

REPEATED READING AND VOCABULARY-PREVIEWING INTERVENTIONS TO IMPROVE FLUENCY AND COMPREHENSION FOR STRUGGLING HIGH-SCHOOL READERS

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Using an adapted alternating treatments design, this study compared the effects of two intervention conditions on the reading fluency, comprehension, and comprehension rate of six high-school students reading below grade level. Students were repeatedly exposed to repeated reading (RR), repeated reading and vocabulary previewing (RR + VP), and no intervention control conditions. Dependent variables were assessed at the end of experimental sessions by using practiced passages. Both interventions had positive effects on reading performance as compared to the control condition. Results indicated that the RR + VP condition led to the greatest improvements in reading fluency for all participants. The RR + VP condition led to the highest reading comprehension levels for three participants, and the RR + VP and RR conditions resulted in similar comprehension levels for the other three participants. For five participants, reading comprehension rate was greatest under the RR + VP condition. Discussion focuses on future directions for research on reading interventions for high-school students. © 2010 Wiley Periodicals, Inc.

The field of school psychology has placed increased emphasis on the importance of prevention and early intervention for academic skills and behavior through the implementation of Response to Intervention (RTI) service delivery models. Core components of RTI are (a) the implementation of a scientifically based curriculum, (b) the use of universal screening procedures for the early identification of students who are at risk for academic or behavioral difficulties, and (c) the provision of early intervention to these students (Batsche et al., 2005). Although the prevention of future reading difficulties emphasized through RTI should be a major focus of school psychologists, even with preventative interventions in place, some students will continue to need reading intervention throughout their schooling. It was reported by the Center for Education Reform (1998) that 25% of 12th-grade students do not have basic reading skills. School psychologists need to be knowledgeable of effective interventions to support these students and their teachers.

Some argue that high-school students with reading difficulties may not gain additional fundamental skills due to a lack of direct and intensive instruction at the secondary level (Espino & Tindal, 1998). High-school teachers may not typically view themselves as responsible for teaching basic reading skills and may not be prepared to provide such instruction. As a result, high-school students may not receive the reading instruction and intervention they need (Gillespie & Rasinski, 1989). School psychologists are in a position to provide teachers with consultation support to increase the likelihood that effective interventions are implemented for struggling high-school readers.

Students with reading deficits at the secondary level may take much longer than peers to accurately decode text, resulting in fluency deficits (Wexler, Vaughn, Edmonds, & Reutebuch, 2008). Reading fluency can be defined as how quickly and accurately a student reads a passage. According to the National Reading Panel (NRP; 2000), fluency is a critical factor for the development

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of reading comprehension. Research has repeatedly shown this link between reading fluency and comprehension, suggesting that students with poor reading fluency are less likely to comprehend reading material (e.g., Kuhn & Stahl, 2003; LaBerge & Samuels, 1974; Shinn & Good, 1992; Slocum, Street, & Gilberts, 1995). LaBerge and Samuels (1974) theorized that students who cannot read fluently must use their cognitive resources to decode words. As a result, fewer cognitive resources are available for comprehension. Difficulties with reading fluency and comprehension are compounded at the high-school level by the increasing amount of reading material that students are expected to master across content areas (Swanson & Hoskyn, 2001). School psychologists and teachers working with students with comprehension skills deficits should not overlook the role of reading fluency and the need to target fluency as well as comprehension in intervention planning.

One widely researched intervention for increasing reading fluency is repeated reading (RR; Kuhn & Stahl, 2003; Meyer & Felton, 1999; NRP, 2000; Samuels, 1979, 1988; Therrien, 2004). In RR interventions, students are asked to repeatedly read a passage either a predetermined number of times or until a predetermined fluency criterion is reached. Students may repeatedly read for 1-minute timed segments or reread entire, short passages. Research indicates that three to four readings may be needed for positive effects to be demonstrated (Meyer & Felton, 1999), with four readings having superior effects on comprehension (Therrien, 2004). Although the exact procedures used across studies have varied, overall, the research indicates that RR interventions can improve not only fluency, but also comprehension (NRP, 2000; Therrien, 2004). The majority of research on RR and other fluency interventions in general has primarily focused on elementary school students, however (Biancarosa & Snow, 2004; Wexler et al., 2008). Additional research is needed on fluency and comprehension-building strategies for high-school students.

In a recent review, Wexler and colleagues (2008) examined the research on fluency interventions for secondary students over the years 1980–2005. After a thorough search of the literature, the researchers identified only 19 studies evaluating the effects of various reading fluency intervention procedures on the reading fluency and comprehension of struggling secondary students. Nine of these studies included high-school students as participants. In their synthesis, Wexler and colleagues concluded that RR interventions led to positive effects on reading fluency for both practiced and high content overlap material. Results also indicated, however, that increases in fluency were not always accompanied by increases in comprehension. This finding was consistent with previous research findings that (a) few interventions targeting fluency have positive effects on overall reading comprehension (Kuhn & Stahl, 2003) and (b) the correlation between fluency and comprehension decreases as students advance in grade and as reading material becomes more complex (Paris, Carpenter, Paris, & Hamilton, 2005). Furthermore, results from two studies (i.e., Homan, Klesius, & Hite, 1993; Rashotte & Torgesen, 1985) included in the review were cited as evidence that reading an equal amount of text nonrepetitively may have more positive effects on comprehension and sight word accuracy than RR. With only nine of the reviewed studies including high-school students, there is a clear need for additional research on RR interventions at the high-school level.

Given the vast amount of reading material presented to high-school students, it may be more efficient and desirable for teachers to develop fluency interventions that may sacrifice the number of recommended readings for RR procedures but require students to read more material. For example, rather than having students reread material 1 minute at a time or reread 100- to 200-word passages for three or four readings, students could be required to read longer passages of 300–500 words twice. In addition, given previous research indicating that fluency interventions may not always be enough to improve comprehension, additional intervention components may be added to fluency strategies to further promote reading comprehension.

One area that can be targeted to help improve reading comprehension is vocabulary knowledge. Researchers have identified a strong relationship between vocabulary and reading comprehension

(NRP, 2000). As students' vocabulary knowledge increases, so does their ability to construct meaning from text. A variety of methods for improving students' vocabulary have been explored in the literature. Incorporating vocabulary-building strategies within fluency interventions is one possible way to enhance the effects of reading fluency interventions on reading comprehension. One common vocabulary-building strategy is previewing vocabulary words prior to having students read material containing the targeted words (Gaskins, Ehri, & Cress, 1996; Kolton & Biemiller, 1999; Koury, 1996; Ryder & Graves, 1994; Wixson, 1986). Students are explicitly taught word meanings, and some research found that this approach improved both vocabulary acquisition and vocabulary comprehension (e.g., Gaskins et al., 1996; Koury, 1996). The research on the effects of VP on reading comprehension is inconclusive, however. VP may enhance understanding of sentences containing the target words but not overall passage comprehension (Pany, Jenkins, & Schreck, 1982). Additional research is needed to determine if adding VP activities to fluency interventions can increase reading comprehension, especially for high-school students facing a large amount of content area vocabulary and for whom there is less reading intervention research.

When evaluating interventions designed to target both reading fluency and comprehension, researchers often have assessed reading fluency and comprehension through two distinct measures. Commonly, reading fluency is assessed using standard curriculum-based measurement (CBM) procedures. To assess comprehension, researchers have used open-ended or multiple-choice comprehension questions. Simply measuring comprehension level (i.e., the number of comprehension questions answered correctly) does not, however, take into account the amount of time required for students to read the passage (Skinner, 1998). For example, if two students answer the same number of comprehension questions correctly, you might conclude that they have similar reading skills, but if you were to learn that one student took 20 minutes to read the material whereas the other student took 10 minutes, you would likely perceive the student who read the passage in less time as the stronger reader. To capture both the time required for reading and the comprehension level of students, researchers have suggested using reading comprehension rate as a dependent variable, particularly for readers beyond the fourth grade (Skinner, 1998).

Reading comprehension rate is calculated by dividing the percentage of correct answers to comprehension questions by the total time required to read the passage in seconds and multiplying by 60 (Daly, Chafouleas, & Skinner, 2005; Skinner, Neddenriep, Bradley-Klug, & Ziemann, 2002). Essentially, this measure provides an estimate of the percentage of the reading material that was understood per each minute spent reading. Skinner (1998) explains that rates of reading comprehension are valid measures based on the assumption that reading comprehension is often reinforced. Students may earn better grades, enjoy leisure reading, and have more free time if required reading can be understood more quickly.

Some studies evaluating reading intervention procedures have found the silent reading comprehension rate to be sensitive enough to reveal changes in performance associated with interventions (e.g., Freeland, Skinner, Jackson, McDaniel, & Smith, 2000; Hale et al., 2005). Other researchers found that a significant limitation in measuring silent reading comprehension rates is that students may not actually read the material (e.g., McDaniel et al., 2001). As an alternative, students' oral reading comprehension rate may be assessed. Only one study was identified that measured oral reading comprehension rate when evaluating reading intervention procedures (i.e., Neddenriep, Skinner, Wallace, & McCallum, 2009). When comparing and selecting intervention procedures, it may be important for problem-solving teams to consider reading comprehension rate rather than focusing on reading fluency or comprehension level alone.

The current study aimed to contribute to the research on reading interventions for high-school students in several ways. First, the study evaluated the effects of an RR with error correction intervention on the reading performance of struggling high-school readers. Rather than requiring

students to reread brief passages in their entirety three to four times, or repeatedly read from a passage in 1-minute time segments (i.e., the most common procedures in RR studies), students read longer reading passages of 400 words twice. Second, the study examined the effects of adding VP activities to RR procedures to boost the effects on comprehension. Next, previous research typically has focused only on reading fluency and comprehension without considering comprehension rate as a dependent variable. With one exception (i.e., Neddenriep et al., 2009), researchers who have examined reading comprehension rate did so by timing students as they read silently. The current study included oral reading comprehension rate as a dependent variable. The research questions were the following: (a) Does RR lead to improvements in reading fluency, comprehension, and oral reading comprehension rate for high-school students reading below grade level? (b) Does the addition of a VP component to RR intervention procedures lead to greater gains in fluency, comprehension, and comprehension rate? It was hypothesized that both interventions would have positive effects on reading performance, with the RR + VP intervention leading to the highest performance levels.

METHOD

Participants and Setting

Participants included six students enrolled in an urban high school in the Midwestern United States. The school served 976 students in Grades 9–12 with 43.10% of the student population qualifying for free or reduced lunch. Approximately 72% of the student population was Black, 24% White, 3% multiracial, and 1% Hispanic. Table 1 provides demographic information for each of the participants. Study participants were enrolled in Grades 10 and 11 but were reading between the fourth- and eighth-grade levels. All participants received special education services, with each meeting the criteria for Specific Learning Disability in reading. Students were eligible to participate in the study if they were reading at least one level below their actual grade level. A special education teacher from the school identified potential participants, and the researcher verified the instructional level of potential participants before experimental procedures were implemented.

Determining Instructional Level. To determine instructional level, students were asked to read three passages each at different grade levels, starting with their current grade level and moving down grade levels until instructional level criteria were met. Instructional level was defined as the highest level at which the student read between 70 and 100 words correct per minute with fewer than seven errors (Shapiro, 2004). Median scores were used to evaluate performance at each grade level.

Materials

During both the instructional level assessment and experimental sessions, students read passages from the *Timed Reading Series* (Spargo, 1989). Each passage was 400 words, and passages covered a

Table 1
Student Demographics

Student	Ethnicity	Age	Grade Level	Instructional Level
Pam	Black	17	10	4
Ray	Black	17	11	8
Jenn	White	16	10	7
Lily	American Indian	16	10	8
Beth	White	16	10	7
Pete	Black	16	10	5

variety of nonfiction topics. Passages were followed by 10 multiple-choice comprehension questions with three possible answer options. Five of the questions targeted factual knowledge, and five of the items targeted inferential knowledge. Passages were randomly assigned to conditions and sessions. For the RR + VP condition, 10 target vocabulary words were selected. The collaborating special education teacher and primary researcher independently selected 10 words believed to be unknown to students and important for comprehension. Words selected by each were compared and disagreements were discussed to create a final list of 10 target words. The researcher and teacher then worked together to generate brief definitions that were relevant to the content of the passage for each of the targeted words. Words and their definitions were written on index cards that were also used for the error correction procedure included in both RR conditions. Stopwatches were used to record how long students took to read passages.

Dependent Variables and Experimental Design

The study used an adapted alternating treatments design to compare the effects of two intervention procedures and a no intervention control condition on reading fluency and comprehension (Cooper, Heron, & Heward, 2007). Typically with an alternating treatments design, participants are exposed to each experimental condition an equal number of times. In the adapted alternating treatments design used in the current study, the control condition was intentionally presented for a smaller number of sessions based on the assumption that student performance would consistently be lower in this condition and to maximize the amount of time that students spent in intervention. The presentation order of conditions was counterbalanced across participants. Dependent variables included oral reading fluency (ORF), defined as the number of words read correctly in 1 minute, and reading comprehension level, defined as the percentage of comprehension questions answered correctly. Also, oral reading comprehension rate served as a third dependent variable. Reading comprehension rate was defined as the percentage of comprehension questions answered correctly divided by the total number of seconds taken to read the passage multiplied by 60 (Daly, Chafouleas, & Skinner, 2005). Dependent variables were assessed by using practiced passages from intervention sessions.

General Procedures

Each student was repeatedly exposed to three conditions: control, RR, and RR + VP. During each experimental session, the primary researcher or collaborating special education teacher worked one on one with students. Sessions were conducted in a quiet classroom in the school during students' study hall time. Sessions were held 3–5 days a week and lasted between 10 and 20 minutes.

Control. In the control condition, students were presented with a copy of a reading passage and were asked to read aloud at their normal reading pace. Students were told that after reading the passage they would be asked to answer 10 multiple-choice comprehension questions about what they had read and that they would not be able to refer back to the passage. After students finished reading, the passage was collected and students answered the comprehension questions. As students read, the teacher or researcher recorded the words read correctly during the first minute using reading CBM scoring procedures (Shapiro, 2004). The total time required for students to read the passage was also recorded.

RR. In the RR condition, students were given a copy of a reading passage and asked to read aloud at their normal reading pace. As students read, the researcher or teacher marked misread words. After students finished reading the entire passage, the researcher or teacher wrote the misread words on index cards. The index cards were then presented to students one at a time, and students were

asked to read the words. The index cards were repeatedly presented to students until they read each word correctly three times. After this error correction procedure, students were instructed to read the passage aloud again. Students were told that, after they finished reading, they would have to answer comprehension questions about what they read without referring back to the passage. During the second reading of the passage, the researcher or teacher recorded the number of words read correctly during the first minute using standard reading CBM scoring procedures (Shapiro, 2004). The stopwatch continued to run until the student finished reading the entire passage, and the time was recorded to calculate reading comprehension rate.

RR + VP. In the RR + VP condition, students first were presented with index cards of key vocabulary words from a reading passage. Students read through the words and definitions on their own. Then, the researcher or teacher presented the vocabulary words to students one at a time and asked students to read each word aloud and provide the correct definition. After students correctly defined each of the vocabulary words three times, the session followed the same procedures used in the RR condition.

Procedural Adherence

A second observer recorded procedural adherence for 22 (25.88% of) experimental sessions. For half of these sessions, the primary researcher was observed; for the other half, the teacher was observed. The observer used a checklist to note the occurrence or nonoccurrence of procedural steps (Appendix A). Procedural adherence was 100% across all observed sessions.

Inter-Scorer Agreement

A second observer co-scored 25.88% of ORF assessments, reading comprehension question sets, and time to complete reading passages. Inter-scorer agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. Average inter-scorer agreement for ORF was 98.97%. Inter-scorer agreement for reading comprehension was 100% across all question sets. Average agreement on time to complete reading passages was 98.65%.

Intervention Acceptability

As one aspect of social validity, intervention acceptability data were collected through the use of questionnaires. All six participating students responded to five items, including (1) I liked doing the reading activities, (2) It was easy to follow the directions for the reading activities, (3) I think the activities helped me read better, and (4) It is important for me to be a good reader. Students rated the first four items on a scale of 1–5, with 1 indicating strong disagreement and 5 reflecting strong agreement. For the fifth item, students were asked which intervention procedure they preferred. The questionnaire also provided students with open space to provide additional comments.

Average ratings for the first four items ranged from 4.50 to 5.00, suggesting that students liked the intervention procedures and thought that the procedures helped them read better. Regarding preference, three students indicated that they preferred the RR + VP intervention, with the remaining three students indicating a preference for the RR intervention. Two students indicated that they preferred the RR condition over the RR + VP condition because it took less time, with one of the students also noting that learning the definitions of the vocabulary words was difficult.

The collaborating teacher completed a questionnaire including the following four items: (1) I liked the reading and vocabulary previewing strategies used, (2) It was easy to implement the strategies, (3) I will continue to use the strategies in my classroom in the future, and (4) I think the strategies are beneficial to my students. In addition, the teacher was asked if he preferred one of the

instructional approaches to the other. The teacher gave each statement a rating of 5 and reported that he liked including the VP component in the procedures because he thought that the students did not get enough direct instruction on vocabulary.

RESULTS

Data for all dependent variables were graphed for each participant. Visual analysis was the primary method for the interpretation of results. Descriptive statistics and effect size (*ES*) estimates also are reported. *ES* values were calculated by dividing the mean difference between conditions by the pooled standard deviation (Busk & Serlin, 1992).

Reading Fluency

Figure 1 displays students' ORF across conditions and sessions. The graphs show that all participants had higher reading fluency in the two RR conditions than in the control condition. Only Beth had a data point from the control overlap with data from an intervention condition (i.e., RR). The graphs show that Pam, Ray, Jenn, and Beth had consistently higher reading fluency in the RR + VP condition than in the RR condition. ORF data for Lily and Pete also were generally higher in the RR + VP condition than in the RR condition, although there was some overlap in the data paths. Data paths for all three conditions showed increasing trends for Pam, Ray, Jenn, and Lily. Beth's data from the RR condition and Pete's control condition data also had slightly increasing trends. ORF data presented in Table 2 show that all participants had the highest mean ORF in the RR + VP condition. *ES* data reported in Table 3 show large *ES* values for all comparisons, including fluency differences between the two RR conditions (Kratochwill, Elliott, & Busse, 1995).

Reading Comprehension

As displayed in Figure 2, all students answered more comprehension questions correctly in the RR conditions than in the control condition. Data from Jenn, Lily, and Beth show higher comprehension levels in the RR + VP condition than in the RR condition. The data paths for Pam, Ray, and Pete from the RR and RR + VP conditions did not clearly separate, indicating similar levels of comprehension for these students across the two intervention conditions. Data from both intervention conditions displayed slightly increasing trends for Pete and Beth over the course of the study. For Pam and Jenn, there were increasing trends for both intervention conditions during the second half of the study. Increasing trends also are seen in Ray's RR data, Pam's control data, and Lily's control and RR + VP data.

Table 2 displays the condition means for each participant, with five participants having the highest mean percentage of comprehension questions answered correctly in the RR + VP condition and one participant having equal means in the RR and RR + VP conditions. *ES* data included in Table 3 indicate that the RR interventions had a significant positive effect on the percentage of comprehension questions answered correctly as compared to the control condition, with the one exception being a small *ES* of .24 resulting from the comparison of Lily's performance in the RR and control conditions. Consistent with the visual analysis, performance comparisons between the RR and RR + VP conditions resulted in high *ES* values for Jenn, Lily, and Beth, no effect for Pete, a small *ES* of .14 for Ray, and a moderate *ES* of .56 for Pam.

Reading Comprehension Rate

Overall, the graphs included in Figure 3 show that all participants had higher oral reading comprehension rates in the RR conditions as compared with the no intervention control condition. Data from Pam, Jenn, Lily, Beth, and Pete show slightly higher reading comprehension rates in

Table 2
Participants' Means (M) and Standard Deviations (SD) for Dependent Variables across Conditions

	ORF			Percentage of Comprehension Questions Correct			Reading Comprehension Rate		
	Control <i>M(SD)</i>	RR <i>M(SD)</i>	RR + VP <i>M(SD)</i>	Control <i>M(SD)</i>	RR <i>M(SD)</i>	RR + VP <i>M(SD)</i>	Control <i>M(SD)</i>	RR <i>M(SD)</i>	RR + VP <i>M(SD)</i>
Pam	76.00 (4.08)	88.40 (7.17)	96.40(9.56) ^a	46.67 (4.71)	86.00 (8.00)	90.00 (6.32) ^a	7.81 (0.28)	17.09 (1.41)	20.22 (1.81) ^a
Ray	102.33 (5.69)	116.33 (11.22)	128.67 (14.19) ^a	53.33 (5.77)	76.67 (16.33)	78.33 (7.53) ^a	12.40 (0.22)	21.73 (7.84)	22.65 (3.41) ^a
Jenn	92.00 (7.00)	114.00 (6.86)	123.33 (12.04) ^a	46.67 (5.77)	68.00 (4.47)	78.33 (7.53) ^a	9.96 (0.62)	15.85 (2.20)	21.30 (3.42) ^a
Lily	114.00 (12.77)	128.20 (5.02)	136.60 (9.34) ^a	56.67 (11.55)	60.00 (15.81)	78.00 (8.37) ^a	15.26 (3.99)	17.78 (4.11)	25.63 (2.99) ^a
Beth	101.33 (3.51)	115.83 (13.75)	133.50 (6.25) ^a	56.67 (11.55)	76.67 (8.16)	90.00 (10.95) ^a	16.22 (4.93)	22.41 (3.28)	29.70 (3.94) ^a
Pete	73.33 (3.05)	85.67 (10.40)	103.17 (5.27) ^a	46.67 (5.77)	90.00 (8.94) ^a	90.00 (10.95) ^a	7.85 (1.22)	18.07 (2.07)	21.29 (3.69) ^a

Note. ^aHighest values for each student for each dependent variable.

the RR + VP condition than in the RR condition. Intervention data paths for Ray did not clearly separate over the course of the study, with similar reading comprehension rates seen in both RR conditions. Slight increasing trends can be seen in the intervention data paths for all participants. All participants had the highest mean comprehension rates in the RR + VP condition (Table 2). All but two comparisons of reading comprehension rate performance resulted in large *ES* values (Table 3). Lily's data revealed only a moderate *ES* of .62 based on the comparison of the RR and control conditions, and Ray's data resulted in a small *ES* of .16 when comparing reading comprehension rate in the RR and RR + VP conditions.

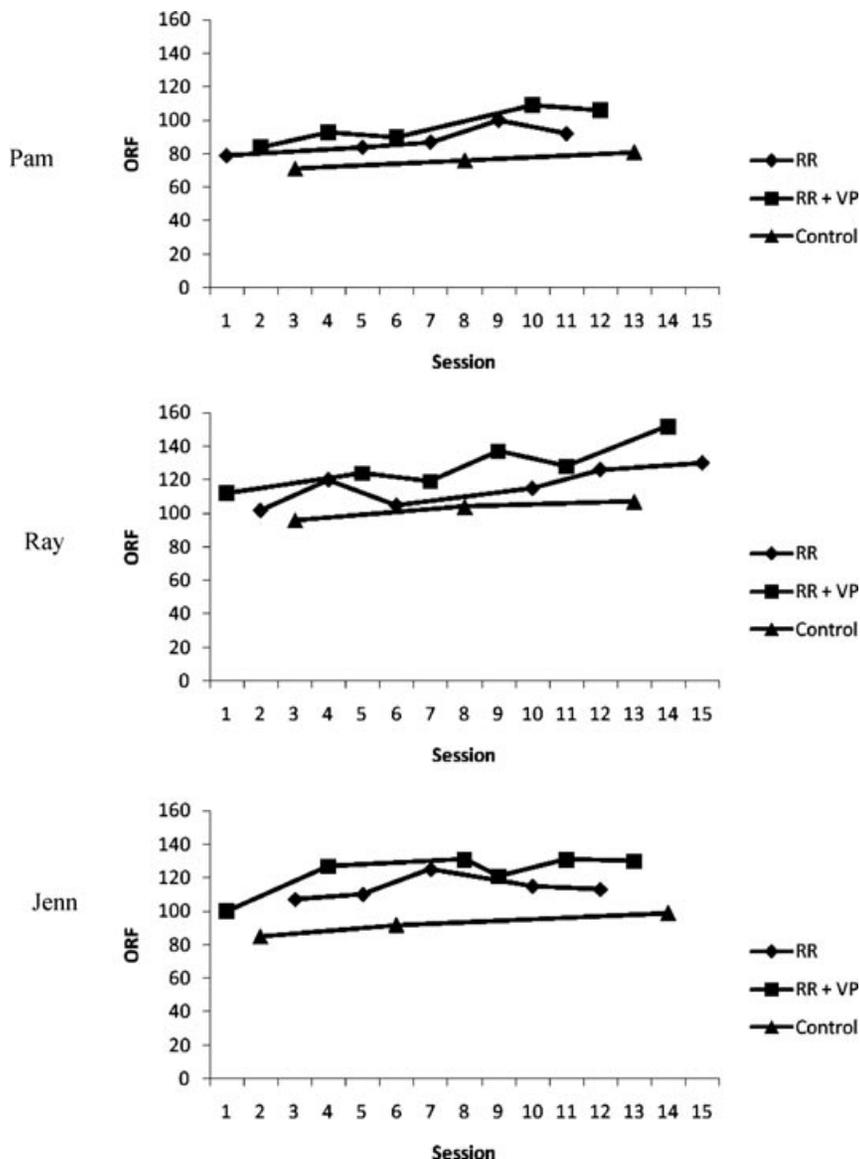


FIGURE 1. ORF across conditions. (Continued)

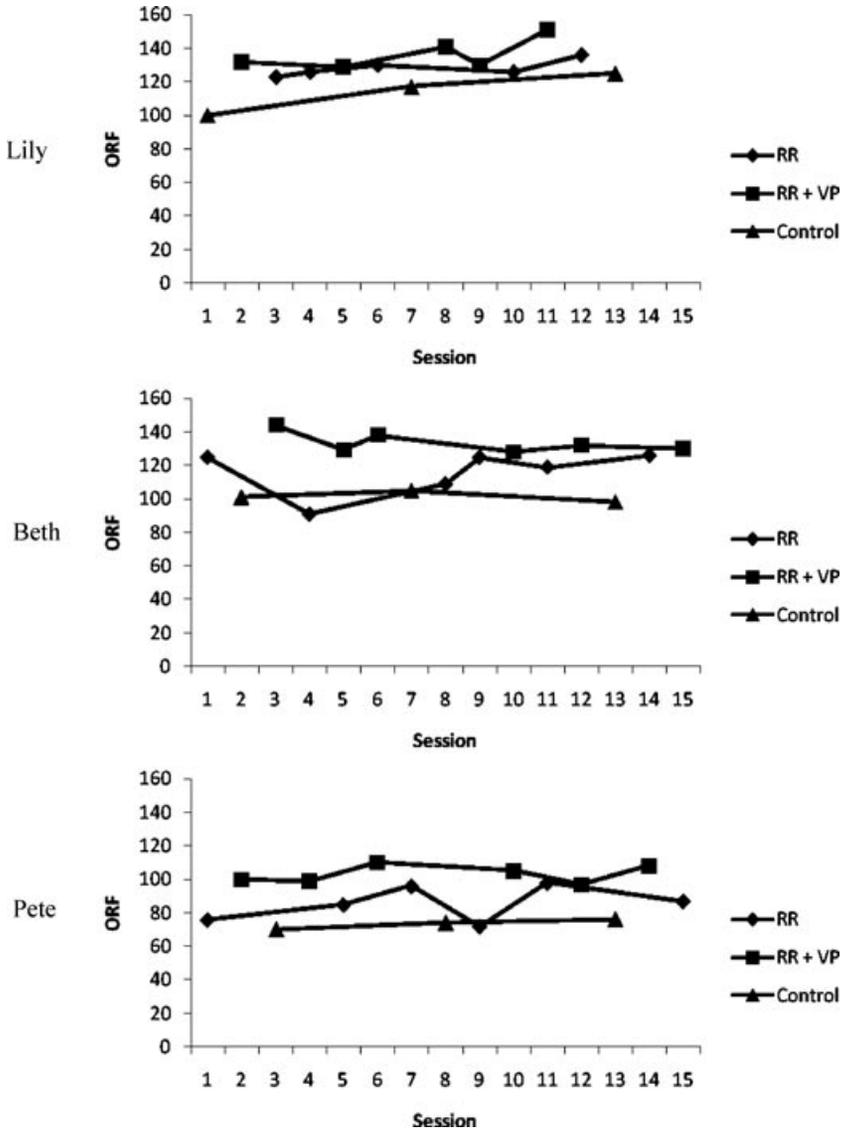


FIGURE 1. Continued.

DISCUSSION

In the current study, RR strategies led to increases in reading fluency, comprehension, and oral reading comprehension rate for practiced material as compared to a no intervention control for struggling high-school readers identified as having learning disabilities. Although students performed at the instructional level (i.e., 70–100 words correct per minute) for fluency in the control condition, all participants displayed fluency levels at the mastery level (i.e., >100) at least once in the intervention conditions (Shapiro, 2004). Regarding comprehension, student performance improved the equivalent of a letter grade or more (i.e., at least 10%) in the intervention conditions as compared

Table 3
ES Estimates

	ORF			Percentage Comprehension Questions Correct			Reading Comprehension Rate		
	Control vs. RR	Control vs. RR + VP	RR vs. RR + VP	Control vs. RR	Control vs. RR + VP	RR vs. RR + VP	Control vs. RR	Control vs. RR + VP	RR vs. RR + VP
Pam	2.20	2.99	.96	6.18	7.85	.56	11.05	11.82	1.94
Ray	1.66	2.65	.97	2.11	3.76	.14	2.32	5.63	.16
Jenn	3.17	3.29	.99	4.17	4.76	1.72	4.18	5.61	1.94
Lily	1.60	2.04	1.17	.24	2.14	1.49	.62	2.97	2.21
Beth	1.68	6.59	1.77	2.03	2.96	1.39	1.51	3.04	2.03
Pete	1.83	7.17	2.23	5.89	5.18	0	6.19	5.46	1.12

to the control condition. Furthermore, for many of the participants, the addition of VP activities to RR procedures led to higher ORF than when RR was implemented alone. The relative effects of the two interventions on comprehension, however, were less clear. For three of the participants, the RR + VP condition did not result in consistent, added gains in the percentage of comprehension questions answered correctly. Regarding the relative effects of the two interventions on reading comprehension rate, the RR + VP resulted in consistently higher performance than the RR alone for five participants. Across dependent variables and experimental conditions, many data paths had slight increasing trends, which may suggest that students' overall reading performance was improving over the course of the study.

Findings from the current study are consistent with previous research showing that RR interventions can lead to improvements in reading fluency for high-school students (e.g., Steventon & Frederick, 2003; Valleley & Shriver, 2003). The RR strategies implemented in the current study provided students with additional opportunities to practice reading connected text. In addition, through the error correction procedures, students gained even more practice with challenging words. Although designed to target vocabulary knowledge and comprehension (and not necessarily fluency), the addition of the VP component also provided students with oral reading practice as they read each of the vocabulary words at least three times before defining them. Combined, these extra opportunities to practice reading words in isolation and in connected text had a positive impact on students' reading fluency.

The results from the current study also are consistent with previous research indicating that RR strategies can improve reading comprehension (Therrien, 2004; Wexler et al., 2008). Researchers have suggested that, when fluency is improved, students are able to focus more cognitive resources on understanding the material (LaBerge & Samuels, 1974). All students demonstrated improvements in reading fluency accompanied by improvements in reading comprehension in the RR conditions as compared to the control condition.

Although not seen in the results from the current study, it has been suggested that RR interventions alone may not be enough to improve reading comprehension. The current study aimed to determine if adding a VP component could enhance any positive effects that the RR condition had on reading comprehension. The mixed results found are consistent with previous research. Some researchers have found VP strategies to have positive effects on the understanding of sentences containing the target words but not overall understanding of passages (Pany et al., 1982). Additional research is needed to examine effective strategies for promoting comprehension that may be incorporated into fluency intervention procedures.

Unlike most studies examining the effects of reading interventions on fluency and comprehension, this study included oral reading comprehension rate as a dependent variable. Previous researchers have used silent reading comprehension rate to account for the amount of time required for students to read when evaluating the effects of interventions on comprehension (Freeland et al., 2000; Hale et al., 2005). The two RR strategies implemented in the current study led to improvements in oral reading comprehension rate for all participants. Given that the reading fluency and number of comprehension questions answered correctly were higher in the RR conditions than in the control condition, this finding is not surprising. Comparing reading comprehension rates across the

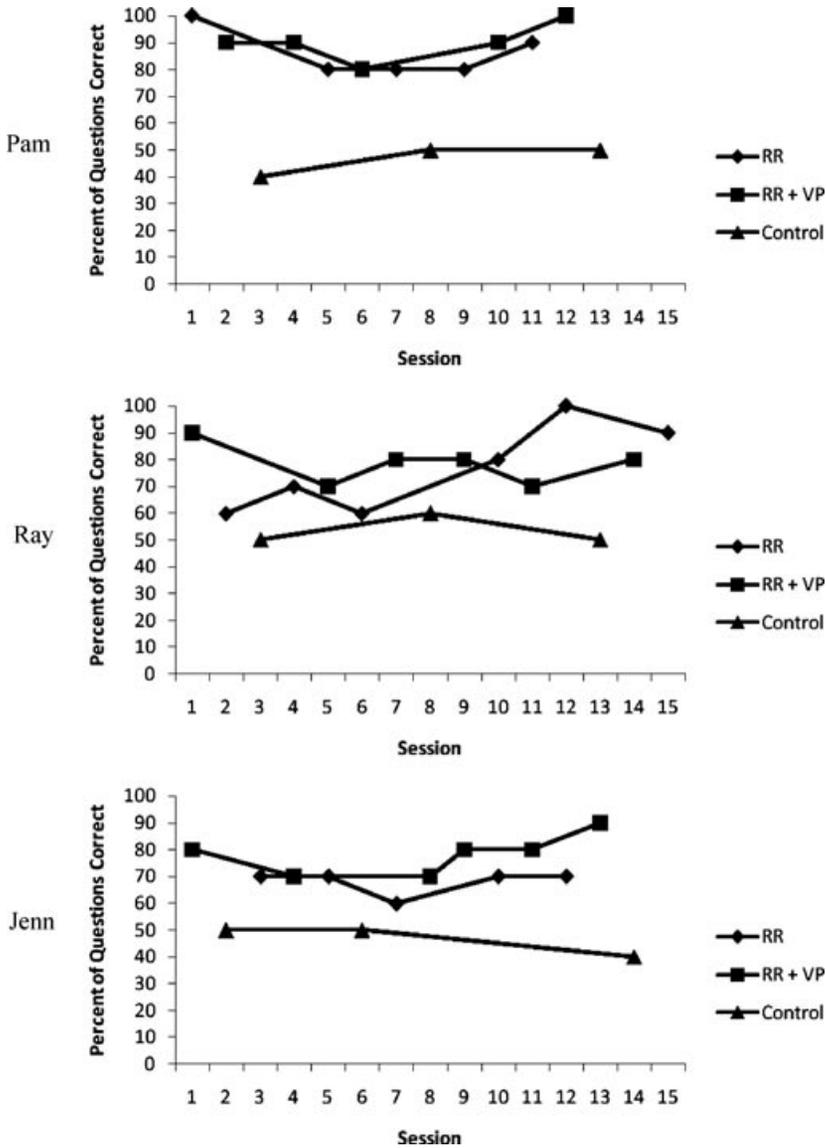


FIGURE 2. Number of comprehension questions answered correctly across conditions. (Continued)

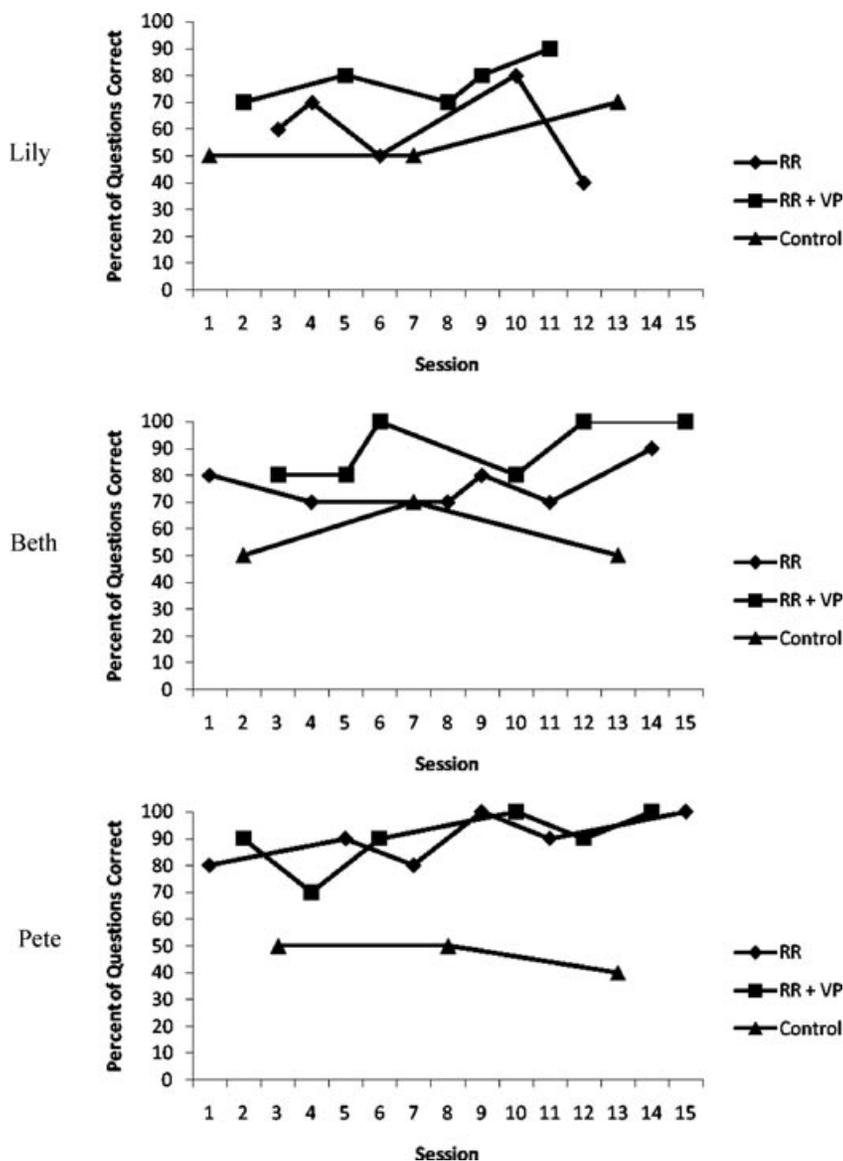


FIGURE 2. Continued.

two intervention conditions, five students had consistently higher comprehension rates in the RR + VP condition. This finding, however, does not suggest that all five students had both higher reading fluency and comprehension levels in the RR + VP condition. Although three of these students had both higher ORF and comprehension levels in the RR + VP condition, Pam and Pete had higher ORF in the RR + VP condition only, with similar comprehension levels in both intervention conditions. For these two students, decreases in the amount of time required to read passages (i.e., increases in ORF) appear to be the primary factors contributing to increased reading comprehension rates. This scenario points to the need to measure both reading comprehension level and rate to ensure that

students are not only increasing their reading speed but also their ability to extract meaning from text.

Limitations

There are several limitations to the interpretation of data from the current study. First, all assessments were completed using the practiced passages from intervention sessions. It remains unknown if the interventions would lead to overall improvements in reading fluency, comprehension, and comprehension rate for novel reading material. Second, students' vocabulary knowledge was not

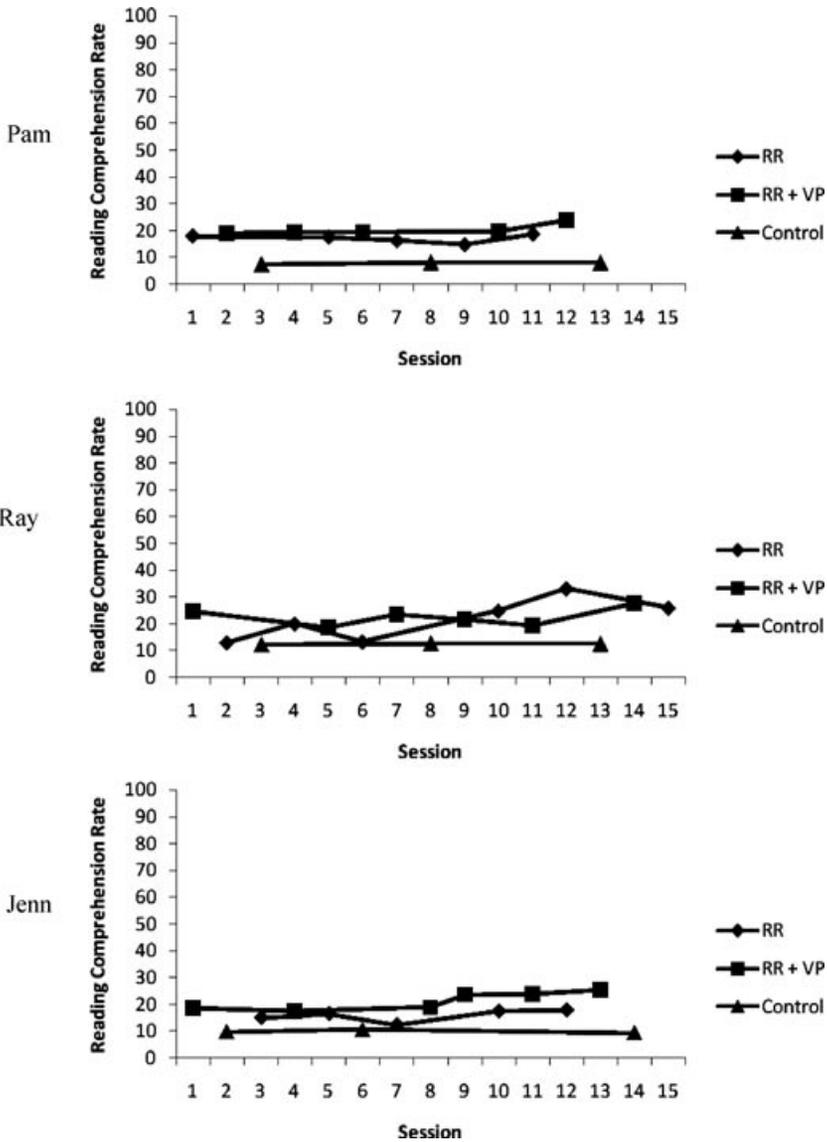


FIGURE 3. Reading comprehension rate across conditions. (Continued)

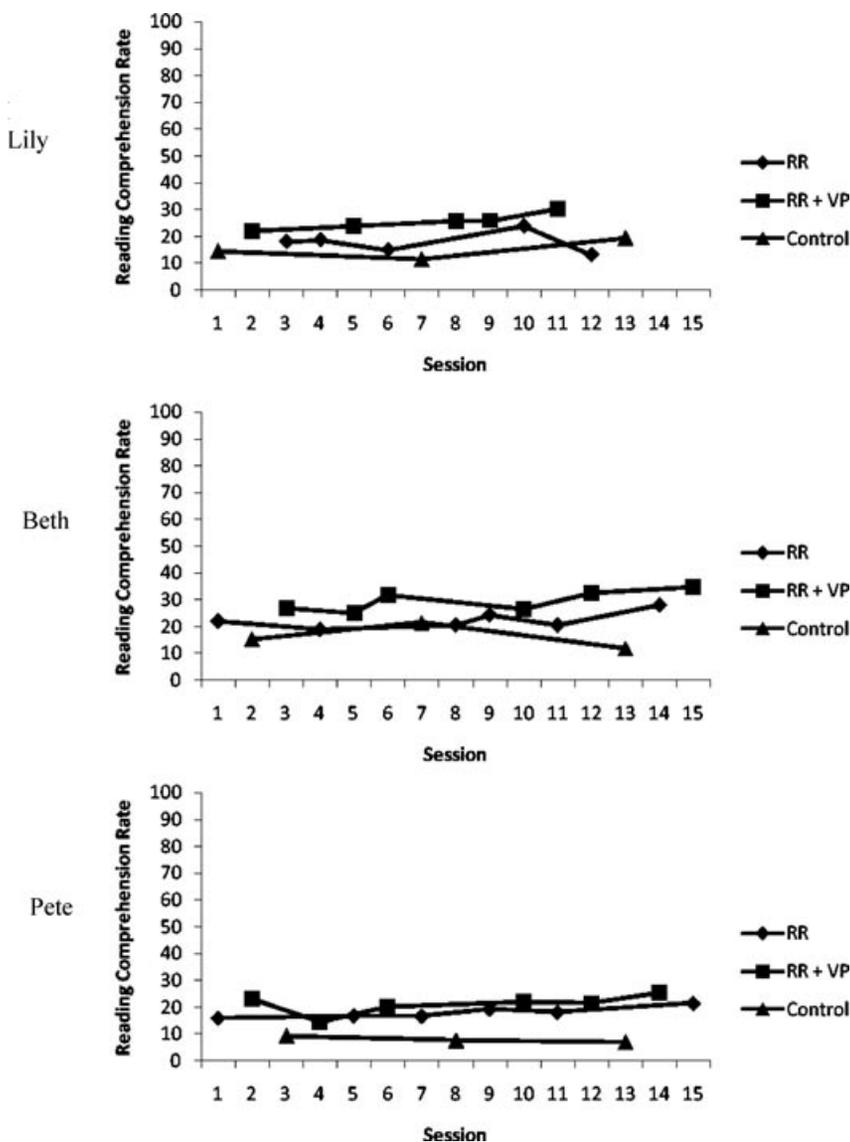


FIGURE 3. Continued.

assessed. It is unknown how many of the vocabulary words selected by the teacher and researcher for inclusion in the intervention were already known by students. The impact of the VP component on reading comprehension may have been more pronounced if all targeted words were truly unknown to students prior to intervention. Next, because students were required to read vocabulary words aloud at least three times each in the RR + VP condition, it is unknown whether this additional oral reading practice or the learning of the vocabulary definitions was responsible for the improvements in reading comprehension level as compared to the RR condition for some participants. Also, both RR conditions included an error correction component that likely contributed to the positive effects of the interventions on student performance. Thus, both experimental conditions involved multicomponent

interventions, and the effects of RR alone apart from the error correction can not be determined. Finally, students received intervention and were assessed using instructional level materials, which were two to six grades below actual grade level. Future researchers should examine the effects of similar intervention strategies on both instructional and grade-level reading performance.

Conclusions

Overall, the results of the current study suggest that RR with error correction procedures can lead to improvements in the reading performance of struggling high-school students. Furthermore, adding a VP component may enhance positive effects of RR interventions for some students. It is also important to emphasize that student participants and the collaborating teacher reported that they liked the intervention procedures and felt that reading skills had improved as a result. In addition, the student participants were each diagnosed with a learning disability in reading and had a history of reading difficulties. Despite this history, the interventions implemented had positive effects on their performance both within sessions and over time, suggesting that these interventions may be a promising option when planning for students with significant learning needs. In the current study, students received intervention 3–5 days a week for 10- to 20-minute sessions. Greater effects may have resulted if the intervention had occurred more frequently, for longer sessions, and/or over a longer period of time. Nevertheless, based on these results as well as on those of previous studies demonstrating positive effects, school psychologists consulting with teachers and collaborating as part of problem-solving teams may consider recommending RR interventions to help improve the reading fluency, comprehension, and comprehension rate of high-school students. In response to the emphasis on content area learning at the secondary level, teachers implementing RR interventions like those used in the current study could incorporate reading material from the actual curriculum used in daily classroom instruction. Potentially, this strategy could lead to gains in not only reading performance, but also content area performance.

APPENDIX A

Procedural Adherence Checklists

Control Condition

1. Direct student to the correct reading passage.
2. Tell the student, “When I say start, I want you to read the story aloud at your normal reading pace. If you come to a word you don’t know, I will tell it to you. Right after you finish reading, I will give you some questions to answer about what you have read. You will not be able to look back at the story to help you answer the questions.”
3. Say, “Start,” and begin timer.
4. Record words read correctly and errors in the first minute of reading but continue to let the timer run.
5. Record time taken to read the entire passage.
6. Direct student to the comprehension questions.
7. Say, “Do your best to answer the questions correctly.”

Repeated Reading

1. Direct student to the correct reading passage.
2. Tell the student, “When I say start, I want you to read the story aloud at your normal reading pace. If you come to a word you don’t know, I will tell it to you. After you finish reading, we will practice reading the words you didn’t know. Then, you will read the passage again

- and answer some questions about the story. You will not be able to look back at the story to help you answer the questions.”
3. Say, “Start,” and begin timer.
 4. Record words read correctly and errors in the first minute of reading but continue to let the timer run.
 5. Record time taken to read the entire passage.
 6. Once student finishes reading the passage, write the words that he or she mispronounced or did not know on index cards.
 7. Say, “Now we will practice the hard words from the passage using these flashcards.”
 8. Present flashcards to the student one at a time.
 9. Provide praise if he or she reads the word correctly and say “The word is _____” if he or she provides no response or an incorrect response.
 10. After student reads each word correctly three times, say “OK. When I say start, I want you to read the story aloud again. This time when you are done reading, I will give you some questions to answer about what you have read. You will not be able to look back at the story to help you answer the questions.”
 11. Say, “Start,” and begin timer.
 12. Record words read correctly and errors in the first minute of reading but continue to let the timer run.
 13. Record time taken to read the entire passage.
 14. Direct the student to the comprehension questions.
 15. Say, “Do your best to answer the questions correctly.”

Repeated Reading and Vocabulary Previewing

1. Tell the student, “Before we read today, we are going to go over some vocabulary words that will be in the story I will have you read a little later.”
2. Give the student the flashcards of vocabulary for the passage.
3. Say, “Take a couple of minutes to read through these words and their definitions, which are on the back of the cards. If you don’t know a word, ask me and I’ll tell you how to say it. After you go through the cards on your own, we’ll go over them together.”
4. Give the student 2 minutes to read through the vocabulary.
5. Say, “OK. Let’s go over the words. I’ll show you the word and you give me the definition.”
6. Present words to the student one at a time.
7. Provide praise if he or she provides a correct definition and say “The word means _____” if he or she does not respond or gives the wrong definition.
8. After the student responds correctly to each of the words three times, say “OK. Now I’ll have you read.”
9. Direct the student to the correct reading passage.
10. Tell the student, “When I say start, I want you to read the story aloud at your normal reading pace. If you come to a word you don’t know, I will tell it to you. After you finish reading, we will practice reading the words you didn’t know. Then, you will read the passage again and answer some questions about the story. You will not be able to look back at the story to help you answer the questions.”
11. Say, “Start,” and begin timer.
12. Record words read correctly and errors in the first minute of reading but continue to let the timer run.
13. Record time taken to read the entire passage.
14. Once the student finishes reading the passage, write the words that he or she mispronounced or did not know on index cards.
15. Say, “Now we will practice the hard words from the passage using these flashcards.”
16. Present flashcards to the student one at a time.
17. Provide praise if he or she reads the word correctly and say “The word is _____” if he or she provides no response or an incorrect response.

18. After student reads each word correctly three times, say “OK. When I say start, I want you to read the story aloud again. This time when you are done reading, I will give you some questions to answer about what you have read. You will not be able to look back at the story to help you answer the questions.”
19. Say, “Start,” and begin timer.
20. Record words read correctly and errors in the first minute of reading but continue to let the timer run.
21. Record time taken to read the entire passage.
22. Direct the student to the comprehension questions.
23. Say, “Do your best to answer the questions correctly.”

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