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The Effects of Repeated Reading on the Fluency and Comprehension Skills of Elementary-Age Students with Learning Disabilities (LD), 2001-2011: A Review of Research and Practice

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This article provides an extensive review of the literature on the use of repeated reading to improve the reading fluency and comprehension skills of elementary-age students with learning disabilities. A systematic review of the published literature from 2001 to 2011 was conducted and nineteen (N = 19) research-based repeated reading studies were identified. Based on the criteria for inclusion, repeated reading research has been conducted using four main approaches: (a) repeated reading as the primary intervention, (b) repeated reading compared to other reading interventions, (c) repeated reading in combination with other reading interventions, and (d) repeated reading as part of a reading program. Overall, the results suggest that repeated reading is an effective strategy to increase students' reading fluency and comprehension skills. Findings indicated moderate to large gains in reading fluency and comprehension on practiced passages. However, these gains showed only minor to moderate transfer to novel passages. Implications for classroom practice, limitations, and future research directions are presented.

Reading is one of the most important early academic skills for students to acquire in school, yet learning to read continues to be a challenge for many elementary-age students in our nation's schools. The 2011 report of The Nation's Report Card (National Center for Education Statistics [NCES], 2011) indicated that one third (33%) of all elementary-age students enrolled in the fourth grade in the U.S. and nearly a quarter (24%) of students in the eighth grade were found to read below a "*Basic*" skill level of reading proficiency required for their grade level. Moreover, the report indicates that the reading achievement scores have remained relatively unchanged for fourth graders and showed only a slight increase for students in the eighth grade from 2007-2011 (Lee, Grigg, & Donahue, 2007; NCES, 2009; NCES, 2011). These findings are concerning and quite alarming for educators, as the percentage of students scoring below a basic reading level continues to remain high and shows relatively no change in the previous four years. For students with disabilities, the situation is even more daunting. As the report states, 68% of students with disabilities in the fourth grade and 64% in the eighth grade perform below grade level in reading instruction.

The results of the report suggest that the reading skills of a large number of fourth graders, with and without disabilities, are below grade level and this continues to the eighth grade, which will unfortunately impact their success in reading into the secondary grade levels, as well. Thus, it is imperative that educators use research-based reading interventions in early elementary-age classrooms.

In response to these growing literacy concerns in the U.S., mandates such as the No Child Left Behind Act of 2001 (NCLB, 2001) required schools to use research-based reading interventions in the classroom. In addition, the National Reading Panel (NICHHD, 2000) was formed in 2000 to examine effective instructional methods to teach reading instruction in the early elementary grade levels. The panel issued a report titled, *Teaching Children to Read*, which described five reading skill areas considered to be the most important to reading success. These beginning reading skills included: (a) phonemic awareness, (b) phonics, (c) reading fluency, (d) vocabulary instruction, and (e) reading comprehension (NICHHD, 2000). While each of these skill areas of reading is important, reading fluency, which is commonly defined in terms of reading with speed and accuracy, has a major impact on comprehension (Samuels, 1979). Chard, Vaughn, and Tyler (2002) concluded that, "both rapid reading of high-frequency words and rapid decoding as a means to enhance text understanding appear critical for typical reading development" (p. 386). LaBerge and Samuels (1974) posited that automatic information processing – automaticity in decoding, word recognition and organization of connected words into meaningful units while reading – is necessary to gain understanding and making sense of the text.

Unfortunately, not all school-age students possess the necessary pre-skills to be fluent independent readers, especially those students with learning disabilities (LD) who often struggle to decode single words. In fact, many students with LD are unable to decipher whether a vowel within a word should have a short or long vowel sound. Fluency is often problematic for these students, as they often lack the, "ability to read sight words, decode words, and read phrases and sentences automatically and rapidly" (Chard et al., 2002, p. 386). In general, fluent reading continues to be an arduous task for students with LD as they often spend most of their reading time trying to decode words, thus diverting cognitive resources from focusing on comprehension (LaBerge & Samuels, 1974; Therrien, 2004).

While numerous approaches to increase fluency have been tried over the years, one strategy known as *repeated reading* has been shown to be effective in increasing reading fluency and, to a lesser extent, reading comprehension for students with learning disabilities (Therrien, 2004). The basis for using repeated reading is that students practice reading passages multiple times instead of reading isolated words, which improves both their word recognition and comprehension skills (O'Shea & O'Shea, 1988). Repeated reading is a fluency strategy, "that consists of re-reading a short and meaningful passage until a satisfactory level of fluency is reached" (Samuels, 1979, p. 404). Implementation in the classroom is relatively easy and requires little preparation time by the teacher. In addition, repeated reading can be utilized in a variety of settings such as small group instruction, peer reading, and learning centers (O'Shea & O'Shea, 1988).

Recent research has corroborated that the use of repeated reading instruction improves reading skills, especially reading fluency and comprehension, of ele-

mentary-age students with LD when used as the primary intervention (Therrien & Kubina, 2007), combined with other reading intervention strategies (Nelson, Alber, & Gordy, 2004), or when used as part of an intervention package to increase students' reading skills (Therrien, Wickstrom, & Jones, 2006b; Walker, Jolivette, & Lingo, 2005). However, research has also shown that other reading interventions, which did not include repeated reading, can be as effective to increase students reading skills when used alone or as part of a reading package (O'Connor, White, & Swanson, 2007; Therrien, Kirk, & Woods-Groves, 2012[1]).

Thus, this article summarizes the research-base from 2001 to 2011 on the use of repeated reading interventions to increase the reading skills, both fluency and comprehension, of elementary-age students with LD. The time frame was selected to build upon a previous review of repeated reading interventions for elementary-age students with LD conducted from 1975 to 2000 included as part of Chard et al. (2002). Through this review of the literature, we will examine the efficacy of repeated reading on students' reading fluency and comprehension skills, and provide both general and special education teachers with a greater understanding of the various models of repeated reading interventions that have been conducted in the classroom.

Method

Literature Search Procedures

The search procedures consisted of an electronic search of five major databases including: *Academic Search Complete*, *ERIC*, *Psyc*ARTICLES, *Psyc*INFO, and *Education Research Complete* from 2001 to 2011. Descriptors included "repeated reading", "disabilities", "special education", "learning disabilities", "education (elementary)", "education (elementary – research)", "reading", "reading disability", "oral reading", "verbal reading", "fluency (language learning)", and "reading comprehension". Also, an ancestral search of references cited in the identified articles, a search of tables of contents of relevant journals, and e-mail correspondence to university professors to retrieve in-press manuscripts that were pertinent to this review was conducted. All articles identified were read and evaluated independently by the first two authors to exclude those that did not meet the inclusion criteria. The procedure resulted in a pool of 19 studies that used repeated reading as an intervention or as part of a reading package to improve the fluency and comprehension skills for elementary-age students with LD.

Criteria for Inclusion

The selection criteria were as follows: (a) repeated reading interventions were used to increase reading fluency and/or comprehension; (b) studies included students identified with a learning disability according to the state criteria; (c) individuals were enrolled in kindergarten through fifth grade; however, studies with participants in middle school were included only if elementary-age students were also participating in the study and were classified as LD; (d) instruction was delivered in English; (e) studies employed either an experimental/quasi-experimental treatment/comparison group design, a pretest-posttest case design, or a single-subject re-

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search design; and (f) studies were published from January 2001 to December 2011. Research studies in which there was not a clear use of repeated reading or where the participants were described as low-achieving readers without specific classifications of LD were omitted.

Coding Procedures & Calculation of Effect Sizes

All articles were read and coded by the first two authors using the following study characteristics: (a) number of participants, (b) number of participants identified with learning disabilities; other disability categories, and students in general education, (c) age, (d) intelligence quotient (IQ) scores, (e) grade level(s), (f) research design, (g) instructional conditions, (h) dependent measures, (i) results, and (j) effect sizes. Effect sizes for the experimental treatment/control group designs (Cohen's *d*) were calculated as the difference between the groups' means divided by the pooled standard deviation. For pretest-posttest group designs, effect sizes were computed as the difference between pretest-posttest gains divided by the pooled pretest standard deviation (Morris, 2008). For studies that did not provide means and standard deviations, Cohen's *d* was estimated using univariate *F* and *t* scores, when present in the study (Thalheimer & Cook, 2002). Effect sizes were adjusted for small sample overestimation bias using the Hedge and Olkin's correction factor (Hedges & Olkin, 1985). Additionally, if a study reported several related outcomes, an aggregate effect size was computed by weighting the effect size by their inverse variance (Lipsey & Wilson, 2001). According to Cohen's interpretation criteria (1988), an effect size of 0.8 is large, around 0.5 is moderate, and 0.2 is small.

The percentage of non-overlapping data points (PNDs) was calculated to estimate the effect size for single-subject design studies when the study provided a legible chart/figure. PND was calculated by counting the number of treatment data points above the highest baseline data point and dividing by the total number of treatment data points and then multiplying by 100 (Scruggs, Mastropieri, & Casto, 1987). For alternating-treatments designs with a baseline condition, if a best treatment was used, the PND for the best treatment was obtained. Otherwise a separate PND was calculated for each treatment. Furthermore, individual PNDs were obtained for the single-subject design studies including multiple participants, and then aggregated in order to estimate the overall treatment effectiveness. The following criteria proposed by Scruggs et al. (1987) were used to interpret PND scores: (a) over 90 indicates the intervention was "highly effective", (b) between 70 and 90 suggest the intervention was "fairly effective", (c) between 50 to 70 indicates the intervention was "questionable", and (d) under 50 deems the intervention as "ineffective".

In order to assess the reliability of the coding and the computation of the effect sizes, a trained coder independently coded 30% of the identified articles. The mean inter-rater reliability was 97%. Any disagreements were discussed and resolved to achieve a 100% final inter-rater agreement.

Overall Study Characteristics

In total, nineteen studies ($N = 19$) were identified from 2001 to 2011 in journals such as *Behavioral Disorders; Beyond Behavior; Education and Treatment of Children; Exceptional Children; Journal of Behavioral Education; Journal of Learning*

Disabilities; Learning Disabilities: A Contemporary Journal; Learning Disability Quarterly; Learning Disabilities Research & Practice; Preventing School Failure; Psychology in the Schools; Reading Improvement; Remedial and Special Education, and *The Journal of Special Education*. The studies included 234 participants with and without disabilities. Of those reporting, students had a mean age of 10.08 years (range 8 to 13) and a mean IQ of 87.19. The total number of participants with learning disabilities was 89. The average number of participants per study was 11.70, ranging from 1 to 37, and the average number of participants with LD per study was 4.45, ranging from 1 to 18. Participants in the studies were in Grades 1 through 8 with a mean grade level of 3.91. Five of the studies used an experimental design. Seven studies used a multiple baseline design, five studies used an alternating-treatments design, and one study was a case study using an AB design. Finally, one study used a pretest-posttest case design.

Results of Repeated Reading Interventions

The repeated reading interventions were implemented using four different approaches:

(1) *Repeated reading as the primary intervention* (Chafouleas et al., 2004; Kostewicz & Kubina, 2010; Kubina, Amato, Schwilk, & Therrien, 2008; Therrien & Kubina, 2007)

(2) *Repeated reading compared to other reading interventions* (Begeny, Daly, & Valleley, 2006; O'Connor et al., 2007; Therrien & Hughes, 2008; Welsch, 2007)

(3) *Repeated reading in combination with other reading interventions* (Musti-Rao, Hawkins, & Barkley, 2009; Nelson et al., 2004; Oddo, Barnett, Hawkins, & Musti-Rao, 2010; Staubitz, Cartledge, Yurick, & Lo, 2005; Tam, Heward, & Heng, 2006; Yurick, Robinson, Cartledge, Lo, & Evans, 2006)

(4) *Repeated reading as part of a reading program* (Denton, Fletcher, Anthony, & Francis, 2006; Therrien & Gormley-Budin, 2008; Therrien et al., 2006b; Therrien et al., 2012; Walker et al., 2005).

Of the 19 studies included in the review, four studies used repeated reading as the primary intervention. Four studies compared the effectiveness of repeated reading to other reading interventions, while six studies investigated repeated reading in combination with other reading strategies. And finally, five studies used repeated reading as part of a reading program. Each of the studies will be summarized and described in the following sections.

Repeated Reading as the Primary Intervention

Four studies ($N = 4$) employed repeated reading as the primary intervention to determine the effects of the intervention on the reading skills of students with LD and other disability categories (e.g., Emotional and/or Behavioral Disorder [EBD], Attention Deficit Hyperactivity Disorder [ADHD], Auditory Processing [AP], Memory Disorder [MD]), reading difficulties, and students in general education (see Table 1). Three of the studies employed single-subject designs (Chafouleas et al., 2004; Kostewicz & Kubina, 2010; Kubina et al. 2008), and one study used an experimental design (Therrien & Kubina, 2007). As shown in Table 1, all of the interventions were used at the el-

ementary grade levels. In three studies, students were asked to repeatedly read passages until meeting a pre-established fluency criterion (Chafouleas et al., 2004; Kubina et al. 2008; Kostewicz & Kubina, 2010), while one study required that students repeatedly read passages to a fluency criterion in at most six readings (Therrien & Kubina, 2007). In three of the four studies, students received error correction after reading.

Using an alternating-treatments design, Chafouleas et al. (2004) examined the effects of repeated reading (RR), repeated reading with performance feedback (RR/FB), and repeated reading with performance feedback and a contingent reward (RR/FB/REW) on three elementary-age students' oral reading fluency, including one student with LD. Only the procedures and results of the student with LD, Molly, will be discussed. The RR component of each of the interventions required that the student read each passage three times each session, and the correct words per minute (CWPM) and errors per minute (EPM) were recorded for the last reading. In the RR/FB condition, the student received performance feedback after each reading. During the RR/FB/REW condition, the student received a reward if she read at least one more word correctly than in the previous session. After two repetitions of the interventions, the student read three transfer passages, which were rewritten versions of the intervention passages with over 90% word overlap. Molly's order of conditions was as follows: RR/FB, RR/FB/REW, and RR. Molly was not able to reach criterion (i.e., 60 words per minute with at most 3 errors) on any of the three conditions. Nevertheless, her results revealed that her oral reading fluency progressively increased in all conditions, where the RR/FB condition showed the most overall improvement, followed by RR/FB/REW, and finally, the RR alone condition. Molly's results also showed a gradual decrease in error rate for all three conditions. On average, the RR/FB condition yielded the lowest error rate, followed by the RR and then RR/FB/REW on intervention passages. Molly's performance on transfer passages mirrored her performance on intervention passages; her reading fluency improved but at a lower rate than during intervention, while her error rate decreased at a similar pace.

In 2007, Therrien and Kubina investigated the importance of context and connected text in repeated reading. Sixteen students in Grades 3 and 5, reading below grade level, participated in the study, with two students diagnosed with LD. Students participated in two conditions in a counterbalanced order: (a) repeatedly read a passage aloud and (b) repeatedly read randomized words. In both conditions, upon mastering a preset fluency criterion or completing six reading trials, the students were asked to read a transfer passage, which had a 55% word overlap on average with the experimental readings. Results indicated that reading contextual words required a significantly lower number of re-readings to improve reading speed than reading words out of context in experimental readings ($d = 2.09$). It is noteworthy to mention that, while all students were able to achieve the fluency criterion when reading contextual words, less than a third of the students did when reading acontextual words. Moreover, students reading contextual words made significantly fewer errors in the first reading than students reading words out of context ($d = 0.62$). Even though the findings of the study indicated that reading words in context improved the reading speed and reduced the error rate on transfer passages compared to reading words out of context ($d = 0.20$ and 0.28, respectively), the differences between both conditions were not statistically significant.

Kubina et al. (2008) used an alternating-treatments design to compare the effects of two levels of fluency criteria for repeated reading on the fluency retention of three third grade students, including two with LD and one classified as EBD. Students participated in two instructional conditions: (a) repeated reading to a high fluency criterion (i.e., 200 correct words per minute) and (b) repeated reading to a low fluency criterion (i.e., 123 correct words per minute). In both conditions, students were asked to read a passage two to three times per session until the fluency criterion was mastered for two consecutive sessions. The students' fluency retention on the treatment passages was evaluated two, four, and fourteen weeks after mastering the fluency criterion. Results indicated that both students with LD consistently retained higher fluency gains on the high fluency criterion passage for all post-intervention sessions. Furthermore, one of the students with LD showed a steady fluency decay over time on both treatment passages, but the other student, who had lower oral fluency prior to the study, displayed a more accelerated decline. Overall, the findings suggested that repeated reading to a high fluency criterion yielded higher lasting effects on retention of fluency gains.

Using an alternating-treatments design, Kostewicz and Kubina (2010) compared the effects of repeated reading to a fluency criterion (RRFC) and interval sprinting (IS) on the reading fluency of three elementary students, including one student, Brad, with LD and other disabilities. Prior to each phase, the students performed a timed reading of the experimental passages to assess their initial reading levels. Students received both conditions, RRFC and IS, until a fluency mastery criterion (i.e., 200 or more correct words with two or less errors) was met in either condition. During the RRFC condition, the students read a passage twice for one minute each and received error correction and oral feedback following each reading of the passage. In the IS condition, reading passages were split into six consecutive parts with an identical word count. The IS condition started with the students reading the first three parts of the passage, where each part was read two consecutive times for 10 seconds each (i.e., sprinting). Upon completion of the first three reading parts, oral feedback and error correction was provided. Afterwards, the students read the final three reading parts using the same procedures. Results indicated that the student with LD gradually increased his reading fluency in both the RRFC and IS conditions within each of the phases (PND = 100% and 100%, respectively). Nevertheless, his error rate remained high and variable through the two phases for both treatments (PND = 29.17% and 20.83%, respectively). Even though the student with LD mastered the adjusted fluency criterion under the RRFC condition in both phases, none of the strategies concordantly outperformed the other on reading fluency and error rate in either phase.

Repeated Reading Compared to Other Reading Interventions

Four studies ($N = 4$) were identified that compared the use of repeated reading to other interventions on reading skills such as reading fluency and comprehension. Table 2 provides a summary of the studies, comparing the effects of repeated reading to other reading interventions for students with LD, Speech and/or Language Impairment (SLI), English-Language Learners (ELL), reading difficulties, and students in general education. Two of the studies employed experimental designs (O'Connor et al., 2007; Therrien & Hughes, 2008), while the other two studies em-

ployed single-subject designs (Begeny et al., 2006; Welsch, 2007). As shown in Table 2, all of the interventions were used at the elementary and early secondary grade levels. Three studies required that students read passages two (Begeny et al., 2006), three (O'Connor et al., 2007), and four times (Welsch, 2007). One study asked students to repeatedly read passages until meeting a pre-established fluency criterion in at most four readings (Therrien & Hughes, 2008). In two studies, students did not receive error correction during the repeated reading condition (Begeny et al., 2006; Welsch, 2007), while in two other studies the students were provided with error correction in all conditions (O'Connor et al., 2007; Therrien & Hughes, 2008).

In 2006, Begeny et al. employed an alternating-treatments design to compare the effects of repeated reading (RR), phrase-drill with error correction (PD), and a reward contingency for improved reading (RE) on the oral reading fluency of a third grade student, Lucas, diagnosed with LD and a speech and/or language impairment. During the baseline condition, the participant read a passage to assess his current reading level. In the RR condition, the participant read a passage two times. During the PD condition, the participant read a passage aloud and practiced miscued words and phrases containing those words. In the RE condition, Lucas was given a reward when his reading performance on an unpracticed passage improved relative to a previous passage. Results indicated that RR and PD had comparable positive effects on Lucas' reading fluency (PND = 100% and 100%, respectively) with nearly the same gains from baseline (23.50 and 23.87 CWPM, respectively), but the PD strategy achieved a more stable level of performance than RR. The RE condition was the least effective (PND = 75.00%), with a 7.87 CWPM increase on average. On error rate, Lucas demonstrated the greatest average decrease in the PD condition, followed by the RE condition, and then the RR condition (3.00, 2.00, and 1.62 EPM, respectively).

Two studies were identified that were conducted in 2007 which compared the use of repeated reading to other reading interventions. In the first study, O'Connor et al. (2007) contrasted the effects of repeated reading with continuous reading on the reading fluency and comprehension skills of 37 students in the second and fourth grades, 17 of whom had been identified with LD. Students were placed into triads consistent with their reading ability and then were randomly assigned to one of three instructional conditions: (a) repeated reading (RR), (b) continuous reading (CR), or (c) a control condition. Students in both experimental conditions read aloud selected readings to an adult for an allocated time period three times a week. In the RR condition, the students read each page of text three times, while in the continuous reading condition, the students continuously read from the text. Students in these conditions were provided with missed words and received error correction during reading, when needed. No reading intervention was delivered to the students in the control group. Results indicated that students in the RR and CR groups outperformed their peers in the control group on measures of fluency (d_a = 0.69 and 0.66, respectively) and passage comprehension (d = 1.09 and 0.71, respectively). However, no significant differences were found between the RR and continuous reading conditions on all dependent measures.

In the second study, Welsch (2007) investigated the best reading intervention to improve the oral reading fluency of four third and fourth grade students with LD using a brief experimental analysis. Treatment conditions included: (a) baseline

at the students' grade level of reading instruction (B/GL), (b) baseline using easier materials, where the reading material was at the grade below the students' grade level of reading instruction (B/EM), (c) repeated reading (RR) where the students read instructional passages four times, (d) listening passage preview (LPP) in which the instructor read the instructional passage before the student read the story one time, (e) repeated reading – easier materials (RR/EM), and (f) listening passage preview/ easier material (LPP/EM). Results indicated that for three of the four students, RR/ EM was the most effective treatment, while for the remaining student RR proved to be more beneficial. Both RR/EM and RR treatment conditions were effective to increase the correct word rate (PND = 100% and 100%, respectively) and oral retell (PND = 100% and 100%, respectively) during the best treatment phase. The RR/EM strategy was more effective in reducing the error rate of the students than RR alone (PND = 97.33 and 50.00%, respectively). Gains in oral fluency and comprehension recalls attained on experimental passages during the best treatment phase were moderately transferred to unpracticed passages.

Therrien and Hughes (2008) compared the effects of repeated reading and question generation on the reading fluency and comprehension skills of 32 students, including 18 with LD in Grades 4 through 6. During the repeated reading condition, students repeatedly read aloud a passage and received error correction, when needed, until a fluency criterion was met or four attempts were completed. In the question generation condition, students first read a set of five story grammar questions on a cue card, orally read a story once, received error correction feedback, and finally, answered story grammar questions with the support of a tutor. Results revealed that the students in the repeated reading group significantly improved their reading fluency on last passage readings ($d = 0.80$). The reading fluency of the repeated reading group on the first passage reading outperformed the reading fluency of the question generation group ($d = 0.05$), which indicates that the repeated reading group transferred fluency gains slightly better to unpracticed passages than the question generation group, but differences were not significant. On comprehension measures, the repeated reading group performed better than the question generation group on factual comprehension ($d = 0.84$) and inferential knowledge ($d = 0.39$), with statistically significant differences noted on factual comprehension.

Repeated Reading in Combination with Other Reading Interventions

Six studies ($N = 6$) were identified that used repeated reading with other reading interventions to improve the reading fluency and comprehension skills of students in the elementary grades, including students with LD. Table 3 provides a summary of the studies. All six of the studies employed single-subject designs (Musti-Rao et al., 2009; Nelson et al., 2004; Oddo et al., 2010; Staubitz et al., 2005; Tam et al., 2006; Yurick et al., 2006). One study required that students repeatedly read passages a fixed number of times (Nelson et al., 2004), while in three studies, students were asked to repeatedly read passages until meeting a pre-established criterion (Musti-Rao et al., 2009; Staubitz et al., 2005; Yurick et al; 2006). One study compared repeatedly reading a passage a fixed number of times to repeatedly reading text to a fluency performance criterion (Tam et al., 2006). In addition, four of the six studies implemented peer-mediated repeated reading. Of these studies, three assigned

students to dyads to participate in partner reading (Musti-Rao et al., 2009; Staubitz et al., 2005; Yurick et al., 2006) and one study placed students in groups of three or more students (Oddo et al., 2010). In all studies, the students received error correction procedures during intervention.

Nelson et al. (2004) investigated the effects of systematic error correction (SEC) and systematic error correction with repeated reading (SEC+RR) on the reading accuracy and fluency of elementary-age students using a multiple baseline design across participants. Four second grade students participated in the study, including three students with LD. In the systematic error correction condition, the students read a passage aloud for a period of five minutes. When a mistake was made, the teacher modeled the word, and then asked the students to pronounce the word and read the sentence again. After completing the reading, the teacher indicated each of the miscued words in the text, and prompted the students to re-read each the words. Once a word was misread again, the teacher pronounced the word and then directed the student to restate the word. The error correction plus repeated reading condition used identical procedures as in the systematic error correction condition except that systematic error correction procedures were implemented after the first passage reading and followed by three one-minute re-readings of the same passage. In the error correction plus repeated reading with previously read materials condition (SEC+RR EM), procedures were the same as in the error correction plus repeated reading condition except that the reading passages were the ones used during baseline. Results for the students with LD revealed that the SEC condition marginally improved the participants' baseline reading fluency (PND = 19.70%), with a mean increase of 7.44 CWPM, and reduced their error rate (PND = 43.69%) in 3.29 EPM on average. Alternatively, the SEC+RR condition yielded higher improvements for all of the students with LD on reading fluency (PND = 84.24%) relative to baseline, with a mean gain of 21 CWPM from baseline, and resulted in a reduction of error rate (PND = 36.97%) similar to the SEC condition, with an average decrease of 3.12 EPM. Lastly, students with LD demonstrated the highest gains in reading fluency during the SEC+RR EM condition (PND = 95.24%), with an average increase of 24 CWPM, as well as the largest drop on error rate (PND = 83.33%), a decrease of 4.54 EPM on average from baseline.

Staubitz et al. (2005) used a multiple baseline design across participants to evaluate the effectiveness of peer-mediated repeated reading on the reading fluency and comprehension of six students with and/or at-risk for EBD, including one student with LD, in Grades 4 and 5. During the baseline, students were engaged in sustained silent reading. In the peer-mediated repeated reading instruction condition, students were paired with a partner and took turns to repeatedly read a passage, while the other partner provided feedback and error correction, until mastering the passage. Results for the student with LD, Dante, indicated that peer-mediated repeated reading was effective to substantially improve his reading fluency from 39 to 134 CWPM (PND = 100%), reading accuracy from 85.50% to 92.05%, and correct comprehension questions from 2.72 to 5.00. By the end of the intervention, Dante advanced two reading grade levels, requiring fewer re-readings to reach the mastery criterion. However, these results should be interpreted cautiously since the researcher served as the reading partner in 86% of the sessions in which the students mastered

the fluency criterion during the study. On generalization passages, Dante showed more modest average gains of reading fluency from 39.00 to 60.33 CWPM, reading accuracy from 85.50% to 86.67%, and comprehension from 2.72 to 3.03. Lastly, Dante demonstrated a minor increase on the Woodcock-Johnson III (WJ-III; Woodcock, McGrew, & Mather, 2001) measures of fluency and comprehension from pretest to posttest (0.1 and 0.4, respectively).

Tam et al. (2006) evaluated the effects of vocabulary and repeated reading instruction on the oral reading rate and comprehension skills of five ELL students, including two with LD, in Grades 3 through 5 using a multiple baseline across subjects design. The study included a baseline condition, in which the students read a passage three times and then answered literal comprehension questions; a story-telling condition where the students first listened to a story, answered comprehension questions and afterwards followed baseline procedures; and two intervention conditions, new passage each session condition (NP) and same passage to criterion condition (SP). In both intervention conditions the students first received vocabulary instruction, and then the students performed an initial untimed passage reading with error correction, followed by repeated reading trials and completion of factual comprehension questions. Procedures in the NP condition were identical to those in the SP condition except that in the NP condition, the students read a new passage three times in each session, while in the SP condition the students repeatedly read a passage until reaching a pre-established fluency criterion. Results for the two students with LD on reading fluency were mixed. One of the students showed notable fluency gains in both repeated reading conditions, NP and SP relative to baseline (M_{gain} = 19.80 and 34.24, respectively) and story-telling (M_{gain} = 16.60 and 31.04, respectively), which continued through to the maintenance phase. In contrast, the other student demonstrated meager gains in both repeated reading conditions from baseline (M_{gain} = 0.90 and 0.18, respectively) and story-telling (M_{gain} = 7.4 and 6.68, respectively), and these gains were not sustained during the maintenance phase. Furthermore, both repeated reading conditions showed a positive effect in decreasing the error rate of both students with LD from baseline ($M_{decrease}$ = 9.00 and 10.83 respectively) and story-telling ($M_{decrease}$ = 12.10 and 13.93 respectively). One of the students demonstrated a higher reduction on error rate during the NP condition and the other during the SP condition. The students with LD continued to have similar error rate levels in the maintenance phase to those achieved during the NP condition. On the comprehension measure, the two students demonstrated marked gains in both NP and SP conditions from baseline (M_{gain} = 2.40 and 3.10, respectively) and story-telling (M_{gain} = 2.50 and 3.20, respectively), achieving the highest overall improvement in comprehension scores during the SP condition. On generalization, the two students showed moderate transferred gains in comprehension on the NP and SP conditions to unpracticed passages compared to both baseline (M_{gain} = 0.60 and 1.20, respectively) and story-telling conditions (M_{gain} = 0.95 and 1.55, respectively).

Yurick et al. (2006) used a multiple baseline design across participants to evaluate the effects of peer-mediated repeated reading on students' oral reading fluency and comprehension skills in three separate experiments. Eight low-achieving fifth graders, two of whom had LD participated in Experiment 1. In Experiments 2 and 3, the findings of Experiment 1 were extended by implementing repeated read-

ing with third and fourth graders in different instructional settings (i.e., total class and pull-out). Experiment 2 included eight third-grade students without disabilities, while one of the six fourth grade students who participated in Experiment 3 was identified as having LD. General instructional procedures were similar to those outlined in the previous study by Staubitz et al. (2005). Results indicated that peer-mediated repeated reading was highly effective to improve the reading rate of all of the students in Experiments 1 and 3 (PND = 91.86% and 86.33%, respectively). Specifically, during the peer-mediated repeated reading condition, all students in both experiments markedly increased their reading rate (M_{gain} = 66.57 and 51.00 WPM, respectively), reading accuracy (M_{gain} = 4.38% and 4.50%, respectively), and comprehension (M_{gain} = 2.14 and 2.50 questions, respectively) compared to the silent sustained reading condition. In both experiments, the students mastered between two and four reading grade levels during intervention. In Experiment 3, all students except one moderately transferred attained gains to generalization passages on oral fluency (M_{gain} = 7.76 CWPM), reading accuracy (M_{gain} = 1.54%), and comprehension (M_{gain} = 0.60). Overall, on pretest-posttest measures, results indicated that all students in Experiment 1 markedly improved one year on average in the passage comprehension measure of the Woodcock-Johnson Tests of Achievement-Revised (WJ-R; Woodcock, 1989), while in Experiment 3, participants demonstrated a seven month average gain in WJ-III reading fluency and comprehension measures.

Using a multiple baseline across participants design, Musti-Rao et al. (2009) examined the efficacy of peer-mediated repeated reading on the reading fluency of 12 fourth graders. Six of the 12 students had identified disabilities, including three with LD. The entire class participated in class-wide peer-mediated repeated reading instruction; however, only 12 students within the classroom served as participants in the study. Silent reading was conducted during the baseline condition. During the peer-mediated repeated reading condition, 10 of the students worked in pairs, while the other two students, who read under grade level, were paired with two classmates who read at grade level. Paired students took turns reading a paragraph each for a 10-minute period until reaching a fluency criterion. Similar correction procedures were used as in Staubitz et al.'s (2005) study. Results revealed that peer-mediated repeated reading positively impacted the students' reading fluency (PND = 66.22%) with an overall increase of 13.73 CWPM relative to baseline; however, fluency gains did not transfer to unpracticed passages.

Oddo et al. (2010) used a multiple baseline design across groups to evaluate the effects of group peer-mediated repeated reading (PM+RR) on the reading fluency and comprehension skills of elementary-age students. Although all of the students in a fourth grade classroom participated in the study, four of the students, including one student, Michael, who was classified as LD, were identified as target students for the intervention. During the baseline phase, the students participated in silent reading of passages, while in the PM+RR condition, the target students were placed in different groups of four to five and read a passage a minimum of three times each session in a round-robin fashion, taking turns to each read a paragraph. Error correction procedures were delivered by the student in the group who had the next turn to read. Results showed that Michael notably increased his reading fluency and comprehension (PND = 87.50% and 75.00%, respectively) from baseline during the

PM+RR condition and achieved a stable error rate at a slightly lower level than during baseline (PND = 12.50%).

Repeated Reading as Part of a Reading Program

Five studies ($N = 5$) employed repeated reading as part of a package of other reading interventions to determine the effects on students' reading skills. Table 4 provides a summary of the studies utilizing repeated reading as part of an intervention package to increase the reading skills of students with LD, other health impairments (OHI), EBD, and students in general education. Two of the studies employed experimental designs (Therrien et al., 2006b, Therrien et al., 2012), one study was conducted using a pretest-posttest case design (Therrien & Gormley-Budin, 2008), and two of the studies employed single-subject designs (Denton et al., 2006, Walker et al., 2005). As shown in Table 4, all of the interventions were used at the elementary and early secondary grade levels.

All of the five studies used published and research-based reading programs as the interventions. Denton et al. (2006) used *Phono-Graphix* (McGuiness, McGuiness, & McGuiness, 1996) and *Read Naturally* (Ihnot, Mastoff, Gavin, & Hendrickson, 2001), Therrien et al. (2006b; 2008; 2012) used the *Reread-Adapt and Answer-Comprehend* intervention (Therrien, Gormley, & Kubina, 2006a), and Walker et al. (2005) used the *Great Leaps Reading* program (Campbell, 1998). Of the five studies, one of the studies compared a reading program with a RR component to a phonetic-based reading program (Denton et al., 2006), while another study compared the effects of a reading program with a RR part to a modified version of the same program without repeated reading (Therrien et al., 2012). The reading programs with a RR component required that students repeatedly read passages until meeting a pre-established fluency criterion and received corrective feedback.

Walker et al. (2005) used an AB design to examine the effects of the *Great Leaps Reading* program based on repeated reading to increase the reading fluency of one third grade student, Emmanuel, diagnosed with LD. The program begins with a *Great Leaps Reading* placement test. Once a starting point is determined, the student repeatedly reads a passage aloud within one minute until mastering a pre-established fluency criterion with no more than two errors per reading. Error correction and charted performance feedback are provided after each reading. Upon reaching the fluency criterion, the student advances to a new more challenging passage while increasingly adjusting the fluency criterion. Results indicated the *Great Leaps Reading* program was highly effective to increase the participant's reading fluency (PND = 91.67%), averaging 22 more CWPM than in baseline. Nevertheless, fluency gains were marginally transferred to generalization passages (PND = 87.50%), with a mean increase of 7 CWPM relative to the baseline generalization probes. In contrast, the intervention was not effective to reduce Emmanuel's mean error rate during the program readings and generalization probes (PND = 33.33% and 25.00%, respectively). Specifically, Emmanuel's average error rate increased during instruction (from 6 to 6.83 EPM) and generalization probes (from 8 to 10.50 EPM).

Using a multiple baseline between groups and between interventions design, Denton et al. (2006) evaluated the effects of two reading packages: (a) *Phono-Graphix,* a reading package which emphasizes phonetic and decoding skill elements and (b)

Read Naturally, a reading program that uses modeled repeated reading strategies to build fluency. Participants were 27 students with reading difficulties in Grades 1 through 3, including eight with LD, which were assigned at random into two groups. Results revealed that both groups of students demonstrated significant gains from pretest to posttest during the *Phono-Graphix* intervention on measures of decoding (d_a = 0.93), spelling (d = 0.55), fluency (d = 0.45), and comprehension (d_a = 0.74). The *Read Naturally* intervention did not have a significant impact on decoding (d_a = 0.11) and spelling (d = 0.31) from pretest to posttest, but yielded significant growth in fluency (d = 0.73). On comprehension measures, the *Read Naturally* intervention also showed minor to moderate pretest-posttest gains (d_a = 0.29), but differences on all comprehension measures were not significant. Overall, the *Phono-Graphix* intervention resulted in higher pretest-posttest gains on measures of decoding (d_a = 0.58), spelling (d = 0.22), and comprehension (d_a = 0.47) compared to the *Read Naturally* intervention. However, the fluency of both groups of students showed higher increases during the *Read Naturally* intervention than in the *Phono-Graphix* intervention (d = 0.25). In general, the effects of the interventions on the students' reading abilities were mixed, as the reading performance of more than 50% of the students' did not show significant improvements.

Therrien et al. (2006b) conducted a study to determine if the *Reread-Adapt and Answer-Comprehend (RAAC)* intervention would improve the reading fluency and comprehension of 16 elementary and middle school students with LD, and 14 students who were at-risk for reading failure. Students were randomly assigned to either the treatment or the control condition. Students in the treatment condition received the eight-step *RAAC* intervention, a reading program which consists of the following: (a) reading story grammar questions on a cue card, (b) repeatedly reading a story until mastering a performance fluency criterion or completing four reading trials, followed by (c) assisted story grammar questioning and answering, and finally (d) factual and inferential comprehension story questioning. Results indicated that students in the *RAAC* condition significantly increased their reading fluency from the first to the last passage reading (d = 3.59). Additionally, the students in the *RAAC* condition significantly improved their inferential comprehension from the first 10 passage readings to the last 10 passage readings (d = 2.31). No significant differences were noted in factual comprehension measures across readings. On the pretest-posttest *Dynamic Indicators of Basic Early Literacy Skills* (DIBELS; University of Oregon, 2005) oral fluency measure, the *RAAC* group performed significantly better than the control group (d = 0.37), with an average of 13 more correct words per minute. Furthermore, students in the *RAAC* condition demonstrated higher gains on the WJ-III Broad Reading assessment than students in the control condition (d = 0.35), but no statistically significant differences were found between both conditions.

In another study, Therrien and Gormley-Budin (2008) used a pretest-posttest case design to examine the effectiveness of the *Reread-Adapt and Answer-Comprehend (RAAC)* program to improve the reading fluency and comprehension skills of two students in fourth and fifth grade, one of which, Scott, was identified with LD. Procedures were similar to those described in Therrien et al. (2006b). Results indicated that Scott's oral fluency scores marginally improved from pretest to posttest as measured by the DIBELS oral fluency test, with a gain of eight correct words per

minute. Alternatively, Scott's WJ-III Broad Reading scores increased by seven points after the intervention, which the authors indicated was comparable to the mean score gain reported for the students in the *RAAC* group in the previous study by Therrien et al. (2006b).

In the final study, Therrien et al. (2012) investigated the effects of the *Reread-Adapt and Answer-Comprehend (RAAC)* strategy, with and without repeated reading, on the fluency skills of thirty elementary-age students in Grades 3 to 5, including four with LD. Students were randomly assigned to the *RAAC* group and non-repeated reading *RAAC* group on a 1:2 basis. Students in the *RAAC* group received reading instruction according to the *RAAC* reading program, while their peers in the non-repeated reading *RAAC* condition received a modified version of the *RAAC* program in which the students read two new passages one time each session. Results indicated that students in both the *RAAC* and non-repeated reading *RAAC* groups demonstrated significant gains from pretest to posttest on oral fluency ($d = 0.64$ and 0.90, respectively; $M_{gain} = 15.73$ and 26.90 CWPM, respectively) and reading achievement as measured by the WJ-III Broad Reading assessment ($d = 0.61$ and 0.50, respectively; $M_{gain} = 3.37$ and 5.00, respectively). Nevertheless, the students in the non-repeated reading *RAAC* group outperformed their peers in the *RAAC* group in both oral fluency and reading achievement ($d = 0.42$ and 0.19, respectively), with no statistically significant differences found between groups on both measures.

Discussion

In general, repeated reading is an effective strategy to improve reading fluency for both students with and without LD in the elementary and early secondary grade levels. In addition, mostly moderate to large gains in reading fluency and comprehension were shown on practiced passages during the repeated reading interventions. However, of those studies that did report generalization measures, results indicated only minor to moderate gains in fluency and comprehension generalized to unpracticed passages. These findings are consistent and corroborate previous research studies on the effectiveness of repeated reading interventions for elementary-age students with LD (Chard et al., 2002; Therrien, 2004). Results of the studies reviewed suggest the use of repeated reading as the primary intervention, in combination with other reading interventions, or as part of a reading program has been shown to increase students' reading fluency skills and *may* be beneficial to promote reading comprehension, as well. However, it appears from the research literature that among studies that compared the use of repeated reading to other reading interventions, the results indicate that other interventions proved to be as effective as repeated reading to improving students' reading fluency and comprehension skills.

In the first group of studies using repeated reading as the primary intervention, the findings showed that repeated reading with performance feedback (Chafouleas et al., 2004), reading words in context (Therrien & Kubina, 2007), and with oral feedback and error correction (Kubina et al., 2008; Kostewicz & Kubina, 2010) all showed positive effects to increase students' reading fluency skills. Moreover, the effects of repeatedly reading text to a high performance criterion of fluency were better sustained over time than lower fluency criterion (Kubina et al., 2008). In contrast, despite such positive findings for repeated reading as the sole intervention, the second

group of studies that investigated repeated reading compared to other interventions showed somewhat mixed results. Results indicated that, while repeated reading was more effective than question generation on fluency and comprehension (Therrien & Hughes, 2008), no significant differences were found that compared repeated reading with continuous readings (O'Connor et al., 2007) on improving students reading fluency and comprehension skills, while other interventions such as phrase-drill error correction (Begeny et al., 2006) were marginally more effective to increase students reading fluency skills. In the third group of studies, positive results were shown in students reading fluency and comprehension skills when repeated reading was combined with systematic error correction (Nelson et al., 2004), vocabulary instruction and error correction (Tam et al., 2006), and most notably, with peer-mediated (e.g., partner reading) instruction (Musti-Rao et al., 2009; Oddo et al., 2010; Staubitz et al., 2005; Yurick et al., 2006). And finally, in the fourth group of studies, gains on reading fluency and comprehension measures were shown when repeated reading was included as part of a reading program (Denton et al., 2006; Therrien & Gormley-Budin, 2008; Therrien et al., 2006b; 2012; Walker et al., 2005). However, of the two studies that compared reading programs, results indicated studies that did not include a repeated reading component proved to be more effective on students' reading fluency and comprehension skills (Denton et al., 2006; Therrien et al., 2012). In summary, the findings suggest that repeated reading instruction is a well-suited intervention to target deficits in reading fluency for students with and without LD; however, other reading strategies may prove to be potentially more favorable to improve students reading comprehension skills.

Implications for the Classroom

There are a number of reasons both general and special education teachers should consider the use of repeated reading interventions as part of their instructional practices in the classroom. First, repeated reading is a simple, straight-forward strategy that can easily be used and/or adapted, with minimal time within an instructional lesson. Students, both with and without disabilities, can simply read a passage silently or aloud, read to a more proficient peer or partner, or to an adult (e.g., teacher, paraprofessional, volunteer, etc.) and receive corrective and performance feedback on their reading skills. Second, teachers can use the strategy across a wide range of instructional settings including individually at a learning center with recorded passages and audio-books on tape or tablet PC, one-on-one, paired/partner reading groups, small groups, and in inclusive content-area classrooms. Third, repeated reading interventions require minimal student and teacher training to use and can easily be adapted/modified to the curriculum materials. Fourth, using repeated reading interventions in combination with (e.g., peer-mediated instruction) or as part of a reading program (e.g., *Reread-Adapt and Answer-Comprehend - RAAC*) should also be considered by classroom teachers to increase students' reading fluency and comprehension skills.

Limitations

Although the research findings are positive, a number of limitations need to be mentioned to inform both general and special educators as well as researchers.

First, most of the studies reviewed did not have a homogenous group of students in the classroom, as only three studies exclusively included students with LD. Second, five of the studies did not report student demographic information such as the participant's age, while 16 of the studies did not provide information on the participant's IQ scores. Third, due to the small sample size in some of the studies that had an (N = 1) or used a single-subject design, it was difficult to compare findings as often sample demographic information was missing or studies included students with and without disabilities, including a wide range of disability categories. Fourth, no standard protocols to implement repeated reading were followed, as studies reviewed repeatedly read passages a pre-established number of times or to a fluency criterion in a wide range of instructional formats (e.g., read to a peer and/or adult, listened to an audiotape, etc.). Fifth, few studies provided generalization and maintenance measures. Only one study evaluated the retention fluency rate on practiced passages over an extended period of time. Moreover, most of the studies that conducted generalization measures did not specify the level of word overlap of transfer passages with the instructional passages.

Conclusions & Future Research

In summary, repeated reading can be an effective intervention to improve students' reading fluency skills and has the potential to aid in comprehension of elementary-age students with and without LD. However, these finding should be considered with caution, as there are a number of unresolved issues that should be addressed in future research studies.

First, research is needed on the effects of repeated reading interventions for elementary and early secondary grade level students with LD and other disability categories (e.g., speech and/or language impairments, intellectual disabilities, emotional and/or behavioral disorders, autism spectrum disorders, etc.) to determine the benefits of this strategy to improve students' reading fluency and comprehension skills. Second, research should also establish a standard set of procedures or protocols to effectively implement repeated reading interventions, as it varies widely across studies. Third, studies should investigate the effectiveness of the different types of repeated reading interventions used as the sole strategy (e.g., read aloud, read silently, read/listen to a tape recorder, or read to a peer and/or adult), in combination with other reading strategies (e.g., partner reading, peer-mediated instruction), and in reading programs (e.g., *Great Leaps Reading*, *Phono-Graphix*, *Read Naturally*, *Reread-Adapt and Answer-Comprehend - RAAC*). Fourth, additional studies should explore repeated reading interventions in a range of classroom settings (e.g., self-contained, resource, inclusive). Fifth, since most of the studies used single-subject research designs with small sample sizes, further studies should be conducted with larger samples using experimental treatment/comparison group designs. Sixth, future studies should examine the long-term effectiveness of repeated reading interventions, since only six of the studies provided maintenance and generalization measures. And finally, research is warranted on the benefits of these interventions on improving students reading comprehension skills, which is the ultimate goal of reading instruction.

Table 1. ***Repeated Reading as the Primary Intervention***

Citation	Participants	Research Design/Instructional Conditions	Setting/ Sessions/ Session Length	Dependent Measures	Results
Chafouleas, Martens, Dobson, Weinstein, & Gardner (2004)	*N* = 3 *n* = 1 LD *n* = 2 General Education Age: 8 to 9 years IQ (NR) Grade: 2 *n* = 2 Grades 1-3 *n* = 1	Single-Subject: Alternating-treatments T_1: RR (IC: FC) Students read a passage three times to a performance fluency criterion (60 CWPM with at most 3 errors) for three sessions in a row. T_2: RR + Performance Feedback (IC: FC, OPF) Same as T_1, but students also received oral performance feedback. T_3: RR + Performance Feedback + Reward (IC: FC, OPF) Same as T_2, but students also received a reward if their fluency improved from the last reading of the previous session.	1:1 Pullout/ T_1: 3-6 T_2: 4-7 T_3: 5-7/ NR	a. Correct words per minute b. Errors per minute	For the student with LD: a. T_2 outperformed T_3 T_3 outperformed T_1 b. T_2 outperformed T_1 T_1 outperformed T_3
Therrien & Kubina (2007)	*N* = 16 *n* = 2 LD *n* = 14 General Education Age (NR) IQ (NR) Grades: 3 & 5	Experimental: Treatment/comparison T_1: RR on reading passage (IC: CSA, FC, EC) Students repeatedly read a passage to a performance fluency criterion (93 CWPM) or 6 reading trials were completed. T_2: RR on randomized word list (IC: CSA, FC, EC) Same as T_1, except that students read a list of acontextual words.	1:1 Pullout/ T_1:1 T_2:1/ NR	a. Readings to reach criterion[a] b. Errors during first reading[a] c. Correct words per minute on transfer passages d. Errors on transfer passages[a]	For all students: a. T_1 vs. T_2: d = -2.09 ($p < 0.0005$) b. T_1 vs. T_2: d = -0.62 ($p < 0.05$) c. T_1 vs. T_2: d = 0.20 d. T_1 vs. T_2: d = -0.28

Kubina, Amato, Schwilk, & Therrien (2008)	*N* = 3 *n* = 1 LD *n* = 1 LD, SLI *n* = 1 EBD Age: 9 years IQ (NR) Grade: 3	Single-Subject: Alternating-treatments T_1: RR + high fluency criterion (IC: CS, FC, EC) Students repeatedly read a passage two to three times until mastering a high performance fluency criterion (200 CWPM) for 2 consecutive sessions. T_2: RR + low fluency criterion (IC: CS, FC, EC) Same as T_1, except that students repeatedly read to a low performance fluency criterion (123 CWPM).	1:1 In-class/ T_1: 7-8 T_2: 17-26/ NR	a. Correct words per minute	For students with LD: a. Last reading T_1: M_{gain} = 135.50 T_2: M_{gain} = 79.50 After 14 weeks T_1: M_{gain} = 81.50 T_2: M_{gain} = 50.00
Kostewicz & Kubina (2010)	*N* = 3 *n* = 1 LD, ADHD, AP, MD *n* = 1 AP *n* = 1 General Education Age: 8 to 10 years IQ (NR) Grades: 2 & 4	Single-Subject: Alternating-treatments T_1: RR (IC: FC, CS, EC, OPF) Students read a passage twice for one minute until mastering a fluency criterion (200 CWPM with at most 2 errors). T_2: Interval Sprinting (IC: FC, CS, EC, OPF) Students "sprint" through six parts of a passage until mastering a fluency criterion (200 CWPM with at most 2 errors) as follows: (a) students read the first three parts of the passage, completing 2 consecutive readings of each part for 10 seconds, (b) received error correction after completing the first three parts, and (c) the students proceeded to read the next three parts following the same procedures.	1:1 Pullout/ T_1: 18-22 T_2: 18-22/ 10-20 minutes	a. Correct words per minute b. Errors per minute	For the student with LD: PND(%) a. T_1 100.00 T_2 100.00 b. T_1 29.17 T_2 20.83

a. A negative Cohen's *d* indicates the treatment listed first outperformed the second.

Note: ADHD = Attention Deficit Hyperactivity Disorder, AP = Auditory Processing, BPD = Bipolar Disorder, CD = Cognitive Disability, DD = Developmental Disability, EBD = Emotional and/or Behavioral Disorder, ELL = English-Language Learner, LD = Learning Disability, MD = Memory Disorder, OHI = Other Health Impaired, SD = Speech Deficit, SED = Severe Emotional Disability, and SLI = Speech and/or Language Impairment.

IC = Instructional Components, ADM = Audio Device Model, AM = Adult Model, CC = Cue for Comprehension, CPF = Charted Performance Feedback, CS = Cue for Reading Speed, CSA = Cue for Reading Speed and Accuracy, CSAC = Cue for Reading Speed, Accuracy and Comprehension, EC = Error Correction by the Interventionist, FC = Fluency Criterion, FN = Fixed Number of Readings, PEC = Peer Error Correction, PM = Peer-Mediated, and OPF = Oral Performance Feedback.

NR = Not Reported in the Study.

Table 2. ***Repeated Reading Compared to Other Reading Interventions***

Citation	Participants	Research Design/Instructional Conditions	Setting/ Sessions/ Session Length	Dependent Measures	Results
Begeny, Daly, & Valleley (2006)	*N* = 1 *n* = 1 LD, SLI Age: 8 years IQ (NR) Grade: 3	Single-Subject: Alternating-treatments B: The student read aloud a passage once (baseline). T_1: RR (IC: FN) The student read a passage twice. T_2: Phrase-drill with error correction (IC: EC) The student read a passage, practiced incorrect words, and then continued reading phrases in the text with the miscued words until completing 3 correct readings. T_3: Reward contingency The student read a passage with the same reading difficulty of a previously practiced passage and received a reward if his fluency increased compared to the practiced passage.	1:1 Pullout/ T_1: 8 T_2: 8 T_3: 4/ NR	a. Correct words per minute b. Errors per minute	For the student with LD: PND(%) M_{gain} a. T_1 100.00 23.50 T_2 100.00 23.87 T_3 75.00 7.87 $M_{decrease}$ b. T_1 1.62 T_2 3.00 T_3 2.00

O'Connor, White, & Swanson (2007)	*N* = 37 *n* = 16 LD *n* = 1 LD, ELL *n* = 14 General Education *n* = 6 General Education, ELL Age (NR) IQ (NR) Grades: 2 & 4	Experimental: Treatment/comparison C: No intervention (control). T_1: RR (IC: FN, EC) Students repeatedly read each page of text 3 times for a 15-minute period. T_2: Continuous reading (IC: EC) Students read pages of text for a 15-minute period.	1:1 NR/ T_1: 42 T_2: 42/ 15 minutes	a. Correct words per minute b. GORT-4 fluency c. GORT-4 comprehension d. PPVT-III e. WRMT-NU word identification f. WRMT-NU word attack g. WRMT-NU passage comprehension	For all students: a. T_1 vs. T_2 : $d = 0.08$ T_1 vs. C : $d = 0.87$ ($p < .01$) T_2 vs. C : $d = 0.74$ ($p < .01$) b. T_1 vs. T_2 : $d = -0.04$ T_1 vs. C : $d = 0.53$ ($p < .01$) T_2 vs. C : $d = 0.58$ ($p < .01$) c. T_1 vs. T_2 : $d = -0.24$ T_1 vs. C : $d = 0.75$ T_2 vs. C : $d = 0.95$ d. T_1 vs. T_2 : $d = 0.15$ T_1 vs. C : $d = 0.86$ T_2 vs. C : $d = 0.59$ e. T_1 vs. T_2 : $d = 0.29$ T_1 vs. C : $d = 0.58$ ($p < .01$) T_2 vs. C : $d = 0.21$ ($p < .01$) f. T_1 vs. T_2 : $d = -0.04$ T_1 vs. C : $d = 0.46$ T_2 vs. C : $d = 0.46$ g. T_1 vs. T_2 : $d = 0.07$ T_1 vs. C : $d = 1.09$ ($p < .01$) T_2 vs. C : $d = 0.71$ ($p < .01$)

Welsch (2007)	*N* = 4 *n* = 4 LD Age: 9.4 to 11.1 years IQ: 95 -108 Grades: 3 & 4	Single-Subject: Alternating-treatments-Best treatment B_1: Students read a passage on grade level for 1 minute (baseline$_1$). B_2: Students read a passage below grade level for 1 minute (baseline$_2$). T_1: RR (IC: FN, OPF) Students read a passage 4 times. T_2: Listening passage preview (IC: AM) Students (a) listened to an adult read a passage aloud and (b) independently read the same passage. T_3: RR with easier material (IC: FN, OPF) Same as T_1 with passages one grade level below the students' reading level. T_4: Listening passage preview with easier material (IC: AM) Same as T_2 with passages one grade level below the students' reading level.	1:1 In-class/ T_1: 1, 4, 18 T_2: 1, 4 T_3: 1, 4, 22-26 T_4: 1, 4/ 5-10 minutes	a. Correct words per minute b. Errors per minute c. Oral recalls	Connor: PND(%) Best Treatment / Generalization a. T_1 100.00 / 66.67% b. T_1 50.00 / 5.56% c. T_1 100.00 / 88.89% Donald, Wendell and George: PND(%) Best Treatment / Generalization a. T_3 100.00 / 75.67% b. T_3 97.33 / 48.34% c. T_3 100.00 / 82.02%
Therrien & Hughes (2008)	*N* = 32 *n* = 18 LD *n* = 14 General Education Age: 9 to 13 years IQ (NR) Grades: 4-6	Experimental: Treatment/comparison T_1: RR (IC: CSAC, EC) Students (a) repeatedly read a passage until a fluency criterion was reached or 4 readings were completed. Error correction was provided during and after each reading. T_2: Question generation (IC: CC, EC) Students (a) read aloud story grammar questions on a cue card, (b) read a story once, (c) received error correction procedures, and (d) answered story grammar questions assisted by a tutor.	1:1 NR/ 4/ 10-15 minutes	a. Correct words per minute first passage reading b. Correct words per minute last passage reading c. Correct factual comprehension questions d. Correct inferential comprehension questions	For all students: a. T_1 vs. T_2 : $d = 0.05$ b. T_1 vs. T_2 : $d = 0.80$ ($p < .005$) c. T_1 vs. T_2 : $d = 0.84$ ($p < .05$) d. T_1 vs. T_2 : $d = 0.39$

Note: GORT-4 = Gray Oral Reading Tests, Fourth Edition (Wiederholt & Bryant, 2001); PPVT-III = Peabody Picture Vocabulary Test, Third Edition (Dunn & Dunn, 1997); WRMT-NU = The Woodcock Reading Mastery Tests-NU (Woodcock, 1998).

Table 3. ***Repeated Reading in Combination with Other Reading Interventions***

Citation	Participants	Research Design/Instructional Conditions	Setting/ Sessions/ Session Length	Dependent Measures	Results
Nelson, Alber, & Gordy (2004)	$N = 4$ $n = 3$ LD $n = 1$ ADHD Age: 8.2 to 9.6 years IQ (NR) Grade: 2	Single-Subject: Multiple baseline across participants B: Students read a passage orally for 5 minutes (baseline) (IC: EC). T_1: Systematic error correction (IC: EC) Students (a) read a passage for 5 minutes while receiving error correction, and (b) reviewed and practiced mispronounced words assisted by the interventionist. T_2: Systematic error correction + RR (IC: FN, EC) Students (a) received systematic error correction procedures on a reading passage for 3 minutes, and (b) read the passage three times for 1 minute each. T_3: Systematic error correction + RR on previously read materials (IC: FN, EC) Same as T_2, but students read baseline passages.	1:1 In-class/ T_1: 6-11 T_2: 5-11 T_3: 4-7/ 6 minutes	a. Correct words per minute b. Errors per minute	For students with LD: a. PND(%) M_{gain} T_1 19.70 7.44 T_2 84.24 21.00 T_3 95.24 24.27 b. PND(%) $M_{decrease}$ T_1 43.69 3.29 T_2 36.97 3.12 T_3 83.33 4.54

Staubitz, Cartledge, Yurick, & Lo (2005)	*N* = 6 *n* = 1 LD *n* = 3 EBD *n* = 1 EBD,ADHD *n* = 1 EBD, BPD, ADHD Age: 9.10 to 11.10 years IQ (NR) Grades: 4 & 5	Single-Subject: Multiple baseline across participants B: Students performed sustained silent reading for 10 minutes (baseline). T: Peer-mediated RR (IC: FC, PM, PEC, CPF) Students worked in pairs (student or researcher) and took turns to read a passage and perform error correction procedures for 10 minutes until a mastery criteria for the passage was reached, which consisted of reaching a fluency criterion (4th grade: 145 WPM, with at most 10 errors, 5th grade: 180 WPM, with at most 10 errors) and correctly answering all comprehension questions.	1:1 Pullout & In-class/ T: 12-35/ 10-15 minutes	a. Words per minute b. Percent of correct words per minute c. Correct cloze comprehension questions (*n* = 5) Pretest-posttest measures d. WJ-III letter-word identification e. WJ-III word attack f. WJ-III reading fluency g. WJ-III passage comprehension	For the student with LD: a. PND = 100.00%, Gain score = 95.00 b. Gain score = 6.55% c. Gain score = 2.28 Generalization: a. Gain score = 21.33 b. Gain score = 1.17% c. Gain score = 0.31 Pretest-posttest measures d. Gain score = 0.2 e. Gain score = -0.7 f. Gain score = 0.1 g. Gain score = 0.4

Tam, Heward, & Heng (2006)	*N* = 5 *n* = 2 LD, ELL *n* = 1 DD, ELL *n* = 2 General Education, ELL Age: 9.4 to 11.1 years IQ (NR) Grades 3-5	Single-Subject: Multiple baseline across participants B: RR (baseline) Students read a passage 3 times and completed literal comprehension questions after each reading. S: Story-telling Students (a) were read a story aloud, (b) asked questions related to the story, (c) answered literal comprehension questions, and (d) were introduced to baseline procedures. T_1: Vocabulary instruction + RR of a new passage per session (IC: CS, FN, EC, CPF) Students (a) received vocabulary instruction prior to reading a novel passage, (b) read the passage aloud while receiving error correction, and (c) read the passage three times and answered literal comprehension questions after each reading. T_2: Vocabulary instruction + RR to a fluency criterion (IC: CS, FC, EC, CPF) Same as T_1, except that a new passage was introduced after a fluency criterion was mastered.	1:1 Pullout/ T_1: 12-21 T_2: 7-22/ 35 minutes	a. Correct words per minute b. Errors per minute c. Correct comprehension questions (*n* = 5)	For students with LD: a. T_1 $M_{gain\text{-}B}$ 10.35, $M_{gain\text{-}S}$ 12.00 T_2 17.21, 18.86 b. T_1 $M_{decrease\text{-}B}$ 9.00, $M_{decrease\text{-}S}$ 12.10 T_2 10.83, 13.93 c. T_1 $M_{gain\text{-}B}$ 2.40, $M_{gain\text{-}S}$ 2.50 T_2 3.10, 3.20 Generalization: c. T_1 $M_{gain\text{-}B}$ 0.60, $M_{gain\text{-}S}$ 0.95 T_2 1.20, 1.55

Yurick, Robinson, Cartledge, Lo, & Evans (2006)	Experiment 1: N = 8 n = 2 LD n = 6 General Education Age: 10.7 to 11.11 years IQ (NR) Grade: 5 (Experiment 2 not discussed – did not include students with LD.) Experiment 3: N = 6 n = 1 LD n = 1 SD n = 4 General Education Age: 9.3 to 10.11 years IQ (NR) Grade: 4	Single-Subject: Multiple baseline across participants Experiment 1: B: Students performed sustained silent reading for 10 minutes and answered comprehension questions (baseline). T: Peer-mediated RR (IC: FC, PM, PEC, CPF) Students worked in dyads and read a passage for 10 minutes alternating paragraphs and performing error correction procedures. After mastering a fluency criterion (180 WPM with at most 10 errors), the students completed comprehension questions. Criteria for mastering a passage consisted of (a) reaching the fluency criterion and (b) correctly answering all comprehension questions. Experiment 3: B: Students performed sustained silent reading for 10 minutes and answered comprehension questions (baseline). T: Peer-mediated RR (IC: FC, PM, PEC, CPF) Same as Experiment 1, except for differences in the error correction procedures.	Experiment 1: In-class/ T: 11-26/ NR Experiment 3: Pullout/ T: 15-39/ NR	Experiments 1 & 3: a. Words per minute b. Percent of correct words per minute c. Correct cloze comprehension questions (n = 5) Pretest-posttest measures Experiment 1: d. WJ-R letter-word identification e. WJ-R passage comprehension Experiment 3: f. WJ-III letter-word identification g. WJ-III word attack h. WJ-III reading fluency i. WJ-III passage comprehension	For all students: Experiment 1: a. PND = 91.86%, M_{gain} = 66.57 b. M_{gain} = 4.38% c. M_{gain} = 2.14 Pretest-Posttest d. M_{gain} = 0.40 e. M_{gain} = 1.00 Experiment 3: a. PND = 86.33%, M_{gain} = 51.00 b. M_{gain} = 4.50% c. M_{gain} = 2.50 Generalization: a. M_{gain} = 7.76 b. M_{gain} = 1.54% c. M_{gain} = 0.60 Pretest-Posttest f. M_{gain} = 0.40 g. M_{gain} = 1.30 h. M_{gain} = 0.70 i. M_{gain} = 0.70

Musti-Rao, Hawkins, & Barkley (2009)	*N* = 12 *n* = 3 LD *n* = 1 CD *n* = 1 OHI *n* = 1 SED *n* = 6 General Education Age: 9.3 to 12.5 years IQ (NR) Grade: 4	Single-Subject: Multiple baseline across participants B: Students performed sustained silent reading for 30 minutes (baseline). T: Peer-mediated RR (IC: FC, PM, PEC, OPF) Students worked in dyads to read a passage for 10 minutes, alternating paragraphs and error correction procedures, until mastering a fluency criterion.	Pullout & In-class/ T: 5-14/ NR	a. Correct words per minute	For all students: a. PND = 66.22%, M_{gain} = 13.73
Oddo, Barnett, Hawkins, & Musti-Rao (2010)	*N* = 4 *n* = 1 LD *n* = 3 General Education Age: 9 years IQ (NR) Grade: 4	Single-Subject: Multiple baseline across groups B: Students performed sustained silent reading for 10 minutes (baseline). T: Group peer-mediated RR (IC: PM, PEC) Groups of 4-5 students read a passage at least three times in a round-robin format, alternating paragraphs and error correction procedures, for three 10-minute sessions.	Small group & In-class/ T: 8-11/ 10 minutes	a. Correct words per minute b. Errors per minute c. Correct Maze comprehension questions	For the student with LD: PND(%) a. 87.50 b. 12.50 c. 75.00

Note: WJ-III = Woodcock-Johnson Tests of Achievement, Third Edition (Woodcock, McGrew, & Mather, 2001); WJ-R = Woodcock-Johnson Tests of Achievement-Revised (Woodcock, 1989).

Table 4. ***Repeated Reading as Part of a Reading Program***

Citation	Participants	Research Design/Instructional Conditions	Setting/ Sessions/ Session Length	Dependent Measures	Results
Walker, Jolivette, & Lingo (2005)	*N* = 1 *n* = 1 LD Age: 10 years IQ: 95 Grade: 3	Single-Subject: AB B: The student orally read a passage for 1 minute (baseline). T: *Great Leaps Reading* program (IC: EC, CPF) The student repeatedly read a passage to a fluency criterion and received error correction and performance feedback following the *Great Leaps Reading* program. After mastering a passage, the student advanced to the next reading level in the program.	1:1 In-class/ T: 24/ 20-25 minutes	a. Correct words per minute b. Errors per minute	For the student with LD: PND(%) Intervention Generalization a. 91.67 87.50% b. 33.33 25.00%
Denton, Fletcher, Anthony, & Francis (2006)	*N* = 27 *n* = 8 LD *n* = 2 OHI *n* = 1 EBD *n* = 16 General Education Mean Age = 8.6 years IQ: 64-117 Average IQ: 85 Grades: 1-3	Single-Subject: Multiple baseline between groups and between interventions T_1: *Phono-Graphix* Students received phonetic and decoding instruction thru the use of the *Phono-Graphix* program. T_2: *Read Naturally* (IC: FC, EC, ADM, CPF) A modified version of the *Read Naturally* program was used as follows: students (a) were asked to make an oral prediction of a passage, (b) performed an initial timed reading of the passage, (c) received error correction procedures, (d) repeatedly read the passage with an audio model to a fluency criterion, and (e) answered comprehension questions.	*Phono-Graphix*: 1:2 Pullout/ 80/ 50 minutes *Read Naturally*: 1:2 Pullout/ 40/ 60 minutes	a. GORT-4 fluency b. GORT-4 comprehension c. TOWRE sight word fluency d. TOWRE phonemic decoding fluency e. WJ-III word attack f. WJ-III letter-word identification g. WJ-III spelling h. WJ-III passage comprehension	For all students: a. T_1 vs. T_2 : d = -0.25 b. T_1 vs. T_2 : d = 0.63 c. T_1 vs. T_2 : d = -0.18 d. T_1 vs. T_2 : d = 0.37 e. T_1 vs. T_2 : d = 1.90 f. T_1 vs. T_2 : d = 0.64 g. T_1 vs. T_2 : d = 0.22 h. T_1 vs. T_2 : d = 0.31

Therrien, Wickstrom, & Jones (2006b)	*N* = 30 *n* = 16 LD *n* = 14 General Education Age (NR) IQ (NR) Grades: 4, 5, 7, & 8	Experimental: Treatment/comparison C: No intervention (control). T: *Reread-Adapt and Answer-Comprehend* (*RAAC*) (IC: CSAC, FC, EC) Students (a) read story grammar questions on a cue card, (b) repeatedly read a story to a fluency criterion or completed four readings, (c) received error correction procedures, (d) answered story grammar questions assisted by the interventionist upon completing the last passage reading and (e) answered factual and inferential passage questions.	1:1 Pullout/ T: 50/ 10-15 minutes	a. Correct words per minute b. Correct factual comprehension questions c. Correct inferential comprehension questions Pretest-posttest measures d. DIBELS oral reading fluency - correct words per minute e. WJ-III broad reading standard score	For all students: a. T: Last passage reading vs. first passage reading $d = 3.59$ ($p < .0005$) b. T: Last 10 passages vs. first 10 passages: NR c. T: Last 10 passages vs. first 10 passages $d = 2.31$ ($p < .0001$) d. T vs. C : $d = 0.37$ ($p < .05$) e. T vs. C : $d = 0.35$
Therrien, & Gormley-Budin (2008)	*N* = 2 *n* = 1 LD *n* = 1 General Education Ages: 10-11 years IQ (NR) Grades: 4 & 5	Pretest-posttest case design T: *Reread-Adapt and Answer-Comprehend* (*RAAC*) (IC: CSAC, FC, EC, OPF) Similar procedures were used as in Therrien et al. (2006b).	1:1 Pullout/ T: 50/ 10-15 minutes	a. DIBELS oral reading fluency – correct words per minute b. WJ-III letter-word identification c. WJ-III reading fluency d. WJ-III passage comprehension e. WJ-III broad reading standard score	For the student with LD: a. Gain score = 8 b. Gain score = 6 c. Gain score =10 d. Gain score = 2 e. Gain score = 7

Therrien, Kirk Woods-Groves (2012)	*N* = 30 *n* = 4 LD *n* = 26 General Education Grades: 3-5 Age (NR) IQ (NR)	Experimental: Treatment/comparison T_1: *Reread-Adapt and Answer-Comprehend* (*RAAC*) (IC: CSAC, FC, EC, OPF) Similar procedures were used as in Therrien et al. (2006b). T_2: Non-repeated *RAAC* (IC: CSAC, EC, OPF) Same as T_1, except that students read two unpracticed passages once in each session.	1:1 Pullout/ T_1: 50 T_2: 50/ 10-15 Minutes	a. DIBELS oral reading fluency – correct words per minute b. WJ-III broad reading standard score	For all students: a. T_1 vs. T_2: *d* = -0.42 b. T_1 vs. T_2: *d* = -0.19

Note: DIBELS = Dynamic Indicators of Basic Early Literacy Skills (University of Oregon, 2005); GORT-4 = Gray Oral Reading Tests, Fourth Edition (Wiederholt & Bryant, 2002); TOWRE = Test of Word Reading Efficiency (Torgesen, Wagner, & Rashotte, 1999); WJ-III = Woodcock-Johnson Tests of Achievement, Third Edition (Woodcock, McGrew, & Mather, 2001).

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