In segmentation tasks, the student is asked to identify the

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separate sounds within a word (ship has three sounds). In phoneme deletion, the student is asked to delete a sound from a word and make another word (“smile”, without the “s” is “mile”).

The National Reading Panel’s review of literature found that these techniques were very successful and effective for the teaching of reading. When examining the specific conditions in which PA training was effective, they found that instruction of one or two PA techniques at a time was more effective than teaching all of the techniques simultaneously. They found that PA training was more effective for beginning readers who were considered at risk and “normally” progressing readers than it was for older disabled readers. Although PA training was effective for all readers, larger effect sizes were found for preschool and kindergarten students than for first grade and older students. .

Fluency. The National Reading Panel defined fluency as “the ability to read orally with speed, accuracy and proper expression “(NRP, 2000a, p. 11). Important to reading fluency is the ability to read text smoothly, effortlessly, and with little conscious attention to the mechanics of reading such as decoding. The authors of the National Reading Panel (2000a) noted that reading fluency is the area of reading that is most often overlooked within the classroom setting. They noted that recent research about the importance of reading fluency and effective interventions has lead to more attention within classrooms. Two common types of reading fluency interventions are guided repeated oral reading and silent reading. Empirical support has been found for guided oral reading, while little support has

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been found for interventions that simply encourage students to read more often. The importance of fluency lies in the fact that fluent reading is required for reading comprehension. Without reading fluency, most cognitive resources are spent on decoding, leaving little left to be utilized for reading comprehension (NRP, 2000a).

Reading Comprehension. Reading comprehension involves prior knowledge activation, question generation during reading, construction of mental images from text, summarization, and analyzing stories into story grammar components (Chard & Levy, 2001). There were four major findings in the NRP review of the literature regarding reading comprehension. The first finding was that “reading comprehension is a complex cognitive process that cannot be understood without a clear description of the role that vocabulary development and vocabulary instruction play in the understanding of what has been read” (NRP, 2000a, p. 13). A reader’s vocabulary can be increased and improved through both direct and indirect techniques, and multiple systems of vocabulary attainment are more useful than a single method.

The second finding was that reading is an active process and requires the reader to interact with the text. When a reader is able to relate what he reads to his own experiences, comprehension is improved. The NRP also found that direct instruction of reading comprehension techniques such as comprehension monitoring, cooperative learning, use of graphic organizers, question generation and answering, using the structure of the story to cue

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understanding (story structure), and summarization assisted in the development of reading comprehension.

The third finding was that teachers need to be directly trained to provide students with methods to improve reading comprehension. Techniques that were found to be empirically supported were Direct Explanation and Transactional Strategy Instruction. Direct Explanation requires the teacher to develop techniques that allow her to explain the specific methods and reasoning that good readers use to improve their comprehension. Reading is seen as a problem solving task that needs to be approached in a strategic manner. Transactional Strategy Instruction involves the teacher learning methods to increase his abilities to facilitate classroom discussions about reading materials. The research clearly supported the conclusion that direct instruction of comprehension techniques is necessary. The fourth finding was that computers can be useful for reading instruction, especially when used in conjunction with writing assignments.

Beyond the National Reading Panel: Adolescent reading recommendations. The report of the National Reading Panel was published in 2000. The recommendations focused primarily on reading acquisition (preschool to third grade); however, the key areas are equally relevant to reading instruction for individuals above third grade. The Commission of Adolescent Literacy of the International Reading Association (Moore, Bean, Birdyshaw, & Rycik, 1999) took the NRP recommendations and expanded the concepts to be relevant to students from 4th to 12th grade. They presented a position paper that indicated that adolescent

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reading development had been ignored and that adolescents were being “short-changed” (p. 1). This group asserted that reading instruction that occurred in the primary grades was only the beginning of literacy development. Middle and high school students need to be instructed on methods to build onto their existing literacy skills to make sense of the abstract concepts that are the focus of their academic endeavors. One of the main position statements of this group and other groups that focus on raising achievement and improving high school completion rates is that reading instruction cannot be provided only within the English or Language Arts curriculum. Teachers within the content areas need to model and provide explicit instruction in successful reading comprehension techniques within their disciplines (Bottoms, 2004; Moore, Bean, Birdyshaw, & Rycik, 1999).

The Commission of Adolescent Literacy of the International Reading Association recommendations all focused on reading comprehension. However, the requisite skills of phonemic awareness and fluency need to be mastered before reading comprehension can be successfully addressed. In fact, fluency can be seen as the link between alphabetic/phonetic and comprehension (Rasinski, Padak, McKeon, Wilfong, Friedauer, & Heim, 2005). Eldredge (2005) demonstrated the link through the use of a cross-lagged panel analysis which found that phonemic awareness was necessary for phonics knowledge, phonics knowledge was necessary for word recognition, word recognition was necessary for fluency, and fluency was necessary for comprehension. In conclusion, without adequate fluency, good reading comprehension is almost impossible.

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Reading Fluency

Due to the focus of the current study on interventions for reading fluency, it is essential that reading fluency be defined and the most relevant research concerning reading fluency be reviewed. In this section, (a) the theoretical framework which is used in the research will be described; (b) the relationship between fluency and reading comprehension will be discussed (c) the importance of fluency will be further elucidated; and (d) the most frequently used and empirically supported fluency intervention will be described.

As was demonstrated by Eldridge's model (2005) fluency is considered to be necessary for comprehension. Reasons surrounding this relationship are most often explained using information processing theory. The key aspects of information processing theory used to describe the link between fluency and reading comprehension focus on the limited capacity of attention and the requirement that many aspects of reading must become automatic in order for adequate attention to be allocated to comprehension. LaBerge and Samuels (1974) were the first to elucidate a theory to explain how reading skills become automatic and how attention resources are allocated to comprehension. That framework is described below.

Theoretical framework

In their theory, LaBerge and Samuels (1974) describe a myriad of skills which must be mastered and automatized in order for reading comprehension to occur. Essential to their theory is the concept that individuals are "able to process many things at a time as long as no

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more than one requires attention (p. 295)". In this theory, for reading comprehension to occur, written words must be automatically processed through many stages and each transition between stages must occur automatically. These stages and transitions occur within and between visual memory, phonological memory, episodic memory, and semantic memory. When a person is learning to read, attention resources are needed to facilitate the transitions between the memory systems; however, as automaticity develops, these transitions require significantly less attention resources. Fluent reading occurs when "...the reader can maintain his attention continuously on the meaning units of semantic memory, while the decoding from visual to semantic systems proceeds automatically (p. 313)". The transition from the need for attention to automaticity occurs through repeated practice of the skills until they become automatic. The myriad of findings indicating that reading fluency and comprehension improve with repeated reading have been taken as evidence to support this theory.

LaBerge and Samuel's theory is considered a "bottom-up" or data driven theory in which lower-level units are assumed to feed into higher order units. Automaticity occurs when lower-level units are bypassed because higher order levels are unitized (Wickens & Hollands, 2000). Bottom-up information processing theories were the first to be applied to the field of reading. However, over time, these theories were not considered sufficient to explain the entire process of learning to read. Critics of the bottom-up theories implied that data driven models did not account for the reciprocal relationships between higher-order and

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lower order reading processes. Therefore, other explanations have been posited to explain the phenomenon of reading fluency (Stanovich, 1980).

Another theory that attempts to account for individual differences in reading fluency was presented by Stanovich (1980). Stanovich identified his model as an interactive-compensatory model. In this model, readers utilize both bottom-up and top-down (i.e., context driven) techniques. According to Stanovich, poor reading comprehension was the result of attention resources being needed by both lower and higher order tasks. Poorer readers needed to use context to identify words in the absence of quick visual recognition or phonological recoding. With all of the attention resources being focused on shifting between the memory systems, fluency is reduced.

Importance of reading fluency for secondary school students. Fluent reading skills are important for success in secondary school (i.e., middle and high school). In secondary school, the amount of reading in courses generally increases and teachers expect that their students will be able to read the assignments fluently and that comprehension will be relatively easy. For slow readers, these assignments can take significantly more time, and it is possible that multiple re-reads will be necessary for adequate comprehension. This can lead to homework and school work taking considerably longer and the student might either remain behind (Mastropieri, Leinart, & Scruggs, 1999) or just give up and decide to do something more rewarding such as sports, watching television, or playing video games

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(Archer, Gleason, & Vachon, 2003). Therefore, rather than improving reading fluency, these students become more proficient athletes and “gamers” and less proficient readers.

Repetition is needed for proficiency in many things. To some extent, reading, video game skills, and sports all require a transformation from the need for conscious attention to the minute details (e.g., a tennis serve, a set of keystrokes, or symbol-sound relationships) to automaticity of the small details so that the more complex skills (e.g., playing tennis, writing a paper or reading a book) are able to gain the individual’s attention. For all of these skill acquisitions, repetition and practice is required. Therefore, LaBerge and Samuels (1974) assert that the only way to achieve automaticity in reading is through repeated practice. This assertion became the driving force of the development of reading fluency interventions.

Fluency Interventions

There are multiple types of fluency interventions. The focus of this review will be upon the interventions that have as their theoretical base LaBerge and Samuels (1974) theory of automatic information processing. The focus of these interventions is on reading speed and word recognition accuracy. Samuels (1979) indicated that there was often a trade-off between speed and accuracy. He suggested that speed be the primary focus of fluency interventions because a focus on 100% accuracy often caused students to slow down to a level that interfered with comprehension. The majority of the fluency interventions involve students reading text aloud until the reading is without significant error (usually 95% accuracy) and at a set criterion (speed). In general, repeated reading interventions have three

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phases: the initial timing phase, the practice phase, and the final timing phase. First the student is timed while she reads a new passage. Then, she reads the passage aloud several times (e.g., three to seven times) independently, and then she is timed while reading the passage again. Often, the number of words read correctly per minute is graphed in order to chart reading fluency progress. These types of interventions are known as guided oral readings or repeated readings and have been demonstrated empirically to be effective (e.g., Chard, Vaughn, Tyler, 2002; Daly, Martens, Hamler, Dool, & Eckert, 1999; NRP, 2000 a & b). “Guided oral reading” and “repeated reading” are terms often used interchangeably; however, there are subtle differences between the two types of interventions. Repeated reading only involves having the reader read a passage multiple times until a certain level is achieved. Guided oral reading involves components which are implemented before and/or after the repeated reading, as well as, the reading of the passage multiple times. Guided oral reading can be conceptualized as a repeated reading intervention coupled with another type of intervention such as listening while reading or phrase drills that occur before, during, or after the repeated reading.

Guided oral reading. In guided oral reading, the teacher or another fluent model reads the passage to the student and provides other information that will assist the student’s pronunciation and knowledge of the focus of the passage. Guided oral reading includes immediate teacher feedback and guidance to the student (Al Otaiba, & Rivera, 2006). In this intervention, students are usually given materials that are at an independent reading level and

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include repetition of words. In the teacher-focused intervention, the teacher first reads the passage and models smooth and fluent reading and then has the student read the passage. In partner reading or paired oral reading, peers work together and read the passages to each other instead of the teacher doing the reading.

Guided reading can be taught through direct instruction, independent learning, or a cooperative approach (Richards, 2000). In direct instruction, the teacher reads the passage and then explains any unfamiliar vocabulary. Next the students repeat the passage in chorus, and then each student practices reading the material independently. The independent learning approach involves setting up an area in the classroom where students can practice oral reading. The cooperative approach involves using tapes or other recorded copies of the passage. In this approach, the student listens to and reads with the recorded copy. The key to guided reading is that passages are repeated multiple times until the student can read the material fluently and understand what he is reading.

Different aspects of the guided reading interventions have been investigated to determine the need and usefulness of the different parts of guided reading (Allinder, Dunse, Brunken, Obermiller-Krolikowski, 2001; Daly & Martens, 1994; Eckert, Adoin, Daly & Martens, 2002; Skinner, Adamson, Woodward, Jackson, Atchinson, & Mims, 1993; Skinner, Cooper & Cole, 1997; Skinner & Richards, 2000). These studies have utilized elementary school students as their subjects; however, findings from these studies are relevant to the

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proposed investigation because the process of reading fluency intervention remains the same despite the age of the individual.

Research indicates that initial fluent reading by a model is an important and useful aspect of the reading fluency intervention. Daly and Martens (1994) examined the effectiveness of having a student read the passage silently to himself, having a student read a list of words aloud with an audiotape, and having a student listen to a teacher fluently read a passage prior to the passage being read by the student. They found that teacher modeling was associated with the most improvement in fluency, while the other two interventions only slightly improved reading fluency. Eckert, Ardoin, Daly and Martens (2002) found that teacher modeling improved some students' reading fluency but did not affect the fluency of other students.

The presence of specific strategy instruction was examined by Allinder et al., (2001). They compared the reading fluency performance of seventh grade students who were encouraged to use specific strategies to the performance of students who were not given fluency strategies. The strategies that were used were: (1) reading with inflection; (2) not adding words, and pausing at commas and periods; (3) monitoring for accuracy; (4) reading at an appropriate pace (i.e., not too fast); (5) watching for word endings; and (5) tracking with a finger. Student and teacher observations were used to determine which strategies to use. The chosen strategy was written on a bookmark. The control students were given a bookmark with "Just do your best" written on it. Allinder et al., found that all students'

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reading skills improved from pretest to post-test on standardized reading instruments, but only the students who were given a specific strategy improved on a maze technique. The authors' conclusions were that providing specific strategy instruction is useful for improving reading fluency and comprehension.

The necessity of performance feedback (e.g., graphing accuracy and speed) and contingent reinforcement is often dependent on the individual student. For example, Eckert, et al. (2002) examined the effect of contingent reinforcement (educationally relevant reinforcers, e.g., pencils or erasers) independent of and in conjunction with performance feedback on the reading speed of elementary school students. Their findings were mixed. For two of the students, the antecedent condition (modeled reading) was sufficient to improve reading speed. However, for two other students, the addition of the performance condition was necessary for improvement. One student's reading speed improved with the addition of contingent feedback, and another student's performance improvement required both performance feedback and contingent reinforcement. The authors concluded that the combination of performance feedback and reinforcement did not make a consistent difference in reading rate in comparison to either strategy being used independently.

A comparison of several methods of error correction was examined by O'Shea, Munson and O'Shea (1984). They compared word supply (correcting the error and having the student repeat the word), word drill (repeating the word several times), and phrase drill (repeating the phrase in which the word occurred). They found that phrase drill was superior

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to word drill. They proposed that implementation of repetition of the phrase in which the word occurred allowed for the use of context in the identification of the word, and increased the probability of recognition of the target word.

The rate of the modeling reader's presentation has been found to be relevant to outcomes. In a comparison of the effects of fast-rate (77.5% faster than the student's rate), slow-rate (22% faster), and silent previewing conditions, Skinner, Adamson, Woodward, Jackson, Atchinson, and Mims (1993) found that the slow-rate condition was more effective for middle and high school students identified as having learning disabilities than were the fast-rate and silent previewing conditions. This finding was confirmed by Skinner, Cooper, and Cole (1997) who compared two speeds of presentation. In the "slow trial," the adult read at a speed of 50 words a minute. This level was chosen because it is the minimum rate that second and third graders are expected to read. In the "fast/normal" trial, the adult read the passage at his or her "normal" reading rate. Skinner et al. (1997) found that students were able to read the passage quicker and more accurately when the passage was presented at a slower than normal rate. They suggested that the slower reading allowed students to subvocally read the words with the adult.

In summary, repeated reading techniques have been empirically supported for the improvement of reading fluency and are advocated by the National Reading Panel. Therrien (2004) conducted a meta-analysis of guided oral reading. The key findings of this meta-analysis were (1) passages should be re-read three to four times; (2) modeling by a teacher

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yielded higher effect sizes than modeling by peers; (3) a speed and comprehension cue should be given to encourage the student to focus on the need for understanding what was being read; and (4) if the purpose of the intervention is to increase fluency or comprehension there should be a corrective aspect to the intervention and a criterion (amount of time or number of answers) should be set. These findings were used to formulate the intervention administered in this research and all four of the recommendations were implemented in the intervention. A review of what is known about overall academic achievement, reading difficulties, and reading interventions with EBD youth within traditional schools and residential treatment centers are reviewed henceforth.

Academic and Reading Skills of Students with EBD

Due to the scarcity of research on academic achievement of youth with EBD (educational definition), some research that focuses on achievement of individuals identified as delinquent (legal definition), and information about academic achievement of students who engage in aggressive and delinquent acts (behavioral definition) are included in this review.

Educational experiences of students with disabilities. The most comprehensive evaluation of the academics of students with EBD was published in the National Longitudinal Transition Study (NLTS). The National Longitudinal Transition Study (NLTS) was developed in the early 1990's to describe the secondary school experiences and transition to early adulthood of students with disabilities (Wagner & Cameto, 2004). This

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study is now in its second phase. The NLTS-2 data is based on a nationally representative sample of 11,000 13 to 16 year old youth who were receiving special education and were at least in the seventh grade. Information was gathered from parents, guardians and school staff through telephone interviews, detailed mail questionnaires, and brief mail surveys. One thousand of the students were identified as having emotional disturbance (ED). Results indicated that the students with ED differed from the general population and the other disability groups in many ways.

The school history of these students differed from the general population and students within other disability categories. To illustrate, 40% of the youth with ED had attended more than five schools, and 20% of their parents reported that the last change in school was due to reassignment (often due to behavior) rather than relocation. The parents of these students had a much more negative view of their children's services. Twenty-nine percent of parents reported that they were "somewhat" or "very" dissatisfied with their child's school and a similar percent reported dissatisfaction with their child's special education services (Wagner & Cameto, 2004).

When examining the school history of the students with EBD, the NLTS researchers found that 73% of the students had been suspended or expelled at least once in comparison to 33% of students in other disability categories. The academic course schedules of the students with EBD closely resembled the general population's schedules with the exception of fewer students with EBD taking a foreign language. The vast majority of the students with EBD

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were in classes with the general population for at least half of the time. In comparison to the original NLTS, more students in the NLTS-2 were taking science and social studies than in the group studied between 1984 and 1993. The ED students were more likely than other students with disabilities to receive “mostly Ds or Fs” (14% vs. 8%). In terms of social outcomes of these students, 42% had been recipients of physical aggression by peers at school and 36% of the parents admitted that their child had been aggressive toward or bullied others (Wagner & Cameto, 2004).

Not all students with EBD are served within the traditional school setting. There are a high percentage of students identified as having EBD or LD within the juvenile justice population. Quinn, Rutherford, Leone, Osher, and Poirer (2005) found that 33.4% of youth in a juvenile justice facility had been identified with a disability prior to their incarceration. Approximately 48% (47.7) of these youth had been identified with EBD and 38.6% of the students had been identified as LD. Brunner (1993) reviewed the academic skills of youth in correctional facilities and found that the average reading level of a 15-year-old within the juvenile justice system was at the fourth grade level. The majority of reports and research about the academic issues of youth in juvenile justice stress that academic improvement is a factor that reduces recidivism (Archwanetz & Katsiyannis, 2000; Brunner, 1993; Keith & McCray, 2002).

Juvenile justice programs are required to have schools, to provide special education services to the students who have been identified, and to identify students who are in need of

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services (The National Center on Education, Disability, and Juvenile Justice, 2006). Often these requirements are difficult to meet; especially in detention centers where the length of stay can be very short (Burell & Warboys, 2000).

The high rate of incarceration of youth who have been identified as having emotional disturbances is alarming. A vast majority of students with EBD are at significant risk for dropping out and becoming involved with adult legal system (The National Adolescent Treatment Study, 1996). Coupled with this are data suggesting that a vast majority of adults involved with the adult justice system had significantly poor reading skills (National Assessment of Adult Literacy, 1992), and that adults with poor literacy were more likely to be unemployed (National Assessment of Adult Literacy, 2003). It seems essential that individuals responsible for education and treatment of these youth do all they can to intervene and change the trajectory away from incarceration and unemployment. One hope for intervention lies in the improvement of academics. The Center on Crime Communities and Culture (1997) found that literacy and criminal recidivism were inversely correlated; therefore, a strong focus on academics, especially reading, seems to be a prudent idea.

Research into reading instruction for EBD youth .There have been two comprehensive reviews of the literature on reading instruction provided to EBD youth. Levy and Chard (2001) conducted a review of the reading and EBD literature and Vaughn, Levy, Coleman, and Bos (2002) published a synthesis of the types of reading instructions provided to students with LD and EBD based on the findings of 11 separate published studies. The purpose of

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both reviews was to determine whether the reading instruction provided to students with EBD utilized the most effective interventions and classroom techniques to teach reading.

Levy and Chard (2001) evaluated the extant literature focusing on the reading skills of youth identified as EBD. They examined whether the interventions contained the six elements that they identified for successful reading instruction. These six elements were (a) oral language and vocabulary development, (b) phonological and phonetics skills, (c) letter-sound correspondences and decoding, (d) frequent opportunities to use skills with connected texts, (e) opportunities to improve fluency, and (f) ongoing progress monitoring. These six elements were not found in *any* of the reviewed studies. Levy and Chard (2001) reported that there was little time spent in the EBD classroom engaged in direct and explicit instruction of reading skills. Despite recent research suggesting the use of a variety of group schedules for teaching reading, independent seatwork and worksheets were the primary methods of teaching students in classrooms for students with EBD. The instruction that occurred focused on phonological awareness and word attack skills with no attention to fluency, comprehension, or application of the reading lessons or other reading activities. Levy and Chard also noted that the majority of time was devoted to behavior management. Their final comment was that a number of school factors appeared to exacerbate rather than ameliorate the antisocial behaviors of students with EBD. These factors included: (a) ineffective instruction resulting in academic failure, (b) inconsistent and punitive management practices, (c) lack of instruction in pro-social interpersonal and self-

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management skills, and (e) failure to enforce rules. They suggested that individuals involved in the education of students with EBD needed to learn from the early reading research (e.g., explicitly teach phonics, word identification, fluency, vocabulary and comprehension) while minimizing distractions and carefully monitoring individual students' reading progress.

In their review of reading instruction within 12 independent samples of classrooms for EBD and LD youth, Vaughn et al., (2002) focused on the amount of time allotted for reading instruction, the setting (individual or group), and the amount of direct instruction and seatwork. They too found that empirically supported components were sorely lacking within the EBD classrooms. Vaughn et al., found that the majority (40-50%) of time was spent doing seatwork and worksheets and that there was very little time spent in direct instruction. Time spent reading silently was 6-10 minutes a day, while oral reading occurred 3-10 minutes per day. Further, EBD and LD youth received more individual instruction than did students in a regular classroom; however, large group instruction that did not differentiate between those who could and could not read the material was still the norm.

In summary, direct instruction of reading for youth with EBD, both in schools and institutions, is often insufficient. A focus on behavior in lieu of academics and a preponderance of seatwork has been the status quo within EBD classrooms, and there has been little focus on improving these students' reading (Levy & Chard, 2001). Despite limited research that addresses reading instruction of students with EBD within traditional

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schools or juvenile correctional centers, there has been several reading fluency interventions used successfully to improve the reading of these youth.

Fluency interventions for students with EBD

Suggested methods for implementing a reading fluency intervention with students with EBD were outlined by Al-Otaiba and Rivera (2006). They based their recommendations on research-validated fluency interventions and best-practice recommendations for fluency interventions from the NRP. Their first suggestion was to carefully choose reading passages that are of interest to youth and at the students' instructional level. Second, there should be a large number of "overlapping" words. Their third suggestion was that a model be provided for the youth. They felt that older youth may be more receptive to a tape recorded model or the use of a computerized model. However, they acknowledged the only research that compared the use of a "live" model and a computerized model found that the live model was more effective than the computer model and the computer model was more effective than no model at all (Al-Otaiba & Rivera, 2006). Their fourth recommendation was that praise and intrinsic reinforcement be utilized to encourage students to practice reading. These suggestions encompass the aspects of guided reading; therefore, it seems that Al-Otaiba and Rivera were inferring that guided oral reading would be an effective method for improving reading fluency in EBD youth.

Prior research of reading fluency interventions with EBD youth is reviewed herein. In this review, a total of five studies are reviewed. Two of the interventions reviewed are with

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students served in non-residential school settings and three are with students who were served in residential settings. These studies are evaluated for the presence of seven features, chosen from the confluence of the Al-Otaiba and Rivera (2006) and Therrien (2004) recommendations. The seven criteria are (1) at instructional level; (2) presence of overlapping words; (3) modeling; (4) speed and comprehension cue; (5) error correction; (6) use of a criterion; and (7) presence of praise and other types of reinforcement.

Interventions with students served in non-residential school settings. A curriculum which addressed phonological awareness, fluency, and reading comprehension was implemented within a class of six middle school students served in a school for students with severe behavior problems (Strong, Wehby, Falk, & Lane, 2004). Goals of this study were to determine the effectiveness of the *Corrective Reading (SRA)* curriculum for a class of EBD middle school students, and to determine whether repeated reading would have an additive effect on the students' reading achievement beyond that attributed to *Corrective Reading*. Prior to the beginning of the intervention, all students were administered the Woodcock Reading Mastery Tests-Revised (WRMT-R; Woodcock, 1998), the Gray Oral Reading Test – Third edition (GORT-3; Wiederhold & Bryant, 1992) and the Social Skills Rating System (SSRS-T; Gresham & Elliott, 1990). The reading scores were used to determine each student's reading grade level. The SSRS-T, a behavior rating scale filled out by the teacher, was used as a pre- and post-test to determine whether the student's behaviors changed during the intervention. During the study, two reading probes were administered

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weekly to each student. The first weekly probe was a curriculum-based probe that was at the student's current reading level. The second probe was administered weekly from a seventh grade literature book. The number of correct words read per minute on these probes was the dependent variable.

A multiple-baseline procedure was implemented with three groups of two students. The reading fluency intervention consisted of the students and a Research Assistant chorally reading a passage then the students alternating reading the passage. When one student was reading, the other provided help if the peer struggled over a word for more than three seconds. Each student read the passage four times. Then, the students were timed reading a passage of similar difficulty and the correct words per minute were noted. This intervention occurred for 24 weeks, with the oral reading on both the seventh grade and the instructional grade passages measured. The data were plotted weekly. Strong et al., (2004) suggested the results of this study indicated that repeated reading had an additive effect on all measures on the *Corrective Reading* intervention for four of the six youths. The authors used effect sizes to examine whether the students made statistically significant progress on the fluency measure. In addition, the authors visually analyzed the results of the reading comprehension measure. The four youths showed significant progress in both reading fluency (ES: 1.8 – 3.02) and reading comprehension. The authors noted that the remaining two students' lack of significant progress may have been due to a ceiling effect as they were the students who were

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initially functioning at a higher level. The intervention did not have any significant effect on the frequency of teacher-reported acting out behaviors of the six students.

This intervention met three of the seven criteria. The passages were read four times, there was a corrective aspect included when the student or Research Assistant provided words which the student was unable to read within 3 seconds, and the Research Assistant was a model during the choral reading aspect of the intervention. The authors did not note whether they gave a speed or comprehension cue to the students prior to the repeated reading, or whether they utilized a set criterion for success. The authors did not indicate whether there were overlapping words in the passages, or if the student's interest level was a consideration for the choice of reading passages.

The authors also did not indicate why they chose to present the students with another probe for timing, rather than using the practiced probe during the repeated reading intervention. Changing the probe is usually a test for examining the transfer of the reading fluency tasks to unfamiliar text, but this was not one of the stated goals. The use of the passage that was read four times would have been a more accurate estimate of the student's reading fluency. Strong et al. (2005) utilized the most commonly used standardized tests to evaluate the effectiveness of their evaluation (*GORT-3 & Woodcock-Reading Mastery Test*) and used a published curriculum that was written for the education of students who were reading one or more years behind their current grade for the intervention. According to the Florida Center on Reading Research, the Corrective Reading program is consistent with the

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recommendations of the 2000 National Reading Panel; however, there is only preliminary evidence for its efficacy (Smith, 2004). The use of the English book the students would have been using if they were not receiving special services for Language Arts provided a good benchmark to evaluate whether the students were performing on grade level.

In their discussion of limitations, Strong et al. (2005) noted that the students' behaviors effected how much of the intervention each student received. They reported multiple absences, suspensions, and other events that precluded the students' abilities to participate in the program.

Scott and Shearer-Lingo (2002) conducted a study to examine whether a reading fluency intervention focusing on success improved the educational and behavioral performance of three students with EBD in self-contained classrooms. All three of the students were reading at least three years below grade level. In this multiple-baseline design, the students were administered a reading fluency probe once a week during the course of the study. This probe was chosen based on a placement test that the students were given in order to determine on what level of *The Great Leaps Curriculum* (Campbell & Mercer, 1994) they would start. The same probe was used throughout the intervention because none of the students met the set criterion for speed during the intervention. The baseline condition consisted of a reading curriculum of self-chosen stories and reading comprehension worksheets. The intervention began with two weeks of lessons from the *Teach Your Child to Read in 100 Easy Lessons* book (Kameenui & Carmine, 1998). The purpose of these lessons

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was to make sure that all students had the requisite phonetic skills enabling them to utilize the next curriculum, *Great Leaps*. Each lesson of the *Great Leaps* curriculum consists of three parts, all of which are read orally by the students and words per minute (WPM) tracked. The first part includes one minute timing of a phonics reading activity (single words or letters), sight words (short phrases), and a short 1-minute story. The students charted their WPM after reading the short story. Results indicated that the addition of the *Great Leaps* curriculum increased the reading fluency on the weekly reading probe of all three students. The first student began at an average of 58 WPM during baseline, obtained an average of 60 WPM during the *Teach Your Child to Read in 100 Easy Lessons (Teach)*, and then increased to an average of 81 WPM during the *Great Leaps* phase of the intervention. The second student began at an average fluency rate of 0 at baseline, 21 WPM during the first intervention, and obtained an average of 85 WPM at the end of the *Great Leaps* portion of the intervention. The third student began at baseline reading an average of 25 WPM. His average fluency rate decreased during the *Teach* part and increased to an average of 36 WPM before he left the study due to incarceration in a juvenile justice facility.

If evaluated by the comparison criterion, this study included four of the seven features. The program is written to be implemented at instructional level and there is a high frequency of overlapping words in the phrases and passages. The *Great Leaps* program includes clear criterion for progression within the program. A speed criterion is set by the program, and once the student meets this set criterion on one of the three parts (words,

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phrases, story), he “leaps” to the next lesson. The authors only reported one “leap” by the students during the intervention. There also is a corrective aspect to the *Great Leaps* program. At the beginning of each session, the teacher goes over any words or phrases that the student missed during the prior session. Over time, the student does read the same passage more than three times; however, this is not repeated reading per se. This intervention did not include modeling by the teacher, a speed or comprehension cue, or reinforcement.

Scott and Shearer-Lingo (2002) stated that this intervention was successful because the curriculum was at the student’s level, there were multiple opportunities for practicing, there was direct student-teacher interaction, and the students were actively engaged in monitoring their own progress. The use of the initial phonics lessons was a good method to attempt to insure that all three of the students had the requisite phonics skills. However the choice to start all three students at the same level is questionable. Two of the students were reading at the third grade level, while one was at the pre-primer level. It would seem that the students were at different levels, and thus should not have necessarily started on the same lesson. Noncompliance by one of the students actually increased when the *Teach your Child to Read in 100 Easy Lessons* phase was implemented. The results of these two studies indicate that reading fluency interventions can be effective for improving the reading fluency of students with EBD who are placed in school settings. However, students placed in residential programs can have more serious behavioral problems in comparison to students

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served within their own home and community. Three groups of researchers have examined the effects of reading fluency interventions within residential programs.

Interventions with students in residential settings. Longo, Chmelka, and Curtis (1997) and Valleley and Shriver (2003) performed research on reading interventions with students in psychiatric residential treatment centers, and Malmgren and Leone (2000) examined the effectiveness of a reading intervention that included repeated reading with students placed in a juvenile justice detention center.

In an unpublished conference presentation, Longo, Chemelka and Curtis (1997) examined whether the rate of improvement in reading achievement differed among students based on their intellectual functioning level (IQ). One-third of the students had IQs below 80, one third had IQ scores between 80 and 90, and one third had IQ scores above 90. Fifty-two students (25% girls, 75% boys) at the residential school of Boys and Girls Town were provided with a reading intervention for an academic semester. Longo et al. (1997) utilized the first two parts of the “Reading is FAME” program developed by the Girls and Boys Town Reading Center.

The intervention consisted of a daily 45-minute class for 18 weeks. The classes included oral reading, computerized activities, and word games. The *Foundations in Reading* program involved learning a different decoding rule each week, while the *Adventures in Reading* focused on recognizing words and their meanings. The students were administered the Basic Reading and Vocabulary tests of the *Woodcock-Johnson-*

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Psychoeducational Battery-Revised (W-JA), and the Fluency measure of the *Gray Oral Reading Test (GORT)* prior to the beginning of the intervention, midway through the intervention, and after the intervention was completed.

Results indicated that all three groups of students made statistically significant growth in words read per minute from pretest to post-test (*WJ-A*, *GORT*). On the fluency measures, all students started out on average at the same rate (91 WPM) and ended at the same average rate (113 WPM). All three IQ groups' progress occurred at a parallel rate of change. Longo et al. concluded that it was not too late to improve older adolescents' reading, and that this type of repeated reading and vocabulary development program was useful for students of different intellectual levels.

There was limited detail provided to describe the intervention completed by Longo et al. (1997). The information above was gleaned from a power-point presentation the authors presented at a Council of Exceptional Students Conference. It is odd that the groups started and ended with the same fluency rate. It would seem that the students who were reading at a lower grade level would be reading at the fluency rate for their grade, while the students who were reading at the fourth grade and above would be reading at a faster rate. The "Reading is FAME" program is reported to be research-based and congruent with The National Reading Panel recommendations by the Girls and Boys Town Reading Center. It is difficult to determine whether the intervention would meet the seven key criteria. The program was developed to address instructional levels. There was not any mention of speed and

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comprehension cues, error correction, or the use of a criterion. It is not possible to determine whether the passages were interesting or included overlapping words. The authors did not address whether there was any reinforcement for participation.

Another intervention with youths in a residential treatment center was completed by Valleley and Shriver (2003). They intervened with four high school students whose initial reading rates were between 30 and 50 words per minute and whose *Woodcock Reading Mastery Test-Revised* scores were below 85. Four other youths whose WRMT-R scores were between 90-110 were used as a comparison group to identify the reading rate of typical youth at the treatment center. Valleley and Shriver used passages from the *Timed Reading Series* (Spargo, 1989). Words per minute using passages from each student's English or Social Studies books were used as a pre and post-test. The students read half a passage (English or Social Studies) as a pre-test, and the remaining half as a post-test. Passages at the ninth grade level from the *Timed Reading Series* were used for weekly fluency probes based on a cloze procedure. Specifically, every seventh word was removed from the passage and the students were expected to fill in the missing word. These passages were approximately 200 words long, and had 30 words removed.

The intervention started with the four experimental youth on fourth grade passages in the *Timed Reading Series*. The students read the entire passage and answered the comprehension questions for every third passage. At all other times, they read the passages in one-minute increments. During the intervention phase, which lasted for a total of ten

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hours, the student needed to make three consecutive gains of at least one word to progress to the next passage. If the three consecutive gains did not occur after ten readings, a new passage was presented to the student. No feedback was given to the students about the accuracy of their reading. A multiple baseline across subjects design was implemented. Examination of the data was based on changes in the average number of words read from baseline to intervention. Valleley and Shriver found that reading fluency scores of all four students improved over the course of the intervention, while the comparison students' fluencies remained the same. Progress on comprehension was not found during the ten hours of intervention, however it was noted that the students were able to correctly answer most of the comprehension questions of the fourth and fifth grade passages; they continued to have difficulties with the ninth grade passages.

This intervention met three of the seven key criteria. There was no mention of whether the passages were interesting. The creators of *Timed Reading* passages report that they attempt to make the passages interesting; however, how well the creators were able to do this is unclear. The passages were read at least four times. However, Therrien (2004) suggested that any reading over four times becomes redundant, and thus the incidences where the students read the same passage 10 times was probably superfluous. During the intervention phase, the investigators provided the students with a speed cue. Of the studies reviewed herein, Valleley and Shriver (2003) best utilized a set criterion. Their criteria for progression was at least one more word read per minute, and they attempted to utilize a

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criterion (reading at a rate of 140 WPM and answering 8 of the 10 multiple choice questions correctly) for placement into the readings. This study did not utilize any modeling, nor was there a corrective aspect. Review of words pronounced wrong and hearing the passages aloud may have further helped the students' progress. Valleley and Shriver reported that finding reading materials at an instructional level was difficult and suggested that reinforcement may be a key aspect of intervention for some students. This study illustrated the reality of working with students who are in a residential treatment center. The authors had ideas about how they expected the intervention to proceed, but it did not follow the plan. Initially they had hoped to identify the starting point of the reading passages by the student's instructional reading level as ascertained by reading a passage at 144 WPM and answering 8 of 10 comprehension questions correctly. However, none of the students were able to meet the criteria at any curriculum grade level. Therefore, they all started at the fourth grade level because that was the lowest curriculum level. One of the four students in the study was asked to leave the residential treatment center due to behavior problems. Another student required more immediate reinforcement (soda or candy) to continue in the study. Another problem they encountered was that the post-test was too difficult for the students, and thus the authors decided not to administer it. The authors also discovered that the cloze procedure based on the ninth grade curriculum was too difficult as well. The authors admitted their hopes for significant change were unrealistic; however, it would seem that they would know

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that comprehension cannot be improved in 10 hours using an intervention that lacked direct instruction.

Malmgren and Leone (2000) conducted a short term intensive summer reading intervention with 45 youth in residence at a juvenile detention center. Fifty-percent of the youth had been identified as previously receiving special education services under the category of EBD, 7 (35%) had identified learning disabilities and 3 (15%) were identified as having mild mental retardation. The intervention was conducted for 2 hours and 50 minutes, five days a week for six weeks. The Gray Oral Reading Test-Third Edition (*GORT-3*) was used for pre and post testing. The *Corrective Reading Curriculum* (SRA-McGraw-Hill) was utilized for reading instruction. This curriculum includes direct instruction of decoding and comprehension skills, reciprocal peer tutoring, and oral reading by the teacher. At pretest, 73% percent of the youth had Oral Reading Quotients on the *GORT-3* that were below the 1st percentile. The median standard score was 58 and many students scored at the floor (52).

Despite the fact that the intervention did not directly target fluency, the students' rate and accuracy scores on the *GORT-3* improved significantly. The comprehension subtest score changed at a level that approached significance. A vast majority (66%) of the students' Oral Reading standard scores continued to be at or below 70. Four students' standard scores were between 85 and 90. Whether these four students initially had higher than the median score of 52 was not stated by the authors. Therefore it is unclear whether this was a treatment effect or regression to the mean. This intervention was a short-term program.

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Results indicated that participants continued to need intensive reading services. In their conclusions, the authors stressed their concerns that youth who are incarcerated often are at serious risk for further academic difficulties. This study did not directly address fluency, so it is difficult to utilize the seven criteria. The *Corrective Reading* program was developed with the National Reading Panel's recommendations as its basis. Malmgren and Leone (2000) did not describe which aspects of the program they utilized; however, the description of the program indicated that the authors attempted to make the material interesting to older readers, and they used highly decodable text and peer modeling.

In summary, information about effective reading interventions for EBD youth in residential settings is scarce. To date, only two published studies and one conference presentation are available. The overall results of these three studies are fairly positive. All three found that reading interventions can have a significant effect upon EBD adolescents' reading skills. Longo et al. (1997) found that reading skills could be improved independent of intellectual level, while Valley and Shriver (2003) found that a 10 week intervention was effective for improving several adolescent's reading speed and comprehension of curriculum at an instructional level. Malmgren and Leone (2000) found that a short-term intensive reading intervention for youth within a juvenile detention center was effective in improving reading accuracy and rate. These results suggest that attempts to improve the reading skills of youth with EBD are likely worthwhile.

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Statement of the Problem

There is little information about whether guided oral reading or other repeated reading interventions are effective for increasing the oral reading fluency of youth who have been identified as having severe behavioral and emotional disorders. What is known is that there is a high incidence of reading difficulties in youth who have been identified as EBD, and that the academic skills of these youth often are severely lacking. The effectiveness of guided oral reading to improve reading fluency and comprehension has been validated for individuals with reading disabilities and reading difficulties. However, not all interventions which are successful with other populations are as effective with students with EBD.

Students with EBD often have motivational and behavioral issues that interfere with the smooth implementation of planned interventions (Lane, Carter, Pierson, & Glaeser, 2006). If interventions can improve the literacy of these youth and increase their chances of passing the benchmark exams, the trajectory toward negative results (e.g., poverty and imprisonment) might be diverted toward a more successful outcome.

Youth who are placed in residential treatment programs may be at an even higher risk than students with EBD educated in traditional school settings for immediate and long-term negative outcomes. Some of these students have been in multiple failed out-of-home placements prior to their entry to a residential treatment center (Stuck, Smalls, & Ainsworth, 2000; Sunseri, 2005). They are more likely to have been exposed to family violence, to be violent themselves, to be poor, and to have experienced multiple traumatic incidences

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(Abramovitz & Bloom, 2003). In a review of the outcomes of students in residential treatment centers between 1993 and 2003, Hair (2005) found that improved academics were a predictor of positive outcomes for students who successfully completed a residential treatment program. Collaboration with the academic setting post discharge was also found to be a marker of success. Therefore, it would seem that being able to facilitate academic progress within a residential treatment center and assist with achieving the skills necessary to meet the requirements for grade progression (i.e. passing the NCLB tests) could encourage students to remain in school and could improve their likelihood of a successful post placement outcome. The purpose of this study was to examine whether a reading fluency intervention would improve reading skills of students in a residential treatment center who were reading at or below grade level. The design of this study was a multiple baseline across subjects design.

Research Questions and Hypotheses

1. Will Students with EBD and below average reading fluency skills demonstrate improved reading fluency on passages during a guided oral reading intervention?
 - a. Hypothesis 1a. As a result of the intervention, the students will significantly increase their reading rate, as demonstrated by an increase in words read correctly per-minute (WCPM) on the Oral Reading Fluency-Immediate passages from baseline to intervention.

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- i. Significance will be indicated by an increase of one word per week plus the Standard Error of the Measurement at the 95th percentile (Number of weeks in study + 19.8).
 - ii. The Percent of All Nonoverlapping Data Phi score will be used to indicate a significant difference between the baseline and intervention scores of all the students as a group.
 - b. Hypothesis 1b. As a result of the intervention, the students will significantly increase their accuracy as demonstrated as reduction in Words Incorrect per Minute (WIPM) from baseline to intervention. Significance will be indicated by a decrease in errors of at least 50% from baseline to intervention.
 - c. Hypothesis 1c. As a result of the intervention, the students will maintain or improve their WCPM from ORF-Immediate to ORF-Retention. Significance will be indicated by an average ORF-Retention score that is equal to or greater than the average ORF-Immediate score.
2. Will students show improvements on standardized reading assessments?
 - a. Hypothesis 2a. The students' scores on the GORT-4 will increase significantly from pretest to posttest.
 - i. Significance will be examined for the students as a group using a Wilcoxon-signed ranks test

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- ii. Significance for the students as individuals will be examined by comparing the difference between pretest and posttest scores to the standard error of the measurement at the 95th percentile for the GORT-4.
 - b. Hypothesis 2b. The students' scores on the TOWRE will increase from pretest to posttest.
 - i. Significance will be examined for the students as a group using a Wilcoxon-signed ranks test
 - ii. Significance for the students as individuals will be examined by comparing the difference between pretest and posttest scores to the standard error of the measurement at the 95th percentile for the TOWRE.
 - c. Hypothesis 2c. The students' Reading subtest scores on the WJ-III will increase from pre-test to post-test.
 - i. Significance will be examined for the students as a group using a Wilcoxon-signed ranks test
 - ii. Significance for the students as individuals will be examined by comparing the difference between pretest and posttest scores to the standard error of the measurement at the 95th percentile for the WJ-III
- 3. Will students show improvements on Curriculum-Based Measurements?

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- a. Hypothesis 3a. The students' rates of reading (i.e., words correct per minute; WCPM) will increase on a curriculum-based measurement (AIMSweb® benchmark fluency passages) from pretest to posttest.

Improvement will be measured by comparing the difference between the median pretest benchmark score and the median posttest benchmark score to the expected rate of change as indicated by the expected rate of improvement.

1. Expected rate of improvement will be calculated using the equation (Number of weeks in study * the AIMSweb published Rate of Improvement).
2. If the difference between the median pretest and posttest benchmark scores is greater than the expected rate of improvement then the difference will be considered significant.

- b. Hypothesis 3b. Students' number of correct answers on the AIMSweb® benchmark maze passages will increase from pretest to posttest. Improvement will be measured by comparing the difference between the median pretest benchmark score and the median posttest benchmark score to the expected rate of change as indicated by the expected rate of improvement.

1. Expected rate of improvement will be calculated using the equation (Number of weeks in study * the AIMSweb published Rate of Improvement).

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2. If the difference between the median pretest and posttest benchmark scores is greater than the expected rate of improvement then the difference will be considered significant.

Method

Participants

Choice of participants. All names of the participants were changed and given pseudonyms that bear no resemblance to their actual names. The participants, hereby identified as “students”, were chosen from the population of a residential treatment center serving children and youth from the entire state in which it is located. The program serves youth between the ages of 6 and 13. Students who were in the fifth grade or above and met the following criteria were selected for inclusion. The first criterion was that the student was scheduled to be a resident of the treatment program for at least the length of the study (i.e., four months). The second inclusion criterion was that the student was willing to participate and his or her parent or parental surrogate gave informed consent. The third criterion was that the student was identified by his/her teacher as potentially benefiting from additional reading assistance. The fourth criterion was that the student demonstrated adequate phonological awareness and the ability to rapidly process information, as indicated by observation or direct assessment using a standardized instrument. This criterion for phonological awareness was chosen because it is necessary to have adequate phonological

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skills to be able to benefit from a fluency intervention and to ascertain that any difficulties with reading fluency are not caused by a deficit in rapid processing of information rather than reading difficulties. The fifth criterion was that the student was able to read at least at the third grade level. This criterion was necessary because students performing below the third grade likely need focused phonics-based instruction rather than instruction in fluency. The ability to read at least at the beginning of the third grade level was determined by the student's median scores on the AIMSweb® benchmark exams (AIMSweb®, 2007). In terms of exclusionary criteria, students in the custody of the Department of Social Services were not included in this study because of the guidelines delineated by the university IRB.

Students were recruited in two cohorts, consistent with the multiple baseline design of this study. A total of ten students met the eligibility criteria for participation in the first cohort. Of those 10, four of the students' graduation dates were moved forward, so finishing the intervention was impossible, and a fifth student had significant behavior difficulties that precluded him from participating. Another student completed the study, but his data was not included in the data analysis because he was reading at a level above grade level. The first cohort, therefore, was comprised of four students. Four students met eligibility criteria for participation in the second cohort; one of those students dropped out due to behavioral problems and another graduated earlier than had been anticipated. The second cohort thus included a total of two students. The period of time that each student was involved in the study is reported in Table 1; participants and students who began but did not complete the

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study are included on the Table. At the time of their pretesting, the age range for all six students was 11 years, 9 months to 13 years, 3 months (*Mean*= 12.51; *SD* = 0.53). See Table 2 for description of students who completed the study.

Instrumentation

See Table 3 for summary of all instruments used. There were two progress monitoring curriculum based measures collected on an ongoing basis throughout the study. One of these measures evaluated oral reading fluency (ORF) and the second measure addressed reading comprehension (Maze). In addition, three standardized tests of reading ability were administered in a pre-post fashion, prior to and immediately following the intervention. Each of these tests had two equivalent forms. Form A was used for pretest and Form B for posttest. Those three standardized tests yielded a total of 11 subtest scores that served as variables for use in this study. Pre-post measures are described below, followed by a description of the progress monitoring measures.

Standardized Tests

Gray Oral Reading Test (GORT-4; Wiederholt & Bryant, 2001). The GORT-4 was used for a pre- and post-test measure of reading fluency and comprehension. This instrument was developed to (1) identify students who are significantly below their peers in oral reading proficiency and may benefit from intervention; (2) aid in the determination of reading strengths and weaknesses of students; (3) document students' reading progress in response to special intervention programs; and (4) serve as a measure of reading in investigations in

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which researchers are studying the reading abilities of school-aged students (Weiderholt & Bryant, 2001).

The GORT-4 is comprised of two parallel forms, each containing 14 sequenced reading passages followed by five associated comprehension questions. The test yields five scores: Rate (number of seconds taken to read the passage); Accuracy (number of deviations from print); Fluency (combination of rate and accuracy); Oral Reading Comprehension; and an Oral Reading Quotient (combination of the scores). All five of the scores were used for pre-and post assessment. The GORT-4 was administered by the primary investigator for the first cohort and the interventionist (i.e., the educator who delivered the intervention) administered the GORT for the second cohort.

The GORT-4 was normed on 1,600 students between the ages of 6-0 and 18-11, based on a stratification method which utilized race, gender, ethnicity, and geographic region as the stratification variables. The reliability coefficients for internal consistency, test-retest stability, and comparison of the two forms ranged from a high of .95 for test-retest of the fluency subtest, to a low of .78 for the consistency between the Comprehension score of Form A to Form B (Wiederholt & Bryant, 2001). In terms of the validity of the GORT, scores correlate well with other standardized tests of reading, language, and cognition.

Test of Word Reading Efficiency. (TOWRE; Torgesen, Wagner, & Rashotte, 1999). The TOWRE was developed to monitor the growth of the ability to accurately recognize familiar words (sight words) and rapidly sound out words. The TOWRE is

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comprised of two subtests, including Sight Word Efficiency (SWE) and Phonetic Decoding Efficiency (PDE). Each subtest has two forms that are of equivalent difficulty. The TOWRE yields standard scores and grade equivalents. The standard scores were used for this research. The primary investigator administered the TOWRE to the first five participants; the interventionist administered it to the last two students.

The TOWRE was normed on over 1,500 individuals who reflected the demographic characteristics of the U.S. according to the 1997 Statistical Abstract of the United States. Alternate form reliability coefficients exceeded .90 for all age groups. Test-retest coefficients ranged from .83 to .96. Inter rater agreement of the scoring of the TOWRE was .99. In a study of validity, TOWRE scores were found to correlate well with other tests of reading and to differentiate between individuals based on age and reading ability.

Woodcock-Johnson Tests of Achievement-Third Edition (WJ-III-ACH; McGrew & Woodcock, 2001). The three subtests that comprise the Broad Reading Score of the WJ-III (Letter-Word Identification, Reading Fluency, and Reading Comprehension) were utilized as pre- and post-test measures. The residential program utilized the WJ-III as one of the assessments administered to all students upon their entry to the program. Thus, available scores were used as the pretest, and the same individual who administered the pretest (the program's reading specialist) also administered the posttest.

The WJ-III was developed to provide a wide age-range, comprehensive system for measuring general ability, specific cognitive abilities, oral language and academic

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achievement (McGrew & Woodcock, 2001). The WJ-III was developed using a large, nationally representative sample of 8,818 subjects between the ages of 2 and 80+. One-year test-retest reliabilities for the reading tests for all ages ranged from .88 for Reading Fluency test to .95 for the Letter-Word Identification test. The Broad Reading one-year test-retest reliability coefficient was .97. There are two alternative forms for the WJ-III ACH.

Comparison of the scores of individuals on both forms yielded median cluster reliability scores above .80. Four sources of validity evidence were examined by the authors of the WJ-III. These four sources were: (a) test content; (b) developmental patterns of scores; (c) internal structure, and (d) relationships to other external variables. All of the subtests were determined to measure what they were designed to measure. The authors also found that the cluster scores correlated well with other published tests of academic achievement (e.g., Wechsler Individual Achievement Test & Kaufman Tests of Educational Achievement).

Curriculum-Based Measure

The Curriculum Based Measure used was the AIMSweb® benchmark and progress monitoring passages. See Table 3 for names and descriptions of variables.

Passage reading (Oral Reading Fluency; ORF). The AIMSweb® is a formative assessment system of curriculum-based assessment and measurement. Its development was scientifically based, and it has been identified as a system that meets the requirements for progress monitoring and response to intervention (AIMSweb®, 1999). The AIMSweb system provides curriculum-based materials for measuring reading fluency, reading

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comprehension, early literacy, early numeracy, mathematics, spelling and written expression. The reading fluency and comprehension assessment curriculum were used in this intervention (AIMSweb®, 1999). The reading fluency materials consist of benchmark and progress monitoring passages. There are three benchmark passages for each grade level (K-8) and 20-30 progress monitoring passages for grades one through eight. The benchmark passages provide a general outcome measure for the fall, winter, and spring. For each passage the number of words read correctly in one minute (i.e., WCPM) is the student's score. The AIMSweb® passages were created with a goal of providing reading passages which were standard, curriculum independent, sensitive to all reading curricula and of equal difficulty within each grade level (Howe & Shinn, 2002). The benchmark Oral Reading Fluency (ORF) passages were used for pretest posttest comparisons. The ORF progress monitoring passages were used for baseline (ORF-Immediate), intervention (ORF-Immediate) and retention (ORF-Retention) materials.

Maze. The Maze passages were added to the AIMS system in order to provide a collaborative and supplemental assessment of reading fluency and reading comprehension. The maze is a multiple-choice cloze technique. For each passage, the first sentence is complete, but every seventh word in the rest of the passage is replaced with three words within parentheses and the student is expected to circle the correct word. One of the three words is the word from the original passage, the second is a “near distractor” (same part of speech), and the third is a “far distractor” (word randomly chosen from the rest of the

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passage and does not make sense). The final score is the number of correct answers circled (RC) in three minutes. The maze passages were used as a measure of retention from the previous session. Benchmark maze passages were administered at pre-test and posttest, progress monitoring mazes were administered during every session and used as a measurement of retention and reading comprehension.

The alternate-form reliability coefficients for the AIMS benchmark passages were found to be at or above .85. The alternate-form reliability coefficients for the AIMS progress monitoring passages also were at or above .80. The authors compared the AIMS passages stated grade levels to the grade level obtained using lexiles and readability formulas (Fry, Flesch, Powers, Spache, & Smog). The median reliability coefficient was .90 with a range between .83 and .98. There have been multiple studies regarding the validity of curriculum based measurement and assessment. In the AIMSweb® Training Workbook (Shinn & Shinn, 2002), the authors provide a summary of 21 criterion validity studies completed in the 1980's and 1990's. Their conclusion is that their CBM program is a valid method of assessing reading progress. The National Center on Response to Intervention (2011) reported that there was convincing evidence that the AIMSweb® maze was valid and reliable. They reported convincing evidence for the reliability of the performance score and the slope as well as validity of the performance score, the slope of improvement, alternate forms, and sensitivity of scores to improvement following intervention.

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Research Design

The multiple baseline study included two cohorts of students (See Table 2). The first cohort consisted of five students (3 boys, 2 girls) and the second consisted of 2 students (both boys). The two cohorts did not overlap in time. Specifically, the second cohort began the study seven months after the completion of the first cohort. Each member of the cohort was administered the pre-test assessments then completed a baseline phase followed by a four-component guided oral reading intervention and post-test. The four intervention components were chosen based on the recommendations of Therrien (2004) and Al-Otaiba and Rivera (2006) for effective guided oral reading interventions. The four components, described in detail below, include (a) repeated reading, (b) listening while reading, (c) reading to criterion, and (d) phrase drill.

Procedure

With the exception of the GORT-4 and TOWRE pre and post-tests to the first cohort, and the Woodcock-Johnson-III pre and post tests, the study was implemented by the Assessment Team Coordinator of the program (hereby referred to as the Interventionist). The interventionist had been working at the program for 15 years and had a Ph.D. in Special Education. She had been a special education teacher for five years prior to employment at the Residential Treatment Center.

Pretest. Each student was individually administered the GORT-4, TOWRE, and WJ-A-III. Two students came into the program with current WJ-III scores; those scores were

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used for the pretest. After the standardized tests were administered, the interventionist administered the ORF benchmark passages according to the material selection criteria (See Appendix A).

Baseline. The baseline assessment sessions were administered on average two times a week (Appendix B). Whenever possible the sessions did not occur on sequential days. For each session, the student was brought to the office and asked to read an ORF from the grade level assessed prior to the beginning of the intervention. A words correct-per-minute (WCPM) and words incorrect per minute (WIPM) for the first minute of the readings was plotted on the respective WPM graph. The number of correct responses (RC) and incorrect responses (RIC) (either incorrect word circled or no response circled) for the maze passages was plotted on the comprehension graph. Prior to reading the passages, the student was cued “I want you to read this passage as quickly and accurately as you can while still paying attention to what it is about.” If the student paused for more than 3 seconds, the investigator told the student to “go on”. The students remained at baseline until a stable baseline was established. A stable baseline was defined as at least three reading fluency rates on the applicable ORF passages that appeared to be a stable trend. The investigator consulted a fluency expert (Dr. Begeny, Co-Chair of the dissertation committee) to verify that this criterion was met for each student. Students entered the intervention phase in the order in which they achieved a stable baseline.

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Implementation of Intervention

Cohort one. The intervention was conducted during one to four sessions a week for between 9 ½ and 18 ½ weeks (average 2 sessions a week) (See Appendix C). The first cohort's intervention consisted of six features that were presented in the following order during every intervention session (a) retention assessment ; (b) listening while reading; (c) repeated reading; (d) phase drill; (e) reading to a criterion; and (f) extrinsic reward. During the second cohort the criteria for the extrinsic reward was more stringent and self-monitoring, a seventh component, was added (See Appendix C).

Retention Assessment. The student was instructed to do a one-minute reading of the passage that he had completed the session before. The words correct per minute (WCPM-Retention) and words incorrect per minute (WIPM-Retention) were noted and graphed. After this one minute reading, the student completed the maze passage for the same passage that he had just read (the prior session's practiced passage).

Listening while reading. The interventionist read the next new AIMS passage for the grade level in which the student was working. The interventionist provided the student with a copy of the passage that she was going to read. She then said "Now I am going to read today's passage to you. Please follow along with your finger reading the words to yourself as I say them. I may stop reading and ask you to tell me the next word in the story." The interventionist read the passage at a moderate rate of between 75 to 100 words per minute. This rate was chosen based on the research of Skinner, Cooper, and Cole (1997)

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who found that reading at a slower than normal rate was more effective for students in middle and high school than was reading at a fast rate.

Repeated Reading. The interventionist prompted the student “I want you to read the passage as quickly as you can while still paying attention to what it is about.” The student was instructed to read the passage for one minute, three times. The student started from the beginning of the passage each of the three times.

Phrase drill. After each reading, the interventionist pointed out the words that the student mispronounced. The student was then instructed to read the phrase containing the incorrect word three times.

Reading to criterion. After the phrase drill, the student was told that the interventionist would be timing the first minute of his or her reading and was reminded about the WCPM met the session before (reading to criterion). This prompt included praise, intrinsic reinforcement, and a reading to criterion aspect (Al-Otaiba & Rivera 2006; Therrien, 2004). The interventionist documented the WCPM and WIPM on the interventionist’s copy of the administered passage. This score was utilized as the final repeated reading score (ORF-Immediate).

Self-monitoring. During intervention for the second cohort, after the student read the passage, he or she was told his or her WCPM and instructed to put a dot on their graph noting the WCPM. The student was asked to graph his/her own progress to provide ownership of progress and intrinsic reinforcement for the task.

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Extrinsic reinforcement. After each session throughout the study, students were given the opportunity to receive a small reward (e.g., pencil) from the reward bag or to forgo immediate rewards for that session in order to receive a larger reward (e.g., fast food item) after completing 10 sessions. Students were also given “bonus points” (a part of the residential program’s point system) for participating. These rewards were included to provide extrinsic reinforcement for an activity which could be considered boring and difficult.

Cohort two. The intervention components used for cohort one were also used for cohort two except that phrase drill was not administered, and during intervention sessions for the second cohort, the reinforcement was contingent upon reading at a rate between the 50th and 75th percentile for the grade level materials being used. This change in the program was implemented to evaluate whether tangible reinforcement for improvement increased the students’ performance beyond that of Cohort 1.

Treatment fidelity

After training the interventionist in intervention procedures using modeling and role plays, the investigator monitored the initial sessions and provided the interventionist with corrective feedback. To enhance fidelity, the interventionist utilized scripts for every session (Appendix E). At least 25% of each of the students’ sessions was audio recorded and the investigator reviewed these sessions and utilized the Fidelity checklist (Appendix D) to determine whether the specific intervention techniques were implemented correctly. Early in the study, students balked at doing phrase drill and it was determined that the one-minute

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readings were the priority; therefore, not administering the phrase drill was not considered an error in administration. Based on the observations using the Fidelity checklists, the baseline scripts and timing were implemented with 100% accuracy, and the intervention was implemented with 94% accuracy (there were only two minor errors in administration of the intervention procedures).

Results

Changes from Baseline to Intervention

The first research question focused on changes between baseline and intervention. The first hypothesis for this research question was that students would demonstrate improved reading fluency on ORF-Immediate and ORF-Retention during a guided oral reading intervention. This hypothesis was examined by a comparison of the difference score between each student's average ORF-Immediate Baseline score and the average ORF-Immediate Intervention score to a target score that reflected the expected rate of change due to typical educational improvement. If the difference between the ORF-Immediate Baseline and ORF-Immediate Intervention score was greater than the target score, then the intervention was considered effective.

The target score was calculated by the equation: Weeks in Study + Standard Error of Measurement of materials. According to Deno et al., (2001) the expected rate of growth for late elementary and middle school students is one additional word per minute per week, therefore for this study, the number of weeks in the study equaled the expected rate of

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growth. The standard error of the measurement value was added to the number of weeks in the study to ensure that the difference between the scores was not due to the inherent error of the materials.

Christ and Silbergliitt (2007) developed a range of likely estimates for the standard error of measurement for curriculum based measures. During the second half of their study, the materials used were the AIMSweb passages. Christ and Silbergliitt's choice of which SEM to use was determined by grade level (1st to 5th), expected level of reliability (Lower, Middle, & Higher), and variability within the group of students (Homogenous, Typical, & Heterogeneous). The SEM of 12 was chosen for this study, which corresponded to the highest grade available (5th), the middle of the expected reliability (.92) (because this study was implemented well, but not perfectly), and a typical group (because the sample had some variability, but was neither very homogenous nor heterogeneous). The benchmark and intervention scores were compared using a critical t-score of 1.65 for the 95th percentile ($1.65 \times 12 = 19.8$). Therefore, if the difference between the average ORF-Immediate baseline and ORF-Immediate intervention score was greater than the target score (Weeks in study +19.8) the gain was considered to be significant.

As seen in Table 4, the average ORF-Immediate Intervention score for all students was greater than the average baseline ORF-Immediate baseline score. The intervention increased all of the student's average reading speed; however, the gain scores were only greater than the target for Dallas, Mike, Brooke and Kathy. Examining the graphs of the

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students (see Figure 1 A-D), it appears that Yuri's intervention scores were more variable and less linear than the other five students. None of the students had completely linear growth; however Yuri's scores dipped five times over the course of the intervention, and the standard deviations of his scores were the greatest of all of the students. This variation may account for the lack of significant progress during the intervention.

Due to the overlap between baseline to intervention phases, The Percent of Nonoverlapping Data technique (PAND; Parker, Hagan-Burke, & Vannest, 2007) (see Appendix G for an explanation and rationale for use of PAND) was used to determine whether the differences between the baseline ORF-Immediate and the intervention ORF-Immediate scores were significant. There was overlap between the baseline and intervention scores for all of the students except Dallas. The percentage of scores that did not overlap ranged from 73.8% for Yuri to 100% for Dallas. Eddie, Brooke and Kathy all had less than 10% of their data overlapping between baseline and intervention. The overall percent of data that did not overlap was 83%. This indicates that most of the intervention ORF scores were above the baseline ORF scores. The Phi coefficient for the ORF-Immediate passages was 0.74 (CI: 0.58-0.85, $p < .0001$). This coefficient is within the medium to large range (Parker, Hagen-Burke and Vannest, 2007). This suggests that as a group, the students improved their reading fluency, and that the hypothesis of improvement was supported.

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Words Incorrect Per Minute

The second hypothesis for research question one that the accuracy of the students' reading would improve from baseline to intervention was partially supported. Using the rubric of number of errors decreasing by at least 50% (See Figure 2 and Table 5); Brooke, Kathy, and Mike had a significant reduction of errors. Eddie, Yuri and Dallas also had a reduction in the number of errors that they made, but the average number of errors did not decrease by hypothesized amount. Yuri's average error rates were affected by several incidents in which he missed an entire line of the passage. It appeared that in the attempt to read faster, at times Yuri sacrificed accuracy for speed. He was responsive to reminders to read without making mistakes, but at times he was focused on reading quickly. Dallas and Eddie, the lowest readers of their cohorts continued to struggle with words both during the baseline and the intervention.

All of the students had a baseline error mean of more than one, while at intervention, Brooke, Kathy, and Mike all had averages below one. None of the students had a mean error rate above two for the intervention. Kathy made the greatest change from a baseline average of 2.2 errors to an intervention average of 0.36 errors. During the study, Kathy became more aware of her reading errors and seemed to be working hard to not make any mistakes.

ORF- Retention.

The third hypothesis of research question one was that the students' ORF would remain the same or improve on the retention passages was partially supported. The student's

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retention WCPM scores were similar to the corresponding ORF-Immediate score. All of Kathy's and Brooke's ORF-Retention scores were equal to or above the ORF-Immediate score. Scores for the boys were mixed, with most of the ORF-Retention scores being equal to or greater than the ORF-Immediate score. Looking at the descriptive statistics (See Table 5) the first cohort's mean scores showed improvement from ORF-Immediate to ORF-Retention, but the opposite occurred for the two students in the second cohort. Eddie's, Yuri's, Brooke's and Kathy's average WCPM on the retention assessment were greater than their average WCPM on the intervention. Mike's and Dallas' scores were not appreciably different from ORF-Immediate to ORF-Retention; however, the ORF-Retention means were lower than the ORF-Intervention means. For most of the students, the repeated reading gains remained for the time between the sessions.

Pretests and Posttests

The second hypothesis was that students would show improvement on standardized tests of reading from pre-test to post-test. To examine this hypothesis, first, the score changes from pretest to posttest were compared to the respective standard error of measurement at a critical t-value of 95% ($SEM \times 1.65$) for the specific test/subtest to determine if any changes were beyond what would be expected based on the inherent error of the test. Next, the pretest and posttest scores were compared using the Wilcoxon signed rank test. The Wilcoxon signed rank test was used because the scores are not expected to be normally distributed; thus, a nonparametric test was appropriate.

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Standardized tests. A battery of standardized reading tests was administered to the students as pre and post-tests (See Table 6). Using the 95% critical t-value, Eddie's, Dallas' and Yuri's post-test GORT-4 Oral Reading Quotient scores were significantly higher than their pre-test scores. Eddie's Accuracy and Comprehension scores improved, while all of Dallas' subtest scores improved significantly. However Kathy's Comprehension posttest score was significantly lower than her pretest scores. This seemed to be an artifact of decreased motivation to complete the post testing rather than the intervention decreasing her reading comprehension.

On the TOWRE Brooke's scores improved at a level greater than the standard error of measurement on the Sight Word Efficiency and Total Word Reading Efficiency, and all three of Dallas' scores increased significantly. Mike's scores on the TOWRE actually decreased from pretest to posttest.

On the Woodcock-Johnson Reading subtests, only Mike's Letter-Word score increased at a level greater than the 95th confidence interval based on the published SEM. However, two-thirds of the students who were administered both the pretest and posttest showed improvement on their Reading Fluency score. The two students who did not improve their scores were Eddie and Mike.

Overall, Dallas was the student who made the most progress on the standardized tests. On the 11 variables, he improved on nine; all of his scores on the GORT-4 and TOWRE improved, and his WJ-A-III Reading Fluency improved. Most of the rest of the students

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improved on one or two of the subtests. Improvement seemed to be due to individual differences. However, half of the students improved their WJ-A-III Reading Fluency score. The primary focus of this study was to improve reading fluency, so this improvement on a measure of reading fluency is a positive indicator of the impact of the intervention. Statistically, using the Wilcoxon Sign-test, only the GORT Rate pretest and post-test subtest scores were significantly different ($W=0, z = 2.37, p < .03$). Thus only one of the three hypotheses of the third research question was supported.

Benchmark Scores

The AIMSweb Benchmark Growth Aggregate charts were used as norms and the difference between the pretest benchmark and posttest benchmark ORF and Maze scores were compared to the published Rate of Improvement (ROI). The ORF and Maze benchmark passages for the study grade level and the grade level above were administered as pre and post-tests. The difference in median scores was compared to the published rate of improvement on the AIMSweb® Growth Table. The comparison number was determined by multiplying the ROI for the grade level and baseline percentile by the number of weeks in the study. Changes greater than this number were determined to be significant.

Benchmark ORF. The third hypothesis that the students would show improvement on Oral Reading Fluency benchmark passages was partially supported. As seen in Table 7, Brooke and Mike made improvements that were greater than expected on the benchmark passages for the curriculum grade level they were administered during the study. In addition,

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Brooke and Mike made greater than expected progress on the grade level *above* their study curriculum grade level. In fact, Brooke made more than two times the amount of progress expected (Brooke expected ROI: 17.5; obtained 36). Dallas also made greater than expected progress on the benchmark assessment of ORF for the grade level above his study curriculum. The pretest and posttest scores were compared using the Wilcoxon signed ranks test; the difference from pretest to post test was significant ($W^+ : 141, z = 3.055, p < .002$).

Benchmark Mazes. The hypothesis that the students would make significant progress in their reading comprehension as indicated as a significant change in Responses Correct was also supported. All six of the students who were administered the pretests and posttests made greater than expected progress on the maze passages at their study grade level (See Table 8). The expected ROI for all but Eddie was 0.2 RC per week (Eddie ROI: 0.1). Eddie made six times the amount of progress expected, Yuri made four times, and Brooke made two times the amount of progress expected. The other three students made more than 1.3 times the amount of progress expected on their study grade level materials. Yuri, Dallas, and Mike also made significant progress on the grade level above their study materials. The comparison of these scores with the Wilcoxon signed rank test was significant. ($W^+ : 7.0, z = 3.194, p < .001$) as well.

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Post-hoc examination of Maze scores

The students were administered the maze passage for the passage that they had read the prior session during both baseline and intervention in an effort to examine the effect of the repeated reading task on comprehension. The same data analysis used for the ORF data was used to examine the maze data.

All of the students' average number of responses correct increased from baseline to intervention (See Table 4 and Figure 3). This difference was statistically significant using the PAND technique (Phi coefficient 0.75 (CI: 0.59-0.85, $p < .0001$). Five of the six students' average number of errors decreased at a level greater than 50% (See Table 5). Kathy's average number of errors also decreased, but not by 50%. Kathy's total number of responses was the highest of all of the students. By the end of the intervention she was completing all of the maze passage within the allotted three minutes. Her error rate was under two; suggesting that her comprehension was accurate despite her lack of significant decrease in error rate. Kathy also frequently made errors that mirrored her use of nonstandard English.

These maze results, coupled with the results of the benchmark mazes suggests that all of the students improved their reading comprehension as measured by a maze task.

Discussion

The primary purpose of this reading intervention study was to examine if a combination of research-validated and best-practice recommendations for fluency

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interventions from the NRP would be effective with students who had been placed in a residential treatment center for children with emotional and behavioral problems. Al-Otaiba and Rivera (2006) and Therrien (2004) already found that the NRP guidelines were effective for students with EBD in non-residential setting; whether effectiveness would generalize to students in residential treatment was the focus of this study.

The academic progress of students who have been identified as having emotional and behavioral difficulties often is secondary to the need to control and change their problematic behaviors. This has lead to students with emotional disturbances not making progress in reading comparable to the progress of their age-mates. What begins as a slight difference in reading achievement in the early grades can become amplified as a student progresses into upper elementary and secondary grades (Trout, Epstein, Mickelson, Nelson, & Lewis, 2003). Coupled with this, the demand for fluent reading intensifies during upper elementary and secondary school. Fluent reading is expected by teachers, so the focus of reading instruction is on comprehension of material, not decoding words (Ivey, 1999).

Students who have been placed in residential treatment centers, in particular, are at risk for falling behind. Residential treatment is usually not the first intervention attempted to address these students' behaviors, and thus often students who are admitted to these treatment facilities have failed multiple other placements and interventions and have had serious interruptions to their academic career. Existent research has found that academic skills of students with EBD are inversely proportionate to the level of restrictiveness of their school

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placement (Lane, Webby, Little , & Cooley, 2005; Reid et al., 2004). All six of the students who completed this study had been placed in at least one out-of-home placement (e.g., hospital or detention center) and had experienced significant difficulties at their school prior to placement at the residential treatment program.

The six students were referred by their classroom teacher as someone who would benefit from a fluency intervention. Despite this referral, Kathy and Dallas were reading on their assigned grade level. Yuri and Brooke were reading one grade below their current grade placement, Mike was reading two grade levels below his grade placement, and Eddie was reading three grade levels below his grade placement. Thus, the students in this study were diverse in terms of their initial reading achievement.

Empirical findings. Overall, the students made statistically significant gains in oral reading fluency. There are many indicators of these gains. First, all of the student's mean WCPM increased from baseline to intervention, and for four of the students, the change was greater than the expected growth. Furthermore, the number of errors decreased over the course of the study, which indicates that student's accuracy increased as well as their rate. This level of ORF change was also reflected in the comparison of the benchmark scores for the curriculum that the students used (study materials). For half of the students, their pretest to posttest change was at or twice the expected rate of change.

These types of changes were also seen in the Maze passages. In fact, the pretest to posttest maze benchmark score changes was greater than the ORF passages changes. All of

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the students made greater than expected changes on the maze passages. The maze results are a measurement of both fluency and comprehension; therefore, these results suggest an improvement in understanding of the reading passages. Very few of the students ever finished reading the passage within one minute, but they all were able to choose correct responses to the maze beyond the point that they stopped reading. This suggests that they were able to use what they had read to make sense of the rest of the passage. Familiarity with vocabulary and being able to use context and information that has already been read to figure out unfamiliar material is one of the essential skills needed for reading comprehension (NRP, 2000); therefore it appears that the students improved their understanding of the material through the repeated reading process.

In order to be successful academically, it is important that students are able to remember the materials that they encountered during the previous day's class. Especially in middle school, teachers expect that students mastered the previous day's materials and are ready to move on when they enter the classroom. Whether the students retained the gains they made on the repeated reading (ORF-Immediate) was a measure of retention. The maze passages and a one-minute reading of the prior session's passage were used as a measure of retention. During both baseline and intervention, students completed the maze for the passage they had read the previous session. For the students in the first cohort, the ORF-Retention mean was greater than the ORF-Immediate mean. So for these students the repeated reading gains were maintained for a least the time between the sessions. Hopefully

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the gains will be maintained, and more cognitive resources will be “freed up” for comprehension, the ultimate goal of fluent reading (Mastropieri, Leinart, & Scruggs, 1999). This result was not found for the two students in the second cohort; however their average ORF-Retention scores were not significantly lower than their ORF-Immediate. Most likely this was an individual difference in these two students’ actual performance, rather than a consequence of the addition of self-monitoring and graphing.

Based on the findings of Malmgren and Leone (2000) and Longo et al. (1997), a significant increase in reading scores on the standardized tests of reading achievement was expected. However, with the exception of the Rate subtest of the GORT-4, in which six students improved following the intervention, the rest of the results were inconsistent across students; scores for some students increased, some remained the same, and scores for some students were actually lower on the posttest than the pretest. Malmgren and Leone (2000) reported significant differences from pretest to posttest on the GORT, however the average scaled score at both pretest and posttest were both low. They reported that 66.7% of the participants’ Oral Reading Quotients were still below the 1st percentile at posttest. Eddie was the only student whose GORT-4 scores were commensurate with the Malmgren and Leone (2000) participants, and he too made similar progress. It is possible that the GORT-4 is more sensitive to change at the lower percentiles.

Examining the individual students’ standardized testing results, and using a change greater than the standard error of the measurement (SEM) as a benchmark, all of the students

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had at least one standardized test score that was above the published SEM. Dallas made the most progress, with nine of eleven scores being above the SEM. According to the interventionist, Dallas' overall reading skills improved noticeably over the course of the study. This subjective assessment was confirmed by his improving on all the aspects of reading.

There are several potential explanations for the failure to find statistically significant positive changes on the standardized tests. First, these standardized tests were not developed to measure change over a short period of time; rather, they were developed to measure individual differences in achievement within a sample and to assess change over a greater period of time (Marston, 1989). In contrast, curriculum based measures (CBM), such as the AIMSweb, were developed to be sensitive to change over time (Sibley, Biwer, & Hesch, 2001) and to provide reliable, simple, and efficient methods to assess students' progress (Deno, 1985). Curriculum based measurements were developed to measure change relative to the individual and the peer group rather than a national sample.

A second possible reason for the lack of significant increases on the standardized tests was that the standardized test scores are based on age norms. Several of the students had a birthday over the course of the intervention, and thus the norms that their raw scores were compared to changed. So a student who aged over the course of the study from age 11 to age 12 was initially compared to norms for 11 year olds at baseline and had some advantage

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because he was an “old 11”, but that same student was at a disadvantage when compared to norms for 12 year olds at post test because he was then a “young 12”.

A third explanation for limited change on the standardized testing is that there are often inconsistencies in the scores and performance of BED/SED students on standardized tests (Wehby et al., 2003). That is, BED students might do quite well on these tests one day and perform very poorly the next. The reasons for these inconsistencies are varied, and often dependent on the reasons for the students’ identification as having emotional or behavioral problems. It could be day to day struggles with reading, changes in motivation from day to day, (Wehby et al., 2003) or possible interference of comorbid problems such as anxiety, depression or inattention during the day of testing. During this study, it was sometimes difficult to maintain the students’ motivation to continue the study. By the time posttests were administered, some students were tired of participating and may not have done their best on the tests. Despite the use of reinforcement, several of the students seemed more motivated to complete the test rather than to do their best. In contrast to scores on standardized tests, scores on the benchmark passages were based on the median of three scores; that allows for the day-to-day and minute-to-minute fluctuation of the moods of the student.

Lessons learned. In addition to contributing to the literature on *outcomes* of fluency interventions for EBD students, this study also provided insight into several issues related to the *process* of conducting intervention research with EBD students in residential settings.

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Students who have been identified as EBD, especially those who have been identified as having ADHD, often are externally motivated (Barriga, Doran, Newell, Morrison, Barbetti, & Robbins, 2002). Therefore it was expected that the students would need an incentive to fully participate in the study. The reward system developed for the study offered the choice of either an immediate reward after every reading session or the opportunity to “bank” the rewards for points toward a food item from a fast food restaurant. Specifically, students received one punch in a card for every passage they read (1 punch for baseline, 2 for intervention), and after they received 10 punches they could receive a food item. Despite the option of immediate reinforcement, all students chose to delay their rewards until the end when they could receive a complete meal from a fast food restaurant. The students seemed to be further motivated to bank their punches to go to the fast food restaurant with the interventionist. A second type of reinforcement that the students received was being awarded “bonus points” that could make up for any points that they lost over the course of their day for infractions in the residential center. Most of the students in this study were not getting into a lot of trouble, therefore the bonus points were more an indication of doing well, rather than something that helped them obtain privileges and rank. In contrast to expectations, therefore, the students who completed the study did not appear to need immediate tangible rewards to maintain interest in participation. It should be noted, however, that immediate rewards were not sufficient, for the three students who could not manage their behavior well enough to participate and thus did not complete the study.

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Most of the students reported enjoying the 1:1 attention the study allowed. They reported that they liked seeing their reading speed increase and they liked getting out of their classroom. To illustrate, many of the students would ask the interventionist when she was going to come get them for the study when they passed her in the hallway. Despite the residential program having an excellent staff to student ratio, individual attention was more frequently obtained through “pull-outs” by the auxiliary staff members rather than by the residential staff members. Also, the unit where the students lived had a group-based focus; because students did almost everything as a group, time students spent alone with adults was at a premium. In summary, most of the students seemed to be more motivated by individual attention from an adult than they were by immediate tangible rewards.

All students in this study received extensive performance feedback and positive accolades from the interventionist. For the two students who charted their own progress, it seemed that the visual reinforcement of their efforts seemed to motivate them to do better, and it made them concretely aware of their own progress. However, this progress was not maintained on the retention passages. Whether their initial progress was due to the extra reinforcement or the specifics of the individuals is unclear but it is noteworthy that only one of the members of the first cohort showed a similar level of improvement. Eckert et al. (2002) found that whether performance feedback and/or contingent feedback were effective in increasing reading speed was dependent on the individual student. Further research will

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be necessary to more clearly evaluate the relative impact of reinforcement contingent on progress versus participation.

Not all of the students were responsive to the social reinforcement provided in the study. Brooke, in particular, was highly resistant to completing the maze passages; they reported that component of the intervention was “boring.” It is noteworthy that Brooke had been given a diagnosis associated with disturbances in social relatedness (i.e., Reactive Attachment Disorder). She was not as motivated by the social and attention benefits of the intervention; rather she was motivated by the tangible rewards.

There were many lessons learned about implementation of a multi-component fluency intervention with youth in a residential treatment center. Some of these lessons relate to the need to be flexible in administration of the intervention due to students’ complex schedules and multiple roles of staff assigned to conduct the intervention. Those challenges are described below as limitations of the study.

Study Limitations

There were several limitations that became evident over the course of the study. A total of 14 students began this intervention and only six completed it. Quicker than expected completion of the residential treatment program was responsible for five of the students who did not complete the program, and the remaining two students exhibited behaviors that precluded them from being stable enough to be removed from the residential program for the

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1:1 intervention. It is possible the findings might have been different if all students who began the study were able to complete it.

The students who participated were not randomly chosen from the population of the treatment center. Rather, the participants were those students who were willing to participate in the study and had legal guardians who could sign the permission slips. The willingness to participate was a major aspect of being chosen to participate. The program served students who had severe behavior problems within their school setting. For many of the students, school work was something to be avoided, and thus they did not want to volunteer to do extra academic tasks. The students who agreed to participate in this study were ones who were willing and motivated to do additional work. During the time of the study, there was a preponderance of students enrolled in the residential program who were Intellectually Disabled or Autistic. Therefore, the students who participated tended to be higher functioning than the other students enrolled in the residential program. Whether the intervention would be as effective with students who are more emotionally or behaviorally disturbed or developmentally delayed could be addressed in future research.

The students in this treatment center may also be different from students placed in typical residential treatment centers that are open during the entire week. The residential treatment center where this study took place was only open for five days and four nights a week. The students went home every weekend, and there were frequent program closings for vacations and teacher work days. Even though most students who participated in this study

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had been diagnosed with multiple significant mental health diagnoses, it is possible these students had milder disabilities and less serious mental health problems than students placed in full-time residential treatment centers and thus results of this intervention might not generalize to students in full-time centers.

Similar to the findings of Valley and Shriver (2003), this study illustrated the reality of working with students in a residential treatment center. This investigator had ideas and plans for how the study was going to proceed, but the plans were not carried out seamlessly. In fact, there were several deviations in implementation from the planned procedures. First, phrase drill was inconsistently administered. All but one of the students (Yuri) balked at repeating the phrase that included the words they missed and on several occasions the students became oppositional and wanted to leave the session. During the middle of the first cohort, in consultation with the interventionist, it was decided students would repeat the phrase only once. Second, the choice to end the intervention phase was dependent on the students upcoming graduation date rather than after a planned number of sessions. For several of the students, their graduation date was announced soon after the intervention began. Brooke, in particular, had fewer intervention sessions than were planned due to her graduation and participation refusal due to her social relatedness issue.

A third deviation from planned procedures was that intervention sessions were not consistently held as planned (i.e., 3 intervention sessions in each consecutive week). In many residential treatment programs, professionals are responsible for multiple tasks; in this study,

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the interventionist's primary job sometimes interfered with her ability to administer three reading sessions a week to multiple students. At times, due to her schedule or the student's schedule, sessions were missed or there were more sessions than planned during a week. There were also times that the residential staff would not allow the students to leave the group activity, and thus they missed a session. Students also missed entire weeks when there was a programmatic closure or their parents did not return them to the residential center after a break. Student absences often precluded them from participating regularly in the study. On average the students participated in two sessions a week rather than the planned three sessions. In the chaos of doing research, a few of the passages were not administered or the results were lost. Six passages (18% of the total number of intervention passages) were either not administered or data on performance of those passages was lost. These types of implementation challenges were also reported by Strong et al (2004). In spite of these deviations from the planned intervention, however, results still indicated statistically and clinically significant improvements in reading fluency.

Two study limitations are related to measurement issues. First, the study procedures might have inflated scores on the measure of retention. Specifically, the retention assessment occurred at the beginning of each session. The student read the prior session's passage for one minute and then completed the maze passage. Because they had just read the passage again, the maze scores may not have been as strong of a measure of retention because they had just read the passage again. Counterbalancing the order of administration of the mazes

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and the ORF might have controlled for this. Alternately, the maze passages could have been administered during a different session when the same passage ORF was not read.

Another limitation related to measurement was that several of the students were not assessed using the benchmark passages for their current grade placement. One of the goals of this study was to increase the student's reading fluency and comprehension to facilitate progress within their classroom and grade. The benchmark passages were able to give an estimate of grade level reading percentage, for Dallas, Yuri and Kathy. However, Brooke, Eddie and Mike did not complete their current grade level passages, so where they ranked in comparison to their classmates could not be determined.

A final limitation of this study is that there was no follow-up to determine whether gains in reading fluency were stable over time. Unfortunately, the pretest and posttest benchmark passages took too long to administer, and thus there was not time to implement the planned follow-up. Often a month was needed to administer the 18 passages that made up the grade below, the grade above, and the chosen grade level benchmark passages. This month would have been better used for follow-up or continued intervention, rather than completing the benchmark materials. A quicker method of determining the level of materials would have allowed more time for the study.

Further study

Due to a lack of time for follow-up, whether the reading gains remained after the intervention was completed was not assessed. Without follow-up, it is impossible to

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determine whether the gains were short-lived and the students' reading fluency returned to baseline or if the students' upward trajectory continued and they continued to read within the upper percentile of their curriculum grade or their current grade placement. Improved academics have been found to be a predictor of positive outcomes for students who successfully complete a residential treatment center (Hair, 2005). Long-term follow-up of these students would allow one to examine if the improved reading assisted them in keeping up with their peers academically. Long-term follow up could also determine if the intervention would have resulted in improved standardized test scores further out from the initial testing.

This residential treatment center is focused on serving youth between the ages of 5 and 13. Research indicates that academic problems that begin in elementary school are likely to become more pronounced as the student progresses through school (Nelson et al, 2004). Students with EBD are at increased risk for dropping out of school (Wagner et al., 2003; Wagner et al., 2006). Examining whether this type of intervention would be effective for improving the reading skills of high school students with EBD would be of interest, as would whether gains in reading are associated with increased graduation rates

Another opportunity for study is examination of the effect of self-monitoring and increased incentives on the performance of students in a residential setting. In this study, the two students who received these intervention components did very well, and reported

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enjoying the experience. Whether these positive effects are child specific or can be generalized to other students is an area of possible study.

This study utilized a combination of techniques found to be best practice for “regular” students, students with other exceptionalities (i.e. Specific Learning Disabled, Intellectually Disabled-Mild), and students in non-residential settings who have been identified as EBD. Whether all, one or a combination of the techniques were responsible for the progress could be evaluated by isolating specific components of the intervention and evaluating their independent effectiveness.

In summary the intervention was found to be effective for increasing the reading fluency of students at a residential treatment center. In spite of some deviations from planned procedures, all of the students made substantial progress on multiple curriculum based measures of reading fluency and comprehension. This progress is remarkable given (a) the short-term nature of the intervention, (b) the low intellectual functioning of many of the students, and (c) the multiple challenges of conducting an intervention within a residential treatment center. These students, characterized by serious mental health disorders (e.g., Bipolar Disorder, PTSD, and Conduct Disorder) willingly participated in the study and most students reported that they enjoyed the 1:1 attention and the opportunity to learn to read better. Improved academics are a predictor of success after discharge from a residential treatment center. If best practice reading activities are effective as well as enjoyable and motivating for EBD students, then it is a “win-win” situation.

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REFERENCES

AIMS Web (2007). AIMS Web home page. Retrieved from <http://aimsweb.com/>

Alexander, P.A., & Fox, E. (2004). A historical perspective on reading research and practice.

In R.B. Ruddell, and N.J. Unrau (Eds.), *Theoretical models and processes of reading*

(pp. 33-68). Newark, DE: International Reading Association. Retrieved from

<http://www.reading.org/Publish.aspx?page=bk502-2>

[Alexander.pdf&mode=retrieve&D=10.1598/0872075028.2&F=bk502-2-](http://www.reading.org/Publish.aspx?page=bk502-2&mode=retrieve&D=10.1598/0872075028.2&F=bk502-2-Alexander.pdf)

[Alexander.pdf&key=77554C48-0CB0-458A-B2F0-](http://www.reading.org/Publish.aspx?page=bk502-2&mode=retrieve&D=10.1598/0872075028.2&F=bk502-2-Alexander.pdf&key=77554C48-0CB0-458A-B2F0-)

Alfassi, M. (1998). Reading for meaning: The efficacy of reciprocal teaching in fostering

reading comprehension in high school students in remedial reading classes. *American*

Educational Research Journal, 35, 309-332. doi: 10.3102/00028312035002309

Alliance for Excellent Education (2003). Every child a graduate: A framework for an

excellent education for all middle and high school students. Retrieved from

<http://www.all4ed.org/files/archive/publications/EveryChild>

[AGraduate/every.pdf](http://www.all4ed.org/files/archive/publications/EveryChild)

Allinder, R. M., Dunse, L., Brunken, C. D., & Obermiller-Krolikowski, H. J. (2001).

Improving fluency in at-risk readers and students with learning disabilities. *Remedial*

and Special Education, 22, 48-54.

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

- Al Otaiba, S., & Rivera, M.O. (2006). Individualized guided oral reading fluency instruction for students with emotional and behavioral disorders. *Intervention in School and Clinic*, 41, 144-149. doi: 10.1177/10534512060410030301
- Archer, A. L., Gleason, M. M., & Vachon, V. L. (2003). Decoding and fluency: Foundation skills for struggling older readers. *Learning Disabilities Quarterly*, 26, 89-101.
- Archwaynety, T., & Katsiyannis, A. (2000). Academic remediation, parole violations, and recidivism rates among delinquent youth. *Remedial and Special Education*, 21, 161-170. doi:10.1177/074193250002100306
- Ardoin, S. P., & Christ, T. J. (2009). Curriculum-based measurement of oral reading: Standard errors associated with progress monitoring outcomes from DIBELS, AIMSweb, and an experimental passage set. *School Psychology Review*, 38, 266-283,
- Barrigam A. Q. (2002). Relationships between problem behaviors and academic achievement in adolescents: The unique role of attention problems *Journal of Emotional and Behavioral Disorders*, 10, 233-240. doi: 10.1177/10634266020100040501
- Baumann, J. F., Hoffman, J. V., Moon, J., Duffy-Hester, A. M. (1998). Where are teachers' voices in the phonics/whole language debate? Results from a survey of U. S. elementary classroom teachers. *The Reading Teacher*, 51, 636-650.
- Begeny, J. C., & Martens, B. K. (2006). Assisting low-performing readers with a group-based fluency intervention. *School Psychology Review*, 35, 91-107.

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

Bottoms, G. 10 Strategies for raising achievement and improving high school completion

rates. Retrieved from [http://www.sreb.org/programs/hstw/](http://www.sreb.org/programs/hstw/publications/2004Pubs/04V50_10Strategies_Raising_Achievement.pdf)

[publications/2004Pubs/04V50_10Strategies_Raising_Achievement.pdf](http://www.sreb.org/programs/hstw/publications/2004Pubs/04V50_10Strategies_Raising_Achievement.pdf)

Boys Town (2007) Reading is FAME. [http://www.neglected-](http://www.neglected-delinquent.org/nd/resources/spotlight/spotlight200504d.asp)

[delinquent.org/nd/resources/spotlight/spotlight200504d.asp](http://www.neglected-delinquent.org/nd/resources/spotlight/spotlight200504d.asp)

Brunner, M. S. (1993). Reduced recidivism and increased employment opportunity through

research-based reading instruction. Department of Justice, Office of Juvenile Justice

and Delinquency Prevention. Washington, DC: Juvenile Justice Clearing House.

Retrieved from [http://unllib.unl.edu/](http://unllib.unl.edu/LPP/PNLA%20Quarterly/guerra75-1.htm)

[LPP/PNLA%20Quarterly/guerra75-1.htm](http://unllib.unl.edu/LPP/PNLA%20Quarterly/guerra75-1.htm)

Bryant, D. P., Vaughn, S., Linan-Thompson, S., Ugel, N., Hamff, A., & Hougen, M. (2000).

Reading outcomes for students with and without reading disabilities in general

education middle-school content area classes. *Learning Disabilities Quarterly*, 23,

238-252. <http://www.jstor.org/stable/1511347>

Burell, S., & Warboys, L. (2000). Special education and the juvenile justice system. *Juvenile*

Justice Bulletin. Retrieved from [http://www.ncjrs.gov/](http://www.ncjrs.gov/html/ojdp/2000_6_5/contents.html)

[html/ojdp/2000_6_5/contents.html](http://www.ncjrs.gov/html/ojdp/2000_6_5/contents.html)

Campbell, J. M. (2004). Statistical comparison of four effect sizes for single-subject designs.

Behavior Modification, 28, 234-246. doi:10.1177/0145445503259264

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

The Center on Crime Communities and Culture (1997) Retrieved from

http://www.soros.org/initiatives/justice/articles_publications/publications/edbrief_19970901

Chard, D. J., Vaughn, S., & Tyler, B. (2002). A synthesis of research on effective interventions for building reading fluency with elementary school students with learning disabilities. *Journal of Learning Disabilities, 35*, 386-406.

doi:10.1177/00222194020350050101

Christ, T. J. (2006). Short-term estimates of growth using curriculum based measures of oral reading fluency: Estimating standard error of slope to construct confidence intervals. *School Psychology Review, 35*, 128-133.

Christ, T. J., & Silberglitt, B. (2007). Estimates of the standard error of measurement for curriculum-based measures of oral reading fluency. *School Psychology Review, 36*, 130-146.

Daly, E. J., & Martens, B. K. (1994). A comparison of three interventions for increasing oral reading performance: Application of the instructional hierarchy. *Journal of Applied Behavior Analysis, 27*, 459-469. doi: 10.1901/jaba.1994.27-459

Daly, E. J., Martens, B. K., Dool, E. J., & Hintze, J. M. (1998). Using brief functional analysis to select interventions for oral reading. *Journal of Behavioral Education, 8*, 203-218.

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

- Daly, E. J., Martens, B. K., Hamler, K. R., Dool, E. J., Eckert, T. L. (1999). A brief experimental analysis for identifying instructional components needed to improve oral reading fluency. *Journal of Applied Behavior Analysis, 32*, 83-94. doi: 10.1901/jaba.1999.32-83.
- Daly, E. J., Witt, J. C., Martens, B. K., & Dool, E. J. (1997). A model for conducting a functional analysis of academic performance problems. *School Psychology Review, 26*, 554-574
- Deno, S. L., Fuchs, L. S., Marston, D., & Shin, J. (2001). Using curriculum based measurement to establish growth standards for students with learning disabilities. *School Psychology Review, 30*, 508-524.
- Eckert, T. L., Ardoin, S. P., Daly, E. J., & Martens, B. K., (2002). Improving oral reading fluency: A brief experimental analysis of combining an antecedent intervention with consequences. *Journal of Applied Behavioral Analysis, 35*, 271-281. doi: 10.1901/jaba.2002.35-271.
- Eldridge, J. L. (2005). Foundations of Fluency: An exploration. *Reading Psychology, 26*, 161-181. doi: 10.1080/02702710590930519
- Executive Summary. Retrieved from <http://www2.ed.gov/nclb/overview/intro/execsumm.html>
- Focus on Policy (2003). Is the GED valuable to those who pass it? *Connecting Research and Policy: National Center for the study of adult learning and literacy, 1*, 1-8.

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

GED online. Retrieved 1/17/2007 from <http://www.gedonline.org/facts/facts.html>

Gillet, J. W., Temple, C., Crawford, A. N., & Cooney, B. (Eds.). (2004). *Understanding reading problems: Assessment and instruction* (6th ed.). Boston: Pearson

Greenbaum, P. E. (1996). National Adolescent and Child Treatment Study (NACTS):

Outcomes for children with serious emotional and behavioral disturbances. *Journal of Emotional and Behavioral Disorders, 4*, 130-146.

Hale, A. D., Skinner, C. H., Winn, B. D., Oliver, R., & Allin, J. D. (2005). An investigation of listening and listening while reading accommodations on reading comprehension levels and rates in students with emotional disorders. *Psychology in the Schools, 42*, 39-51. doi: 10.1002/pits.20027

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

Howe, K. B., Shinn, M. M. (2002). Standard Reading Assessment Passages (RAPs) for use in general outcome measurement? A manual describing development and technical features. Retrieved from <http://www.aimsweb.com/uploads/news/id98/Summary%20of%20Reliability%20Information%20for%20AIMSweb%20R-CBM.pdf>

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

- Hughes, C. A., Deshler, D. D., Ruhl, K. L., & Schumaker, J. B. (1993). Test-Taking Strategy Instruction for Adolescents with Emotional and Behavioral Disorders *Journal of Emotional and Behavioral Disorders* 1, 189-198, doi:10.1177/106342669300100307
- Ivy, G. (1999). A multicase study in the middle school: Complexities among young adolescent readers. *Reading Research Quarterly*, 34, 172-192. Stable URL: <http://www.jstor.org/stable/748163>
- Jolivet, K., Stichter, J. P., Nelson, C. M., Scott, T. M., & Liaupsin, C. J. Improving post-school outcomes for students with emotional and behavioral disorders. (ERIC Document Reproduction Service No. ED447616) Retrieved from <http://www.ericdigests.org/2001-3/post.htm>
- Keith, J. M., & McCray, A. D. (2002). Juvenile offenders with special needs: critical issues and bleak outcomes. *Quantitative Studies in Education*, 15, 691-710.
- Kortering, L.J., Brazier, P.M., Tompkins, J.R.(2002). The challenge of school completion among youths with behavioral disorders: Another side of the story. *Behavioral Disorders*, 27, 142-154.
- Keenan, J. M., & Betjemann, R. S. (2006). Comprehending the Gray Oral Reading Test without reading it: Why comprehension tests should not include passage-independent items. *Scientific Studies of Reading*, 10, 363 - 380. doi: 10.1207/s1532799xssr1004_2
- LaBerge, D., & Samuels, S. J. (1974). Toward a theory of automatic information processing in reading. *Cognitive Psychology*, 6, 293-323.

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

- Lane, K. L., Carter, E. W., Pierson, M. R., & Glaeser, B. C. (2006). Academic, social, and behavioral characteristics of high school students with ED or LD. *Journal of Emotional and Behavioral Disorders, 14*, 108-117.
- Lane, K. L., Wehby, J. H., Little, M. A., & Cooley, C. A. (2005). Academic, social, and behavioral profiles of students with emotional disorders educated in self-contained classrooms and self-contained schools: Part one-Are they more alike than different. *Behavioral Disorders, 30*, 349-361.
- Levy, S., & Chard, D. J. (2001). Research on Reading Instruction for Students with Emotional and Behavioral Disorders. *International Journal of Disability, Development and Education, 48*, 429-444. doi: 10.1080/10349120120094301
- Longo, A. M., Chmelka, B., & Curtis, M. B. (1997). Teaching basic reading skills to adolescents with behavioral disorders. Presentation at the Annual convention of the Council of Exceptional Students in Salt Lake City 1997. Retrieved from <http://eric.ed.gov/PDFS/ED408797.pdf>
- Malmgren, K.W., & Leone, P. (2000). Effects of short-term auxiliary reading program on the reading skills of incarcerated youth. *Education and Treatment of Children, 23*, 239-247
- Marsten, D. B. (1989). A curriculum-based measurement approach to assessing academic performance: What it is and why do it. In M. R. Shinn (Ed.) *Curriculum-based measurement: Assessing special children* (pp.18-78). New York, NY: Guilford Press.

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

Mastropieri, M. A., Leinart, A., & Scruggs, T. E. (1999). Strategies to increase

reading fluency. *Intervention in School and Clinic*, 34, 278-283. doi:

10.1177/105345129903400504

McGrew, K. S., & Woodcock, R. W. (2001). Technical manual. *Woodcock-Johnson III*.

Itasca, IL: Riverside Publishing.

Mooney, P., Epstein, M. H., Reid, R., & Nelson, J. R. (2003). Status of and trends in

academic intervention research for students with emotional disturbance. *Remedial*

and Special Education, 24, 273-287. doi:10.1177/07419325030240050301

Moore, D. W., Bean, T. W., Birdyshaw, D., Rycik, J. A. (1999). Adolescent literacy: A

position Statement for the commission of adolescent literacy of the International

Reading Association. International Reading Association. Retrieved from:

www.reading.org/downloads/positions/ps1036_adolescent.pdf

National Assessment of Adult Literacy (1992). Literacy Behind Prison Walls. Retrieved

from <http://nces.ed.gov/pubs94/94102.pdf>

National Assessment of Adult Literacy (2003). A first look of the literacy of adults in the 21st

century. <http://nces.ed.gov/NAAL/PDF/2006470.PDF>

National Center on Response to Intervention (2011). Progress Monitoring Tools. Retrieved

from: <http://www.rti4success.org/progressMonitoringTools/>

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

National Reading Panel (2000a). Report of the National Reading Panel: "Teaching children to read": Summary Report. Retrieved from

http://www.nichd.nih.gov/publications/nrp/upload/smallbook_pdf.pdf

National Reading Panel (2000b). Report of the National Reading Panel: "Teaching children to read": Reports of subgroups. Retrieved from

<http://www.nichd.nih.gov/publications/nrp/upload/ch3.pdf>

Oregon Reading First Center (2007) Retrieved from

http://oregonreadingfirst.uoregon.edu/assess_information.html

O'Shea, L. J., Munson, S. M., & O'Shea, D. J. (1984). Error correction in oral reading:

Evaluating the effectiveness of three procedures. *Education and Treatment of Children*, 7, 203-214.

Parker, R. I., Hagan-Burke-S., & Vannest, K. (2007). Percentage of all non-overlapping data (PAND): An alternative to PND. *Journal of Special Education*, 40, 194-204.

doi:10.1177/00224669070400040101

Rathvon, N. (2008) *Effective school interventions: Evidence-based strategies for improving student outcomes* (2nd Ed.) p.24. Retrieved from

http://books.google.com/books?id=UXcmpbzbeWcC&pg=PA24&lpg=PA24&dq=children's+intervention+rating+profile,+rathvon&source=bl&ots=4oaYSwUeqJ&sig=5TZmfABvjUrx7IMRq1FjyB4HzhQ&hl=en&ei=Zd4pTd94gv7wBquqdIB&sa=X&oi=book_result&ct=result&resnum=1&ved=0CBgQ6AEwAA#v=onepage&q&f=false

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

Reyner, J. (2008). The Reading Wars: Phonics vs. Whole Language Retrieved from

http://jan.ucc.nau.edu/~jar/Reading_Wars.html

Quinn, M.M., Rutherford, R. B., & Leone, P. E. (2001, February). *Students with disabilities in correctional facilities*. Council of Exceptional Students. Retrieved from

<http://www.ericdigests.org/2002-4/correctional.html>

Rasinski, T. V. Padak, N. D. McKeon, C. A. Wilfong, L. G. Friedauer, J. A. Heim, P (2005).

Is reading fluency a key for successful high school reading? *Journal of Adolescent and Adult Literacy*, 49, 22-29. Stable URL: <http://www.jstor.org/stable/40009266>

Reid, R., Gonzalez, J. E., Nordess, P. D., Trout, A., & Epstein, M. H. (2004). A meta-analysis of the academic status of students with emotional/behavioral disturbance.

The Journal of Special Education, 38, 130-143. doi:10.1177/00224669040380030101

Richards, M. (2000). Be a good detective: Solve the case of oral reading fluency. *The*

Reading Teacher, 53, 534-539.

Rissman, L. (Nov, 2006). Florida Center for Reading Research: Timed Readings. Retrieved

from www.fcrr.org/FCRRReports/PDF/TimedReadingsFinal.pdf

Rivera, M.O., Al-Otaiba, S., & Koorland, M. A., (2006). Reading instruction for students with emotional and behavioral disorders and at risk for antisocial behaviors in

primary grades: A review of literature. *Behavioral Disorders*, 31, 323-337.

Samuels, S. J. (1997). The method of repeated reading. *The Reading Teacher*, 50, 376-381.

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

- Scanlon, D., & Mellard, D. (2002). Academic and participation profiles of school-age dropouts with and without disabilities. *Exceptional Children, 68*, 239–258. Retrieved from <http://www.sbac.edu/~werned/DATA/RESEARCH/journals/Excep%20Children/dropouts%20with%20and%20without%20dis.pdf>
- Scruggs, T. E., & Mastropieri, M. A., (1994). The utility of the PND statistic: A reply to Allison and Gorman. *Behavior Research and Therapy, 32*, 879-883.
- Shinn, M. R., & Shinn, M. M. (2002). AIMSweb training workbook: Administration and scoring of reading maze for use in general outcome measurement. http://www.aimsweb.com/uploads/pdfs/scoring_maze.pdf
- Shinn, M. R., & Shinn, M. M. (2002). AIMSweb training workbook: Administration and scoring of reading curriculum based measure (R-CBM) for use in general outcome measurement. Retrieved at http://www.aimsweb.com/uploads/pdfs/scoring_rcbm.pdf
- Sibley, D., Biwer, D., & Hesch, A (2001). Establishing curriculum-based oral reading fluency performance standards to predict success on local and state tests of reading achievement. Retrieved from: http://www.aimsweb.com/uploads/news/id19/orf_benchmarks.pdf
- Scott, T.M., & Shearer-Lingo, A. (2002). The effects of reading fluency instruction on the academic and behavioral success of middle school students in a self-contained EBD classroom. *Preventing School Failure, 46*, 167-173

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

Schrank, F. A., McGrew, K. S., & Woodcock, R. W. (2001). Technical Abstract (Assessment Service Bulletin No. 2). Itasca, IL: Riverside Publishing.

Skinner, C., Adamson, K. L., Woodward, J. R., Jackson, R. R., Atchison, L. A., & Mims, J. W. (1993). A comparison of fast-rate, slow-rate, and silent previewing interventions on reading performance. *Journal of Learning Disabilities, 26*, 674-681.
doi:10.1177/002221949302601005

Skinner, C., Cooper, L., & Cole, C. L. (1997). The effects of oral presentation previewing rates on reading performance. *Journal of Applied Behavior Analysis, 30*, 331-333.
doi: 10.1901/jaba.1997.30-331.

Smith, S.A. (2004). Florida Center for Reading Research: SRA Corrective Reading.
Retrieved at www.fcrr.org/FCRRReports/PDF/corrective_reading_final.pdf

Stahl, S. A., Duffy-Hester, A. M., Stahl, K. A. D, (1998). Theory and research into practice: Everything you wanted to know about phonics (but were afraid to ask) *Reading Research Quarterly, 33*, 338-355. Stable URL: <http://www.jstor.org/stable/748309>

Stanovich, K. E. (1980). Toward an interactive-compensatory model of individual differences in the development of reading fluency. *Reading Research Quarterly, 16*, 32-71. Stable URL: <http://www.jstor.org/stable/747348>

Strong, A.C., Wehby, J.H., Falk, K.B., Lane, K.L. (2004). The impact of a structured reading curriculum and repeated reading on the performance of Jr. High students with emotional and behavioral disorders, *School Psychology Review, 33*, 561-581

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

Therrien, W.J. (2004). Fluency and comprehension gains as a result of repeated reading.

Remedial and Special Education, 25, 252-261

Therrien, W. J., Gormley, S., & Kubina, R. M., (2006). Boosting fluency and comprehension to improve reading achievement. *Teaching Exceptional Students, 38*, 22-26

Trout, A. L., Epstein, M.H., Mickelson, W.T., Nelson, J.R., & Lewis, L. M. (2003). Effects of a reading intervention for kindergarten students at risk for emotional disturbance and reading deficits. *Behavioral Disorders, 28*, 313-326.

Valleley, R. J., & Shriver, M. D. (2003). An examination of the effects of repeated readings with Secondary Students. *Journal of Behavioral Education, 12*, 55-76.

Vaughm, S., Levy, S., Coleman, M., & Bos. C. S. (2002). Reading instruction for students with LD and EBD: A synthesis of observational studies. *Journal of Special Education, 36*, 2-13. doi:10.1177/00224669020360010101

Wagner, M. M., (1995). Outcomes for youths with serious emotional disturbance in secondary school and early adulthood. *Critical Issues for Children and Youths, 5*, 90-112.

Wagner, M., & Cameto, R. (2004). The Characteristics, Experiences, and Outcomes of Youth with Emotional Disturbances. NLTS2 Data Brief: Reports from the National Longitudinal Transition Study, 3, retrieved from <http://www.ncset.org/publications/viewdesc.asp?id=1687>

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

- Wagner, M., Marder, C., Blackorby, J., Cameto, R., Newman, L., Levine, P., & Davies-Mercier, E. (with Chorost, M., Garza, N., Guzman, A., & Sumi, C.). (2003). The Achievements of Youth with Disabilities During Secondary School. A Report from the National Longitudinal Transition Study-2 (NLTS2). Menlo Park, CA: SRI International. Available at www.nlts2.org/reports/2003_11/nlts2_report_2003_11_complete.pdf.
- Wagner, M., Newman, L., Cameto, R., & Levine, P. (2006). The Academic Achievement and Functional Performance of Youth With Disabilities. A Report of Findings from the National Longitudinal Transition Study-2 (NLTS2). Menlo Park, CA: SRI International. Available at www.nlts2.org/reports/2006_07/nlts2_report_2006_07_complete.pdf.
- Watson, D. J. (1989) Defining and describing whole language. *The Elementary School Journal*, 90, 128-141. Stable URL: <http://www.jstor.org/stable/1002025>
- Wickens., C. D., & Hollands, J. G. *Engineering psychology and human performance-Third Edition*. New Jersey: Prentice Hall.
- Winn, B. D., Skinner, C. H., Oliver, R., Hale, A.D., & Ziegler, M. (2006). The effects of listening while reading and repeated reading on the reading fluency of adult learners. *Journal of Adolescent and Adult Literacy*, 50, 196-205.
- Woodcock, R. W., McGrew, K. S., & Mather, N. (2001). *Woodcock-Johnson-III Tests of Achievement*. Itasca, IL: Riverside Publishing.

FLUENCY INTERVENTION AT A RESIDENTIAL TREATMENT CENTER

Zuker, C. (1993). Using whole language with students who have language and learning disabilities, *The Reading Teacher*, 46, 660-670.

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Table 1

Months Students Were Involved in the Study

Cohort One

	6/09	7/09	8/09	9/09	10/09	11/09	12/09	1/10	2/10	3/10	4/10
Eddie	X			X	X	X	X				
1	X			X							
2	X			X							
3	X			X							
Yuri				X	X	X	X	X	X		
4						X	X				
Brooke					X	X	X	X	X	X	X
J						X	X	X	X	X	
Kathy							X	X	X	X	
5								X	X		

Cohort Two

Month	6/10	7/10	8/10	9/10	10/10	11/10	12/10	1/11	2/11	3/11
6	X	X	X							X
Mike						X	X	X	X	X
Dallas						X	X	X	X	X
7							X	X	X	X

Note. Numbers refer to students who did not complete the study.

J refers to a student who completed the study but who did not qualify for the study due to reading at a level above his grade level.

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Table 2

Student Characteristics

<i>Student</i>	<i>Age</i>	<i>Race</i>	<i>Grade Level</i>	<i>Grade Level Materials used</i>	<i>Exceptionality</i>	<i>Diagnoses</i>	<i>Scores on assessments prior to placement</i>	<i>Number of weeks in study</i>	<i>Baseline Sessions</i>	<i>Intervention sessions</i>
Cohort One										
Eddie	11	EA	6	3	SED	ADHD; ODD; Bipolar Disorder-Mixed, Severe with psychotic features; seizure disorder	WISC-IV GAI: 82	13	7	10
Yuri	12	B	7	6	None	Bipolar Disorder; Anxiety Disorder		14	7	17
Brooke	12	AA	7	6	OHI	PTSD; Reactive Attachment Disorder; ADHD	WISC-IV GAI: 93	20	16	5
Kathy	12	B	7	7	None	Conduct Disorder-Childhood Onset	WISC-IV FSIQ:81	9	9	11
Cohort Two										
Mike	11	EA	6	4	OHI	Bipolar, NOS Intermittent Explosive Disorder; ADHD	WISC-IV FSIQ: 80	14	16	7
Dallas	13	AA	6	6	SLD/OHI	ODD, PTSD	WISC-IV FSIQ: 82	14	9	7

AA: African-American; B: Biracial; EA: European-American; ADHD: Attention-Deficit Hyperactivity Disorder; OHI: Other Health Impaired; NOS: Not otherwise Specified ; ODD: Oppositional Defiant Disorder; PTSD: Post-Traumatic Stress Disorder; SED: Severely Emotionally Disabled; SLD: Specific Learning Disabled; FSIQ: Full Scale Intelligence Quotient; GAI: Global Ability Index; WISC-IV: Wechsler Intelligence Scale for Children-Fourth Edition

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Table 3

Instrumentation and Variables

Instrument	Variables	When used in study
Gray Oral Reading Tests-4 (GORT-4)	Rate scaled score Accuracy scaled score Fluency scaled score Comprehension scaled score Oral Reading Quotient standard score	Form A: Pretest, Form B: Posttest
Test Of Word Reading Efficiency (TOWRE)	Sight word efficiency standard score Phonemic Decoding efficiency standard score Total Word Reading Efficiency standard score	Form A:Pretest, Form B: Posttest
Woodcock-Johnson Tests of Achievement-Third Edition (WJ-A-III)	Letter-Word Identification Reading Fluency Passage Comprehension	Form A: Pretest, Form B: Posttest
AIMSweb Benchmark passages	ORF Benchmark Passages Maze Benchmark Passages	Determination of grade level curriculum for study Pretest-Posttest Baseline & Intervention
AIMSweb Progress Monitoring Passages	ORF-Immediate: WCPM & WIPM ORF-Retention: WCPM Maze RC & RIC	Intervention Baseline & Intervention; measure of retention

ORF: oral reading fluency; RC: responses correct; RIC: responses incorrect ;WCPM: words correct per minute; WIPM: words incorrect per minute;.

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Table 4

Gains from Baseline to Intervention

Student	Grade level materials	Weeks in study	ORF-Immediate Baseline Mean (SD)	ORF-Immediate Intervention Mean (SD)	Difference Gain Score	Target Score	ORF-Retention Mean (SD)	Maze Baseline Mean (SD)	Maze Intervention Mean (SD)
Eddie	3	29	45.6 (9.6)	78.4 (12.3)	32.8	48.8	80.0 (7.6)	6.8 (2.7)	10.6 (2.2)
Yuri	6	24	132.9 (25.5)	157.0 (28.2)	24.1	33.8	165.3 (29.7)	26.1(8.2)	30.0 (9.3)
Brooke	5/6	25	108.9 (16.7)	156.3 (16.2)	47.4 ^a	34.8	163.0 (16.5)	missing data	missing data
Kathy	7	14	124.3 (22.9)	161.3(21.1)	37.0 ^a	23.8	181.1 (18.8)	29.5 (3.6)	42.1 (7.8)
Mike	4	15	71.5 (18.2)	122.5 (14.9)	51.0 ^a	24.8	117.4 (12.5)	15.6 (4.4)	23.1 (4.6)
Dallas	6	18	161.3 (10.9)	212.9 (18.2)	51.6 ^a	27.8	201.3 (20.4)	28.2 (5.2)	32.6 (8.8)

^a Difference from Baseline to Intervention is greater than the target score.

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Table 5
Comparison of Error Rates and Percent of Nonoverlapping Data

ORF-Immediate				
Student	Baseline Error Mean	Difference Goal (50% reduction)	Intervention Error Mean	PAND *
Eddie	1.36	0.68	1.00	91.67
Yuri	3.46	1.73	1.94	73.06
Brooke	1.70	0.85	0.25 ^a	95.45
Kathy	2.20	1.10	0.36 ^a	90.48
Mike	2.34	1.17	0.80 ^a	87.60
Dallas	2.67	1.33	1.89	100.00
*Phi: 0.74 (CI: 0.58-0.85, $p < .0001$) ^a Error rate decreased more than 50%				
Maze				
Student	Baseline Error Mean	Difference Goal (50% reduction)	Intervention Error Mean	PAND*
Eddie	2.68	1.34	1.00 ^a	90.91
Yuri	0.88	0.44	0.07 ^a	72.73
Kathy	2.80	1.40	1.80	85.00
Mike	1.25	0.62	0.63 ^a	75.00
Dallas	1.50	0.75	0.29 ^a	69.20

*Phi: 0.75 (CI: 0.59-0.85, $p < .0001$)^a Error rate decreased more than 50%.

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Table 6

Standardized Test Scores

Student	GORT-4 Rate **		GORT-4 Accuracy		GORT-4 Fluency		GORT-4 Comprehension		Oral Reading Quotient		TOWRE Sight Word Efficiency		TOWRE Phonemic Awareness Efficiency		TOWRE Total Word Reading Efficiency		WJ-III Letter-Word		WJ-III Reading Fluency		WJ-III Passage Comprehension		
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post	
Eddie	3	4	2	5 ^a	1	2	6	8 ^a	61	70 ^a	71	70	80	69	71	63	75	75	88	78	73	73	
Yuri	10	11	10	11	10	11	10	11	97	111 ^a	95	94	96	103	95	98	109	112	93	107 ^a	104	95	
Brooke	7	8	9	9	8	8	11	11	97	97	85	93 ^a	77	84	77	87 ^a							
Kathy	8	9	9	9	8	9	11	7	97	88	101	98	102	102	101	100	90	86	96	108 ^a	90	82	
Mike	5	6	8	7	8	6	10	10	94	88	84	86	84	78	81	78	77	84 ^a	77	82	89	95	
Dallas	7	9 ^a	6	8 ^a	5	8 ^a	6	9 ^a	73	91 ^a	96	100 ^a	103	108 ^a	99	105 ^a	86	85	86	95 ^a	80	78	

^a Score change is greater than published SEM at 95% level for test (GORT-4: ±1.65 for Rate, Accuracy, Fluency and Comprehension; ± 5 for ORQ;

TOWRE: ± 5-8 [dependent on age] Sight Word *Phonemic Awareness Efficiency & ± 5 Total Word Reading Efficiency; WJ-III: Letter-Word: ± 6.29;

Reading Fluency: ± 7.9; & Passage Comprehension: ± 8.45) ** Wilcoxon Signed Ranks Test z=4.776, p<.001

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Table 7

ORF Benchmark Pretest to Posttest change

Student	Grade Level Materials	Weeks in Study	Intervention Grade Level				One Grade Level Above			
			Pretest Median	Posttest Median	Expected Change	Actual Change	Pretest Median	Posttest Median	Expected Change	Actual Change
Eddie	3	29	36	57	26	21	41	49	26	8
Yuri	6	24	108	122	17	14	118	124	17	6
Brooke	5/6	25	95	131	20	36**	96	119	20	23**
Mike	4	15	83	99	12	16**	67	88	12	21**
Dallas	6	18	158 ^a	167	14	9	143	167	14	24**
Kathy ^b										

^a Actual Student Grade Level ^b Did not complete benchmark posttest.

** Change greater than the published Rate of Improvement

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Table 8

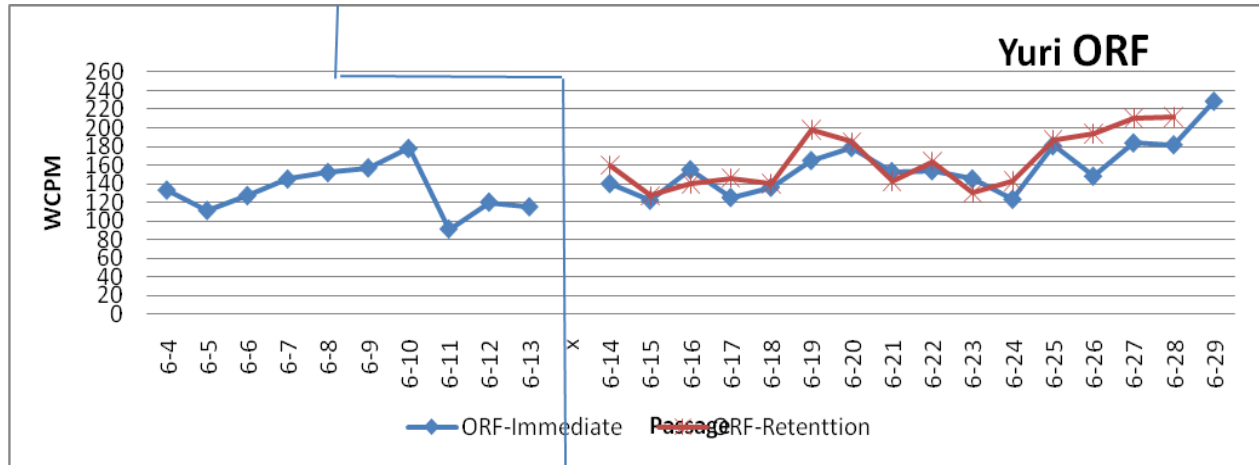
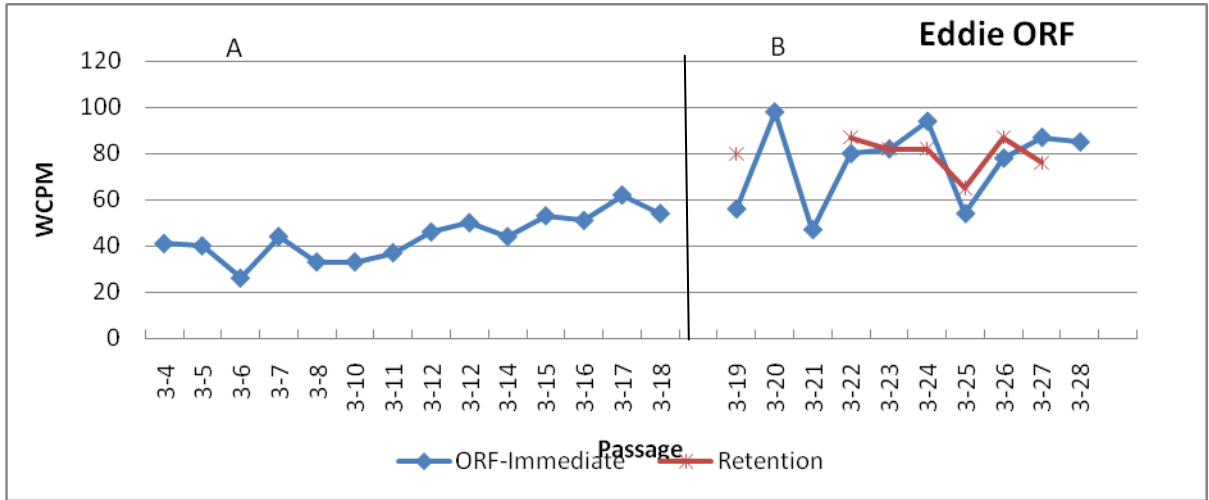
Maze Pretest to Posttest Changes

Student	Intervention Grade Level						One Grade Level Above			
	Grade Level Materials	Weeks in Study	Pretest median	Posttest Median	Expected change	Actual Change	Pretest median	Posttest median	Expected change	Actual Change
Eddie	3	29	2	20	6	18**	6	8	6	2
Yuri	6	24	17	37	5	20**	15 ^a	26	5	11**
Brooke	5/6	25	19	30	5	11**	21	25	5	4
Mike	4	15	15	19	3	4**	10	19	3	8 **
Dallas Kathy ^b	6	18	12a	27	2	7**	14	26	2	12 **

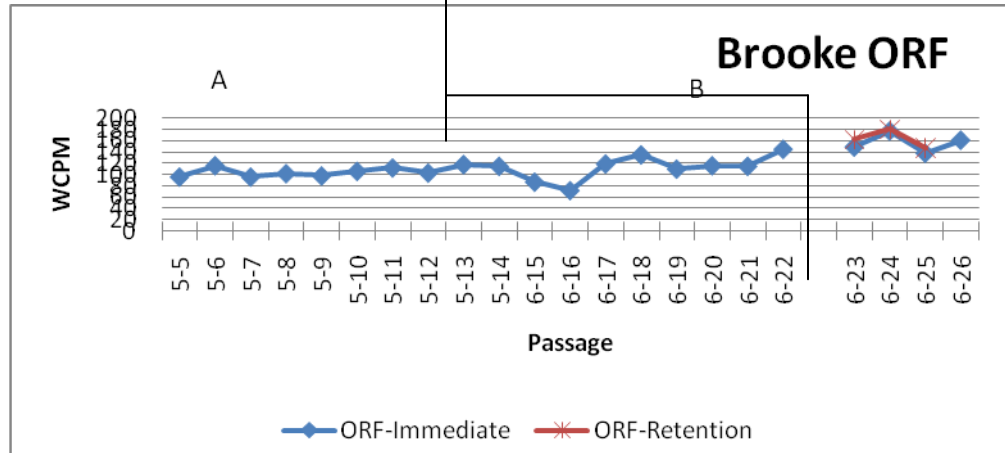
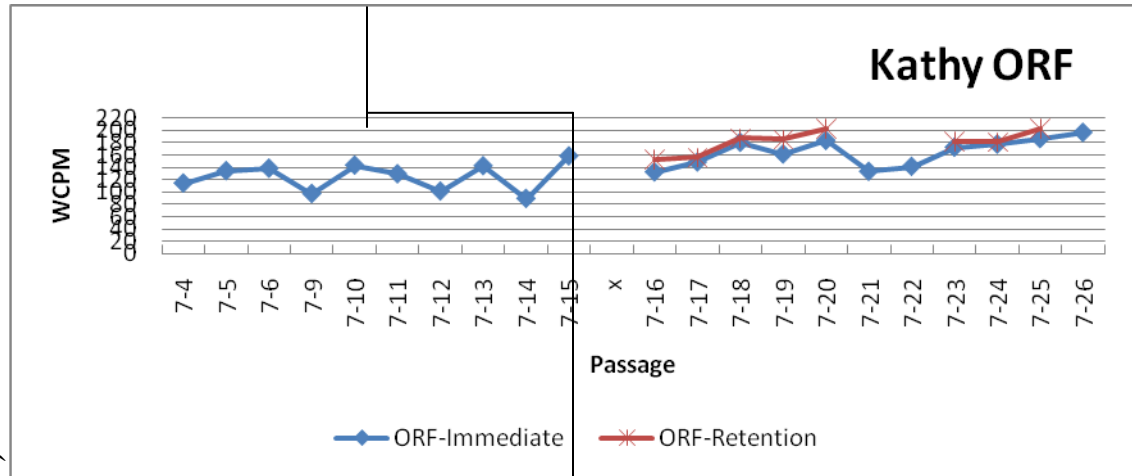
^aActual Student Grade Level ^b Did not complete posttest ** Change greater than the published Rate of Improvement

Figure 1: Oral Reading Fluency

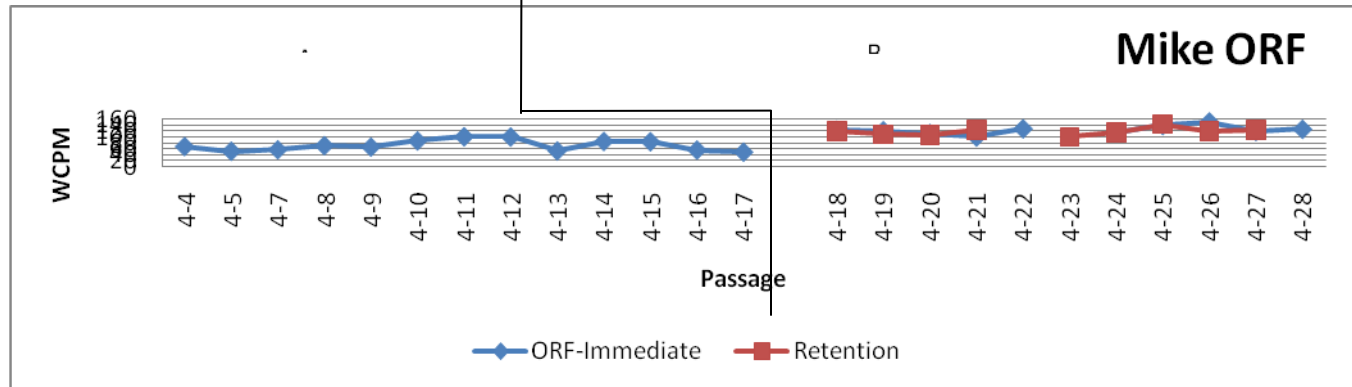
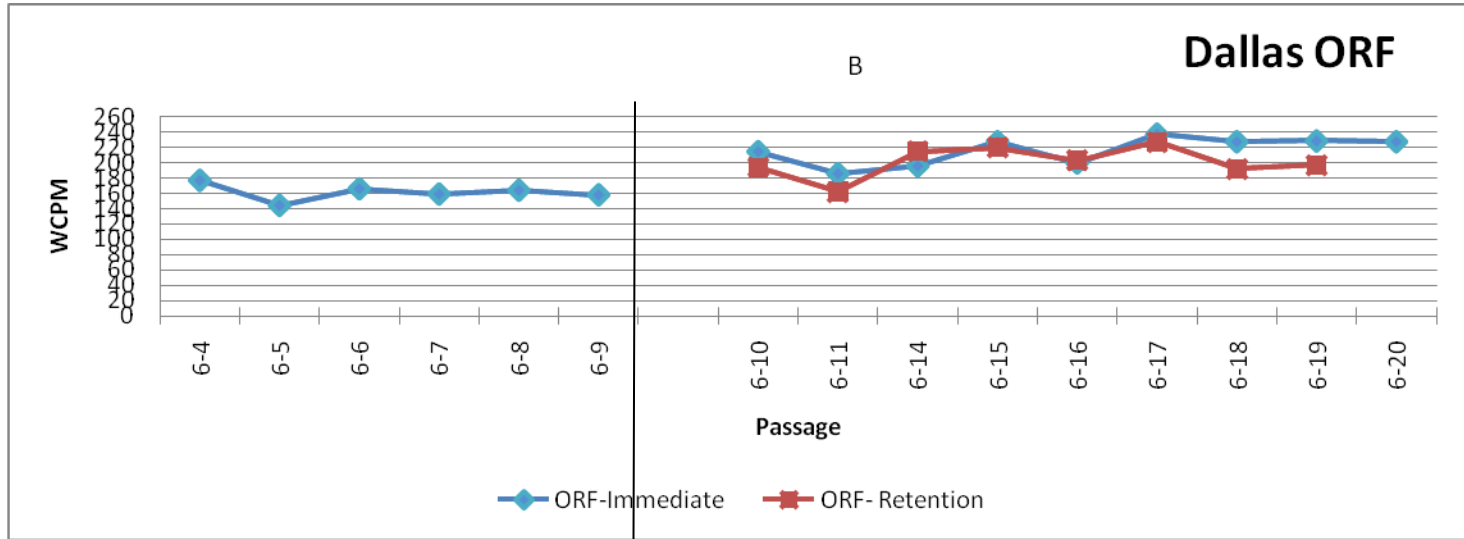
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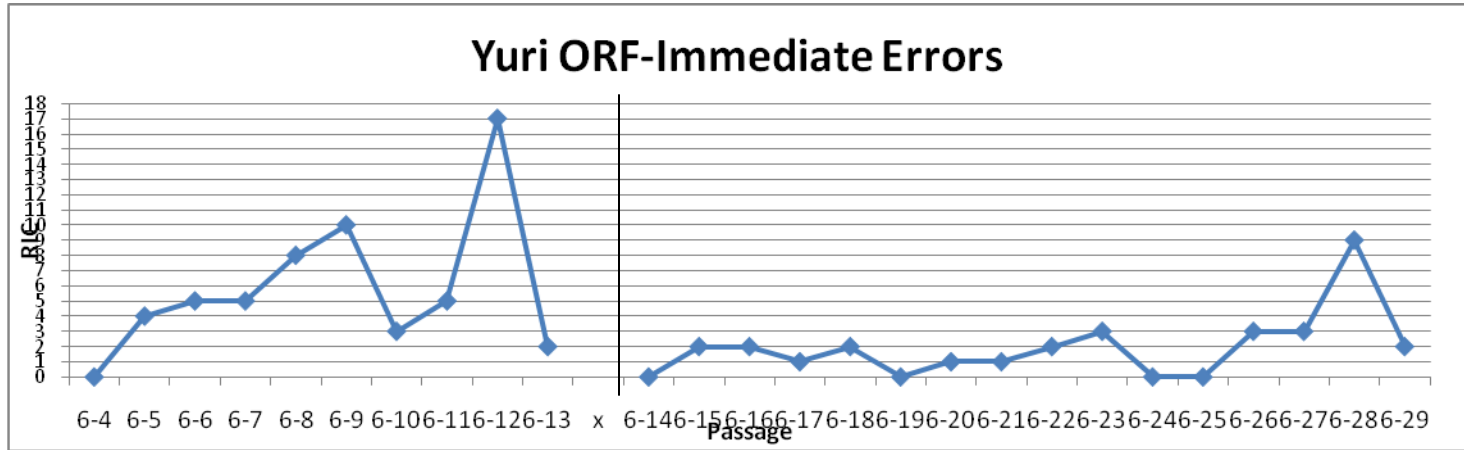
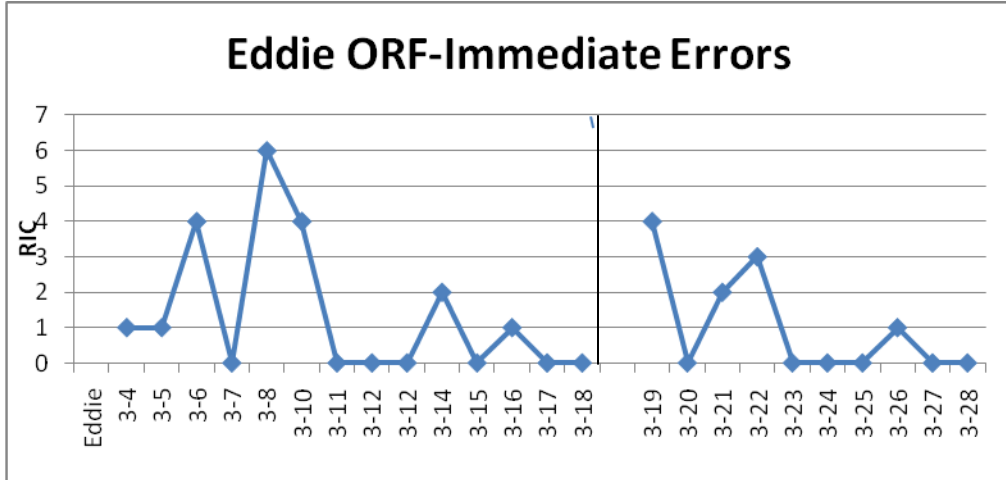
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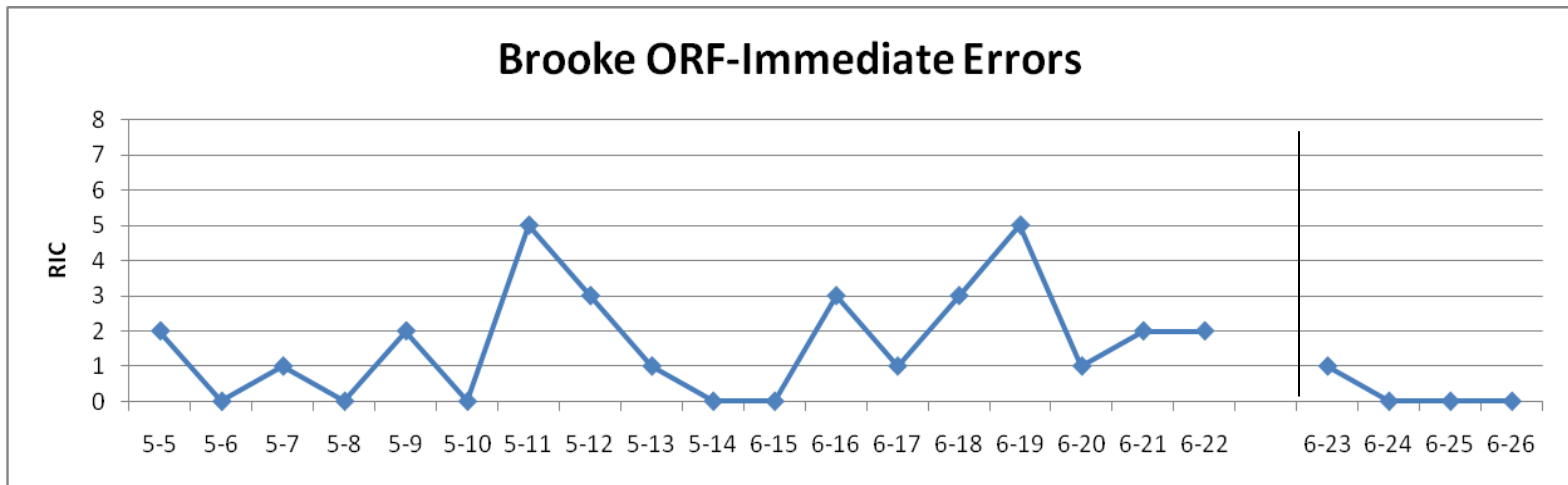
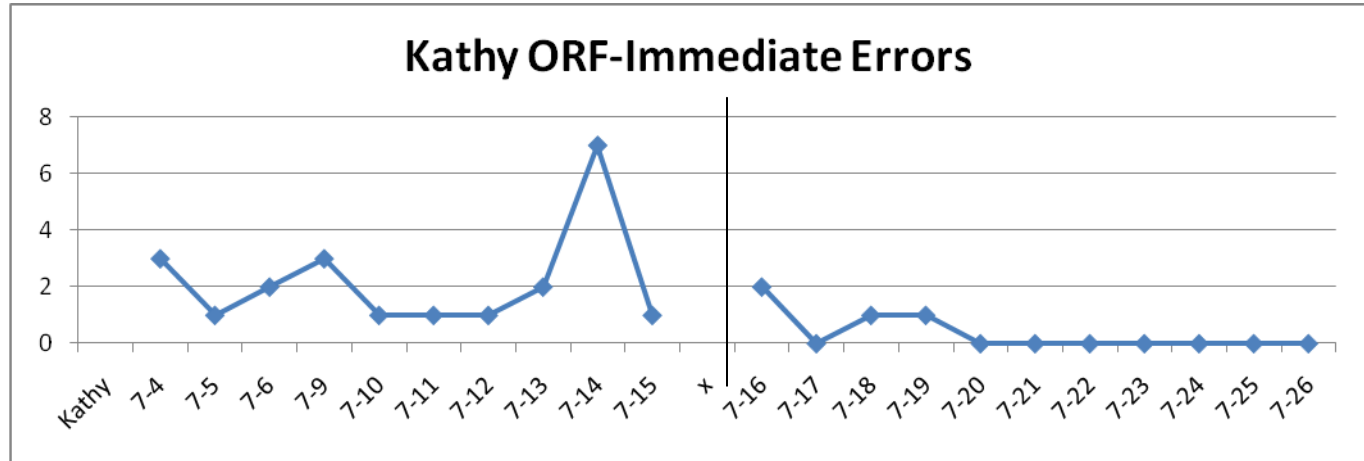
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Figure 2 Oral Reading Fluency Errors

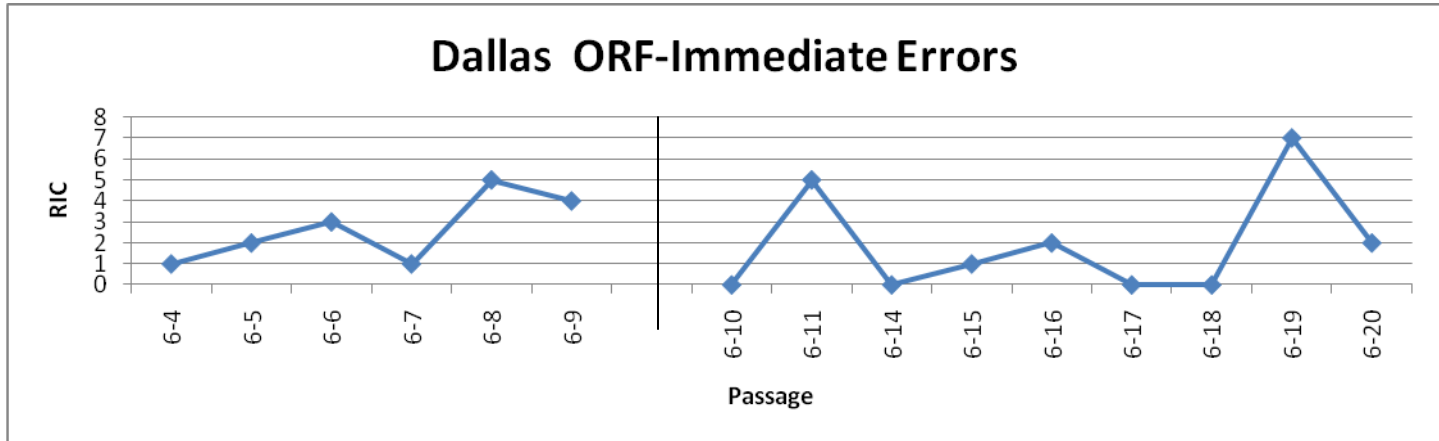
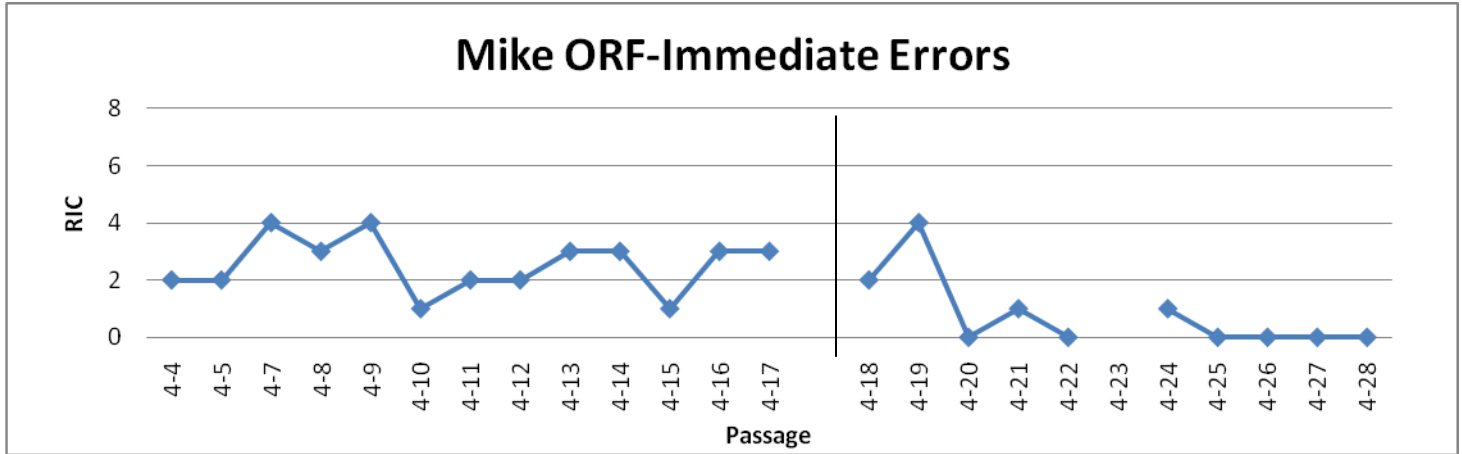
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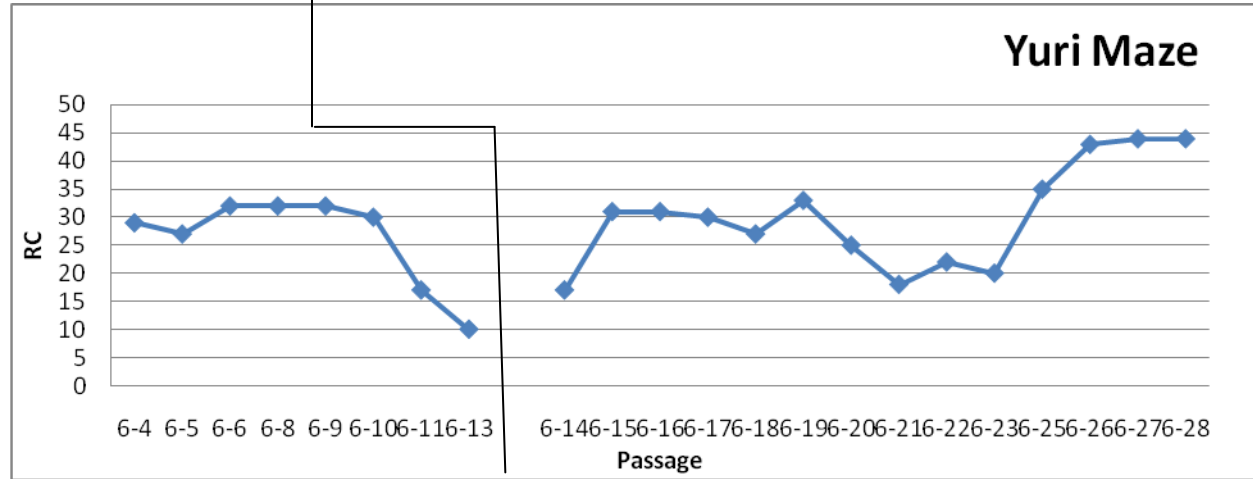
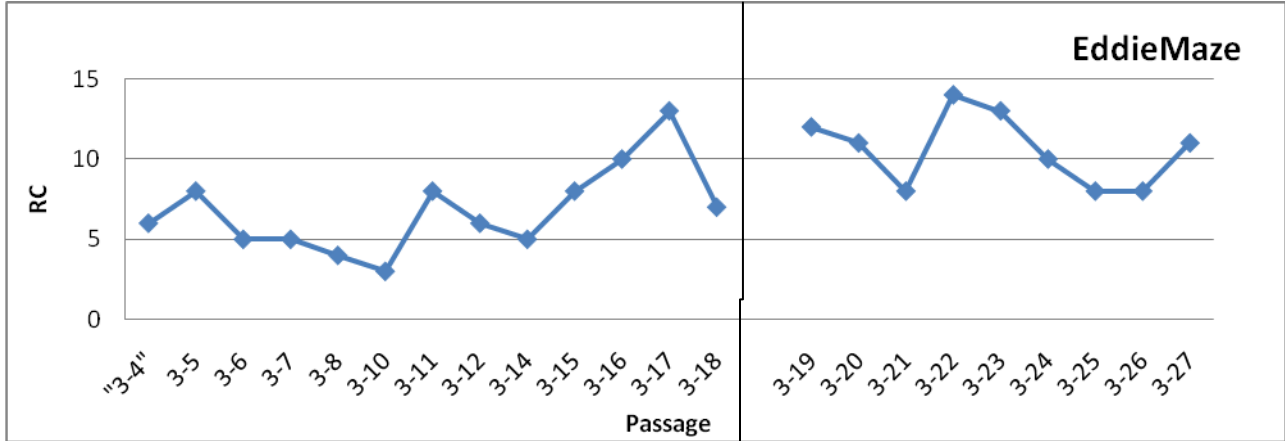
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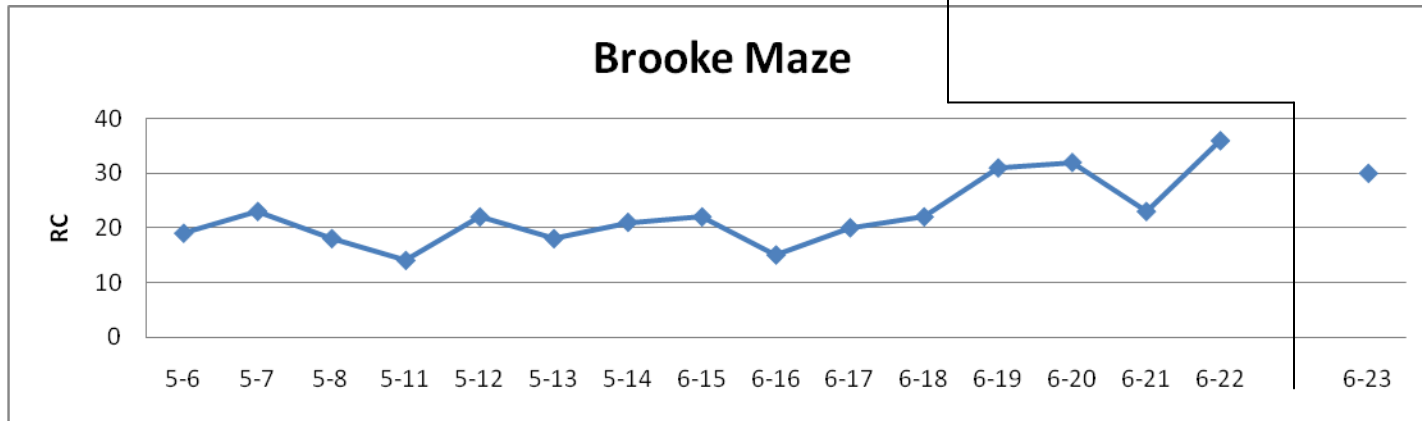
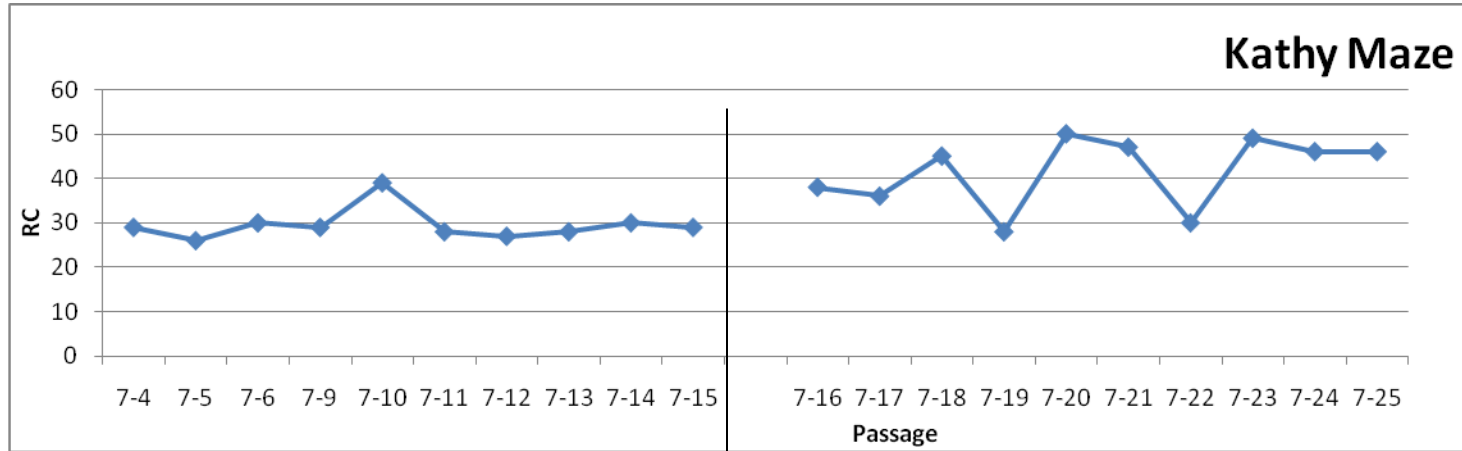
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Figure 3 Mazes Responses Correct

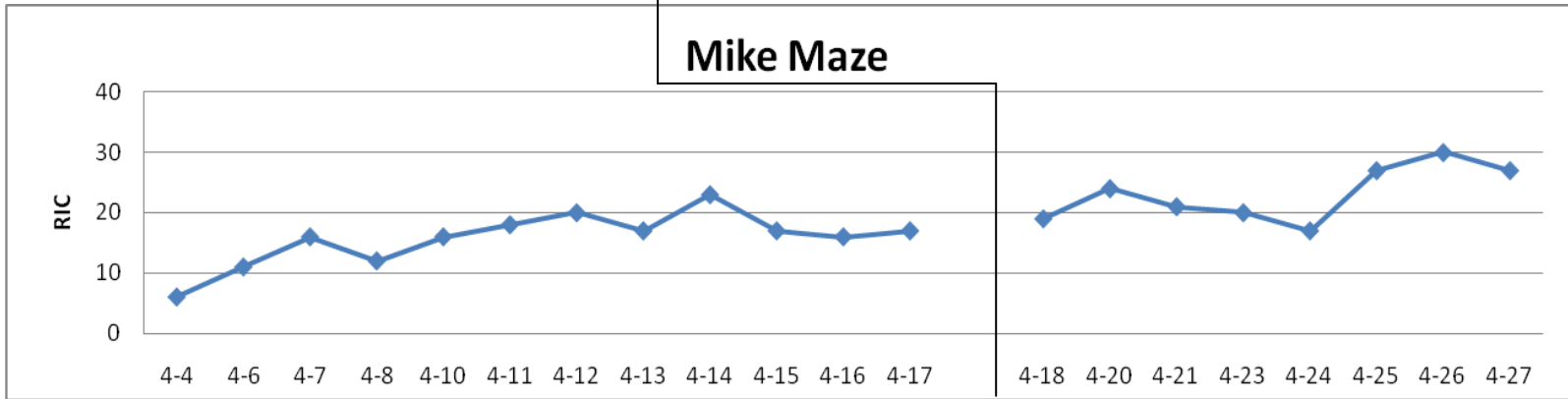
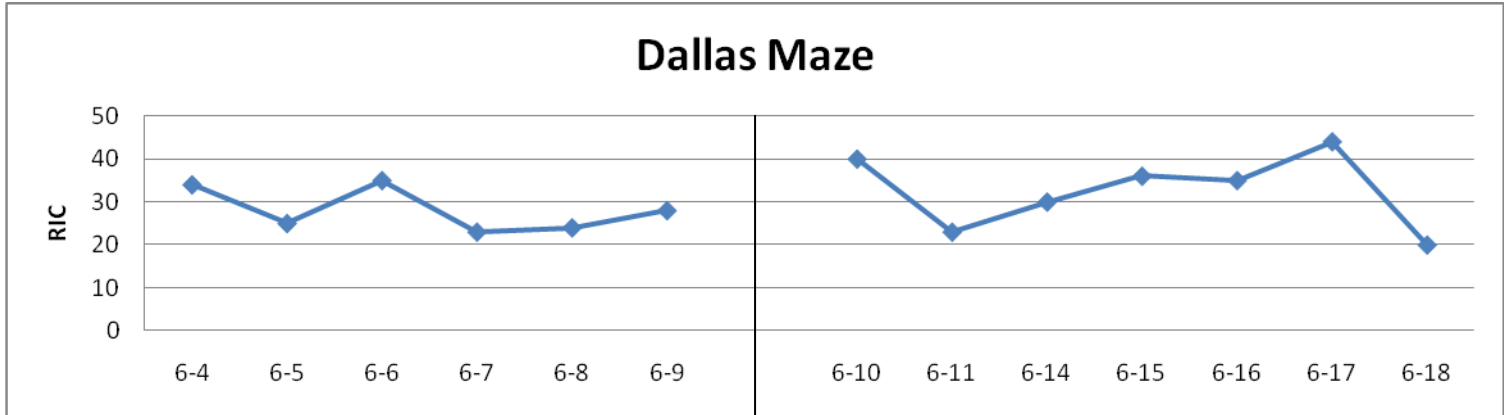
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APPENDICES

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Appendix A

Pretest, Posttest & Determination of level of study materials

1. Administration of the GORT-4, TOWRE and WJ-A-III Reading subtests.
2. Administer the three, fourth-grade benchmark assessments of the AIMSweb®.
 - a. If the median WPM on the fourth grade benchmarks is > 57 WPM administer fifth grade AIMSweb® benchmark passages. (Go to step 3)
 - b. If the fourth grade median benchmark score is < 57 , administer third grade benchmark passages.
 - i. If the median WPM for the third grade passages is greater than 35 but less than 55, the third grade passages will be used for the study.
Administer the second grade benchmark passages.
 - ii. If the median WPM on the third grade passages is < 35 , the student is not reading well enough to be a part of the study.
3. Administer the three, fifth grade benchmark assessments of the AIMSweb®.
 - a. If the median benchmark passage score is > 91 , Go to 4
 - b. If the median benchmark passage score is < 91 , the 4th grade passages will be used. Administer the third grade benchmark passages.
4. Administer the three, sixth grade benchmark assessments of the AIMSweb®.
 - a. If the median benchmark passage score is > 111 Go to step 5

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- b. If the median benchmark score is <111 the fifth grade passages will be used for the study.
5. Administer the seventh grade benchmark passages.
 - a. If the median benchmark passage score is < 112 , the sixth grade passages will be used.
 - b. If the median benchmark passage score is >112 , the seventh grade passages will be used.

Post-test

1. Administer the GORT-4, TOWRE and WJ-III Reading subtests.
2. Administer the benchmark passages
 - a. If the student's study materials were 3rd grade, administer the 2nd, 3rd and 4th grade benchmark passages. Obtain median for both passages and maze.
 - b. If the student's study materials were the 4th grade, administer the 3rd, 4th and 5th grade benchmark passages. Obtain the median for passages and maze.
 - c. If the student's study materials were the 5th grade, administer the 4th, 5th and 6th grade benchmark passages. Obtain the median for passages and maze.
 - d. If the student's materials were the 6th grade, administer the 5th, 6th and 7th grade benchmark passages. Obtain the median for passages and maze.

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- e. If the student's materials were the 7th grade, administer the 6th and 7th grade benchmark passages. Obtain the median for passages and maze.

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Appendix B

Baseline

1. Frequency: Three times a week.
2. The primary investigator presents the grade level passage
 - a. Greeting script
 - b. Follow the reading passage protocol
 - i. Reading Passage Script
 - ii. Document the WPM for the first minute
 - iii. Document the length of time it took for the student to read the entire passage.
 - c. Maze Technique/Retention Assessment
 - i. Maze Script
 - ii. Document the number of maze words answered correctly in three minutes.
 - d. Thank the student for his or her participation.

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Appendix C

Intervention

1. Frequency: Three times a week
2. Greeting Script
3. Retention Assessment.
 - a. Provide the student with the passage he read during the last session
 - b. Follow the reading passage protocol
 - i. Reading Passage Script
 - ii. Document the WPM for the first minute
 - iii. Document the length of time it took for the student to read the entire passage.
 - c. Comprehension Question Protocol
 - i. Maze technique script.
 - ii. Document the number of maze questions answered correctly.
4. Listening while reading
 - a. Present the student with the student copy of the passage to be read.
 - b. Place the examiner copy in front of the investigator.
 - c. Script: **“Now I am going to read today’s passage to you. Please follow along with your finger, reading the words to yourself as I say them.”**

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- d. Read the passage at a rate of @ 100 WPM with good expression. Make sure the student is following along with his/her finger and prompt the student to do this (as necessary)
5. Repeated reading
 - a. Repeated Reading Script: **“I would like you to read out loud the passage I just read.. When I say ‘start’, start reading aloud at the top of the page and read across the page. Try to read each word. If you come to a word you don’t know, I’ll tell it to you. Do you have any questions? Be sure to read this passage as quickly as you can while still paying attention to what it is about.”**
 - b. Say **“Great** (good, excellent or something encouraging). (2nd reading)**Now read the passage again,** (third reading) **one more time.**
 - c. Investigator highlights all words that the student hesitates on, omits, provides a substitution for, or mispronounces while the student reads the passage the third time.
 6. Phrase drill
 - a. Phrase drill script: **“Now we are going to practice the words you had trouble reading.”**

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- a. Investigator reads reward script.
- b. Student chooses reward.
 - i. Chooses a small reward
 1. investigator provides student with bag of small rewards for the choice.
 - ii. Chooses to bank reward
 1. investigator punches a hole in the student's reward card. Once the student receives 10 holes, he/she can choose a larger reward.

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Appendix D

IMPLEMENTATION/ FIDELITY CHECKLISTS
(check all answers that would be “yes”)

Baseline

- Did the investigator give the speed and accuracy cue?
- Did the investigator start the stopwatch immediately when the student started to read?
- Did the investigator correctly record the number of words read after one minute?
- Did the investigator give any cues other than “go on” or stating the word if the student paused for more than 3 seconds during the reading during baseline?
- Did the investigator remove the reading passage before giving the questions to the student?
- Did the investigator count the number of right answers correctly?

Intervention

Comprehension Generalization

- Did the investigator give the speed and accuracy cue for the comprehension generalization task?
- Did the investigator start the stopwatch immediately when the student started to read?

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_Did the investigator correctly record the number of words read after one minute?

End of passage?

Did the investigator remove the reading passage before giving the comprehension questions to the student?

Did the investigator provide a cue when the student mispronounced or stumbled on a word?

Listening While Reading

Did the investigator read the Listening cue?

Did the investigator read the passage at a moderate rate (@100 WPM)?

Repeated Reading

Did the investigator read the repeated reading cue?

Did the investigator accurately identify all words/phrases that the student had difficulties with?

Phrase Drill

Did the investigator read the phrase drill cue?

Did the investigator provide a phrase drill for all applicable phrases?

Timed Reading

Did the investigator give the speed and accuracy cue for the comprehension generalization task?

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Did the investigator start the stopwatch immediately when the student started to read?

Did the investigator correctly record the number of words read after one minute?
End of passage? _____

Reward

Did the investigator read the reward prompt?

Did the investigator give the student the reward chosen?

Weekly Comprehension Monitoring

Did the investigator give the speed and accuracy cue?

Did the investigator give the student the a copy of the Level 5 passage?

Did the investigator start the stopwatch immediately when the student started to read?

Did the investigator correctly record the number of words read after one minute?

Did the investigator give cue the student when he/she faltered or did not read for >3 seconds?

Did the investigator remove the reading passage before giving the questions to the student?

Did the investigator count the number of right answers correctly?

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Appendix E

Scripted Protocols

#1: Greetings

1. Escort the student to the reading office.
2. Have the student sit down.
3. Say to the student **“Good morning. How are you doing today? Today we are going to (say applicable tasks) (a) Read a passage out loud; (b) answer comprehension questions; (c) read a passage several times in order to improve your reading speed; (d) listen to me read a passage; (e) practice reading phrases that you have difficulties reading; (f) time your reading speed; (g) do a computer task.**

#2: Directions to administer before student reads a story (baseline & weekly during intervention)

1. Place the examiner copy in front of the investigator and shield it so that the student can not see what you record.
2. Present the student with a copy of the reading passage.
3. Say to the student **“ Here is a passage that I would like you to read. When I say ‘start’, start reading aloud at the top of the page and read across the page. Try to read each word. If you come to a word you don’t know, I’ll tell it to you. Do you have any questions. Be sure to read this passage as quickly as you can while still paying attention to what it is about.”**
4. Say **“Start”** and start the stopwatch when the student says the first word.
5. If the student hesitates on a word for more than 3 seconds, say the word.
6. At the end of one minute, place a closed bracket after the last word.
7. Remove both copies of the reading passage.
- 8.

#3 Directions to administer comprehension questions.

1. Remove the copy of the passage from the student.
2. Say **“Now I am going to give you the comprehension questions for this passage. Please read all of the questions and all of the possible answers and circle the number of the answer that you think is right. When you are done, please give me the sheet.”**
3. Place the comprehension questions in front of the student.
4. Wait for the student to complete the comprehension questions.
5. Remove the copy of the comprehension questions.

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#4: Directions to model fluent reading

1. Present the student with a copy of the passage to be read.
2. Place the examiner copy in front of the investigator.
3. Say **“Now I am going to read today’s passage to you. Please follow along with your finger, reading the words to yourself as I say them.”**
4. Read the passage at a rate of @ 100 WPM with good expression. Make sure the student is following along with his/her finger and prompt the student to do this (as necessary).

#5 Directions for repeated reading.

1. Say to the student **“ Here is a passage that I would like you to read. When I say ‘start’, start reading aloud at the top of the page and read across the page. Try to read each word. If you come to a word you don’t know, I’ll tell it to you. Do you have any questions. Be sure to read this passage as quickly as you can while still paying attention to what it is about.”**
2. Say **“Great** (good, excellent or something encouraging). (2nd reading)**Now read the passage again, (third reading) one more time.**

#6: Directions for administering phrase drill.

1. Say to the student **“Now we are going to practice the words you had trouble reading.”**
2. Point to the first error word, say the word, and then read the 2-5 words phrase containing the error word. Say **“Please repeat what I just said, and point to the words as you read it”, “Say the phrase again”, “One more time”.**
3. Repeat this procedure for all error words (unique) in the passage.
4. Praise the student periodically.

#7 Directions for Reading to criterion

“Now I want you to read this passage again as quickly as you can while still paying attention to what it is about. Start when I say ‘start’

Appendix F

Justification for PAND

There has been significant controversy over recommendations for analysis of multiple baseline studies. The controversy can be bifurcated between proponents of the use of regression-based models and nonregression based models (e.g., percent of overlapping data (PND); percent of zero data (PZD) and mean baseline reduction (MBLR) (Campbell, 2004). Of all models, the PND is reported to be used the most. According to Campbell (2004), the supporters of the nonregression models report that their methods are “superior” because they (a) agree with visual inspection; (b) have intuitive appeal; (c) demonstrate reduced bias when small numbers of observations exist; and (d) are easier to calculate. The regression-based model supporters argue that regression methods are superior because (a) trend can be modeled prior to evaluating treatment efficacy; (b) non-regression models are overly sensitive to outliers; (c) changes in both slope and intercept can be modeled with regression techniques and thus there is greater sensitivity to detect treatment effects and (d) the regression model yields effect sizes. Implicit in the arguments are the weaknesses of both types of data analysis. The weaknesses of the PND and regression models were presented by Parker et al., (2007) as: (a) the PND is neither an effect size, nor is it related to any accepted effect size; (b) has unknown reliability and lacks a known sampling distribution, p-values or confidence intervals; and (c) ignores all baseline data except for one, extreme, data point which is most likely the most unreliable; (d) is insensitive at the upper end of the scale; and

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(e) does not take into account baseline trend. Critique of the regression models were (a) lack of normality, equal variance, and serial independence present in single subject designs; (b) regression analyses can be unduly influenced by extreme outliers; and (c) expertise is required to conduct and interpret regression analysis and to judge whether data assumptions have been met (Parker, Hagan-Burke, & Vannest, 2007). Another critique posed by Scruggs & Mastropieri (1994) is that there often are not enough data points in the baseline to create a reliable estimation of the pre-intervention trend.

In a comparison of three nonregression techniques (PND, MBLR, & PZD) and a regression model, Campbell (2004) found that the Cohen *d* effect size overestimated the effects of treatment, and was less sensitive in detecting the presence of moderating variables. His overall conclusion was that the regression based effect size provided no advantage, and produced results that were difficult to interpret intuitively and recommended the use of the PND or PZD.

The PND is the percentage of phase B (intervention) data that are more extreme in an improvement direction than the single most-extreme phase A (baseline) data. Scruggs and Mastropieri (1994) posited general interpretive guidelines for the PND. These guidelines were: PND > 70; effective intervention; 50 > PND > 70; questionable and PND < 50; no observed effect. Due to the aforementioned weaknesses of the PND, an alternative, the PAND technique, was developed by Parker, Hagen-Burke and Vannest (2007).

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Parker, Hagen-Burke and Vannest (2007) developed the PAND technique in order to address the weaknesses they perceived with the regression and nonregression (Percent of nonoverlapping data (PND), percent of zero data (PZD) and mean baseline reduction (MBLR)) models (Campbell, 2004).

PAND is defined as “the percentage of all non-overlapping data”. Parker et al., (2007) stress that the PAND is superior to the PND because (a) all data from both phases are included, so there is not an overemphasis on one, possibly unreliable, data point, and (b) can be translated into Pearson’s *Phi* and *Phi*² which are both effect sizes and have associated p-values, power estimates, and confidence intervals.

The requirements for PAND are the same as those for chi-square tests with frequency data. There needs to be at least 20 data points. There are no expectations of normality or independence, and serial independence and lack of autocorrelation have little impact because the tabled frequency data are unordered. Parker et al., (2007) report that the PAND does not remedy two of the limitations of the PND. There is still insensitivity at the upper end of the scale, and it measures a simple mean level shift and does not control for baseline trend.