Fluency and Comprehension Gains as a Result of Repeated Reading: A Meta-Analysis

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A Meta-Analysis

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ABSTRACT

Repeated reading is an evidenced-based strategy designed to increase reading fluency and comprehension. The author conducted a meta-analysis to ascertain essential instructional components of repeated reading and the effect of repeated reading on reading fluency and comprehension. This analysis indicates that repeated reading can be used effectively with nondisabled students and students with learning disabilities to increase reading fluency and comprehension on a particular passage and as an intervention to increase overall fluency and comprehension ability. Essential instructional components of repeated reading varied as a function of the type of repeated reading (i.e., whether effectiveness was evaluated reading the same passage or different passages). Implications for future research are also presented.

Although teaching students to read remains a major goal of education, many students have extreme difficulty learning even basic reading skills. At least one in five students has significant difficulties with reading acquisition (Lyon & Moats, 1997). In addition, approximately 37% of fourth-grade students did not achieve at the most basic reading level on a recent national test (U.S. Department of Education, 2000). Reading difficulties are even more pronounced for students with special needs, who often struggle with reading throughout their school careers and into their adult lives (Lyon & Moats, 1997).

The continuing difficulties students have with reading has caused the educational community to reevaluate how to teach basic and higher order reading skills. In 2000, a report from the National Reading Panel (National Institute of Child Health and Human Development, 2000) delineated five important reading skill areas: phonemic awareness, phonics, vocabulary instruction, text comprehension strategies, and reading fluency.

In this article, I examine procedures used to increase reading fluency, which is the ability to read with speed and accuracy (Samuels, 1979). The importance of reading fluency began to emerge as early as 1969 (Clay, 1969; Clay & Imlach, 1971). Historically, two theoretical constructs for explaining the importance of reading fluency and the origins of fluency deficits have been cited in the literature. LaBerge and Samuels (1974) theorized that reading fluency problems stem from readers' poor decoding skills. When decoding is too slow, a "bottleneck" is created that impedes the flow of thought and hampers comprehension. Poor readers often spend a great deal of their cognitive resources on decoding and have little left for comprehension. Fluent readers, on the other hand, decode words quickly and accurately, thus retaining many resources they can use for comprehension.

Conversely, Schrieber (1980) theorized that reading fluency difficulties stem from the absence of prosodic cues in written language. Schreiber contended that some readers have difficulty transferring from oral language, where prosodic markings are explicit, to written language, where

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prosodic markings need to be inferred. Readers who fail to generate appropriate prosodic markings do not divide sentences into meaningful phrases and therefore have difficulty comprehending written text, regardless of their ability to decode individual words.

Fluency difficulties may in fact stem from problems in decoding or dividing sentences into meaningful phrases. Logan (1997) contended that reading from text is complex and requires integration across all levels of processing—from decoding individual words to acquiring meaning from sentences, paragraphs, and the text as a whole. Failure at any one of these levels may result in reading fluency difficulties.

Fluency strategies have been designed and empirically tested. One of the first empirically evaluated strategies to focus on fluency was the *neurological impress method* (Hollingsworth, 1970, 1978; Langford, Slade, & Barnett, 1974; Lorenz & Vockell, 1979). The goal of this strategy is to increase fluency by having students and teachers read aloud simultaneously. Although preliminary findings for the method were encouraging, subsequent studies did not produce significant results (Langford et al., 1974; Lorenz & Vockell, 1979).

Three fluency strategies have evolved out of the neurological impress model; they are *assisted reading, reading while listening,* and *paired reading*. The first two are similar to the neurological impress method, except that students read along with an audiotape instead of with a speaking person. In paired reading, which was designed as a home-based intervention, students read along with a model, such as a teacher, until they feel comfortable enough to read alone. Reports regarding the effectiveness of these strategies are mixed (Law & Kratochwill, 1993; Mefferd & Pettegrew, 1997; Miller, Robson, & Bushell, 1986; Reitsma, 1988; Shany & Biemiller, 1995; van Bon, Boksebeld, Font Freide, & van den Hurk, 1991; VanWagenen, Williams, & McLaughlin, 1994; Winter, 1988).

Multicomponent interventions that include a fluency component have also been developed. RAV-O (Wolf & Bowers, 1999) is an intervention that includes instruction in word retrieval, vocabulary, orthography, and fluency. Shared book experience (Eldredge, Reutzel, & Hollingsworth, 1996) includes instruction in prosodic reading, conventions of print, comprehension strategies, and fluency. These strategies appear promising; however, they have limited empirical support.

One fluency strategy that has an extensive research base is *repeated reading,* "a supplemental reading program that consists of re-reading a short and meaningful passage until a satisfactory level of fluency is reached" (Samuels, 1979, p. 404). Two recent literature reviews concluded that repeated reading has the potential to improve students' reading fluency (Meyer & Felton, 1999; National Institute, 2000).

Drawing definitive conclusions from these reviews is difficult, however, for three reasons. First, Meyer and Felton (1999) did not take into account sample size differences among studies. Second, although the National Reading Panel (National Institute, 2000) conducted a meta-analysis, it did not separate out findings for repeated reading from the findings for other fluency strategies. Third, neither review took into account inconsistencies in conceptualization and implementation in repeated reading studies, making it difficult to identify important instructional components within repeated reading interventions.

For this study, I conducted a meta-analysis of repeated reading studies to address the following questions:

1. Is repeated reading effective in increasing reading fluency and comprehension?
2. What components within a repeated reading intervention are critical to the success of the program?
3. Do students with cognitive disabilities benefit from repeated reading?

METHOD

To answer the three questions, I followed a six-step process. First, I formed eligibility requirements for the studies that would be considered for the review. Articles must have (a) been published after Dahl's (1977) chapter on repeated reading and before June 2001, (b) been experimental and quantitative, and (c) used school-age participants (i.e., ages 5–18 years).

Second, I located studies in two ways. I searched the Educational Resources Information Center (ERIC) and Psychological Information (PsycInfo) databases, using the following words: *repeated reading, reading fluency, reading automaticity, reading speed, reading accuracy,* and *reading rate*. Second, I conducted an ancestral search using the reference lists of the electronically identified articles and the reference list in the fluency chapter of The National Institute of Child Health and Human Development's (2000) report. This search produced a total of 33 articles that met the criteria.

Third, I reviewed articles to determine if they were amenable to meta-analysis methodology. Nine articles were excluded because they lacked sufficient quantitative data to calculate effect sizes (i.e., Daly, Martens, Hamler, Dool, & Eckert, 1999; Freeland, Skinner, Jackson, McDaniel, & Smith, 2000; Gilbert, Williams, & McLaughlin, 1996; Kamps, Barbetta, Leonard, & Delquadri, 1994; Layton & Koenig, 1998; Neill, 1980; Samuels, 1979; Tingstrom, Edwards, & Olmi, 1995; Weinstein & Cooke, 1992).

Fourth, I reviewed the remaining articles to determine which effect size calculation would allow as many of the studies to be analyzed as possible. Eighteen articles provided information needed to calculate standard mean gain effect sizes (Becker, 1988); therefore, I chose this calculation as the metric for the meta-analysis. Six articles were excluded be-

cause they did not provide the pertinent information needed to compute mean gain effect sizes (i.e., Carver & Hoffman, 1981; Dahl, 1977; Faulkner & Levy, 1994; Levy, Nicholls, & Kohen, 1993; Rashotte & Torgesen, 1985; Taylor, Wade, & Yekovich, 1985). (Articles included in meta-analysis are noted in the Reference section.)

Fifth, fluency and comprehension effect sizes were calculated. Fluency measures were operationalized as number of correct words per minute, words per minute, or reading speed. Comprehension measures were operationalized as either story retell measures or comprehension questions. Effect sizes were calculated using the formulae that follow:

$$ES = \frac{M_2 - M_1}{S_p}$$

$$SE = \sqrt{\frac{2(1-r)}{n} + \frac{ES^2}{2n}}$$

$$w = \frac{1}{SE^2}$$

"M_1 is the mean at time one, M_2 is the mean at time two, S_p is the average standard deviation of M_1 and M_2, n is the common sample size at Time 1 and Time 2 and r is a correlation estimate between time 1 and time 2 scores" (Lipsey & Wilson, 2001, p. 44). When studies did not include correlation values, conservative estimates of .6 for fluency and .5 for comprehension were used.

Sixth, I coded effect sizes to allow the studies to be analyzed. For each effect size, I coded the following variables: (a) intervention length in sessions, (b) population (i.e., students without disabilities, students with cognitive special needs, or both students with and students without disabilities), (c) dependent variable type (i.e., fluency or comprehension), and (d) repeated reading intervention components. Cohen's (1988) criteria for interpreting the strength of effect sizes (small $ES < .20$, medium $ES = .50$, large $ES > .80$) were used to gauge the magnitude of the findings in this analysis.

Results

Dependent Variables

A preliminary inspection of effect sizes revealed a difference in the nature of dependent measures. Effect sizes were either nontransfer measures (i.e., measures of students' ability to fluently read or comprehend the same passage after reading it multiple times) or transfer measures (i.e., measures of students' ability to fluently read or comprehend a new passage after having read different passages multiple times). Due to this difference, nontransfer and transfer effect sizes were analyzed separately.

Effectiveness of Repeated Reading: Nontransfer

A total of 28 nontransfer effect sizes were calculated (16 fluency, 11 comprehension). Across all nontransfer measures, the mean fluency *ES* increase was .83 (*SE* = .066) and mean comprehension *ES* increase was .67 (*SE* = .080).

Component Analysis of Repeated Reading: Nontransfer

Nontransfer studies varied in the instructional components used within the interventions. Although all nontransfer repeated reading interventions had students read passages aloud to an adult, three components (cued reading, corrective feedback, and performance criteria) often varied among studies and therefore were analyzed (see Note 1). See Table 1 for the nontransfer component analysis.

Cued Reading. Prior to reading, students were cued to focus on speed or comprehension. Four effect sizes did not indicate the cue given and therefore were not included in the analysis. Students cued to focus on speed obtained a mean fluency *ES* of .72 (*SE* = .185) and a mean comprehension *ES* of .66 (*SE* = .197). Students cued to focus on comprehension obtained a mean fluency *ES* of .81 (*SE* = .096) and a mean

TABLE 1. Nontransfer Intervention Component Analysis

Dependent variable	Cue type			Corrective feedback		Number of times passage read		
	Fluency	Comp.	Fluency & comp.	Yes	No	2	3	4
Fluency	0.72	0.81	0.94	0.68	0.88	0.57	0.85	0.95
n	2	8	3	3	13	2	10	3
Comprehension	0.66	0.75	0.67	—	—	—	0.66	0.71
n	2	6	3	—	—	—	10	2

Note. *n* indicates number of effect sizes. Dash indicates effect size not calculated or available.

comprehension *ES* of .75 (*SE* = .127). Students cued to focus on speed and comprehension obtained a mean fluency *ES* of .94 (*SE* = .135) and a mean comprehension *ES* of .67 (*SE* = .136).

Corrective Feedback. Corrective feedback was part of the intervention represented by 3 of the 16 nontransfer fluency effect sizes. Corrective feedback consisted of correcting mispronunciations as they occurred or when students requested assistance. Students who received corrective feedback obtained a mean fluency *ES* of .68 (*SE* = .119), whereas students who did not receive corrective feedback obtained a mean fluency *ES* of .88 (*SE* = .075). None of the nontransfer interventions looked at the effect of including corrective feedback on students' comprehension ability.

Performance Criteria. A fixed number of readings was the performance criterion used in 27 of 28 nontransfer effect sizes (see Note 2). Collectively, these interventions obtained a mean fluency *ES* of .81 (*SE* = .066) and a mean comprehension *ES* of .66 (*SE* = .08). Interventions in which a fixed number of readings were used had students read the passage two, three, or four times (see Note 3). Mean fluency effect sizes based on the number of readings were as follows: two times, *ES* = .57 (*SE* = .141); three times, *ES* = .85 (*SE* = .088); and four times, *ES* = .95 (*SE* = .145). For none of the studies in which comprehension was measured had students read the passage twice. Mean comprehension effect sizes based on the number of readings were as follows: three times, *ES* = .66 (*SE* = .089); and four times, *ES* = .71 (*SE* = .181).

Repeated Reading: Transfer

I calculated 27 transfer effect sizes (16 fluency, 11 comprehension). With the exception of Vaughn, Chard, Bryant, Coleman, and Kouzekanani (2000), whose interventions lasted 1 year to 3 years, mean intervention length was 36 sessions. Across all transfer measures, mean fluency *ES* increase was .50 (*SE* = .058) and mean comprehension *ES* increase was .25 (*SE* = .067).

Component Analysis of Repeated Reading: Transfer

Instructional components within interventions that measured transfer varied more than those in nontransfer studies. I analyzed six components: adult or peer instructor, modeling, corrective feedback, performance criteria, comprehension, and charting (see Note 4). See Table 2 for the transfer intervention component analysis.

Adult or Peer. Interventions were conducted by adults or peers. Students in interventions conducted by adults obtained a mean fluency *ES* of 1.37 (*SE* = .177) and a mean comprehension *ES* of .71 (*SE* = .265). Students in interventions conducted by peers obtained a mean fluency *ES* of .36 (*SE* = .062) and a mean comprehension *ES* of .22 (*SE* = .070). One peer-initiated intervention obtained a higher comprehension effect size than the average adult-run program. Simmons and colleagues' (1995) intervention used peers and obtained a comprehension *ES* of .75 (*SE* = .377). Because there was a discrepancy between adult- and peer-run programs, I separated their effect sizes when examining the remaining repeated reading components.

Modeling. Eleven transfer effect sizes were based on interventions that provided a model of fluent reading. Modeling consisted of the tutor reading the passage prior to having the tutee read it. All of the interventions that contained modeling were conducted by peers. Interventions that included modeling obtained a mean fluency *ES* of .40 (*SE* = .077) and a mean comprehension *ES* of .10 (*SE* = .104). Peer interventions that did not include modeling obtained a mean fluency *ES* of .30 (*SE* = .104) and a mean comprehension *ES* of .45 (*SE* = .119). One intervention that contained modeling

TABLE 2. Transfer Intervention Component Analysis

Dependent variable	Tutor		Modeling[a]		Corrective feedback		Number times passage read		Comp.[a]		Charting	
	Adult	Peer	Yes	No	Yes	No	Fixed	Perf. crit.	Yes	No	Yes	No
Fluency	1.37	0.36	0.40	0.30	0.51	0.46	0.38	1.70	0.39	0.33	0.57	0.40
n	5	10	6	4	14	2	11	5	6	4	9	7
Comprehension	0.71	0.22	0.10	0.45	0.23	0.52	—	—	0.28	0.14	0.11	0.44
n	2	9	5	4	9	2	—	—	6	3	5	6

Note. Perf. crit. = performance criteria. *n* indicates number of effect sizes. Dash indicates effect size not calculated or available.
[a]Modeling and comprehension mean effect sizes are based on studies conducted by peers only.

obtained a fluency effect size higher than the average nonmodel fluency effect size. Rasinski, Padak, Linek, and Sturtevant's (1994) intervention contained modeling and obtained a fluency *ES* of 1.0 (*SE* = .319). It should be noted that this intervention lasted 120 days, compared to the average intervention length of 32.4 days.

Corrective Feedback. Corrective feedback was part of the intervention for all but four transfer effect sizes. Corrective feedback consisted of correcting mispronunciations or omissions while students were reading or after they had read. Students were either provided with the correct pronunciation or prompted to sound out or reread the word. Students who received corrective feedback obtained a mean fluency *ES* of .51 (*SE* = .06) and a mean comprehension *ES* of .23 (*SE* = .07). Students who did not receive corrective feedback obtained a mean fluency *ES* of .46 (*SE* = .227) and a mean comprehension *ES* of .52 (*SE* = .234). When interventions conducted by peers were excluded from the analysis, interventions that provided corrective feedback obtained a mean fluency *ES* of 1.37 (*SE* = .177; see Note 5). The impact of adult feedback on comprehension could not be determined because only one adult-run intervention measured comprehension.

Performance Criteria. Transfer interventions used either a fixed number of readings or a performance criterion to determine when to move from one passage to the next. Performance criteria consisted of either reading until a fixed number of correct words per minute was reached or reading a passage within a predetermined time period. Interventions that used a performance criterion obtained a mean fluency *ES* of 1.70 (*SE* = .188). Interventions that used a fixed number of readings obtained a mean fluency *ES* of .38 (*SE* = .061). A comparison between studies using the two types of criteria in regards to gains in comprehension could not be made because only one study that measured comprehension used a performance criterion.

Transfer interventions that used a fixed number of readings had students read passages two or three times (see Note 6). Mean fluency effect sizes for number of readings were as follows: two readings, *ES* = .37 (*SE* = .087); three readings, *ES* = .42 (*SE* = .091). Mean comprehension effect sizes for number of readings were as follows: two readings, *ES* = .03 (*SE* = .093); three readings, *ES* = .49 (*SE* = .108).

Comprehension Component. Comprehension questions were asked or a paragraph summary was implemented in peer-run transfer interventions, which yielded 12 effect size calculations. Peer-run interventions that included a comprehension component obtained a mean fluency *ES* of .39 (*SE* = .084) and a mean comprehension *ES* of .28 (*SE* = .092). Peer-run interventions that did not include a comprehension component obtained a mean fluency *ES* = .33 (*SE* = .091) and a mean comprehension *ES* of .14 (*SE* = .106).

Charting. Charting student progress was part of the intervention for 14 effect sizes. Interventions that included charting obtained a mean fluency *ES* of .57 (*SE* = .075) and a mean comprehension *ES* of .11 (*SE* = .088). Interventions that did not include charting obtained a mean fluency *ES* of .40 (*SE* = .091) and a mean comprehension *ES* of .44 (*SE* = .105). Adult-implemented interventions that charted student progress obtained a mean fluency *ES* of 1.58 (*SE* = .208). No adult-implemented intervention that charted student progress measured comprehension.

TABLE 3. Comparison of Nondisabled Students and Students with LD

Dependent variable	Nondisabled students	Students with LD
Nontransfer		
Fluency	0.85	0.75
n	12	4
Comprehension	0.64	0.73
n	8	4
Transfer		
Fluency	0.59	0.79
n	6	5
Comprehension	0.18	0.41
n	4	2

Note. *n* indicates number of effect size. LD = learning disabilities.

Students with Disabilities

Students with learning disabilities (LD) were the only students with disabilities who participated in the studies examined. Study reports indicated that students with LD were identified based upon school, school district, or state guidelines. Four studies (Bryant et al., 2000; Mathes & Fuchs, 1993; Mercer, Campbell, Miller, Mercer, & Lane, 2000; Sindelar, Monda, & O'Shea, 1990) that reported the results for students with LD separately explicitly indicated that a discrepancy formula between achievement and IQ was used to identify students with LD.

Students with LD and students without disabilities were compared to ascertain if repeated reading increased fluency and comprehension for both groups (see Note 7). For nontransfer measures, the mean fluency *ES* for students without disabilities was .85 (*SE* = .075), and the mean comprehension *ES* was .64 (*SE* = .094). The mean fluency *ES* for students with LD was .75 (*SE* = .161), and the mean comprehension *ES* was .73 (*SE* = .152).

For transfer measures, the mean fluency *ES* for students without disabilities was .59 (*SE* = .11), and the mean comprehension *ES* was .18 (*SE* = .126). The mean fluency *ES* for

students with LD was .79 (*SE* = .124), and the mean comprehension *ES* was .41 (*SE* = .173). See Table 3 for comparisons between nondisabled students and students with LD.

Discussion

Conclusions

As was found in previous literature reviews (Meyer & Felton, 1999; National Institute, 2000), findings from this analysis indicate that repeated reading improves the reading fluency and comprehension of both nondisabled (ND) students and students with LD. All students obtained a moderate mean increase in fluency (ND students: *ES* = .76, *SE* = .06; students with LD: *ES* = .77, *SE* = .09) and a somewhat smaller mean increase in comprehension (ND students: *ES* = .48, *SE* = .07; students with LD: *ES* = .59, *SE* =. 11; see Note 8).

Unlike previous literature reviews, this analysis separated results into nontransfer measures and transfer measures. Nontransfer results (i.e., measures of students' ability to fluently read or comprehend a passage after reading it multiple times) from this analysis indicate that repeated reading is an effective strategy for improving reading fluency and comprehension on a passage that is read repeatedly. Across all nontransfer studies, the mean fluency increase was large (*ES* = .83, *SE* = .066), and mean comprehension effect size was moderate (*ES* = .67, *SE* = .080). When students reread a passage, they read it more fluently and comprehended it better.

Transfer results (i.e., measures of students' ability to fluently read or comprehend new passages after having previously reread other reading material) from this analysis indicate that repeated reading may also improve students' ability to fluently read and comprehend new passages. Although most interventions lasted 45 sessions or less, students across all transfer studies obtained a moderate mean fluency effect size increase (*ES* = .50, *SE* = .058) and a smaller, but still significant, mean comprehension effect size increase (*ES* = .25, *SE* = .067). For transfer interventions conducted by adults, the mean fluency effect size increase was large (*ES* = 1.37, *SE* = .177), and the mean comprehension effect size increase was moderate (*ES* = .71, *SE* = .265). Consequently, it appears that repeated reading has the potential to improve students' overall reading fluency and comprehension abilities in regards to new material.

This analysis also offered clarification as to essential instructional components of repeated reading. Regardless of purpose, all repeated reading interventions should ensure that students read passages aloud to an adult. Adult implementation is recommended because the fluency and comprehension effect sizes for students in transfer interventions conducted by adults were more than three times larger (mean fluency *ES* = 1.37, mean comprehension *ES* = .71) than those obtained by students in interventions conducted by peers (mean fluency *ES* = .36, mean comprehension *ES* = .22).

In addition, if the purpose of repeated reading is to enable students to fluently read and comprehend a particular passage (i.e., nontransfer), students should be provided with a cue, and the passage should be repeated three to four times. A definitive answer as to the type of cue to provide (i.e., fluency, comprehension, or speed and comprehension) could not be determined because differences in fluency and comprehension gains based on the type of cue received were negligible. In two individual studies, O'Shea, Sindelar, and O'Shea (1985, 1987) directly compared use of a fluency cue versus a comprehension cue and found that although nondisabled students adapted their reading style to the cue provided, students with LD who were cued for comprehension remembered more but read as fast as students with LD who were cued for speed. Until additional research is conducted, the use of a combined speed and comprehension cue is recommended. The passage should be read three to four times because when the passage was read three times (*ES* = .85) or four times (*ES* = .95), mean fluency effect size increases were more than 30% larger than when the passage was read twice (*ES* = .57). Reading the passage more than four times does not appear to be necessary because the difference in comprehension gains between reading the passage three times (*ES* = .66) and four times (*ES* = .71) was minimal. In addition, four individual studies (DiStefano, Noe, & Valencia, 1981; O'Shea et al., 1985, 1987; Stoddard, Valcante, Sindelar, O'Shea, & Algozzine, 1993) investigated the number of readings and found that gains in comprehension ceased to be significant after the third reading.

If the purpose of the intervention is to improve overall reading fluency and comprehension, a corrective feedback component should be added and passages should be read until a performance criterion is reached. Corrective feedback on word errors seems to be essential because all students involved in adult-run interventions were given corrective feedback and obtained a large mean fluency effect size (1.37). The use of a performance criterion (reading until a fixed number of correct words per minute is reached or reading a passage within a predetermined time period) is recommended because interventions that used such a criterion obtained a mean fluency effect size increase (1.70) that was more than four times larger than that obtained by interventions that used a fixed number of readings (.38).

The relative importance of the essential repeated reading components can be independently validated by reviewing research that examined the components outside of repeated reading interventions. For example, DiStefano et al. (1981) examined cue usage and found that when readers were provided with a cue, they were able to adapt their reading rate to fit different purposes. Pany and McCoy (1988) examined corrective feedback and found that it enhanced both word recognition and comprehension, although the effectiveness of feedback may depend on goals and outcome measures (Hoffman et al., 1984). The enhanced performance of interventions that used a performance criterion can be explained by exam-

ining research that compared the use of an equal opportunity to respond (e.g., such as a fixed number of readings) to the use of an improvement criterion (e.g., such as correct words per minute). Underwood (1954) found that equal opportunity to respond did not result in equal learning. Students who learned faster received more benefit from each successful practice trial than did slower learners.

Components deemed by this analysis to be nonessential were not harmful; their effects simply were not pronounced. The impact of these components may have been overshadowed by more potent components (e.g., peer-run programs were effective but not as effective as adult-run programs). The components' impact may not have been dramatic (e.g., peer-run interventions that included modeling did not differ significantly from peer-run interventions that did not include modeling), or their importance may remain unknown because they were implemented in a limited number of studies (e.g., only two nontransfer studies used corrective feedback, and neither of them measured comprehension; none of the interventions conducted by an adult included a comprehension component, and only one charted student progress). Regardless of the reason, the inclusion of components other than those deemed essential through this analysis does not appear necessary to the success of a repeated reading intervention.

Limitations

There are four limitations to the conclusions for this analysis. First, characteristics of students who may benefit from repeated reading needs further clarification. Although the results indicate that repeated reading is effective for nondisabled students and students with LD, most studies did not provide students' reading levels. As a result, the effectiveness of repeated reading for students at different reading levels could not be determined.

Second, most studies did not provide information on the reading material used in the intervention. Individual repeated reading studies have investigated passage characteristics, such as content and word overlap (Faulkner & Levy, 1994; Rashotte & Torgesen, 1985), and found that using a series of passages with a high degree of word overlap may play a critical role in the effectiveness of repeated reading. Other studies that have not dealt specifically with repeated reading have shown that student characteristics as they pertain to fluency may also be important. For example, O'Conner et al. (2002) found that students made stronger fluency gains when the material used was at their instructional level rather than their grade level. Additional research is needed to determine (a) reading material to use within a repeated reading intervention and (b) the relative importance of the selected reading material on the effectiveness of repeated reading.

Third, this analysis was unable to determine the importance of including a charting or comprehension component in a transfer repeated reading intervention. Charting the progress of students and asking them to retell the story or answer comprehension questions could be important components; however, not enough data were available to conduct this type of evaluation. Preliminary results indicate that including a charting component may enhance students' fluency ability, whereas including a comprehension component may enhance students' comprehension ability.

Fourth, effect sizes in this analysis were based on differences between pretest and posttest scores. Without a comparison control group, the relationships between repeated reading and gains in fluency and comprehension are open to other hypotheses. Caution should be used when evaluating the findings of this analysis because unknown independent variable(s) may have affected students' reading achievement. Additional repeated reading studies that include a control group should be conducted to clarify the findings of this analysis.

Implications for Future Research

Although results from this analysis (a) confirmed previous findings that repeated reading improves students' reading fluency and comprehension and (b) delineated essential repeated reading instructional components, many critical questions remain unanswered. Most pressing are questions related to adding instructional components, using peers to conduct repeated reading interventions, including a modeling component, and measuring repeated reading's impact on overall reading achievement measures.

Essential repeated reading instructional components have been defined; however, the addition of components not investigated in this analysis might significantly improve the effectiveness of repeated reading. Preliminary results from an intervention that included a phonics and sight word component indicated that these components may prove to be helpful (Vaughn et al., 2000). The authors obtained a significant increase in students' reading fluency.

Caution is advised if peer tutors are used to conduct repeated reading interventions because the qualities, characteristics, and training they need to be competent tutors have yet to be determined. One study (Simmons, Fuchs, Fuchs, Mathes, & Hodge, 1995) in this analysis did use peers and obtained increases in student achievement commensurate with that for students in adult-run programs. Research into the characteristics of an effective tutor or the training a peer required to implement repeated reading effectively is warranted.

Although preliminary results indicate that modeling is not an essential repeated reading component, additional research on including a modeling component is warranted because no adult-run interventions included this component, and one peer-run intervention (Rasinski et al., 1994) that included modeling obtained a significant increase in students' reading fluency.

Last, to evaluate repeated reading's impact on all aspects of reading ability, long-term studies need to be conducted. With the exception of Vaughn and colleagues (2000), whose interventions lasted 1 year to 3 years, no study in this review had a duration of more than 6 months. To determine the impact of repeated reading on students' reading achievement in general requires conducting studies of longer duration.

Practical Implications

This review provides two findings that inform practice. First, it indicates that repeated reading can be used effectively to improve students' ability to fluently read and understand a particular passage and as an intervention to improve students' overall reading fluency and comprehension ability. Second, this review delineates essential instructional components to include within a repeated reading program. Such components depend on the goal of the intervention. If repeated reading is intended to improve students' ability to read and comprehend a particular passage (i.e., nontransfer), students should be cued to focus on speed and comprehension and the passage should be read aloud three to four times. If repeated reading is intended as an intervention to improve students' overall reading fluency and comprehension (i.e., transfer), there are three essential components: Passages should be read aloud to an adult, corrective feedback on word errors should be given, and passages should be read until a performance criterion is reached. ■

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AUTHOR'S NOTES

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NOTES

1. Other components used, but not regularly, were sentence segmentation, intonation training, and audiotaping of students' reading. Due to their infrequent use, these components were not analyzed.
2. One nontransfer fluency effect size was based on an intervention that used correct words per minute as the performance criterion (Herman, 1985).
3. In four studies (DiStefano et al., 1981; O'Shea et al., 1985, 1987; Stoddard et al., 1993), students read passages seven times. Results indicated that gains in comprehension ceased to be significant after the third reading.
4. Other components used, but not regularly, were explicit instruction, word identification skills, phonics instruction, sight word instruction, audiotapes of students' reading, and performance of reading in front of class. Due to the infrequent use of these components, they were not analyzed.
5. All adult-run interventions that measured fluency provided corrective feedback.
6. In one study (Homan, Klesius, & Hite, 1993), students read passages four times.
7. Mean effect sizes are reported only for studies that provided separate data for nondisabled students and students with LD.
8. Reported mean effect sizes are combined nontransfer and transfer results and include only studies that provided separate data for nondisabled students and students with LD. The combined nontransfer and transfer mean effect size for all of the evaluated studies was .64 (*SE* = .04) for fluency and .42 (*SE* = .05) for comprehension.
9. Only the experimental condition that had students reread passages without the assistance of an audiotape was included in the meta-analysis.

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