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ACCEPTANCE

This dissertation, THE EFFECT OF REPEATED READING WITH AUDIO-RECORDED MODELING ON THE READING FLUENCY AND READING COMPREHENSION OF ADOLESCENTS WITH EBD OR OHI AND BEHAVIORAL DIFFICULTIES, by KATHERINE STOKES COTT, was prepared under the direction of the candidate's Dissertation Advisory Committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree, Doctor of Philosophy, in the College of Education and Human Development, Georgia State University.

The Dissertation Advisory Committee and the student's Department Chairperson, as representatives of the faculty, certify that this dissertation has met all standards of excellence and scholarship as determined by the faculty.

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Nomvete, P. T., & Waller, K. S., Houchins, D., & Jolivet, K. (2009, October). *The effects of procedural facilitators on story elements for students with emotional and behavior disorders in a residential setting*. TECBD Conference, Tempe, Arizona.

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Waller, K. S. & Hall, T. (2007, October). *Strategies for teaching youth to participate in transition planning*. Georgia Department of Juvenile Justice: A Prescription for Successful Teaching, Macon, Georgia.

THE EFFECT OF REPEATED READING WITH AUDIO-RECORDED MODELING ON THE
READING FLUENCY AND READING COMPREHENSION OF ADOLESCENTS
WITH BEHAVIORAL DIFFICULTIES AND EBD OR OHI

by

Katherine Stokes Cott

Under the Direction of Dr. David E. Houchins

ABSTRACT

Adolescents with behavioral difficulties and emotional and behavior disorders (EBD) or other health impairment (OHI) have demonstrated deficits in reading, and these deficits appear to remain stable or worsen over time. Reading fluency is an essential skill for overall reading achievement, yet relatively few studies have addressed reading fluency intervention for adolescents, particularly adolescents with behavioral difficulties. This study used a multiple baseline across participants design to evaluate the effect of a repeated reading intervention on the reading fluency and comprehension skills of middle school students with reading difficulties and behavioral difficulties and EBD or OHI. The intervention involved repeated reading combined with an audio-recorded model and cues to read for comprehension. Working independently at a classroom computer, participants received six to nine minutes of daily supplemental fluency instruction over a four-week period. Instruction involved listening to an audio recording of a model reading a passage, receiving cues to read for understanding, reading the passage aloud while using the computer to record the reading, listening to the recording, and reading the passage aloud again while recording. Results indicated no functional relation between the intervention and the number of words correct per minute or the percentage of comprehension questions answered correctly. However, on-task behavior did improve during study session when compared with on-task behavior during regular classroom instruction. The findings of the study

have implications for addressing the needs of adolescents with behavioral difficulties who have reading difficulties.

INDEX WORDS: Reading fluency, Reading comprehension, Emotional behavioral disorders, Other health impairment, Audio recording, Modeling

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FLUENCY AND READING COMPREHENSION OF ADOLESCENTS
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Katherine Stokes Cott

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DEDICATION

To my family, who made my dissertation and doctoral program possible. To the memory of my father, who taught me to work hard and solve problems through perseverance and creativity. To my mother, who taught me to use my imagination and to pursue my dreams. To my daughters, Sarah and Emily, who, inspired me to keep moving forward through difficult times. Just children when I began my doctoral program, I am so proud of the strong, intelligent women they have become. To Chelsea and Brittany, who kindly shared their dad as we blended a new family. And to my husband, David, whose love, support, and encouragement have been unwavering through it all. To all my family, I am forever grateful.

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1 READING FLUENCY INTERVENTIONS FOR ADOLESCENT STRUGGLING READERS

Ultimately, the goal of reading is to comprehend, or gain meaning from text. LaBerge and Samuels (1974) determined that reading fluency, the ability to read quickly and accurately, is a necessary skill for reading comprehension because automaticity in decoding allows the reader's attention to focus on deriving meaning from text rather than decoding. Numerous researchers have reported a statistically and practically significant correlation between reading fluency and comprehension for elementary-aged (Buck & Torgeson, 2003; Roberts, Good, & Corcoran, 2005; Roehrig, Petscher, Nettles, Hudson, & Torgeson, 2008) and secondary students (Denton, et al., 2011; Kerashaw & Schatschneider, 2012; Rasinski et al., 2005; Rasinski, Rikli, & Johnston, 2009).

Rasinski et al. (2005) examined the reading fluency, decoding, and comprehension skills of ninth grade students ($N = 303$) who attended a high school in the Midwestern United States. The school had a history of low performance on the state high school graduation test. Participants were selected from the general student population, and no disability information was provided. The researchers assessed participants' reading fluency skills using one-minute oral readings of ninth grade level passages from the *Secondary and College Reading Inventory* (Johns, 1990). Researchers compared the percentage and number of words read correctly with participants' scores on the state high school graduation test. Results indicated a significant and moderate correlation between reading fluency and comprehension ($r = .530$). The researchers noted that, although the participants were able to correctly decode a mean of 97.4% of words, the mean number of words correct per minute was 136.4 for the sample, which is below the 25th

percentile norm for eight grade students. The researchers concluded that, at the high school level, improvements in reading fluency may lead to improvements in reading comprehension and that future research should include studies of fluency interventions that include measures of reading comprehension for middle and high school students.

Rasinski, Rikli, and Johnston (2009) examined the effect of oral reading fluency on silent reading comprehension for students in third, fifth and seventh grades. Reading fluency was assessed using a prosody scoring rubric, the Multidimensional Fluency Scoring Guide (MFSG; Rasinski, 2004; Zutnell & Rasinski, 1991). Results indicated that fluency, as measured by prosody, was strongly and significantly correlated with silent reading comprehension scores on the SAT-9 at third ($r = .634$) fifth ($r = .657$) and seventh ($r = .571$) grade. The researchers concluded that reading fluency continues to play an important role in reading comprehension as students progress from elementary to middle school and that additional studies are needed to determine the effect of reading fluency interventions on the reading comprehension skills of older elementary and middle school students.

Fluency Interventions for Struggling Readers

There is a strong base of reading fluency intervention research for school-aged students with disabilities and reading difficulties (Chard, Vaughn, & Tyler, 2002; Morgan & Sideridis, 2006). However, most of this research has targeted elementary-aged students in kindergarten through fifth grade. One of the most frequently used fluency interventions in this research is repeated reading (Therrian, 2004). Repeated reading refers to the rereading of a short passage until a preset criterion is met (Samuels, 1979). For elementary-aged students, researchers have reported that repeated reading is associated with increases in reading fluency (e.g., Chafouleas, Martens, Dobson, Weinstein, & Gardner, 2004; Musti-Rao, Hawkins, & Barkely, 2009) and

comprehension (e.g., Gibson, Cartledge, & Keyes, 2011; Staubitz, Cartledge, Yurick, & Lo, 2005). Therrien (2004) conducted a meta-analysis to examine the effects of repeated reading on reading fluency and/or comprehension for school-aged participants aged 5 to 18. Therrien found 18 studies that met criterion for study inclusion. The studies reviewed were conducted with students with learning disabilities (LD) and those without a disability. Results of the analyses indicated that repeated reading improved fluency (mean ES =.76) and comprehension (mean ES =.48) of unpracticed passages.

Chard et al. (2002) presented a synthesis of research on reading fluency interventions for elementary-aged students with LD. The authors reviewed 24 studies (N =128) and classified all interventions as either repeated reading or word practice. Twenty-one studies examined repeated reading without a model. The ES for fluency, as measured by rate and accuracy, for the group design studies of repeated reading without a model was an average of .68 with a range of .02 to 3.02. The authors also examined studies that involved repeated reading with a model. Fourteen studies examined repeated reading plus an adult model, three examined repeated reading plus modeling by a peer who was a more proficient reader, and four studies examined repeated reading plus modeling via audiotape or computer. Effect sizes for these studies were not calculated by the authors. Seven studies examined repeated reading interventions with multiple features. Three of the seven studies were group design and had an average effect size of 0.71 with a range of .20 to 1.17. Eight studies examined other features that influence the effectiveness of repeated reading. These elements included examination of text difficulty, number of repetitions, and types of feedback. Nine single case studies examined word practice, defined as decoding strategies. The authors reported no clear advantage for increasing passage reading fluency using word practice interventions. Based on the results of the synthesis, the authors

concluded that (a) repeated reading was associated with improvements in reading fluency (i.e., rate and accuracy) and comprehension, (b) repeated reading combined with modeling was more effective than repeated reading without a model, and (c) teachers were more effective than peers as models, but tape recorded/computer recorded models were better than no model. In addition to repeated reading and modeling, the authors recommended that passages used for fluency instruction should have controlled text, that the text difficulty should increase gradually over time, and that teachers should provide students with feedback for words that are missed.

Morgan and Sideridis (2006) reviewed studies involving fluency interventions for students with LD or those at-risk for LD in kindergarten through twelfth grade. The authors reviewed 30 single subject studies (N = 107) that involved interventions from one of seven categories: keywords and previewing, listening and repeated reading, goal setting plus performance feedback, contingent reinforcement, goals setting plus feedback and reinforcement, word recognition, and tutoring. Overall, the authors found goal setting plus performance feedback and goal setting plus feedback and reinforcement had the greatest positive effect over time, and noted that the effects were significantly greater than the effects reported for listening plus repeated reading. In addition to comparing the effectiveness of fluency interventions for this population, the authors identified individual and class level moderators. The authors found that gender and educational setting (i.e., regular versus special education) were significant moderators of intervention effectiveness. Conversely, age was not a significant factor in intervention effectiveness. The authors noted that this finding could have been influenced by the fact that the majority (n = 74) of participants in the studies were categorized as elementary-aged.

Reading Fluency Intervention for Adolescent Struggling Readers

Students without reading difficulties attain reading fluency during the elementary grades as part of the beginning stages of reading. For struggling readers, however, difficulties with reading fluency often extend to the secondary level (Rasinski et al., 2009). Wexler, Vaughn, Edmonds, and Reutebuch (2008) reviewed studies published between 1980 and 2005 that addressed reading fluency interventions for adolescent struggling readers. The authors defined struggling readers as those who had reading difficulties, including those with an identified learning, reading, or speech language disability as well as those with no identified disability. The authors concluded that improvements in reading fluency were greatest when repeated reading was combined with listening to a passage read aloud by an adult, either in person or prerecorded. However, results of repeated reading research were mixed for reading comprehension and for generalization to unpracticed passages. Despite mixed results for reading fluency studies, researchers confirm the importance of reading fluency.

Rasinski et al. (2009) found that reading fluency is an essential skill for overall reading achievement at the elementary level, and it continues to play an important role into adolescence. A strong base of research supports reading fluency interventions for elementary-aged students, but fewer studies have addressed reading fluency interventions for adolescents. The purpose of the present literature review was to determine which reading interventions that address reading fluency for struggling readers in middle and high school are supported by experimental and quasi-experimental research published in peer-reviewed journals. The last published review of adolescent fluency intervention research (Wexler et al., 2008) included articles published through 2005. The current review narrowed the focus of the review to studies with participants

who were in grades six through twelve and, in addition to earlier research, included studies published since 2005.

Methodology

Studies included in the present review were published in peer-reviewed journals between 1980 and 2016. In addition, studies met the following criteria:

1. Researchers had to use an experimental or quasi-experimental design. Single case and group designs were included.
2. At least one participant in the study was identified as being in grades 6-12, in middle or junior high school, or in high school. Studies were excluded if all of the participants were elementary-aged students, adults, or in an unidentified grade level.
3. The focus of at least one instructional component was reading fluency. Reading fluency instruction was defined as instruction that targeted one or more of the following for connected text: (a) reading rate, (b) reading accuracy, and/or (c) prosody.
4. Fluency instruction was conducted in English. Studies in languages other than English, including American Sign Language, were excluded.
5. International studies were included if the article was written in English.

The search encompassed all disability areas as well as participants without an identified disability who were identified as struggling readers. Articles were located using the following data bases: Academic Search Complete, ERIC, PsycArticles, PsycINFO, PsycEXTRA, and Psychology and Behavioral Sciences Collection. The following keywords were used: reading fluency, intervention, instruction, strategies, adolescents, teenagers, youth, juveniles, young people, at-risk readers, learning disabilities (LD), emotional behavior disorders (EBD), reading

comprehension, reading prosody, meta-analysis, synthesis, and review. In addition, an ancestral search was conducted using the reference lists of retrieved articles.

Results

A total of 23 studies were located that met the inclusion criteria (see Table 1.1). Across all included studies there was a total of 710 participants with the majority of those participants classified as either LD ($n = 444$) or struggling readers with no identified disability ($n = 209$). The remaining participants were students with EBD or behavioral difficulties ($n = 29$), other health impairment ($n = 8$), intellectual disability ($n = 8$), speech language impairment ($n = 7$), autism spectrum disorder ($n = 4$), and hearing impairment ($n = 1$).

Studies were grouped by design type: comparison group designs ($n = 11$), single case research designs ($n = 10$), and single group, within-subject designs ($n = 2$). In the proceeding sections, results of studies were first grouped into two major categories: those that involved repeated reading, and those that did not involve repeated reading. The majority of studies fell in the repeated reading group ($n = 20$). Results for repeated reading studies are reported based on dependent measures and then by intervention components. Intervention components included: repeated reading combined with modeling, repeated reading combined with decoding instruction, repeated reading combined with comprehension instruction, peer-assisted learning strategies, and repeated reading combined with both decoding and comprehension instruction. Only three included studies did not employ repeated reading. The results of those studies are reported in a separate section at the end of this section.

Effects of Repeated Reading- Dependent Measures

Repeated reading was used as an intervention in 20 of the studies. In 12 of the repeated reading studies, researchers measured reading fluency with practiced passages, and in all of those

studies gains in reading fluency were reported. For measures of reading comprehension, however, results were mixed with some finding increases in reading comprehension for practiced passages (Barnes & Rehfeldt, 2013; Hawkins, Hales, Sheeley, & Ling, 2011; O'Shea, Sindelar, O'Shea, 1987; Therrien, Wickstrom, & Jones, 2006; Valleley & Shriver, 2003; Wagner & Espin, 2016) while others did not (Alber-Morgan, Ramp, Anderson, & Martin, 2007; Seifert & Espin, 2012). Therrien and Hughes (2008) reported increases in factual but not inferential comprehension questions for practiced passages. The remaining three studies for which practiced passage data were taken did not include a measure of reading comprehension (Scott & Shearer-Lingo, 2002; Steventon & Fredrick, 2003; Sutherland & Snyder, 2007).

Unpracticed passages. Thirteen of the repeated reading studies included a measure of reading fluency for unpracticed passages. In eight of those studies, researchers reported participant gains in reading fluency for unpracticed passages (Calhoon, Sandow, & Hunter, 2010; Graves, Brandon, Duesbery, McIntosh, & Pyle, 2011; Manset-Williamson & Nelson, 2005; Mercer, Campbell, Miller, Mercer, & Lane, 2000; Strong, Wehby, Faulk, & Lane, 2004; Therrien et al., 2006; Valleley & Shriver, 2004; Wagner & Espin, 2016), but in five studies, researchers reported no gains in fluency (Barnes & Rehfeldt, 2013; Fuchs, Fuchs, & Kazdin, 1999; Steventon & Fredrick, 2003; Therrien & Hughes, 2008; Wexler, Vaughn, Roberts, & Denton, 2010). Similarly, significant gains in reading comprehension for unpracticed passages were reported in three studies (Fuchs et al.; Strong et al.; Wagner & Epstein), but the majority of studies in this review reported that gains in reading fluency were not accompanied by gains in reading comprehension for unpracticed passages (Barnes & Rehfeldt; Graves et al.; Manset-Williamson & Nelson; Valleley & Shriver; Wexler et al.).

Standardized measures of reading achievement. Six studies measured gains in reading achievement using standardized measures (Allinder, Dunse, Brunken, & Obermiller-Krolkowski, 2001; Calhoon et al., 2010; Manset-Williamson & Nelson, 2005; Spencer & Manis, 2010; Therrien et al., 2006; Wexler et al., 2010). Four studies (Calhoon et al.; Manset-Williamson & Nelson; Therrien et al.; Wexler et al.) measured reading achievement using select subtests of the Woodcock Johnson Tests of Achievement-III (WJ-III; Schrank & Woodcock, 2001). Manset-Williamson and Nelson reported that in a group design study, participants receiving instruction in phonemic awareness and decoding strategies combined with repeated reading made significant gains on the WJ-III letter-word identification, word attack, and reading fluency subtests. Calhoon et al. conducted a group design study and reported significantly higher scores on the WJ-III letter-word identification, word attack, spelling, and reading comprehension subtests for participants in the group that received instruction that included linguistic skills instruction for seven weeks, linguistics skills and spelling instruction for seven weeks, and spelling, fluency and comprehension instruction for seven weeks. In addition, Calhoon et al. measured participants' silent reading fluency using the Gray Silent Reading Test (Wiederholt & Blalock, 2000), but found that none of the treatment groups made significant gains on the measure. Similarly, three studies (Allinder, et al.; Spencer & Manis, 2010; Valleley & Shriver, 2004) included the Woodcock Reading Mastery Test- Revised (Woodcock, 1996), but none reported significant gains in reading fluency on the measure. Spencer and Manis conducted a group design study and reported that participants in the treatment group, who received instruction using the *Great Leaps Reading Program* (Campbell & Mercer, 1994) made significantly more progress than the control group for rate, accuracy, and passage scores of the Gray Oral Reading Test (Weiderhold & Bryant, 2001) and phonemic decoding efficiency and

sight word efficiency subtests of the Test of Word Reading Efficiency (Wagner, Torgeson, & Rashotte, 1999).

Effects of Repeated Reading – Independent Variables

Modeling. Five studies evaluated repeated reading combined with modeling by an adult (Barnes & Rehfeldt, 2013; Rose & Sherry, 1984; Seifert & Espin, 2012) or peer (Sutherland & Snyder, 2007; Wexler et al., 2010). Three of these studies measured the effects of repeated reading and modeling on reading fluency for practiced passages, and all reported positive effects for the intervention (Barnes & Rehfeldt; Rose & Sherry; Seifert & Espin; Sutherland & Snyder). In contrast, Wexler et al. compared gains in reading achievement between groups using unpracticed, AIMSWeb® (Edformation, Inc., 2002) passages and the WJ-III (Schrank & Woodcock, 2001) for high school students with disabilities. Researchers reported no difference between the group who received repeated reading with peer modeling, the group who engaged in wide reading, and the group that received typical instruction. Similarly, Barnes and Rehfeldt reported that none of the participants, who were in fifth and sixth grade, improved reading fluency for seventh grade level AIMSWeb passages in spite of improvements for instructional level, practiced passages.

Of the five studies that evaluated repeated reading and modeling, three studies included measures of reading comprehension (Barnes & Rehfeldt, 2013; Seifert & Espin, 2012; Wexler et al., 2010). Barnes and Rehfeldt conducted a single case study and reported gains in reading comprehension for two of the three participants for instructional level, practiced passages, but no improvement for seventh grade level, unpracticed passages. In contrast, for the number of reading comprehension questions answered correctly on practiced passages, Seifer and Espin (2012) found no difference between groups who received one of four conditions: (1) word

recognition, adult modeling, and repeated reading; (2) vocabulary instruction; (3) a combination of word recognition instruction, adult modeling, repeated reading, and vocabulary instruction; or (4) no instruction. Wexler et al. measured reading comprehension using WJ-III passage comprehension subtest and found no difference between those receiving repeated reading and peer modeling and those who received wide reading or typical reading instruction.

Repeated reading combined with decoding or phonics instruction. Three studies (Scott & Shearer-Lingo, 2002; Steventon & Fredrick, 2003; Strong et al., 2004) used single case research designs to evaluate the effect of combining repeated reading with direct instruction for decoding. Two studies (Steventon & Fredrick; Strong et al.) evaluated repeated reading combined with *Corrective Reading* (Engelmann et. al, 1999) and the remaining study (Scott & Shearer-Lingo) combined repeated reading using *Great Leaps Reading Program* (Campbell & Mercer, 1994) with *Teach Your Child to Read in 100 Easy Lessons* (Engelmann, Haddox, & Brunner, 1986). Scott and Shearer-Lingo reported gains in words read correctly per minute (WCPM) for practiced passages. Similarly, Steventon and Fredrick reported gains in WCPM for practiced passages, however, these gains did not generalize to unpracticed passages. In contrast, Strong et al. reported that *Corrective Reading* instruction alone was associated with moderate gains in WCPM for unpracticed *Corrective Reading* (i.e., instructional level) passages for all participants, and with gains in number of comprehension questions answered for four participants. The addition of repeated reading resulted in increases in WCPM for both *Corrective Reading* and grade-level passages for four of the six participants.

Researchers evaluated the effects of the *Great Leaps Reading Program* (GLRP; Campbell & Mercer, 1994) in three studies (Mercer et al., 2000; Scott & Shearer-Lingo, 2002; Spencer & Manis, 2010). Instruction using GLRP requires one-on-one instruction that includes

one to two minutes each of word/phonics, phrase, and passage level instruction and requires students to meet a performance criterion in order to advance to the next lesson. Students who fail to meet the criterion repeat the reading during the following session or sessions until the criterion is met (Campbell & Mercer).

Mercer et al. (2000) used a pre/posttest group design to evaluate the effects of GLRP on the reading skills of students with LD who entered middle school over a three-year period. Pre/post analysis of WCPM for unpracticed, curriculum-based grade level passages indicated that increases for all three groups were statistically significant. Spencer and Manis (2010) extended Mercer et.al by randomly assigning 60 middle-school students with severe reading deficits to either the treatment group, which received individual, paraprofessional led instruction using GLRP, or the comparison group which received study skills instruction. Results indicated that the GLRP treatment group made significant gains on the sight word efficiency and the phonemic decoding efficiency subtests of the Test of Word Reading Efficiency (TOWRE; Wagner et al., 1999) and the rate, accuracy, and passage scores on the GORT-III over the comparison group. However, no significant difference was found between the groups for comprehension as measured by the WRMT.

Repeated reading combined with a reading comprehension strategy. Four studies evaluated the effect of repeated reading and a strategy to address reading comprehension (Alber-Morgan et al., 2007; Seifert & Espin, 2012; Therrien & Hughes, 2008; Therrien et al., 2008). Seifert and Espin investigated the effect of repeated reading with modeling, vocabulary instruction, which involved activities for memorization of vocabulary word definitions, and a combination of repeated reading with modeling and vocabulary instruction on participants' reading fluency and comprehension of high school science passages. The researchers reported

that for reading comprehension, there was no significant difference from the control condition (i.e., no instruction) for any of the treatment conditions. Similarly, Alber-Morgan et al. (2007) used a single case research design to examine the effect of repeated reading that included error correction and feedback combined with a story prediction activity. The researchers reported gains in WCPM for practiced passages with the implementation of repeated reading. However, the addition of the prediction activity did not affect reading fluency, and neither condition led to improvements in reading comprehension.

Two group design studies evaluated the effect of repeated and question generation (Therrien & Hughes, 2008; Therrien, Wickstrom, & Jones, 2006). Therrien et al. examined the effect of repeated reading to a preset criteria combined with question generation, a comprehension strategy that teaches students to generate and answer questions while reading, on the reading fluency and comprehension of 30 students with learning disabilities (LD) in grades sixth through eighth who were randomly assigned to the treatment or control group. Over a four-month period, participants in the treatment group received additional, individual reading instruction on 50 instructional-level passage. During each treatment session, the participant read the assigned passage until a present criteria was met and then adapted and answered five story structure questions which were listed on a cue card. Participants in the control group received no additional reading instruction. Results indicated that participants in the treatment group made significantly greater gains than those in the control group for pre/post testing using DIBELS (University of Oregon, 2005; $ES = 0.89$), but no statistically significant difference between the groups was found for scores on the WJ-III Broad Reading Scale (Schrank & Woodcock, 2001).

Therrien and Hughes (2008) compared repeated reading to a preset criterion with question generation to determine which was more effective for improving reading fluency and

comprehension. Participants in both conditions received 10 to 15 minutes of individual instruction, 4 days per week, for a total of 128 sessions. The researchers reported that participants in the repeated reading group made significantly greater gains on WCPM and number of factual comprehension questions answered correctly for practiced passages than those in the question generation group who read the passage only once. However, no difference between the groups was found for the number of inferential questions answered correctly or for WCPM and comprehension questions answered correctly on unpracticed passages.

Peer-assisted learning strategies. Two studies of the studies focused primarily on peer-assisted learning strategies (PAL; Fuchs et al., 1999; Sutherland & Snyder, 2007). Fuchs et al. used a group design study to examine the effects of PALS on the reading skills and beliefs about reading of adolescents. Teachers in the treatment group implemented PALS procedures in five classes every two weeks for 16 weeks. During PALS instruction, students participated in three activities: (a) partner reading, with each partner reading for 5 minutes; (b) paragraph shrinking, which required participants to take turns reading aloud and identifying the main idea of a paragraph; and (c) prediction relay, which required participants to take turns predicting what would happen in the next part of the story, read that part of the story, and confirm or disconfirm the prediction. Contrast group teachers conducted reading class as usual with no implementation of PALS. The researchers assessed reading skills pre- and post- using the Comprehensive Reading Assessment Battery (CRAB; Fuchs, Fuchs, & Hamlett, 1989), which assesses reading fluency and comprehension by measuring WCPM for passages and number of questions answered correctly. In addition, the researchers used a Likert scale questionnaire to assess students' beliefs about reading and working with others. Researchers reported that there was no statistically significant difference between the groups for pre- to post-testing growth in reading

fluency. However, students in the PALS group demonstrated greater growth in reading comprehension, although the ES was small ($ES = .34$). Student beliefs about reading were similar for both groups. Compared with students in the contrast group, students in the PALS group gave more positive scores for statements about working with their peers ($ES = .31$ to $.41$) and about working to improve their reading ($ES = .55$ to $.69$). Furthermore, students in the PALS group scored more positively statements indicating that their teacher worked hard ($ES = .78$).

Sutherland and Snyder (2007) examined the effects of reciprocal peer tutoring, which used the PALS procedures described above, and self-graphing on WCPM for practiced passages and disruptive behaviors using a single case design. All four participants made gains in WCPM, however, follow-up data collected four weeks after the intervention indicated that increases were not maintained by any of the participants. Two of four participants demonstrated decreases in disruptive behavior during intervention, and all four participants increased the percentage of class time spent actively responding.

Studies of repeated reading, comprehension strategies, and decoding strategies. Four studies (Calhoun et al., 2010; Graves et al., 2011; Manset-Williamson & Nelson, 2005; Wagner & Espin, 2016) evaluated multiple intervention components that addressed reading fluency, comprehension, decoding skills. Graves et al. used a group design study to evaluate the effect of 10 weeks of decoding instruction with *Corrective Reading* or *REWARDS*, repeated reading using passages from *Read Naturally* (Inhot, Matsoff, Gavin, & Hendrickson, 2001), and comprehension and vocabulary instruction using *Daybrook for Critical Reading and Writing* (Spandel et al., 2001). Participants in the treatment group made significantly greater gains than those in the control group for WCPM on unpracticed passages, however, there was no difference between groups for reading comprehension.

Calhoun et al. (2010) assigned 90 middle school students to one of three treatment groups. Participants in the alternating module group received instruction in linguistic skills, which involved cognitive strategies for word attack skills, for 3 days per week comprehension instruction using PALS procedures for 2 days per week. Participants in the integrated module group received linguistic skills instruction, spelling instruction, and fluency instruction that included repeated reading for 3 days per weeks and comprehension instruction 2 using PALS procedures 2 days per week. Participants in the additive module group received linguistic skills instruction alone for 7 weeks. During the next 7 weeks, participants received spelling instruction in addition to linguistic skills, followed by the addition of reading fluency instruction for the next 7 weeks. For the last 7 weeks of the study, participants received comprehension instruction along with spelling and fluency instruction, but linguistic skills instruction was discontinued. The groups which received reading fluency instruction (integrated and additive groups) demonstrated significantly greater gains than the alternating group for WCPM on AIMSWeb passages. None of the groups, however, made significant gains on WJ-III reading fluency subtest or the Gray Silent Reading Test (Wiederholt & Blalock, 2000).

Manset-Williamson and Nelson (2005) randomly assigned participants to one of two instructional groups. The guided reading group received phonemic awareness and analysis instruction, decoding strategy instruction, repeated reading, and guided reading. The comprehension strategy group received phonemic awareness and analysis instruction, decoding strategy instruction, repeated reading, and explicit comprehension strategy instruction. Participants in both groups made significant gains on measures of reading decoding, fluency, and comprehension. Participants in the guided reading group made significant gains on the WJ-III

(Schrank & Woodcock, 2001) letter-word identification subtest. On the informal assessment of reading comprehension, the comprehension strategy group made significantly greater gains.

Wagner and Espin, (2016) used a group design study to compare four different treatment conditions with a control condition. Participants received five instructional sessions for each treatment condition and the control condition. During the Word-oriented sessions, participants read aloud word lists and received corrective feedback and word reading strategy instruction. Fluency-oriented sessions involved repeated reading with adult modeling and corrective feedback. Comprehension-Oriented sessions involved instruction in story grammar elements. Multi-component sessions combined word, fluency, and comprehension components. During the control condition, no instruction was provided. The researchers reported that, for practiced passages, all treatment conditions resulted in significantly greater gains than control conditions for WCPM and number of comprehension questions answered. However, only the Multicomponent and Fluency-oriented conditions yielded significantly greater scores for WCPM and number of comprehension questions answered correctly for unpracticed passages.

Fluency Strategies without Repeated Reading

Three studies did not involve repeated reading. Rose and Sherry (1984) used a single case alternating treatment research design to compare silent passage preview to listening passage preview involving an adult modeling the passage. Similarly, Skinner, Cooper, and Cole (1997) used a multi-element design to compare silent passage previewing, listening passage preview with the model reading rapidly, and listening passage preview with the model reading slowly. Researchers in both studies concluded that listening passage preview was more effective than silent previewing for increasing WCPM. Skinner et al. further suggested that a model reading slowly was more effective for improving WCPM than a model reading rapidly.

Allinder et al. (2001) used a randomized treatment versus control group to compare the effects of cues to use reading fluency strategies to generic encouragement to read well. The researchers reported that neither group demonstrated improvements on the reading fluency subtest of the Woodcock Reading Mastery Test- Revised (Schrank & Woodcock, 2001), but both groups made similar gains on the reading comprehension subtest. The fluency strategy group outperformed the generic encouragement group on a curriculum based Maze measure for reading comprehension.

Discussion

The purpose of the current review was to identify reading fluency interventions for adolescent struggling readers that are supported by experimental or quasi-experimental research published in peer-reviewed journals. Twenty-three studies were included in the review, 20 of which involved some form of repeated reading. These studies reported increases in reading fluency for practiced passages, but results for unpracticed passages rates and comprehension were mixed. In 16 of the studies, repeated reading was part of an intervention package that included instruction in other reading skills such as decoding, vocabulary, comprehension, or a combination of these skills. Without isolating repeated reading as an independent variable, it is difficult to determine whether repeated reading contributes to the effectiveness of the reading intervention packages. In four studies, however, repeated reading was an independent variable (Hawkins, Hale, Sheeley, & Ling, 2010; Steventon & Fredrick, 2003; Strong et al., 2004; Valleley & Shriver, 2003). In two of these studies, repeated reading was associated with increases in reading fluency for unpracticed passages (Strong et al.; Valleley & Shriver). Steventon and Fredrick found no improvement for unpracticed passages. Hawkins et al. did not measure unpracticed passages.

Reading Comprehension

Of the studies involving repeated reading as an independent variable, three evaluated the effect of repeated reading on reading comprehension (Hawkins et al., 2010; Strong et al., 2004; Valleley & Shriver, 2003), however results across these studies were inconsistent. Using an alternating treatment design to compare repeated reading, repeated reading plus vocabulary preview, and the control condition, Hawkins et al. found for that for all six participants, repeated reading led to increases in reading comprehension of practiced passages. For three participants, repeated reading combined with vocabulary preview yielded greater gains in comprehension than repeated reading or the control condition. During the repeated reading condition, an error correction procedure was in place that provided the participant with additional practice for words read incorrectly during the first reading of the passage. However, the words selected for the vocabulary previewing condition were selected by the researcher and teacher prior to the reading of the passage. The words were chosen based on the judgment of the teacher and researcher that the words were important for comprehension of the story. Had the words been chosen in a similar manner as the error correction procedure for the repeated reading condition, the other three participants may have demonstrated similar gains. In contrast with Hawkins et al., Strong et al. and Valleley and Shriver measured gains in comprehension for unpracticed passages. Strong et al. combined *Corrective Reading* with repeated reading and found that three out of six participants improved comprehension for unpracticed passages with the implementation of repeated reading. Using a single case, multiple baseline research design, Valleley and Shriver found that repeated reading until 3 consecutive improvements in WCPM were found was associated with increases in reading comprehension for practiced but not unpracticed passages. Strong et al. provided participants with the intervention over 19 sessions. Valleley and Shriver

noted that participants in the study received approximately 10 hours of intervention over 36 sessions. In order for gains in comprehension to generalize to unpracticed passages, adolescent struggling readers may require interventions that are implemented consistently over longer periods.

Summary

Reading fluency is an essential skill for adolescent readers. For those who struggle with reading fluency, effective interventions are needed. Repeated reading is an intervention that has been shown to improve reading fluency for elementary-aged students (Therrien, 2004), however, in the present review of adolescents, only four studies separately examined repeated reading. Results from those studies indicated that repeated reading improved reading fluency for practiced passages, but these results did not consistently generalize to unpracticed passages, to standardized measures of achievement, or to reading comprehension. Participants in the studies were predominately students with LD or those labeled as struggling readers. Students with EBD were included in only eight studies, and half of those studies took place in a setting outside of the typical school setting.

Table 1.1 Summary of Adolescent Reading Fluency Intervention Literature

Authors (year)	Design	Participants	Intervention	Dependent Variables	Results
<i>Comparison Group Designs</i>					
Allinder, Dunse, Brunken, & Obermiller-Krolikowski (2001)	Treatment vs. control with random assignment to group	N = 50 7 th grade students in remedial reading including LD (n = 7) and SLI (n = 7)	Cue to use fluency strategy vs. generic encouragement	CBM Maze; WRMT-R	No significant difference on WRMT-R for reading fluency; both groups improved comprehension on WRMT; Strategy group performed better on CBM Maze
Calhoon, Sandow, & Hunter (2010)	Pretreatment/posttreatment comparison between 3 treatment groups	N = 90 Middle school students (grades 6-8) with LD served in remedial reading program	Alternating module group: linguistic skills instruction (cognitive strategies for word attack) 3 days/week; comprehension instruction (PALS) 2 days/week Integrated module group: linguistic skills+ spelling (direct instruction), and fluency instruction (RR) 3 days/week; comprehension instruction 2 days/week Additive module group: Linguistic skills instruction 7 weeks; linguistic skills & spelling instruction 7 weeks; linguistics skills, spelling, & fluency instruction for 7 weeks; spelling, fluency, comprehension instruction for 7 weeks	WJ-III -L-WID -Word attach -Spelling -Reading fluency -Passage comprehension AIMSweb -WCPM on ORF passages GSRT	All groups made significant gains in linguistic skills; only the Additive group made significant gains in spelling Participants in Additive group scored significantly higher than those in other groups for L-WID, word attack, spelling, and reading comprehension None of the groups made significant gains in silent reading fluency Participants in Integrated and Additive groups made significantly greater gains in ORF than the Alternating group

Table 1.1 Summary of Adolescent Reading Fluency Intervention Literature (cont'd)

Authors (year)	Design	Participants	Intervention	Dependent Variables	Results
Fuchs, Fuchs, Kazdan (1999)	Treatment vs. contrast group	N = 102 High School students with LD (n = 74), ID (n = 4), and other disability (n = 2) along with struggling readers with no identified disability (n = 22) served in remedial or resource reading classes	Treatment group: PALS (5 times bi-weekly for 16 weeks) PALS sessions included partner reading, paragraph summarization, and prediction activities Contrast group: Provided reading instruction as usual	CRAB (included measure of WCPM and comprehension questions)	No difference in WCPM between treatment and contrast group Treatment group significantly outperformed contrast group in reading comprehension (ES = .34)
Graves, Brandon, Duesbery, McIntosh, & Pyle (2011)	Pretest/ Posttest Intervention vs. contrast group	N = 60 Students in grade 6 with reading difficulties including students with LD (n = 7)	10 weeks of instruction <u>Decoding instruction:</u> Corrective Reading (for those with reading grade level of 0-2.4) or REWARDS (for those with reading grade level 2.5-5) <u>Fluency instruction:</u> <i>Read Naturally</i> <u>Comprehension and vocabulary instruction:</u> <i>Daybrook for Critical Reading and Writing</i>	CBM -ORF (WCPM) -Maze reading comprehension	Intervention group significantly outperformed control group (ES= 0.14). No significant difference between groups for reading comprehension.

Table 1.1 Summary of Adolescent Reading Fluency Intervention Literature (cont'd)

Authors (year)	Design	Participants	Intervention	Dependent Variables	Results
Manset-Williamson & Nelson (2005)	Pre/Post Randomized assignment to one of two treatment groups	N=20 Students with LD in grades in grades 4-8 enrolled in a summer community reading program	One-on-one instruction/ 20 hours over 5 weeks Guided reading group received phonemic awareness/analysis, decoding strategy, RR, + guided reading Comprehension strategy group received phonemic awareness/analysis, decoding strategies, RR + explicit comprehension strategy instruction	WJ-III -Word attack -L-WID -Reading fluency -Passage comprehension Informal-Comprehension 4 leveled passages -oral retells of passage -Main idea identification -Multiple choice test of reading comprehension Daily Assessment: CBM -WCPM	Both groups made significant gains on WJ-III - word attack subtest (ES = 0.56 for guided reading; ES = 0.50 for comprehension strategy group); Guided reading group made significant gains on WJ-III L-WID (ES = 0.53); Both groups made significant gains in WCPM on CBM probes; Both groups made significant gains on WJ-III Reading Fluency subtest; The guided reading group made greater gains (ES = .49), However, the difference was not statistically significant On informal assessment of reading comprehension, the comprehension strategy group made significantly greater gains on both oral retell and main-idea identification (ES = .91 and 1.07 respectively); No difference between groups was found for the multiple-choice test or for the WJ-III passage comprehension subtest

Table 1.1 Summary of Adolescent Reading Fluency Intervention Literature (cont'd)

Authors (year)	Design	Participants	Intervention	Dependent Variables	Results
Mercer, Campbell, Miller, Mercer, & Lane (2000)	Pretest/Posttest	N=49 Middle school students with LD in grades 6-8 Groups based on length of intervention: Group 1 6-9 months Group 2 10-18 months Group 3 19-25 months	5-6 minutes daily individual instruction using Great Leaps Reading Program (included RR)	CBM - WCPM on 200+ word passages from the school system basal reading series Grade level reading scores (based on Great Leaps passages)	All three groups made significant gains on both the CBM measures and the grade level reading scores
O'Shea, Sindelar, & O'Shea (1987)	Random assignment to one of two experimental groups	N = 32 Students with LD in grades 5-8	RR – 1, 3, & 7 readings Group 1: cue to read for speed Group 2: cue to read for comprehension	WCPM; Recall of story details	WCPM increased with additional readings. Comprehension was higher for 3 readings but not significantly higher for 7 readings Cue to read for comprehension resulted in significantly higher story recall; no significant difference between cue groups was found for WCPM

Table 1.1 Summary of Adolescent Reading Fluency Intervention Literature (cont'd)

Authors (year)	Design	Participants	Intervention	Dependent Variables	Results
Spencer & Manis (2010)	Treatment vs. control group with random assignment to group	N = 60 Middle school students with severe reading delays	Treatment group: 10 minutes daily paraprofessional-led instruction using Great Leaps Reading (includes RR) Control group: 10 minutes daily paraprofessional-led instruction using The Skills for School Success program	TOWRE -Phonemic Decoding Efficiency -Sight Word Efficiency GORT-III -Rate Accuracy Passage WRMT-R -Word Attack -Word ID -Passage Comp.	Treatment group made significantly more progress than the control group on TOWRE Phonemic Decoding Efficiency subtest (ES = .41) and the GORT-III Rate (ES = .59) Accuracy (ES = .62), and Passage (ES = 0.61) subtests. No significant gains were made by either group on the WRMT-R measure of comprehension
Therrien & Hughes (2008)	Stratified random assignment to one of two treatment groups	N = 32 Students in grades 4-6 with LD (n = 18) or reading difficulties (n = 14)	RR vs Question Generation	WCPM; Number of correct comprehension questions	Participants in the RR group had significantly higher WCPM for practiced passages; results did not transfer to unpracticed passages Participants in the RR group answered significantly more factual comprehension questions correctly; there was no difference between the group for inferential questions

Table 1.1 Summary of Adolescent Reading Fluency Intervention Literature (cont'd)

Authors (year)	Design	Participants	Intervention	Dependent Variables	Results
Therrien, Wickstrom, & Jones (2006)	Treatment vs. control group	N = 30 Students with LD in grades 4-8	Repeated reading +question generation	Instructional Passages: WCPM Number of correct comprehension questions DIBELS WJ-III- Broad Reading Scale	Treatment group increased WCPM and number of correct comprehension questions; Improved DIBELS; no improvement on WJ-III
Wexler, Vaughn, Roberts, & Denton (2010)	Random assignment to one of two intervention groups or comparison group	N = 96 High school students grades 9-12 LD (n = 76) EBD (n = 3) OHI (n = 8) ID (n = 4) HI (n = 1) ASD (n = 1) Unknown disabilities (n = 3)	15-20 minutes daily for 10 weeks Group1: RR Student pairs, 3 readings with student-provided error correction Group2: Wide reading Group 3: Comparison Typical instruction	WCPM AIMSWeb 8 th grade level passages Test of Silent Contextual Reading Fluency WJ-III -L-WID -Passage comprehension Test of Silent Reading Efficiency	No significant difference was found between either treatment condition and the comparison condition for any of the measures

Table 1.1 Summary of Adolescent Reading Fluency Intervention Literature (cont'd)

Authors (year)	Design	Participants	Intervention	Dependent Variables	Results
<i>Single Group Designs</i>					
Seifert & Espin (2012)	Within-participant with 3 treatment conditions and 1 control condition	N = 20 High school students with LD in 10 th grade	One session per condition using 10 th grade science test: T1: Text-reading -Word recognition activity passage vocabulary, adult modeling of passage, and RR with error correction T2: Vocabulary learning -Word definition activity T3: Combined -Word definition activity, adult modeling, and RR with error correction Control: No instruction	Assessment using instructional passages: Words read correctly in 3 minutes Vocabulary measure: -Participant matched 10 terms with definitions Passage Comp: -10 Multiple choice questions	Text-reading and combined conditions resulted in significantly greater number of words read correctly in 3 minutes than the vocabulary learning or control condition, and the vocabulary condition resulted in significantly greater words correct than the control condition Significantly higher scores on the vocabulary measure in the vocabulary learning and combined conditions than in the text-reading or control conditions No significant difference between conditions for comprehension

Table 1.1 Summary of Adolescent Reading Fluency Intervention Literature (cont'd)

Authors (year)	Design	Participants	Intervention	Dependent Variables	Results
Wagner & Espin (2016)	Within-participant design	N = 29 5 th and 6 th grade students with LD (n = 8) EBD (n = 2) ADHD (n = 2) Struggling readers with no identified disability (n = 17)	Five sessions per condition: T1= Word-oriented Word list practice with corrective feedback, word reading strategy T2 = Fluency-oriented RR with adult modeling and corrective feedback T3 = Comp.-Oriented Story grammar elements T4 = Multi-component Combination of word, fluency, and comprehension activities Control Condition = no instruction	WCPM -instructional and transfer passages (average 6.0 grade level) -immediate & delayed (1 week after instruction) Comprehension -number of questions answered correctly -instructional and transfer passages	Fluency-oriented (ES= 1.84), word-oriented (ES= 1.30), & multi-component (ES= 1.26) conditions yielded significantly greater number of WCPM than the control condition for immediate instructional passages. Results maintained for 1 week after instruction On transfer passages, only multi-component (ES = 1.02) and fluency oriented (ES = 0.70) conditions yielded significantly greater scores than the control condition All treatment conditions yielded greater number of questions answered correctly than control for instructional passages; for transfer passages, only fluency-oriented (ES = 1.17) and multi-component (ES = 0.79) conditions yielded higher scores than the control condition

Table 1.1 Summary of Adolescent Reading Fluency Intervention Literature (cont'd)

Authors (year)	Design	Participants	Intervention	Dependent Variables	Results
<i>Single Case Designs</i>					
Alber-Morgan, Ramp, Anderson, & Martin (2007)	Multiple baseline across participants	N = 4 Middle school students in grades 6-7 LD (n = 2) EBD (n = 2) attending an outpatient treatment program for students with significant behavioral concerns	RR+ systematic error correction and performance feedback RR + prediction activity	WCPM; Errors per minute on practiced passage (instructional level) Reading comprehension	3 participants improved WCPM and errors per minute with RR+ error correction and performance feedback. Addition of prediction activity did not affect fluency. No functional relation between the intervention and reading comprehension
Barnes & Rehfeldt (2013)	Multiple probe across participants	N = 3 Students with ASD 5 th grade (n = 1) 6 th grade (n = 2)	Passage preview, error correction, phase drill error correction, performance feedback; RR across sessions until criterion met for 2 consecutive readings	WCPM on instructional passages Comprehension questions AIMSweb grade-level benchmarks	Improvement for WCPM on practiced passages. Two of three participants improved comprehension of practiced passages Results did not generalize to AIMSweb passages
Hawkins, Hale, Sheeley, & Ling (2011)	Alternating treatment design	N = 6 Students with LD in grades 10-11	T1 = no RR T2 = RR T3 = RR +VP	WCPM; Percentage of comprehension questions correct	RR+VP led to greatest gains in ORF; RR+VP led to greater gains in comprehension for 3 participants, the other 3 did better w/RR

Table 1.1 Summary of Adolescent Reading Fluency Intervention Literature (cont'd)

Authors (year)	Design	Participants	Intervention	Dependent Variables	Results
Rose & Sherry (1984)	Alternating-treatments design	N = 5 Students with LD in Grades 8-9	Baseline- No preview T1 = Silent preview T2 = Listening preview (teacher read aloud)	WCPM Instructional-level reading passages	For 4 participants, listening preview was related to greater increases in WCPM than silent previewing, and silent previewing was related to greater increases than no previewing For the other participant, there was no difference between baseline and treatment conditions
Scott & Shearer-Lingo (2002)	Multiple baseline across participants	N = 3 7 th grade students with EBD served in a self-contained classroom	Teach your Child to Read in 100 Easy Lessons; Great Leaps Reading (includes RR)	WCPM On instructional-level reading passages	All three participants improved WCPM as a function of implementation of Great Leaps
Skinner, Cooper, & Cole (1997)	Multielement	N = 2 5 th and 6 th grade students with reading difficulties	Silent previewing Passage preview with adult reading rapidly Passage preview with adult reading slowly	WCPM On instructional-level reading passages	Previewing with modeling more effective than no modeling; slow reading preview more effective than rapid reading preview
Steventon & Fredrick (2003)	Multiple baseline across participants	N = 3 Middle school students attending an alternative school for students with behavioral or academic difficulties	Corrective Reading + RR	WCPM On Instructional-level reading passages	All three participants made gains in WCPM on practiced passages as a function of RR Results did not generalize to unpracticed passages

Table 1.1 Summary of Adolescent Reading Fluency Intervention Literature (cont'd)

Authors (year)	Design	Participants	Intervention	Dependent Variables	Results
Strong, Wehby, Faulk, & Lane (2004)	Multiple baseline across participant pairs	N = 6 Students in grades 7-8 in a separate school for students with EBD	Corrective Reading + RR using passages from Great Leaps Reading Program	Weekly probes WCPM and Comprehension questions answered correctly on related but unpracticed instructional- level passages; Generalization probes – WCPM for passages selected from the 7 th grade curriculum	Corrective Reading led to moderate growth in WCPM; addition of RR led to increase in WCPM for 4 of 6 participants Four participants improved comprehension
Sutherland & Snyder (2007)	Multiple baseline across participants	N = 4 Middle school students with EBD served in a self-contained classroom	Reciprocal peer tutoring (with RR) and self-graphing	WCPM, errors per minute on instructional-level CBM passages	All participants improved WCPM; 3 improved errors per minute

Table 1.1 Summary of Adolescent Reading Fluency Intervention Literature (cont'd)

Valleley & Shriver (2003)	Multiple baseline across participants	N = 4 High school students in a residential treatment facility for children with behavior and academic difficulties	RR of passages to criterion of three consecutive improvements in WCPM	WCPM, Number of comprehension questions answered correctly on 9 th grade-level passages WRMT-R	All participants made gains in WCPM and comprehension for practiced passages as a function of repeated reading All participants improved WCPM from pre to post on unpracticed, 9 th grade level passage No improvement in comprehension on generalization probes No improvement on WRMT-R for any of the Participants
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Note. ADHD = attention deficit hyperactivity disorder; ASD = autism spectrum disorder; CBM = curriculum based measurement; CRAB = Comprehensive Reading Assessment Battery; DIBELS = Dynamic Indicators of Basic Early Literacy Skills; EBD = emotional behavior disorders; GORT-III = Gray Oral Reading Test, 3rd edition; GSRT = Gray Silent Reading Test; HI = hearing impairment; ID = intellectual disability; LD = learning disabilities; L-WID = letter-word identification; MIID = main idea identification; OHI = other health impairment; ORF = oral reading fluency; PALS = peer-assisted learning strategies; RR = repeated reading; SLI = speech/language impairment; TOWRE = Test of Word Reading Efficiency; WCPM= words correct per minute; WJ-III = Woodcock Johnson Tests of Achievement, third edition; WRMT-R = Woodcock Reading Mastery Test, revised; VP = vocabulary preview

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**2 THE EFFECT OF REPEATED READING WITH AUDIO-RECORDED
MODELING ON THE READING FLUENCY AND READING
COMPREHENSION OF ADOLESCENTS WITH
BEHAVIORAL DIFFICULTIES
AND EBD OR OHI**

Results from the National Assessment of Educational Progress Report (NAEP; National Center for Education Statistics, 2015) indicated that 76% of the nation's eighth graders scored at or above the basic level in reading, and 34% scored at or above the proficient level. Nearly 81% of students without a disability scored at or above the basic level, with 38% of those scoring at the proficient or higher levels. In sharp contrast, only 37% of students with disabilities scored at or above the basic level and only 8% scored within the proficient range. Sixty-three percent of eighth graders with a disability scored below the basic level, indicating that these students had not mastered the basic skills necessary for adequate performance on grade level materials.

Students with emotional and behavioral disorders (EBD) tended to have significant academic skills deficits that are similar to those of students with learning disabilities (LD; Lane, Carter, Pierson, & Glaeser, 2006; Mattison, 2015). Reid, Gonzalez, Nordness, Trout, and Epstein (2004) conducted a meta-analysis of studies on the academic status of students with EBD and found that they had significantly lower academic achievement than students without disabilities ($ES = -.64$) and had substantial deficits across all academic areas. In reading, students with EBD exhibited deficits in decoding, fluency, and comprehension, and these deficits remained stable into adolescence (Nelson, Benner, Lane, & Smith, 2004). Wagner, Newman, Cameto, Levine, and

Garza (2006) reported that students with EBD were the least likely among those with disabilities to earn a general education high school diploma.

Researchers agree that there is a dearth of reading instruction research for students with EBD. Griffith, Trout, Hagaman, and Harper (2008) reviewed literacy intervention studies for adolescents with EBD and found only 17 studies that measured literacy outcomes, the majority of which primarily addressed spelling, writing, or grammar ($n = 11$). Of the remaining six studies, one focused on reading and spelling (Carr & Punzo, 1993), two focused on reading fluency (Scott & Shearer-Lingo, 2002; Skinner & Shapiro, 1989) one focused on reading comprehension (Ward-Lonergan, Liles, & Owen, 1996), and two focused on a combination of reading fluency and comprehension (Shapiro & McCurdy, 1989; Strong, Wehby, Falk, & Lane, 2004).

In response to the review by Griffith et al. (2008), Garwood, Brunsting, and Fox (2014) reviewed reading research published from 2004 to 2012 that addressed reading fluency and reading comprehension outcomes for adolescents with EBD. Nine studies met the inclusion criteria. The interventions used in the studies included repeated reading (Alber-Morgan, Ramp, Anderson, & Martin, 2007), Corrective Reading (Englemann et al., 1999) combined with repeated reading (Strong et al., 2004), Corrective Reading alone (Lingo, Slaton, Jolivette, 2006), cognitive text mapping (Blankenship, Ayres, & Langone, 2005; Stone, Boon, Fore, Bender, & Spencer, 2008), choice of reading instruction (i.e., modeling or error correction) followed by reward for meeting goals (Daly, Garbacz, Olson, Persampieri, & Ni, 2006), listening while reading (Hale et al., 2005; Schmitt, McCallum, Hale, Obseldobel, & Dingus, 2009), and reciprocal peer tutoring (Sutherland & Snyder, 2007). One study (Strong et al.) cited by

Garwood et al. was also reported in Griffith et al., therefore the total number of reading studies for students with EBD reported in the two reviews was fourteen.

Reading Fluency

Reading fluency is the combination of reading accurately at an appropriate rate with prosody (Kuhn, Schwanenflugel, & Meisinger, 2010). Reading fluency is a necessary component of reading comprehension, and thus overall reading achievement, yet it is often neglected in classroom reading programs (National Reading Panel, 2000). For beginning readers in early elementary grades, reading fluency is correlated with reading comprehension (Baker et al., 2008; Berninger, Abbott, Vermeulen, & Fultson, 2006) and overall reading performance on state-mandated assessments (Baker et al.; Buck & Torgeson, 2003). Reading fluency is a well-established predictor of reading comprehension for students in grades 3, 7, and 10 (Kershaw & Schatschneider, 2012) and in grades 6-8 (Denton et al., 2011). Reading fluently and expressively has been associated with high reading comprehension scores for students in grade 9 (Paige, Rasinski, & Magpuri-Lavell, 2012). Reading fluency is significantly correlated with overall academic achievement for students in grade 9 (Rasinski et al., 2005) and with reading comprehension for students in grades 3, 5, and 7 (Rasinski, Rikli, & Johnston, 2009).

Fluency Instruction for Adolescents

Reading fluency is typically considered a skill learned in elementary school, therefore relatively few studies have examined reading fluency interventions for adolescents (Wexler, Vaughn, Edmonds, & Reutebuch, 2008). In their synthesis of fluency intervention literature for adolescent struggling readers, Wexler et al. found 19 studies that met the inclusion criteria, 18 of which involved some variation of repeated reading. Repeated reading was associated with increases in reading fluency for practiced passages and passages with a high level of word

overlap (Rashotte & Torgeson, 1985); however, there was less evidence to support the effectiveness of the intervention for unpracticed passages or for reading comprehension. Twelve of the eighteen studies reviewed involved participants listening to a fluent reader model the passage in addition to repeated reading (e.g., Rose & Beattie, 1986; Scott & Shearer-Lingo, 2002; Strong et al., 2004). Wexler et al. concluded that interventions that combined repeated reading and modeling appeared to be more effective than repeated reading alone. The study that did not involve repeated reading examined the effect of cueing participants to use fluency strategies (Allinder, Dunse, Brunken, & Obermiller-Krowlikowski, 2001). The authors noted that only 3 of the 19 studies used expository text for instructional passages (Daly & Martens, 1994; Shapiro & McCurdy, 1989; Valleley & Shriver, 2003) yet academic reading at the secondary level is primarily expository text.

Repeated reading. Repeated reading has been shown to improve reading fluency for practiced passages for adolescent struggling readers (Wexler et al., 2008). Gains in reading fluency have been shown to generalize to unpracticed passages in some studies (Strong et al., 2004; Therrien, Wickstrom, & Jones, 2006; Valleley & Shriver, 2003) but not in other studies (Steventon & Fredrick, 2003; Therrien & Hughes, 2008). Steventon and Fredrick used a single-case, multiple baseline design to examine the effect of adding repeated reading to instruction using Corrective Reading B2 (Englemann et al., 1999) with three adolescents who attended an alternative middle school for students with problem behavior. Although all three participants increased reading rate for practiced passages, none showed improvements in fluency for unpracticed passages taken from the same lesson. In contrast, Strong et al. found that when instruction using Corrective Reading was combined with repeated reading of leveled passages,

four of the six middle school students with EBD improved their reading fluency on both practiced and unpracticed passages.

Although reading fluency is a necessary skill for reading comprehension, improvements in fluency do not always lead to improvements in comprehension (Wexler et al., 2008). Positive effects on comprehension have been found with repeated reading alone (O'Shea, Sindelar, & O'Shea, 1987), combined with question generation (Therrien et al., 2006; Therrien & Hughes, 2008), and combined with vocabulary previewing (Hawkins, Hale, Sheeley, & Ling 2010). As with fluency, gains in comprehension as a result of interventions that included repeated reading have generalized to unpracticed passages and standardized comprehension measures in some studies (Fuchs, Fuchs, & Kazdan 1999; Strong et al. 2004; Valleley & Shriver, 2003), but not in others (Therrien et al.).

Therrien et al. (2006) evaluated the effect of repeated reading combined with the question generation strategy for 30 fourth through eighth grade students at-risk for reading failure. During instructional sessions, participants in the question generation (i.e., treatment) group were cued to read a passage quickly and accurately and reminded that they would answer comprehension questions after the reading. Participants reread the passage until the preset criterion was met for a maximum of four readings. After the final reading, participants were prompted to modify question generation prompts listed on a cue card. Afterward, participants answered comprehension questions specific to the passage read. Results indicated that the treatment group had significantly greater improvements than the control group for inferential questions for practiced passages. However, there was no significant difference between the groups for scores on the Woodcock-Johnson III Tests of Achievement (Woodcock, McGrew, & Mather, 2001) comprehension subtest from pretest to posttest.

Therrien and Hughes (2008) further examined repeated reading in an experimental group design study that compared the effects of repeated reading with question generation for 32 fourth through sixth grade students with LD or reading problems. Participants in the repeated reading group (n = 16) read a passage until a preset criterion was met or until the passage was read four times. Participants in the question generation group (n = 16) were instructed to read a cue card containing generic story structure questions and reminded that they would answer the questions after the reading. After reading the passage and receiving corrective feedback, participants used the generic questions to generate story structure questions about the passage and then answered the story structure questions. In both conditions, participants were asked comprehension questions at the end of the instructional session. The researchers reported that participants in the repeated reading group correctly answered significantly more factual questions than participants in the question generation group. No significant difference between the groups was found for the number of inferential questions answered correctly.

Modeling. Researchers (Wexler et al., 2008; Morgan & Sideridis, 2006) have indicated that listening to a fluent reader model a passage along with repeated reading can improve reading fluency for adolescents. One method of providing students with a model is through peer-assisted learning strategies (PALS; Fuchs et al., 1999) which combines repeated reading, modeling, and comprehension strategies. An extension of class-wide peer tutoring (Greenwood, Delquadri, & Hall, 1989), PALS involves the pairing of higher and lower achieving students who take turns reading aloud a passage. While one reads aloud a section of the passage, the other student listens. After each section, the pair works together to summarize the section and make predictions about the next. PALS has been shown to improve the reading fluency for adolescents on standardized

measures and unpracticed passages (Sutherland & Snyder, 2007) and to improve reading comprehension on a standardized comprehension measure (Fuchs et al.).

In addition to peer-to-peer literacy instruction, researchers (Therrien, 2004; Wexler et al., 2008) have suggested that listening to an audio-recorded model can improve the reading fluency abilities of adolescents. Listening to an audio-recorded model has been shown to be more effective than silent previewing (Daly & Martens, 1994; Skinner, Cooper, & Cole, 1997; Skinner & Shapiro, 1989) or no previewing (Rose & Beattie, 1986). Audio-recorded modeling of passages was found to be more effective for improving fluency than audio-recorded modeling of word lists (Daly & Martens, 1994). Additionally, modeling of the passage at a slower rate, reading approximately 50 words per minute, was found to be more effective than modeling of the passage at a faster rate, approximately 114 to 216 words per minute (Skinner et al.). Rose and Beattie found that both modeling by an adult in situ and audio-recorded modeling led to increases in the number of words read correctly per minute compared to baseline conditions in which no modeling occurred. For three of the four participants, modeling by an adult in situ led to greater increases than audio-recorded modeling.

Cues. Two studies (O'Shea et al., 1987; Allinder et al., 2001) have examined the effect of cues given during fluency instruction with adolescents and found that the type of cue given impacted the students' performance on reading tasks. O'Shea et al. compared the effect of repeated reading plus cues to read quickly and accurately versus cues to read for comprehension and found that those cued to read for comprehension had greater gains on the comprehension measure, which involved percentage of propositions given during story retell, than those cued to read quickly and accurately. There was no difference between groups for words read correctly per minute (WCPM). Similarly, Allinder et al. found that participants who were cued to use

fluency strategies scored significantly higher on curriculum based measures than those who were given generic encouragement.

Narrative versus expository text. One additional factor that may affect fluency outcomes is text type (i.e., narrative versus expository text). Although no studies were found that specifically examined the effect the type of text has on fluency for adolescents, researchers agree that by high school, instructional readings are predominately expository text, yet when text type was specified, most studies used narrative text for instruction (Wexler et al., 2008). Of the studies discussed in the preceding sections, only two (Hawkins et al., 2011; Valleley & Shriver, 2003) indicated that expository text was used for instructional passages. In both cases, passages from the Times Reading Series (Spargo, 1989) were used.

Fluency Instruction for Students with EBD

Vannest, Harrison, Temple-Harvey, Ramsey, and Parker (2011) reviewed single case design studies of academic interventions for students with EBD and calculated effect sizes (ES) using improvement rate differences (IRD), which, borrowed from the medical and insurance fields, report a percentage of improvement within a confidence interval (CI) for an intervention. The researchers grouped the interventions into 16 different categories, three of which contained studies with interventions that targeted reading fluency. Previewing, reading programs, and computer assisted instruction had average IRD ES of 71.01% (95% CI = 42.31-96.41), 52.6% (95% CI = 16.44-91.80), and 77.83% (95% CI = 47.30-100) respectively.

Several studies have evaluated interventions that addressed reading fluency for students with EBD that involved previewing by listening to a prerecorded model reading passages (Rose, 1984), a prerecorded model reading word lists (Shapiro & McCurdy, 1989; Skinner & Shapiro, 1989) or a live model reading passages (Skinner et al., 1997). Previewing was found to be more

effective than no previewing (Rose; Shapiro & McCurdy; Skinner & Shapiro) and modeling with a slower reading rate led to greater fluency gains than modeling with a faster reading rate (Skinner et al.).

Two studies evaluated the effect of reading programs on reading fluency skills for students with EBD (Lingo et al., 2006; Scott & Shearer-Lingo, 2002). Lingo et al. used a multiple probe design to evaluate the effect of Corrective Reading (Engelmann et al., 1999) on the reading skills of seven middle school students with reading difficulties and challenging behavior. After receiving Corrective Reading instruction for 45 minutes daily over a three month period, all participants demonstrated gains in WCPM for instructional and generalization passages, and six of seven participants demonstrated overall reading improvements from pre to post testing on the Woodcock Johnson Reading Mastery Test (Woodcock, 1998). Similarly, Scott and Shearer-Lingo used a multiple baseline across participants design to evaluate the effect phonics instruction and instruction using the Great Leaps Reading Program (GLRP; Campbell & Mercer, 1994) had on the reading fluency skills and on-task behavior of three seventh grade students with EBD. During the phonics instruction phase, participants received instruction using Teach Your Child to Read in 100 Easy Lessons (Engleman, Haddox, & Bruner, 1986), a program that focuses on letter-sound correspondence and blending. When GLRP was implemented, participants read phonic sounds, phrases, and passages as 1-minute timed readings and received feedback and error correction. Results indicated little improvement during phonics instruction, but all participants demonstrated improvements in reading fluency and on-task behavior with the implementation of instruction using GLRP.

Computer assisted instruction (CAI) was used in a study by Dawson, Venn, and Gunter (2000). Although included in the CAI category, the study compared a teacher model, a computer

voice model, and no model on passage reading fluency. Researchers found that the teacher model was more effective than the computer model, but the computer model was more effective than no model. More recently, Blankenship et al. (2005) used a multiple probe design to evaluate the effect of CAI using cognitive mapping on social studies chapter test and quiz scores of three high school students with EBD. All three participants improved in both test and quiz scores, with all scoring passing grades on chapter tests. Researchers suggested that CAI allows students to practice skills (Hall & Hughes, 2000) while freeing the teacher to assist more students (Rozali & Engel, 2005).

Researchers (Rasinski et al., 2005; Roberts, Torgeson, Boardman, & Scammacca, 2008, Wexler et al., 2008) agree that reading fluency instruction is an important but often neglected component of a comprehensive reading program. Although adolescents are primarily required to read expository text, most reading fluency studies have used narrative text for the intervention (Wexler et al.). Studies that addressed reading fluency for adolescents have frequently used repeated reading of text as the primary intervention. Results from these studies have demonstrated improvements in reading rate and accuracy for practiced passages, but fluency for unpracticed passages (e.g., Steventon & Fredrick, 2003) and reading comprehension improvements (e.g., Therrien et al., 2006) have been inconsistent. Evidence suggests that repeated reading combined with listening to a fluent model may increase reading fluency (e.g., Daly & Martens, 1994), and cues to read for understanding, rather than for increased speed (O'Shea et al., 1987), may improve reading comprehension. Finally, researchers have found that prerecorded models are comparable to live models for improving reading fluency (Rose & Beattie, 1986).

Few studies have addressed reading fluency interventions for adolescents with emotional behavior disorders or behavioral difficulties (Garwood et al., 2014; Kostewicz & Kubina, 2008). Of these studies, none have used targeted expository text. No studies have combined listening to a prerecorded fluent model with cues to read for understanding for adolescent students. Thus, the purpose of the current study was to extend the body of literature on reading fluency interventions for adolescents with behavioral difficulties and EBD or other health impairment (OHI) by examining a fluency intervention consisting of: (a) listening to a prerecorded fluent model, (b) receiving cues to read for comprehension, and (c) repeated reading of an expository text.

Research Questions

The study addressed the following questions:

1. For middle school students with behavioral difficulties and either EBD or OHI, is there a functional relation between repeated reading with prerecorded audio modeling and cues to read for comprehension and student reading fluency skills as measured by (a) words read correctly per minute, and (b) errors for practiced and unpracticed passages?
2. For middle school students with behavioral difficulties and either EBD or OHI, is there a functional relation between repeated reading with prerecorded audio modeling and cues to read for comprehension and student reading comprehension skills as measured by the percentage of correct responses on passage comprehension questions for practiced and unpracticed passages?
3. For middle school students with behavioral difficulties and either EBD or OHI, is there a functional relation between repeated reading with prerecorded audio modeling and cues to read for comprehension and student on-task behavior as measured by percentage of time on task?

4. Do students with behavioral difficulties and EBD or OHI find repeated reading with prerecorded audio modeling and cues to read for comprehension to be a socially valid for supplemental reading instruction?

Methodology

Setting

This study took place in a suburban public middle school in a large metropolitan area in the southeastern United States. The school served over 1800 students in grades 6, 7, and 8. The majority of the students, approximately 60%, were Hispanic, 30% were African American, 5% were Asian, 3% were white, 2% were two or more races. The school was classified a school-wide Title 1 school with 94% percent of students participating in the free or reduced lunch program. All study sessions took place in a classroom that contained student desks and two computer stations. Only study participants and research personnel were present in the room.

Participants

Participants for this study were selected from among students receiving special education services who had at least one Individual Education Plan (IEP) goal that addressed reading skills and, in addition to behavioral difficulties addressed by a behavior intervention plan (BIP), had a primary special education eligibility of either Emotional and Behavior Disorders (EBD) or Other Health Impairment (OHI). In the state where the study took place, eligibility criteria for EBD and OHI categories paralleled the definitions outlined in the Individuals with Disabilities Education Improvement Act (2004). Students with an OHI eligibility who did not have a behavior intervention plan in place were excluded because these students did not have documented evidence of behaviors that impacted their academic performance.

In addition to having a BIP and an eligibility of EBD or OHI, participants had to score in the below average or poor range for Oral Reading Index (ORI) of the Gray Oral Reading Test, Fifth Edition (GORT-5; Wiederholt & Bryant, 2012). Participants also had to read between 58 and 137 words correct per minute (WCPM) on fourth to sixth grade level screening passages (Hasbrouck & Tindal, 2006) to ensure that students' reading skills were at a level appropriate for the proposed intervention.

Three eighth grade students met the inclusion criteria for the study. Each participant chose a pseudonym that was used on all study materials. Two of the students, Barry and Justin, were identified with OHI and had a BIP. The third student, Mike, was identified with EBD. None of the participants had a secondary eligibility.

Mike received language arts, science, and social studies instruction in a co-taught classroom where a general education teacher and a special education teacher, the researcher, shared the responsibilities of teaching the class. He received math instruction in a special education resource classroom. Mike's BIP denoted that he had difficulties with verbally disrupting instruction and arguing with teachers. The school psychologist noted on Mike's most recent psychoeducational evaluation that his score on the test of intellectual achievement may not accurately represent his ability because his behavior at the time interfered with testing.

Barry received language arts and math instruction in a special education resource classroom, each taught by a special education teacher. He received science and social studies instruction in co-taught classrooms, which were each taught by a general education and special education teacher. Barry's behavior intervention plan pointed out issues related to fighting and verbally disrupting instruction.

Justin received all instruction, including language arts, in a self-contained classroom for students with EBD. Justin's classes were taught by a special education teacher with paraprofessional support. His behavior intervention plan indicated problems associated with verbally disrupting class and failing to follow teacher instructions.

Descriptive data for each participant, including age, race, score from most recent school system administered test of intellectual achievement, and overall reading fluency and comprehension scores from the GORT-V (Wiederholt & Bryant, 2012) are provided (see Table 2.1). During the time of the study, the primary author was employed at the middle school where the study took place and served as the special education language arts teacher for Mike and Barry.

Table 2.1. Demographic Characteristics of Participants

Participant	Age	Race/ Ethnicity	IA ^a	Primary Disability	GORT-V			Book Level ^e
					Fluency	Comprehension	ORI ^d	
Mike	15	African American	86	EBD ^b	11-9	11-3	86	3
Justin	14	Hispanic	87	OHI ^c	7-9	7-3	70	1
Barry	15	African American	88	OHI ^c	8-3	8-0	73	1

Note. Fluency and Comprehension scores from the GORT-V are reported as age equivalents. ORI is a standard score with a mean of 100 and a standard deviation of 15.

^aIA = Intellectual Achievement. ^bEBD= Emotional Behavior Disorder. ^cOHI= Other Health Impairment. ^dORI = Oral Reading Index. ^eBook Level= level in Timed Readings Plus in Science (2003) or Timed Readings Plus in Social Studies (2004)

Materials

Passages. All passages used in this study were from the *Timed Readings Plus in Science, Book 1* (2003), *Timed Reading Plus in Science, Book 3* (2003), *Timed Readings Plus in Social Studies, Book 1* (2004), and *Timed Readings Plus in Social Studies, Book 3* (2004). These books were chosen because they provided expository text, the type of reading most frequently required in middle and high school. Each passage contained approximately 225 (with a range of 202 – 248) words followed by 15 comprehension items. Books one and three, with readability of fourth and sixth grade, respectively, were chosen for the study based on the participant's performance on the screening measures – the GORT-V (Wiederholt & Bryant, 2012) and a reading of passages as described in the next section. The researcher verified the reading level of each passage. Each passage was typed and saved in Microsoft Word. The passage was copied and pasted electronically into the Oral Reading Fluency Passage Generator (Wright, n.d.). The passage generator computed the Flesch-Kincaid reading level and provided a running count of words at the end of each line of text. Participants were randomly assigned passages from both the science and social studies series on their instructional level.

Audio Recordings. The modeled reading and the students' readings were audio recorded using a personal laptop computer, a microphone, and the RecordPad Sound Recorder (RPSR; Version 5.28). The RPSR application was used to audio record an adult modeling fluent reading of each passage used in the study. Modeled passages were read with appropriate vocal inflection and phrasing and at a rate of approximately 180 words per minute. Each audio recorded passage was checked by a graduate assistant for clarity and accuracy. The model used the generated passage that would be used by participants to record the passages, and the graduate assistant used

the original text to check for accuracy. Discrepancies in either the modeling or the printed passages were noted by the graduate assistant and corrected by the researcher.

The voice activation feature of RPSR (Version 5.28) was used so that when the participant pressed the button to begin recording, the recording and timer did not actually begin until the participant began reading aloud. For the one-minute fluency measures, the timer and audio recorder were set to automatically stop and give a signal (i.e., “beep”) after one minute. The audio recordings were automatically saved to the computer hard drive. At the end of each session, the researcher saved the audio recordings to a flash drive for further analysis, and removed them from the computer’s hard drive at the end of each week. The researcher transferred the audio recordings from the flash drive to a password-protected computer.

Measures

Reading Achievement. The GORT-V (Wiederholt & Bryant, 2012) was used as a screening instrument. The GORT-V is a standardized, individually administered, norm-referenced test that provides a scaled score for reading fluency and comprehension, and it provides an Oral Reading Index (ORI), a standard score derived from the combination of the fluency and comprehension scaled scores. The coefficient alpha for the ORI for 14 and 15 year olds (the ages of the participants in the present study) was .97. The GORT-V consists of timed oral reading passages, each followed by five comprehension questions. During administration of the GORT-V, the participant was asked to read each passage aloud while the examiner timed the reading and marked the errors made. After reading the passage, the participant was asked to answer five comprehension questions. Scores were calculated for each passage read. The time taken to read the passage and the number of errors made were converted to a rate score and an accuracy score. The reading fluency raw score was calculated by determining the sum of the rate

and accuracy scores. The comprehension raw score was calculated by determining the sum of the number of questions answered correctly. A total of 14 passages were included, but starting points, basals, and ceilings were used so that the actual testing time was approximately 30 minutes for each participant. Raw scores for rate, accuracy, fluency (i.e., a sum of rate and accuracy) and comprehension were converted to scaled scores. Age equivalent and percentile rank were calculated for each. The sum of the fluency and comprehension scaled scores was used to determine the Oral Reading percentile rank and ORI, a standard with a mean of 100 and a standard deviation of 15.

Reading Fluency. During baseline, intervention, and generalization, reading fluency, operationalized as rate and accuracy, was measured by calculating WCPM and errors for passages read aloud by participants. The participant was audio recorded for one minute while reading the passage. The participant completed the reading, but only the first minute of the audio recording was used for determining WCPM. After the session, the researcher listened to the audio recording of the participant reading the passage and marked errors on a copy of the passage. The researcher marked a horizontal line through each word pronounced incorrectly or omitted and a caret (^) in the space between words where an additional word was inserted. If the participant self-corrected a missed word, the researcher marked 'sc' above the word, and the word was counted as correct. The researcher recorded the total number of words read in one minute and the number of errors on the data sheet (see Appendix A). The researcher subtracted the number of errors made from the total number of words read and entered the difference in the WCPM column on the data sheet.

Reading Comprehension. For baseline and intervention sessions, reading comprehension was measured using 15 comprehension questions found at the end of each B-

passage from *Timed Reading Plus in Science* or *Timed Reading Plus in Social Studies*. For each passage, there were three multiple-choice items for each of the following areas (for a total of 15 questions): (a) using context clues to determine meaning or words in text, (b) determining whether statements were fact or opinion, (c) identifying the order of events from the passage, (d) making inferences, and (e) distinguishing the main idea of the passage from statements that were too broad or narrow. The percentage of comprehension questions answered correctly was calculated by dividing the number answered correctly by the total number of questions.

On-Task Behavior. During each baseline and intervention sessions, on-task behavior was assessed every 10 seconds using momentary-interval recording (Kennedy, 2005). During baseline phase, on-task behavior was assessed during the participants' reading/language arts class. During intervention sessions, on-task behavior was measured during the first six minutes of each session (see Appendix B). On-task behavior was defined as performance of the required task (i.e., looking at the passage when directed to follow along while listening to the model, reading aloud, or manipulating the mouse to activate the audio recorder). Off-task behavior was defined as any behavior that diverted the student's attention from the required task (e.g., looking around the classroom, talking to others in the room unless directed to do so as part of the lesson, leaving the work area, or sitting with eyes closed). Each behavioral observation session was 6 minutes in length, which was divided into 36 10-second intervals. The researcher and the graduate assistant conducting IOA used the smartphone application *Intervals, an ABA Interval Recording App* (elocinSoft, 2012) to record behavioral data. At the end of each 10-second interval, the Smartphone vibrated to alert the researcher to press "yes" or "no" to indicate whether the student was on task at that moment. The device automatically resumed with the next interval. Data from the session were recorded from the smartphone onto the data collection form

for on-task behavior. For each observation, raw data were converted to the percentage of moments on task by dividing the number of moments in which the participant was on task by the total number of observed moments and multiplying the quotient by 100. For example, if a participant was on-task during 25 of the 30 moments sampled, the percentage of time was calculated as follows: $25/30 \times 100 = 83\%$.

Effect Size. Effect sizes for WCPM and on-task behavior were calculated using percentage of nonoverlapping data (PND; Scruggs, Mastropieri, & Casto, 1987) and Tau-*U* (Parker, Vannest, Davis, & Suber, 2011). To calculate PND for WCPM and on-task behavior, the number of intervention data points that exceeded the highest point in baseline was divided by the total number of data points in baseline and the quotient was multiplied by 100. Using the online Tau-*U* calculator (Vannest, Parker, & Gonen, 2011), Tau-*U* was calculated separately for each participant. Effect sizes for Tau-*U* were interpreted based on Rakap (2015). Scores of .93 or greater were considered very effective. Scores from .66 to .92 were considered effective, and scores of .65 or less were considered questionable or ineffective.

Social Validity. Social validity was assessed using a brief questionnaire. Five questions addressed the participants' opinions about the effectiveness and acceptability of the intervention (see Appendix C). Participants completed the questionnaire after completing all intervention sessions.

Fidelity. Threats to the internal validity of study results were addressed through assessment of intervention fidelity. Three of the dimensions of fidelity described by Dane and Schneider (1998) were assessed: (a) adherence to intervention procedures, (b) amount of exposure to the intervention, and (d) program contamination.

Adherence to intervention procedures was addressed through observations of intervention sessions by a trained graduate assistant. Prior to the beginning of the study, the intervention was analyzed to determine the steps required to complete an intervention session. A list of 15 required steps was developed (see appendix D). For intervention sessions observed for fidelity, the graduate assistant identified the number of steps adhered to during the session. The number of steps completed was divided by the number of relevant steps for that session in order to determine the percentage of steps completed.

The researcher assessed the amount of exposure to the intervention by examining audio recordings of participants' readings and attendance logs. Each reading had a date and time stamp saved on the computer which allowed the researcher to track the amount of time the participant read and the amount of time between readings. The researcher noted in the daily log the date and time that the participant began and ended the session (see Appendix E). Program contamination was assessed by examining the language arts lesson plans to determine whether repeated reading was used as an instructional strategy during the time of the intervention.

Interobserver Agreement for Reading Fluency. Interobserver agreement (IOA) for reading fluency was evaluated by a second observer, a graduate assistant, who listened independently to the audio recordings and recorded data in the same manner as the researcher as described in the dependent variables section above. Prior to IOA data collection, the graduate assistant, who had experience collecting data for WCPM, was trained by the researcher. Guidelines for determining reading errors were provided and reviewed. After discussing the procedures, the graduate assistant evaluated a passage recording using IOA procedures. Responses were reviewed together by the researcher and graduate assistant. During the IOA

training session, the graduate assistant followed 100% of steps for collection of IOA data with 100% accuracy for marking WCPM errors.

The researcher collected data for WCPM and errors for each audio recorded passage reading during each session. The graduate assistant used the same procedures for 25% of passages across all phases of the study. Interobserver agreement was determined using the point-by-point approach (Kazdin, 2011). After both observers (i.e., the researcher and the graduate assistant) marked errors on a copy of the passage, the researcher calculated IOA by determining whether they agreed or disagreed on the rating of each word in the passage (i.e., if both count a word as an error, one 'agree' is counted). The number of times the observers agreed was then divided by the sum of agreements and disagreements, and the quotient was then multiplied by 100 to obtain the percentage of IOA.

Interobserver Agreement for On-task Behavior. A second observer, a trained graduate assistant, observed 22% of baseline and intervention sessions and simultaneously collected data for on-task behavior. Prior to data collection for the study, a training session was conducted. The graduate assistant was provided with guidelines for determining on-task behavior. During a session, both the researcher and the graduate assistant observed a participant and collected data for on-task behavior. After observing, the discrepancies between data collected by the assistant and the researcher were discussed.

During sessions with the second observer present, the researcher and graduate assistant each used their own device to simultaneously engage *Intervals, an ABA Interval Recording App* (elocinSoft, 2012) so that data collection intervals were synchronized. After the session, each observer transferred the data from their device to a data collection form and calculated the percentage of moments observed on task. The percentage of agreement between the two

observers was calculated by dividing the smaller percentage of moments on task by the larger percentage of moments and task and multiplying the quotient by 100.

Design

This study used a multiple baseline across participant design (Kazdin, 2011) to examine the effect of repeated reading with prerecorded audio modeling and cues to read for comprehension on the reading fluency skills, reading comprehension skills, and on-task behavior of middle school students with EBD or OHI and behavioral difficulties. Participants' WCPM for timed reading of passages was used to determine phase changes. All three participants began in baseline phase, and all remained in baseline until Participant One (Mike) had a minimum of five WCPM data points and stability as evidenced by all data points falling within 50% of plus or minus the baseline mean. Once criteria were met, Participant One moved to intervention phase. Participants Two (Barry) and Three (Justin) remained in baseline phase until participant one had a minimum of three data points that indicated a) an upward trend, b) stability, and c) 100% nonoverlapping data (i.e., all scores are above baseline scores), or until five data points had been collected. When Participant One met the criteria, the second participant who had met the criteria for baseline stability (i.e., a minimum of five data points that fell within 50% of plus or minus the mean) advanced to intervention phase. Once the second participant met the intervention phase criteria described above, the third participant, having demonstrated a stable baseline, advanced to intervention phase.

Procedures

Screening. Each potential participant's case manager, a special education teacher responsible for overseeing the student's IEP, sent a form home with the student requesting parental permission to allow the student to participate in the study. For one student, whose

families spoke Spanish at home, the permission form was provided in Spanish. The students who returned signed consent forms received the student assent form. The form was read aloud to the student in an empty classroom. Once parental permission and assent were obtained, participants were screened for participation in the study. Participants were administered the GORT-IV (Wiederholt & Bryant, 2012) by the researcher and the data were entered onto the GORT Screening Form (see Appendix F) to determine study participation eligibility. All three participants' ORI fell in the below average or the poor range, which indicated weaknesses in reading skills, therefore the final screening was administered to each.

Assessment of instructional level and final screening. Using a modified version of procedures described by Hawkins et al. (2010) to determine the participants' instructional level was used. First, based on the GORT-IV grade equivalent score, each participant was asked to read three *Timed Reading Series Plus in Science* (2003) passages on his reading level. The participant read the passage for one minute while the researcher marked errors on a separate copy of the passage. After each reading, the researcher counted the errors and subtracted the errors from the total number of words read to determine WCPM for the passage. The mean WCPM for the three passages was used to determine whether the passages were at an instructionally appropriate level or if higher or lower level passages were needed, based on norms from Hasbrouck and Tindal (2006). The criterion for each grade level was as follows: fourth grade level, 58-104 WCPM, fifth grade level, 75 - 120 WCPM, and sixth grade, 88 – 137 WCPM. If the mean WCPM exceeded the criterion for a particular grade level, the researcher had the participant read three passages from one grade level higher. If the mean fell below criterion, then the researcher had the participant read three passages from one grade level lower. The instructional level was the highest level at which the participant met the criterion. Had a

participant scored below the minimum for fourth grade, he would have been excluded from the study because the materials used in the study were for those reading at or above the fourth grade level. Had a participant scored above the sixth grade level, he would have been excluded from the study because his instructional level would not have been significantly lower than his actual grade level (see Appendix G). Following screening, Mike was assigned to *Book 3* of both *Timed Readings Plus in Science* and *Timed Readings Plus in Social Studies* (approximately sixth grade level) and Barry and Justin were assigned to *Book 1* of both *Timed Readings Plus in Science* and *Timed Readings Plus in Social Studies* (approximately fourth grade level).

Baseline. During baseline conditions, participants continued to receive language arts instruction as usual. The researcher conducted baseline sessions with participants individually in a classroom with no more than two other students present. All baseline sessions took place in the morning before school except one session each for Mike and Barry which took place during a break in the afternoon. During each baseline session, the participant was presented with a copy of a passage at his instructional level. The researcher asked the participant to read the passage aloud. On the computer designated for the study, the researcher clicked on the RPSR record icon. The participants wore the earphone/microphone headset so in order to record the passage. The audio recording was activated as soon as the participant began reading and stopped after one minute. Because the participant was required to answer comprehension questions about the passage, he continued reading until he reached the end of the passage, but only the first minute of the reading was audio recorded and used for data collection. The researcher gave the participant a worksheet containing 15 passage comprehension questions. The participant marked his answers on the sheet and returned the sheet to the researcher. The researcher gave the student a pass to return to his class. The researcher saved the audio recording on the computer and renamed the

audio recording file so that the participant's pseudonym was in the file title. The researcher later analyzed the audio recording and entered the number of errors, the total number of words read, and WCPM along with the percentage of questions answered correctly on the participant's data collection form (see Appendix A). The audio recorded sample was saved in order to calculate interobserver agreement. This procedure was repeated for all participants for all baseline sessions.

Baseline conditions were in effect for each participant for a minimum of five sessions. After five sessions, Mike established a stable baseline for WCPM that is all of his data points fell within 50% of the mean of baseline scores and no upward trend was noted, therefore, he was moved to the intervention phase of the study. Barry and Justin continued in baseline until Mike met the criteria for the next participant to advance to intervention. Analysis of the third, fourth, and fifth intervention session data indicated that Mike had stable data, an upward trend, and 100% PND, the criteria required for the next participant to advance to intervention. At this point in the study, both Barry and Justin had stable baseline data with the required number of data points. However, because the researcher had been unable to collect an adequate amount of baseline behavioral data for Justin, he was held in baseline and Barry advanced to intervention. During intervention, Barry's data for WCPM were stable, but he had overlapping data and a downward trend. Since Barry failed the other criteria, Justin was advanced to intervention based on the criterion that Barry reached five intervention data points.

Intervention. Prior to beginning intervention, the researcher taught each participant to log onto the computer and to use the RPSR to listen to the model, to record himself reading, and to listen to the recording of his reading. After teaching the participant to use the program, the participant was given a practice passage and asked to follow the steps of the intervention. The

participant was instructed to read at a pace that would allow him to be able to answer comprehension questions after the reading. The researcher observed the participant and recorded the number of intervention steps the participant correctly performed. This number was converted to a percentage. When the participant performed 100% of the steps in the appropriate order, the researcher allowed the participant to advance to the intervention phase and data collection resumed.

Intervention sessions were conducted daily with participants who voluntarily came before school to the classroom where sessions were held. All sessions took place before school except for two sessions for Mike and one session for Barry. These three sessions took place in the afternoon during a break in the same classroom as the morning sessions, and there were no other students present during the session. Sessions were not held on days when state-mandated testing, district testing, or school-sponsored activities conflicted with session times (all of which occurred during the study). For each intervention session, participants were given a paper copy of the day's passage and directed to sit in front of the computer and put on headphones connected to the computer. A cue to read for comprehension was typed on a piece of paper and posted next to the computer. The cue reminded participants that they would be asked comprehension questions after reading. Each participant signed onto the computer by clicking on his clip art picture and entering his password. Then, the participant used the mouse to select the icon for day's passage. The participant listened and followed along reading as the prerecorded audio model read the passage aloud. At the end of the reading, the participant pressed the audio record button on the RCRP program and read the passage. The voice-activated audio recording began when the student began reading and stopped after one minute. Next, the participant listened to his audio recording. Finally, the participant read the passage again while audio

recording. For this reading, the participant continued reading, after the audio recording stopped, until he reached the end of the passage. After the final reading, the participant answered the fifteen corresponding multiple choice comprehension questions on the worksheet provided. The investigator analyzed the audio recording and noted the number of errors, the total number of words read, and WCPM. In addition, the percentage of questions answered correctly for each session was noted.

Generalization Probes. After the fifth intervention session, a generalization probe was conducted with each participant at the next session. The procedures used were the same as those used during baseline sessions. The passages for the generalization probe was taken from the same level and series. After reading the passage, the participant answered 15 multiple choice passage comprehension questions. In the same manner as baseline and intervention sessions, the researcher entered the number of words read, errors, WCPM, and percentage of questions answered correctly on the data collection form.

Results

Reading Fluency

Reading fluency results are reported for WCPM (see Figure 2.1) and number of errors (see Figure 2.2). For each participant, effect sizes are reported using both percentage of nonoverlapping data and Tau-*U* (see Table 2.2). Because percentage of nonoverlapping data were more consistent with visual analysis of data than Tau-*U*, only percentage of nonoverlapping data are discussed in subsequent sections.

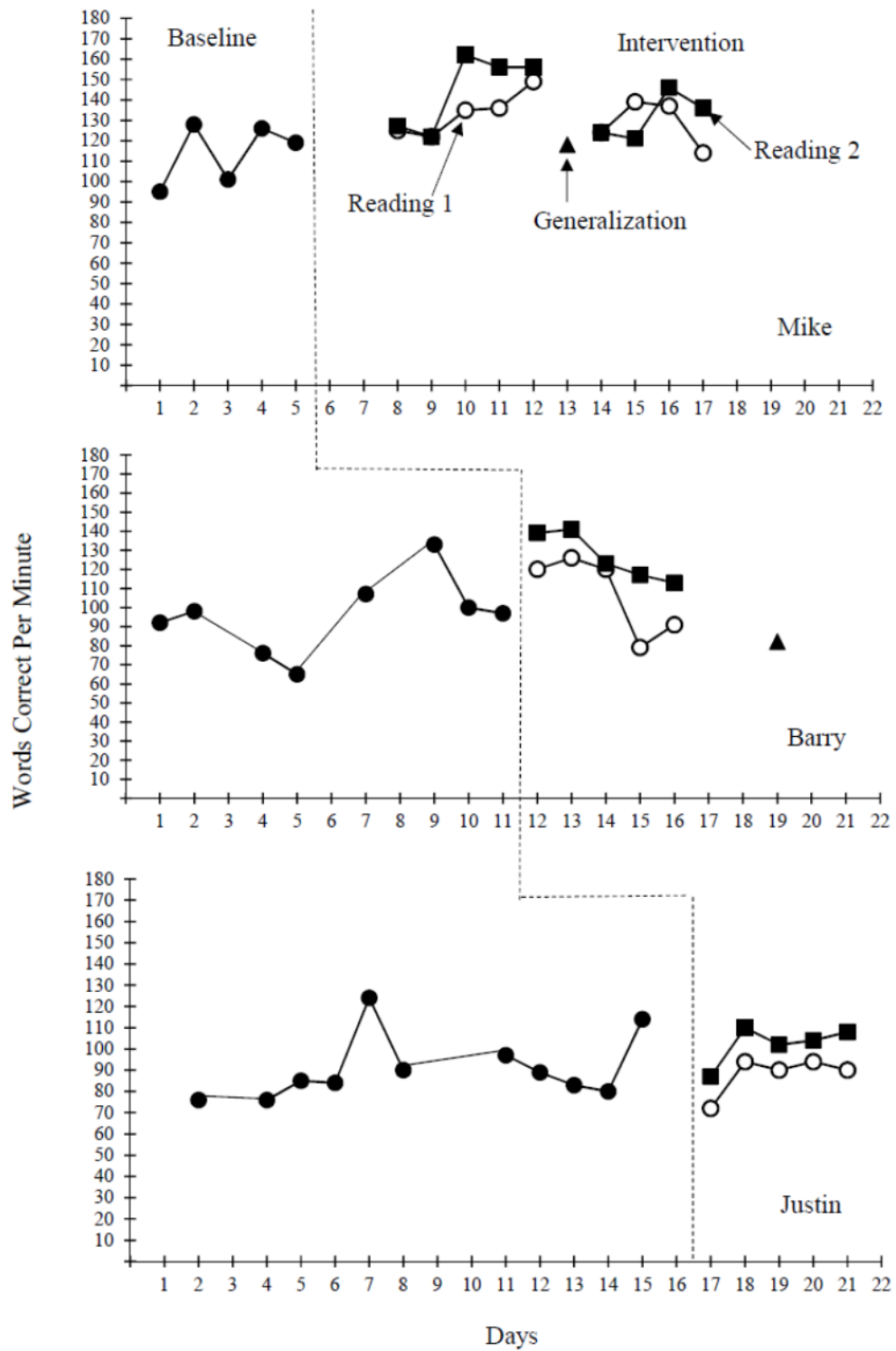


Figure 2.1. Words Correct per Minute

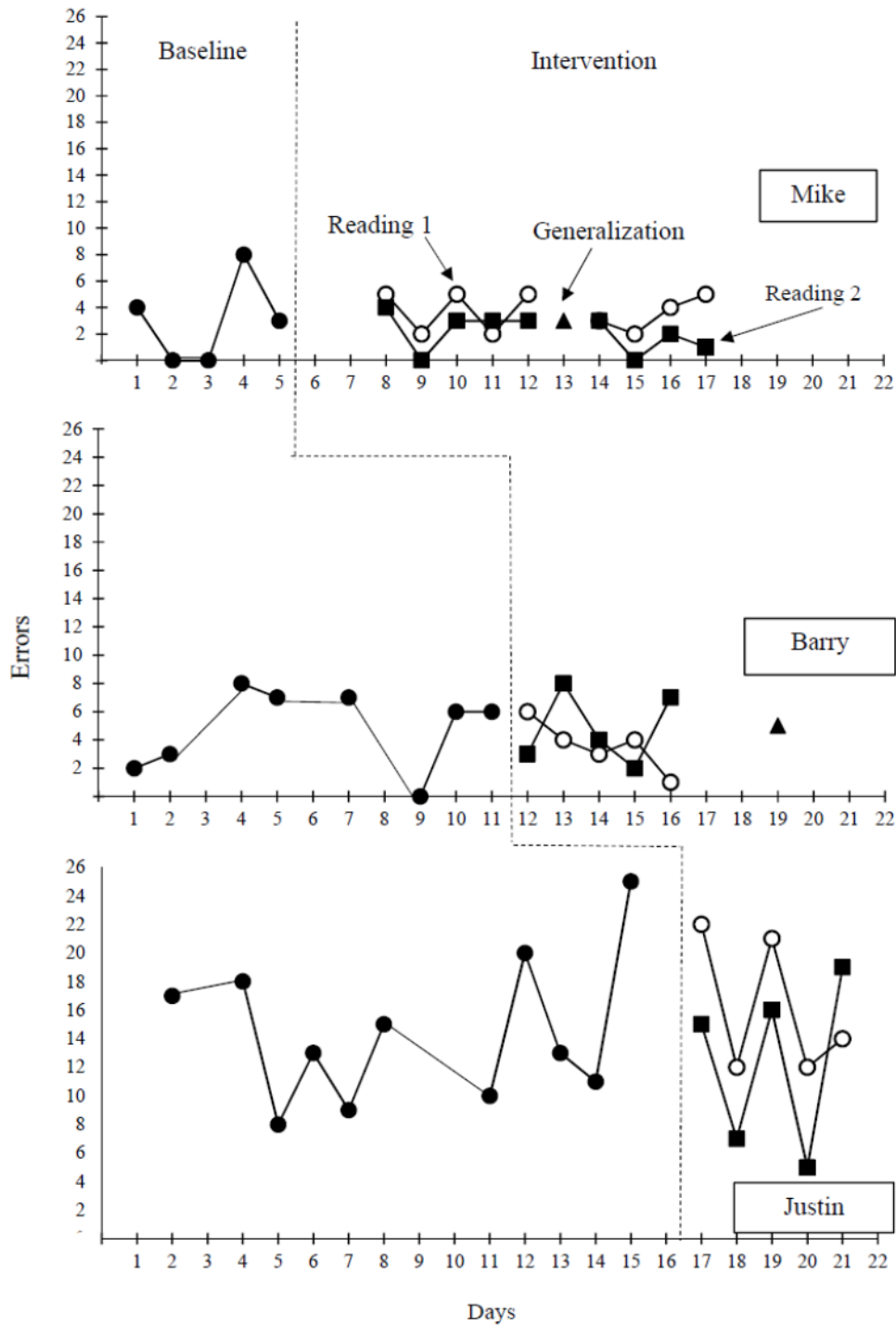


Figure 2.2. Errors

During baseline, Mike read a mean of 113.8 WCPM (range = 95-128) with a mean of 3 errors (range = 0-8). During intervention, Mike read a mean of 134.89 WCPM (range = 119-154) with a mean of 3.67 (range = 2-5) errors for the first reading of the passage and a mean of 138.89 WCPM (range = 121-162) with a mean of 2.11 errors (range = 0-8) on the second reading of the passage. Mike completed one generalization session during which he read 118 WCPM with 3 errors. Mike's rate of nonoverlapping data was 56% for WCPM for both readings of the passages.

Table 2.2. Tau-*U* Effect Sizes for WCPM, Errors, and On-Task Behavior for All Participants

		Tau	<i>p</i> -Value	90% C.I. ^a	Degree of Effect
Words Correct per Minute					
Mike	R1 ^b	0.60	0.07	0.05 to 1.15	Ineffective
	R2 ^c	0.69	0.04	0.14 to 1.24	Effective
Barry	R1	0.25	0.46	-0.31 to 0.81	Ineffective
	R2	0.85	0.01	0.29 to 1.41	Effective
Justin	R1	0.13	0.69	-0.401 <> 0.65	Ineffective
	R2	0.53	0.10	< -0.01 to 1.06	Ineffective
Errors					
Mike	R1	0.22	0.50	-0.33 to 0.77	Ineffective
	R2	-0.13	0.69	-0.68 to 0.42	Ineffective
Barry	R1	-0.33	0.34	-0.89 to 0.24	Ineffective
	R2	0.03	0.94	-0.54 to 0.59	Ineffective
Justin	R1	0.09	0.78	-0.44 to 0.62	Ineffective
	R2	-0.18	0.57	-0.71 to 0.35	Ineffective
On-Task Behavior					
Mike		1	<0.01	0.47 to 1.53	Very Effective
Barry		0.83	0.01	0.29 to 1.38	Effective
Justin		0.75	0.03	0.19 to 1.31	Effective

Note. ^aC.I.= Confidence Interval; ^bR1 = Reading 1; ^cR2 = Reading 2

Barry read a mean of 96 WCPM (range = 65-133) with a mean of 4.88 errors (range = 0-8) for baseline passages. During his five intervention sessions, Barry read a mean of 110.8 WCPM (range = 83-130) and 3.6 errors (range = 1-6) on his first reading of passages, and a mean of 126.6 WCPM (range = 113-141) and 4.8 errors (range = 2-8) on the second reading of passages. During his generalization session, Barry read 82 WCPM with 5 errors. Barry's rate of nonoverlapping data was 0% and 40% for WCPM for the first and second readings respectively.

Justin read a mean of 90.73 WCPM (range = 76-124) and 14.45 errors (range = 8-25) for baseline phase. During intervention phase, Justin read a mean of 88 WCPM (range = 72-94) with 16.2 errors (range = 12-22) on the first reading and a mean of 102.2 WCPM (range = 87-108) and 12.4 errors (range = 5-19) on the second reading of the passage. Justin was the last participant to advance to the intervention phase, and because the school year ended, he was unable to complete a generalization session. Justin's rate of nonoverlapping data was 0% for WCPM for both readings of the passages.

Reading Comprehension

None of the participants increased the percentage of comprehension questions answered correctly from baseline to intervention (see Figure 2.3). Mike, who had the highest score among the participants on the GORT-5, demonstrated the greatest decrease. During baseline he answered a mean of 75% of comprehension questions correctly (range = 66.67-86.67). During intervention, he answered a mean of 70.37% of comprehension questions correctly (range = 53.33-86.67). On the generalization passage, Mike answered 73.33% of questions correctly. During baseline, Barry answered a mean of 41.67% of questions correctly (range = 20-60), and during intervention he answered a mean of 40% of questions correctly (range = 20-53.33). Barry answered 46.67% of questions correctly for the generalization passage. During baseline, Justin

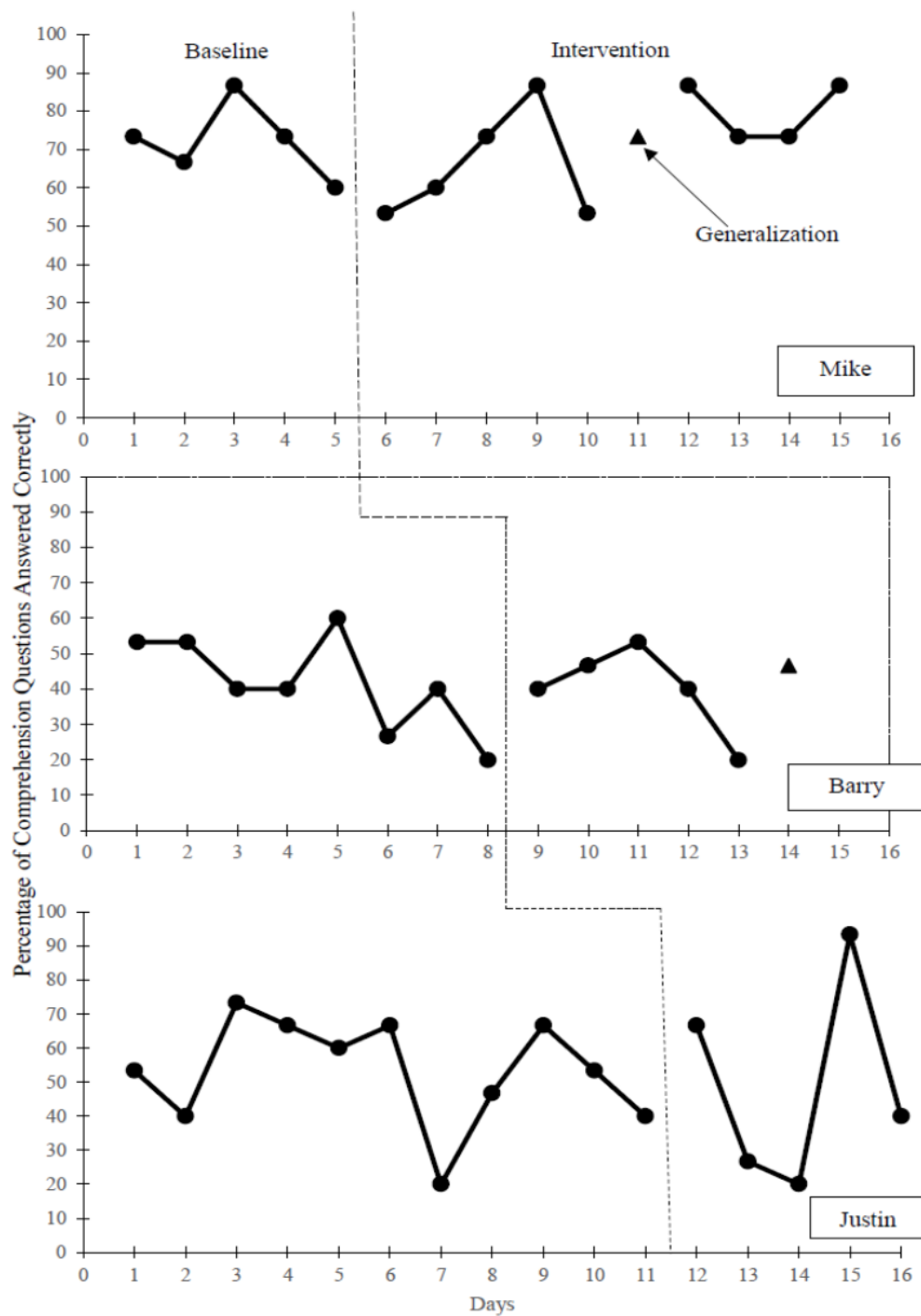


Figure 2.3. Percentage of Comprehension Questions Answered Correctly

answered a mean of 53.33% of comprehension questions (range = 20-73.33), and during intervention he answered a mean 49.33% of questions correctly (range = 20-93.33). For Justin and Barry, the mean decreased, but the range of scores remained the same.

On-task Behavior

Data for on-task behavior were collected during baseline and intervention sessions (see Figure 2.3). All three participants demonstrated improvements in on-task behavior from baseline to intervention phase. Mike and Justin each had 100% nonoverlapping data; Barry had 83% nonoverlapping data.

Mike's mean on-task behavior during baseline was 6.6% of observed intervals (range = 0-33). During intervention, his mean on-task behavior increased to 100% of observed intervals.

The mean of Barry's on-task behavior during baseline was 49.61% of observed intervals (range = 0-100). During intervention, his mean on-task behavior increased to 98.61% (range = 91.67-100).

Justin had the highest rate of on-task behavior during baseline conditions. He was found to be on-task a mean of 79.55 percent of observed intervals (range = 0-100 percent). Although Justin was off task throughout the first baseline observation, he was on task for the majority of intervals in subsequent observational sessions. During intervention, Justin was on task for 100% of observed intervals.

Fidelity

Procedural fidelity. During 17% of intervention phase sessions, a graduate assistant conducted observations of sessions and reported the percentage of steps of the intervention that were observed. Adherence to intervention procedures was 100% of steps during observed sessions.

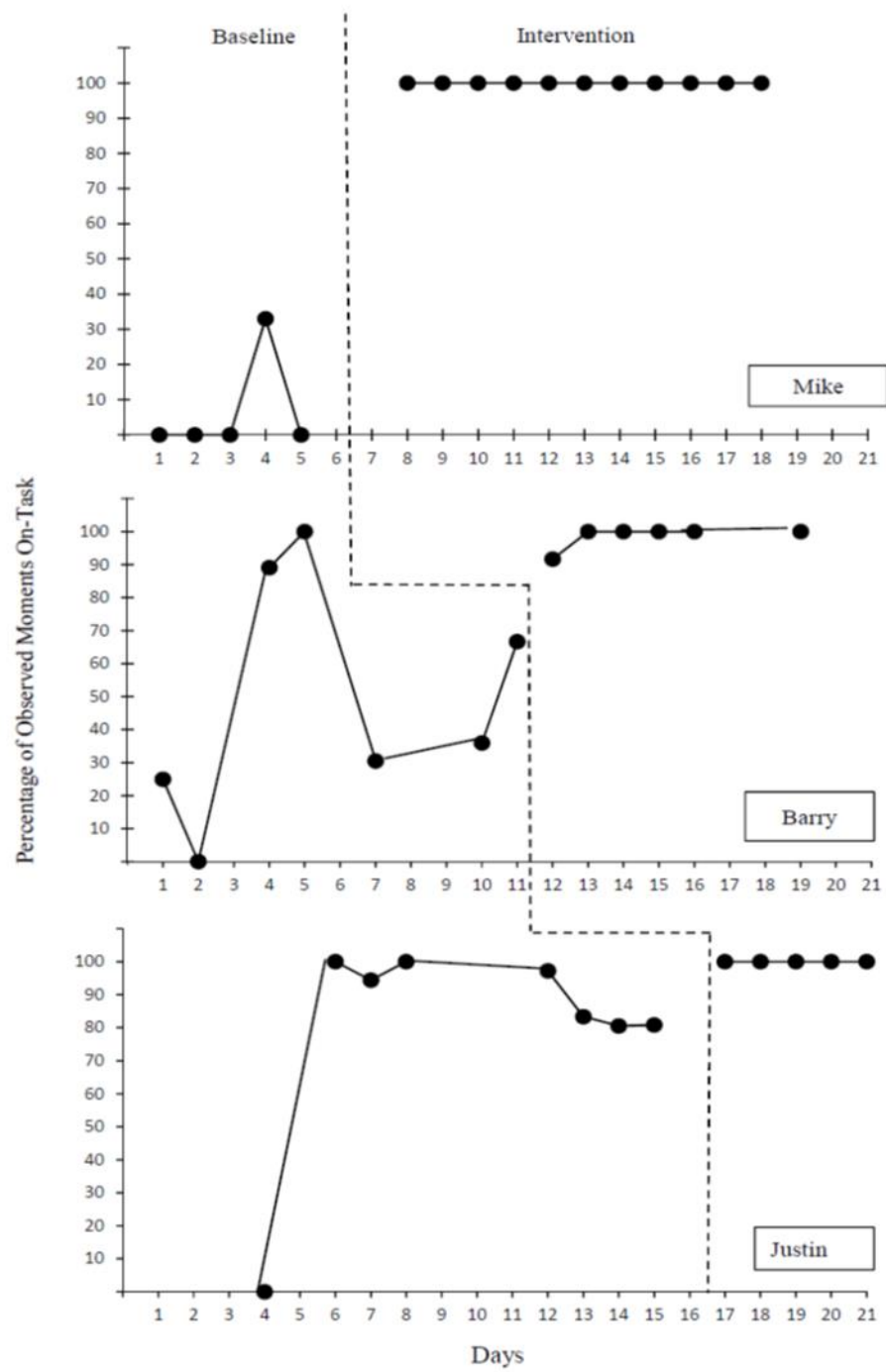


Figure 2.4. Percentage of Observed Moments On-Task

Amount of Exposure. Intervention exposure was assessed using session logs and audio-recorded readings to determine the amount of time each participant was engaged during each intervention session. Mike participated in a total of nine intervention sessions over a three-week period with a mean of 7 minutes per session (range = 6-9 minutes). Barry participated in 5 intervention sessions with a mean of 6.6 minutes per session (range = 6-7 minutes), and Justin participated in 5 intervention sessions with a mean of 6.7 minutes per session (range = 6-8). Observation during sessions and analysis of audio-recorded readings indicated that all three participants completed all required steps for each intervention session.

Program Contamination. Observations during participants' typical language arts instruction and analysis of teacher lesson plans indicated that participants were not exposed to repeated reading strategies during the weeks in which the study took place. All the eighth grade language arts teachers, including those serving students with disabilities, followed a school district instructional calendar and met weekly to plan instruction met curriculum requirements. For all three participants, the focus of the lessons that occurred during their language arts classes in the weeks in which the study took place was either review of language arts content for the year or poetry. Content review included review of language arts content, which involved teacher-led discussions, listening to recordings of readings, and answering both multiple choice and extended response questions. Lessons that focused on poetry included presentation of audio and video of poetry readings, teacher-led discussions of poetry genres, and independent student writing of different types of poetry. Repeated reading was not used in any of the language arts instruction. Although audio recordings were used as part of instruction, students read along or listened but did not reread the passage that was modeled.

Interobserver agreement

The graduate assistant served as the second observer for the study for both WCPM and on-task behavior. The second observer listened separately to 27% of the audio recordings of the passages read aloud by participants across all phases and participants. The mean interobserver agreement for WCPM for these passages was 97.3% (range = 91.24-100). Interobserver agreement was assessed for on-task behavior during 22% of sessions. Interobserver agreement was 99.57% (range = 97-100).

Social Validity

At the end of the study, Barry was suspended for the remainder of the school year, therefore, he was unable to complete the participant treatment acceptability questionnaire. Mike and Justin completed the questionnaire. When asked on the questionnaire how his reading had changed since the beginning of the study, Mike indicated that he felt he no longer stuttered and he read slower. Justin stated, "it was good." Both participants indicated that working alone at the computer was not more difficult, and Justin indicated that working at the computer "was better." Both agreed that listening to a model read the passage and listening to themselves read the passage was helpful. Both indicated that they believed that the reading intervention would help students like them improve their reading.

Discussion

This study examined the effects of repeated reading combined with an audio-recorded model and cues to read for comprehension on the reading fluency, reading comprehension, and on-task behavior of three middle school students with reading and behavioral difficulties. Results indicated no functional relation between the intervention and reading fluency for practiced passages for any of the participants. Furthermore, the intervention was not associated with a

reduction in errors or an increase in the percentage of comprehension questions answered correctly for any of the participants. Increases in mean WCPM for practiced passages for two participants did not generalize to unpracticed passages for either. In contrast, all participants demonstrated improvement of on-task behavior during the intervention.

Reading Fluency. Two of the three participants, Mike and Barry, demonstrated increases in mean WCPM on the second reading of the passages. These findings were somewhat consistent with the results from previous research of repeated reading combined with listening to a fluent reader model the passage (Rose & Beatty, 1986; Rose & Sherry, 1984; Skinner et al., 1997). However, analysis of the first reading of each passage, the reading that took place after modeling but before repeated reading, indicated no improvement in WCPM or errors. The mean errors for the first readings during intervention was higher than the mean errors for baseline for both Mike and Justin. These findings suggest that an audio-recorded model alone was not sufficient for improving reading fluency for participants. These findings were not consistent with previous studies that used an audio-recorded modeling (e.g., Daly & Martins, 1984; Rose & Beatty; Skinner & Shapiro, 1989).

Consistent with previous research (Steventon & Fredrick, 2003; Therrien & Hughes, 2008), gains in WCPM for practiced passages for Mike and Barry did not generalize to unpracticed passages. Therrien and Hughes stated that the lack of generalization to unpracticed passages in their study may have been due to the limited number of study sessions. In the present study, Mike participated in nine intervention sessions, and Barry and Justin each participated in five sessions. Rashotte and Torgeson (1985) found that word overlap between passages greatly influenced reading fluency on unpracticed passages. In the current study, word overlap between passages was not examined. Passages were assigned randomly. Increases in generalization may

have been found if passages with a higher degree of overlap were chosen for generalization sessions.

Reading Comprehension. Repeated reading has been associated with improvement in reading comprehension for practiced passages (Hawkins et al., 2010; O’Shea et al., 1987; Therrien et al., 2006; Therrien & Hughes, 2008), however, none of the participants in the current study improved the percentage of reading comprehension questions answered correctly as a function of the repeated reading intervention. O’Shea et al. reported greater increases in reading comprehension for participants cued to read for comprehension than those cued to read for fluency. However, cues in that study were paired with verbal praise and tangible reinforcers. Before reading, participants were given verbal cues and told that they would receive a sticker if they did well. After reading, participants were given verbal praise and stickers. In the current study, the cue was a written reminder that the participant would be asked questions about the reading. No verbal cue was given, and no reinforcers were provided for task performance. Listening to the audio-recording of their reading prior to the final reading may have provided participants with reinforcement for improving reading fluency, which may explain Mike and Barry’s improvement in WCPM. Similar improvements for comprehension on practiced passages may have been found if participants had been given verbal cues before reading and asked to check and self-graph (Southerland & Snyder, 2007) results. Results from Hawkins et al. (2010) suggest that previewing vocabulary at the beginning of each intervention session may have led to greater gains in WCPM and percentage of comprehension questions answered correctly. This may have been particularly important for Justin, the participant for whom English was his second language.

Time for intervention sessions for the current study was limited due to scheduling constraints. In order to allow time for the participants to listen to the prerecorded model and to their own reading, the number of oral repeated readings of each passage was limited to two readings. Results from O'Shea et al. (1987) suggest that an additional third reading may have improved reading fluency and comprehension outcomes.

On-Task Behavior. In spite of their history of behavioral difficulties in the classroom, all participants in this study were cooperative and well behaved during all intervention sessions. All three participants' on-task behavior improved during implementation of the intervention. Previously, Southerland and Snyder (2007) found improvement of student behavior, as measured by the percentage of time spent actively responding and the number of disruptions per session, for two of four participants with EBD. The intervention sessions were longer in that study than the six to nine minute sessions in the current study, and participants worked in pairs rather than individually. Furthermore, sessions in the current study took place before the school day, so frequently there was only one participant present. However, when other participants entered the room to await their turn for a session, the participants remained on task at the computer station. Blankenship et al. (2005) reported that participants, high school students with EBD, indicated that they enjoyed using computer software to work independently to read and outline high school history book chapters. Similarly, participants in the current study reported that they liked using the computer as part of instruction. These results are in contrast to Southerland and Snyder, whose participants indicated that they did not like the repeated reading component of the peer-mediated intervention. However, those participants worked with a classmate rather than individually at a computer. Participants' on-task behavior in the current study may have improved because participants found working at the computer engaging. During intervention

sessions, participants wore headphones with an attached microphone so that they could listen to the audio model of the reading, record the passage, and then listen to their own reading of the passage. Interestingly, all of the participants, during every session, kept the headphones on while answering the comprehension questions, which was past the point of the session where headphones were not required. Although the headphones were not noise cancelling, they may have reduced auditory distractions such as intercom announcements or students talking in the hallway.

Social Validity. Both participants who completed the social validity questionnaire reported that they believed their reading had improved as a result of the intervention. The participants reported that they liked using the computer to work on their reading skills. Improvements in on-task behavior during the study provides preliminary support for the use of computer-assisted instruction for students with behavioral difficulties.

Limitations

Conducting research with students with academic and behavioral difficulties in a middle school setting presented many challenges. The primary limitation of this study was that participants' exposure to the intervention was limited by scheduling issues and student behaviors in other classes that resulted in discipline that removed participants from the classroom and thus study sessions (Lane, Barton-Arwood, Nelson, & Wehby, 2008). To avoid interfering with classroom instruction, study sessions were scheduled to take place before participants reported to homeroom in the morning. On days that students were administered district and state-mandated standardized assessments, a total of seven days during the study, participants were unable to attend sessions because of scheduling changes. In addition, participants in the study had to independently report, without reminders from their teachers, to the classroom where the research

was conducted before the start of each school day. Occasionally, participants chose to participate in other activities during this time (e.g., tutoring offered by a teacher or socializing with a friend). Mike frequently asked to come later in the day when he missed a session but only for three sessions was that possible.

In addition to scheduling issues, both Mike and Barry received in-school suspension for disruptive behaviors during math and social studies classes respectively, and Barry received out-of-school suspension for stealing a teacher's cell phone (Lane et al., 2006). Researchers have shown that in-school and out-of-school suspension negatively impacts the academic achievement of students with EBD and OHI (Allman & Slate, 2012). Mike and Barry were unable to attend sessions on days that they were assigned to in-school and out-of-school suspension, and Justin was unable to attend several sessions because he arrived late to school. As mentioned previously, participants occasionally missed sessions because they chose to engage in other activities. Participants may have experienced greater gains in reading fluency if they had been able to attend more intervention sessions. In addition, procedural fidelity (Dane & Schneider, 1998) was scheduled to be conducted for 20% of intervention sessions, but because participants were not present for sessions, fidelity was conducted for only 17% of sessions.

Another challenge encountered in this study was with collecting baseline behavioral data that provided a reasonable comparison for behavioral data taken during intervention and that accurately reflected the participants' typical behavior. All three participants were observed during their language arts class during baseline. Therefore, during baseline, more students were present in the classroom than when data were collected during intervention session when no more than three participants and two adults were present at a time. Although distractions were present during intervention sessions that were not present during language arts classes (e.g.,

noise in the hallway, intercom announcements), the lack of students present during intervention may have accounted for part of the improvement in behavior. In contrast, on-task behavior during baseline observations sessions may have been positively influenced by the researcher's presence. The researcher did not serve as Justin's teacher at the time of the study but had served as his resource language arts teacher prior to the study. In order to provide an explanation for the researcher's presence in his classroom during behavioral data collection, Justin was told that the researcher would visit the classroom in order to "see his class." The researcher made an effort during these observations to give the appearance of observing the class as a whole by looking at materials on book shelves and bulletin boards and by visually focusing on the whole class except for the moments observation of Justin was required. Despite these efforts, during two of the baseline behavioral observations, Justin's behavior appeared to be influenced by the presence of the researcher. At the beginning of these observations, the teacher appeared undecided about what she was going to teach for the day's lesson. Justin went to the teacher and suggested language arts activities that the class could do. On both days, Justin's suggestions appeared to be games with which all of the students were familiar, and the teacher allowed the students to play the games. Baseline data for off-task behavior for Justin must be viewed with caution.

Conclusions

This study used repeated reading, an audio-recorded model, and cues to read for comprehension to improve the reading fluency and comprehension of middle school students with behavioral and reading difficulties. For reading fluency and comprehension measures, no meaningful improvements were not found. Improvements in on-task behavior were found, but those improvements may in part be attributed to the setting in which the study took place. The materials used in the study – a computer, headphones, and leveled expository passages – are all

readily available to classroom teachers. In classrooms where students with a variety of behavioral and academic needs are served, computer-assisted instruction may allow teachers to have some students engaged in a meaningful independent task while freeing them to work with other students individually or in small groups. However, the current study did not support the use of computers for reading fluency instruction using repeated reading.

As researchers push for greater academic focus for students with behavioral difficulties and EBD or OHI (Benner, Kutash, Nelson, & Fisher, 2013; Mattison & Blader, 2015) this study provides preliminary support for using computer-assisted instruction for this population. Additional research is needed to determine the types of tasks or instruction that could be implemented effectively using computer-assisted instruction for students with behavioral difficulties and EBD or OHI.

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Appendix B. Data Collection for On-Task Behavior

Participant: _____ Date Observed: _____

Time data collection began ____:____ am/pm Time data collection ended: _____

Directions:

The participant is considered on-task if any of the following behaviors are observed on the 10th second of the interval:

1. Looking at the computer screen
2. Looking at the passage
3. Looking toward the instructor when spoken to by the instructor
4. Looking toward the instructor with hand raised or while asking for assistance
5. Reading the passage orally

Put a slash (/) mark in the box for each interval in which on-task behavior was observed at the 10th second of the interval.

1	2	3	4	5	6
7	8	9	10	11	12
13	14	15	16	17	18
19	20	21	22	23	24
25	26	27	28	29	30
31	32	33	34	35	36

Observation Notes

Percentage of moments observed on-task:

First Observer: # of moments on-task behavior observed _____ / 36 x 100 = _____%

Second Observer: # of moments on-task behavior observed _____ / 36 x 100 = _____%

Agreement: (smaller #/larger#) x 100 = percent agreement _____ / _____ x 100 = _____%

Appendix C. Participant Treatment Acceptability Questionnaire

1. How has your reading changed since you began the computer reading intervention?
2. Was reading by yourself with the computer too difficult?
3. Was it helpful for you to hear the model read the passage each day?
4. Was it helpful for you to record and listen to yourself read?
5. Do you think the computer reading intervention would be helpful to other students like you? Why or why not?

Appendix D. Implementation Steps for Teachers/Graduate Assistant

Date _____ Participant _____ Instructor initials _____

Observer 1 _____ Observer 2 _____ (if IOA was conducted)

	Observer 1	Observer 2	IOA
Steps the teacher must take:	Observed-1 Not observed-0		A or D
1. Check to see that the computer is on			
2. Plug the headphones into the computer			
3. Plug the microphone into the computer			
4. Open the correct file for the participant			
5. Call the student to the computer station			
6. Give the student the passage that corresponds to the recording for the session			
7. Direct the student to put on the headphones and begin the lesson			
8. Respond to student questions if applicable (may be N/A)			
9. On the reading log, record the time the student began listening to the modeled passage			
10. Prompt student to read the passage if the student has not begun reading after 3 minutes (may be N/A)			
11. When the student indicates the lesson is complete, check to see that the student has two recordings			
12. Record the time the session ended on the reading log			
13. Allow the participant to return to his/her seat			
14. Rename the saved recordings so that they are labeled with the participant's initials and the date			
15. Move the file to the participant's computer folder			
Total			

IOA

Percentage of agreement:

of A's _____ / 15 x 100 = _____ %

Appendix F. GORT Screening Form

Participant: _____

Date of birth: _____ Current Age _____ Current Grade _____

GORT-V Scores	Grade Equivalent	Age Equivalent	Scaled Score
Rate			
Accuracy			
Fluency			
Comprehension			
Oral Reading Index (ORI) Score			
ORI Descriptive Term			

Did participant's ORI fall within the below average or poor range?

___ yes (continue with screening)

___ no (not eligible)

Appendix G. Steps for Determining Passage Level Placement

- Using the participant's reading fluency grade equivalent score from the GORT-IV, select the leveled passages that are on the participant's reading level.

Circle One: Fourth Grade Fifth Grade Sixth Grade

- Have the student read each passage for one minute. Record data below:

Passage 1	Passage 2	Passage 3
Words read _____	Words read _____	Words read _____
Errors - _____	Errors - _____	Errors - _____
WCPM _____	WCPM _____	WCPM _____

- Determine the average WCPM for all three passages by adding together the WCPM and dividing the total by 3:

4.

$$\underline{\hspace{2cm}} + \underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}} / 3 = \underline{\hspace{2cm}}$$

- Determine whether the average WCPM falls within the expected range for the grade level. Expected ranges:

4th grade passages 58-104 WCPM

5th grade passages 75-129 WCPM

6th grade passages 88-137 WCPM

- Does the participant's average WCPM fall within the expected range?

___ Yes. This passage level will be used for intervention passages.

___ No, it is above the range. Repeat the preceding steps for passages on the next grade level above

___ No, it is below the range. Repeat the preceding steps for passages on the next grade level below. If below the range for 4th grade passages, student does not qualify to participate in the study.