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Exploring the Value Added of a Guided, Silent Reading Intervention: Effects on Struggling Third-Grade Readers' Achievement

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ABSTRACT. The authors' purpose was to explore the effects of a supplementary, guided, silent reading intervention with 80 struggling third-grade readers who were retained at grade level as a result of poor performance on the reading portion of a criterion referenced state assessment. The students were distributed in 11 elementary schools in a large, urban school district in the state of Florida. A matched, quasi-experimental design was constructed using propensity scores for this study. Students in the guided, silent reading intervention, *Reading Plus*, evidenced higher, statistically significant mean scores on the Florida Comprehensive Assessment Test criterion assessment measure of reading at posttest. The effect size, favoring the guided, silent reading intervention group was large, 1 full standard deviation, when comparing the 2 comparison groups' mean posttest scores. As such, the results indicate a large advantage for providing struggling third-grade readers guided silent reading fluency practice in a computer-based practice environment. No significant difference was found between the treatment and control group on the Stanford Achievement Test–10 (SAT-10) posttest scores, although posttest scores for the treatment group trended higher than the control. After conducting a power analysis, it was determined that the sample size ($n = 80$) was too small to provide sufficient statistical power to detect a difference in third-grade students' SAT-10 scores.

Keywords: guided silent reading, program evaluation, struggling readers

Teaching students to read has long been described as the most important responsibility of elementary schools (Boyer, 1995). Reading research has recently produced an emerging consensus around several essential elements of beginning reading instruction to include phonemic awareness, phonics, fluency, vocabulary, comprehension, oral language, writing, concepts about print, and letter name knowledge (National Institute for Literacy, 2008; National Reading Panel, 2000; Snow, Burns,

& Griffin, 1998). Fluent reading is essential because it is the bridge between word recognition and reading comprehension processes (National Reading Panel, 2000; Rasinski, 1989; Reutzel & Hollingsworth, 1993; Samuels & Farstrup, 2006). The initial stages of reading fluency occur when students are able to automatically recognize words. Later on, automatic word recognition opens the potential to achieve reading's ultimate goal, comprehension (Samuels, 2007; Torgesen & Hudson, 2006). Topping (2006) described this later stage of fluency development when word recognition bridges comprehension processes as "the extraction of maximum meaning at maximum speed in a relatively continuous flow, leaving spare, simultaneous processing capacity for other higher order processes" (p. 107).

In its report, the National Reading Panel (2000) reviewed 77 studies of Guided Repeated Oral Reading (GROR) with Feedback. GROR with Feedback is an approach to reading fluency practice that includes oral, repeated readings of a single grade or instructional level text (usually 3–5) while receiving feedback from a teacher or other more proficient readers. The National Reading Panel (2000) found GROR with Feedback to have substantial scientific evidence to support its efficacy for increasing students' reading fluency.

On the other hand, the National Reading Panel (2000) report sparked considerable controversy when the panel reported a lack of research supporting independent, silent reading practice as an effective means for developing students' reading fluency (e.g., Silent Sustained Reading [SSR] or Drop Everything and Read [DEAR]; Allington, 2002; Coles, 2000; J. W. Cunningham, 2001; Edmondson

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& Shannon, 2002; Krashen, 2002). Thus, one of the unintended consequences of the National Reading Panel's report was to suppress the previously prevalent use of silent, independent reading practice to develop students' reading fluency. Although silent reading practices such as SSR had been generally criticized, sharp critiques of independent, silent reading increased significantly after the National Reading Panel's (2000) report was released. In a contemporary era of high-stakes accountability, it becomes increasingly difficult for classroom teachers to justify the use of instructional practices that do not have the imprimatur of the National Reading Panel or are not sanctioned as evidence based by the federal government.

Consequently since the turn of the new millennia, GROR with Feedback has become the dominant way in which teachers encourage students to practice their reading in classrooms to develop fluency. Once GROR with Feedback became the dominant method of classroom instruction used to develop fluency, it became more and more apparent to teachers, administrators, and researchers that this particular mode of providing school reading fluency practice, oral and guided, was unrelated to the most common way in which most accomplished adolescent and adult readers read—independently and silently. Although guided, oral repeated reading may be useful in school reading fluency practice the long-term goal should be to help students become avid, competent independent silent readers.

Silent Reading

There is little question that the opportunity to read whether silent or oral has been shown to be strongly associated with gains in students' reading achievement (Allington, 2002; Guthrie, Schafer, & Huang, 2001; National Reading Panel, 2000). In addition to the strong correlation evidence for time spent reading and reading achievement, causal evidence for the efficacy of engaging students in independent, silent reading practice has been steadily growing over the past ten years since the publication of the report of the National Reading Panel (2000).

In a large-scale experiment that provided students with an additional 20 min of independent, silent reading of trade books Block, Cleveland, and Reed (2006) found that the additional practice led to significant annual gains in students' vocabulary, comprehension, and fluency. Similarly, Wu and Samuels's (2004) reported results of a quasi-experiment that compared the reading comprehension and reading achievement gains of third- and fifth-grade students who read independently and silently for either 15 or 40 min. Students in the 40-min group evidenced significantly better reading achievement and comprehension than the group that read for 15 min. These and other studies over the past decade (e.g., Hiebert & Reutzel, 2010; Kamil, 2008; Kelley & Clausen-Grace, 2006, 2010; Kuhn & Schwanenflugel, 2008; Reutzel, Fawson, & Smith, 2008; Reutzel, Jones, Fawson, & Smith, 2008; Reutzel, Jones, & Newman, 2010) have begun to pro-

vide a causal research base showing that students' reading comprehension, fluency, and achievement can be benefited by the opportunity to read independently and silently when specific conditions of reading fluency practice are implemented. According to recent research it also appears that using independent, silent reading as the means to practice fluency makes more sense developmentally and empirically for students who are older than age 8 years or at least in Grade 2 (Kuhn, 2004, 2005; Wright, Sherman, & Jones, 2004, 2010).

Today's educational culture of increased accountability has compounded teacher concerns regarding the use of independent, silent reading to practice fluency, especially when this method is used with low-achieving, struggling students. A persistent fear among classroom teachers in an age of increasing accountability about using independent, silent reading to practice reading fluency in classrooms, especially when used with low-achieving, struggling students, is assuring that these students can actually read the books they have selected (Donovan, Smolkin, & Lomax, 2000; Fresch, 1995) and are keeping their eyes on the text (Hiebert, Wilson, & Trainin, 2010). Students achieving in the bottom quartile of their class have been shown to differ substantially when they read silently in an unguided context as compared with a guided context (Hiebert et al., 2010; Trainin, Wilson, Hiebert, Erickson, & Laughridge, 2007). When the classroom setting for independent, silent reading fluency practice lacked sufficient guidance and accountability, struggling readers often failed to read. However, as reported in several recent studies of independent silent reading, when the challenge level of texts and the task of reading independently and silently were carefully scaffolded and guided by the teacher, even third-grade struggling readers were able to engage successfully (Bryan, Fawson, & Reutzel, 2003; Kamil, 2008; Kelley & Clausen-Grace, 2006, 2010; Reutzel, Fawson, & Smith, 2008; Reutzel, Jones, et al., 2008; Reutzel et al., 2010).

Along with research on improving the outcomes of independent, silent reading practice, over the past decade researchers also have been pushing forward on the scientific frontiers of silent reading in other areas over the past decade. Brenner and Hiebert (2010) recently reported research related to a professional development program intended to help teachers increase the amount of time students' eyes were on text during silent reading. These researchers, among others who have recently examined the independent, silent reading process, discovered that previous explanations of the eyes on text phenomenon had seemingly overlooked a fundamental contributor to that process—the eyes (Samuels, Hiebert, & Rasinski, 2010).

Rasinski, Samuels, Hiebert, Petscher, and Feller (2011) recently reported on research conducted with students in Grades 4–10 using a computer-based, guided silent reading fluency intervention known as *Reading Plus*. This intervention makes use of infrared eye-movement photography assessment, placement tests, comprehension assessment,

and computer-adapted levels of reading selections across a variety of genres to guide, monitor, and adjust the silent reading practice of school-aged students. Students' initial placement and progressive reading levels are based on ongoing computerized feedback as students are provided with visual and perceptual modeling practice through reading texts that systematically increase in difficulty and length. In their recent study, Rasinski et al. found a strong relationship between Grades 4 and 10 students who practiced silent reading using this intervention and subsequent gains in reading comprehension and general literacy achievement on a state criterion- and normative-referenced national reading achievement test.

Although these researchers found a relationship between the guided, silent reading practice with the *Reading Plus* program of students in Grades 4–10 and the students' gains in reading comprehension and general reading achievement, much less is known about how such a supplementary intervention program may influence the reading behaviors and achievement of struggling, younger readers. In today's environment of high accountability, there is a need for carefully constructed evaluations of commercially available supplementary intervention programs by credible organizations such as the U.S. Department of Education's What Works Clearinghouse. Thus, studies such as the one reported by Rasinski et al. (2011) are of evaluative and practical importance for classroom teachers and administrators who are seeking guidance and evidence to support the selection and use of available supplementary reading interventions in classrooms.

Although previous studies have shown silent reading to be an effective way to read, more recent studies have shown that silent reading practice conditions in school often result in students acting like they are reading when they are not (Hiebert & Reutzel, 2010). As a result, we sought to determine whether a computer-based, guided silent reading fluency intervention using a combination of scaffolded reading passages and comprehension questions can reliably increase struggling students' reading achievement and comprehension by helping these readers keep their eyes on the text during silent reading.

Research Question

How does a guided silent reading fluency intervention, *Reading Plus*, affect struggling third-grade students' performance on criterion- and norm-referenced tests of reading comprehension and reading achievement?

Method

Research Design

We used a matched, quasi-experimental research design. The study's quasi-experimental control and treatment groups were constructed by the use of a propensity score sam-

pling and matching process. A propensity score, as defined by Rosenbaum and Rubin (1983), has a conditional probability of assignment to a particular treatment given a vector of observed covariates. More simplistically, a propensity score is the probability of being in the treatment group derived from a logistic regression when accounting for important matching variables. The primary objective for the researcher is to select a series of variables that would be considered to be important for matching students. In traditional reading research, these variables might include race/ethnicity, socioeconomic status, English learner status, primary exceptionality status, gender, and some type of baseline measure of achievement (e.g., pretest). The main effects and interactions among these and other variables would be included in a logistic regression to determine the probability of being in the treatment when controlling for these important matching covariates (Shadish, Cook, & Campbell, 2002). The resulting probabilities from the logistic regression may then be used to match students who actually received the intervention with those who did not creating matched treatment and control groups. In this way, students are more probabilistically matched at the pretest, and doing so allows for stronger causal inferences regarding differences on the posttest or on gain scores than a simple comparison of all available students in a sample. There are several limitations that should be noted in regard to using propensity scores to construct an experimental sample such as that used in this study: (a) propensity scores tend to be most practically used with larger samples, (b) missing data can be problematic for propensity analyses as the techniques are still relatively new, and (c) propensity scores assume that no further confounds exist that may predict the propensity. Nevertheless, despite these acknowledged limitations, propensity scores are now viewed as one of the strongest quasi-experimental methods for assessing relationships between treatments and outcomes (Shadish et al., 2002).

Participants

Three criteria were used to select students for the control and treatment group sample. First, students who were selected were age 9 years or older. Second, students were identified as being struggling readers by the scores from their end-of-year high-stakes assessments. The results from these third-grade achievement tests put the students at risk for not being promoted to Grade 4 and the end of the Grade 3 school year. Finally, retained third-grade students were re-enrolled in Grade 3 classrooms during the implementation period, which ran from the beginning of the school year through the administration of the Florida Comprehensive Assessment Test (FCAT) and Stanford Achievement Test–10 (SAT-10) in early March.

We selected struggling third-grade readers for participation in this study for two reasons. First, age 9 years (or Grade 3) has been shown by empirical studies to be an age and stage of reading development where independent, silent reading

becomes possible and advisable based on recent research findings (Hiebert & Reutzel, 2010). Second, the stage in reading development as third-grade students transition into Grade 4 has been long associated with the Grade 4 reading slump or reading crisis (Chall, 2001; Chall, Jacobs, & Baldwin, 1990).

The archival full student sample file available to researchers was 1,253 third-grade students enrolled in a large, urban public school system in the state of Florida. Of these 1,253 third-grade students, 158 represented the required special case of 9-year-old students retained at the end of Grade 3. Thus, all 158 third-grade students in the study's sample population were not promoted to Grade 4 based on their performance on Florida's end-of-year high-stakes assessment, the FCAT. These 158 retained third-grade struggling readers attended 11 different elementary schools within this Florida urban school district. The final propensity score sample constructed for this study's matched, quasi-experimental research design consisted of 40 students in the control and 40 students in the experimental treatment group with a total number of 80 retained third-grade students.

Instrumentation

The FCAT is a major component of Florida's testing effort to assess student achievement in reading, writing, mathematics, and science as represented in Florida's Sunshine State Standards (SSS; Florida Department of Education, 2001). The SSS reading portion of the FCAT is a group-administered, criterion-referenced test consisting of six to eight narrative or informational reading passages, where students respond to between six and 11 multiple-choice items per passage. Embedded within these six to 11 multiple choice questions are four content clusters: (a) reference and research, (b) words and phrases in context, (c) the main idea, and (d) comparison and cause and effect. Based on students' scores, they are placed into one of five performance levels on a scaled score ranging from 100 to 500. Levels 1 and 2 reflect below grade-level performance in reading, with Level 1 being the lowest indication of reading performance. Levels 3 and higher represent proficiency in reading comprehension at or above grade-level standards. Students who score below Level 1 proficiency on the FCAT in Grade 3 must be retained for another year according to Florida law. If they can demonstrate the required reading level or proficiency through an approved alternate test (the SAT) or through a student portfolio they can be granted a good cause exemption and be promoted to Grade 4. Thus, the students selected into this study represented the highest risk segment of the overall Grade 3 population. The internal consistency reliability for the FCAT-SSS has been shown to be .90 (Cronbach's alpha); moreover, test score content and concurrent validity have been established through a series of expert panel reviews and data analyses (Florida Department of Education, 2001). The construct validity of the FCAT-SSS as a comprehensive assessment of reading outcomes

recently received strong support in an empirical analysis of its relationships with a variety of other reading comprehension, language, and basic reading measures (Schatschneider, Fletcher, Francis, Carlson, & Foorman, 2004).

The SAT-10 is approved for use by the U.S. Department of Education and is constructed to determine if students are meeting national or state standards in reading, mathematics, and language. The SAT-10 provides forms acceptable for assessing students' progress toward meeting state and national standards in Grades K–12. The reading section of the SAT-10 has an alpha reliability coefficient of .87, the mathematics section .80–.87, and the language section .78–.84. Alternate forms reliability coefficients ranged in the low .90s for the total reading section. The SAT-10 by design evidences content and criterion related validity because its development is tied very closely to assessing progress toward meeting state and national standards in reading, mathematics, and language (Berk, 1998; Morse, 2005; Spies & Plake, 2005).

Control and Treatment Groups

All 80 retained third-grade students in the control ($n = 40$) and treatment ($n = 40$) groups followed the state-approved Comprehensive Core Reading Program (CCRP) adopted by this large, urban Florida school district. The CCRP delineated specific protocols unique to the third-grade retained students, requiring schools to provide a dedicated and uninterrupted 2-hr block of classroom instructional time for reading instruction for all students. Whole-group explicit reading instruction was provided daily for the first 30–40 min using *Houghton Mifflin's Reading Treasures* (Cooper & Pikulski, 2006) comprehensive core reading program. Thirty minutes of the 2-hr block were dedicated to writing instruction. For the remainder of the 2-hr reading instructional block teachers differentiated instruction using small groups and center rotations. This time was used for students to practice, demonstrate, and extend skills previously taught during the teacher-led explicit reading instruction. Approved supplemental reading intervention programs could be used at this time. Some of these included *Quick-Reads* (repeated oral reading of the same passage), *Elements of Reading: Vocabulary* (oral vocabulary instructional program), and the supplemental activities provided with *Houghton Mifflin's Reading Treasures*. Retained students were required to receive intensive intervention in areas of demonstrated deficiency during the mandated 2-hr reading instructional block.

In addition to the dedicated 2-hr block instructional time that all control and treatment students received, the participating students received an additional 30 min of supplemental reading instruction every day. Supplemental reading programs included *Soar to Success*, *Essential Elements of Reading: Vocabulary*, *Voyager Passport*, *Earobics*, and *Reading Plus*. Treatment group students engaged in *Reading Plus* while the control group used one of the other three supplementary reading interventions for third-grade students. The

programs differed in that *Soar to Success* contained instruction in four of the essential components of reading outlined by the National Reading Panel and Reading First (phonics, fluency, vocabulary, and comprehension) and *Passport Voyager* and *Earobics* in five of the components (phonemic awareness, phonics, fluency, vocabulary, and comprehension) while treatment intervention focused primarily on fluency, vocabulary, and comprehension development.

Reading Acceleration Programs (Control Group)

Selected struggling third-grade students ($n = 40$) received one of three accelerated reading treatments during three 30-min sessions per week. Other programs, utilized by the control groups, were implemented according to publisher guidelines.

Soar to Success. *Soar to Success* is a program designed to accelerate students' reading ability and help them quickly and easily apply comprehension and decoding strategies to other content area texts through the use of reciprocal teaching; an instructional technique that uses teacher-student dialogue to teach students to use cognitive strategies of summarizing, clarifying, questioning, and predicting. Each 30-min lesson consists of five parts: (a) revisiting—students reread self-selected *Soar to Success* books for fluency development, (b) reviewing—students review strategies and summarize what was read utilizing graphic organizers, (c) rehearsing—students follow a teacher-guided or independent preview of the daily reading, (d) reading and reciprocal teaching—students read silently followed by the use of four reciprocal teaching strategies (summarizing, clarification, questioning, and predicting), and (e) responding-reflecting—students complete written reflections and engage in discussions to bring closure to the daily activity (FCRR, n.d.).

Essential Elements of Reading: Vocabulary, Voyager Passport. *Essential Elements of Reading: Vocabulary, Voyager Passport* is a program designed to accelerate reading growth and assist students in reaching grade-level expectations through the use of teacher modeling, guided and independent practice, and immediate corrective feedback. The program consists of daily lessons that are taught in small groups. A typical 30-min lesson for third-grade students consists of advanced vocabulary word analysis, fluency-building passage reading, and comprehension strategies. Third-grade students in need of additional support in word study may engage in an optional targeted word study component (FCRR, n.d.).

Earobics. *Earobics* is a program designed to help students develop foundational skills to become successful readers through the use of software, teacher-directed activities, manipulatives, and books. The program consists of two parts: Part 1 is designed for first- and second-grade students and

Part 2 is designed for second-grade students and older who are struggling with fluency. Students may engage in software games that target phonemic awareness and phonics skills or teachers may provide explicit instruction in language enrichment, phonemic awareness, letter-sound correspondences, decoding, and early reading and writing.

Guided Silent Reading Fluency Intervention (Treatment Group)

An equal number of selected struggling third-grade students ($n = 40$) received the comparison treatment, *Reading Plus*, a guided, silent reading supplementary intervention. Students involved in this guided, silent reading intervention participated in a series of online, computer-based sessions that included a specific sequence of daily activities. As struggling students participated in this guided, silent reading intervention, the difficulty level of the reading materials was adjusted as a function of a student's progress based on reading comprehension and reading rate analyses. Students began the intervention by completing a reading assessment (Reading Placement Appraisal [RPA]) to establish the initial placement level within the guided, silent reading supplementary intervention program. This 20-min placement test assessed independent reading level, rate, comprehension, and vocabulary to determine the most appropriate practice starting level. The RPA consisted of three parts. Part I presented students with several 100-word selections that each were followed by a set of literal recall questions. Content difficulty was adjusted according to a student's comprehension performance and reading rate mastery to ascertain a student's tentative independent reading level. Part II with its 300-word selections and diverse comprehension questions served to confirm the independent reading level. Part III assessed a student's vocabulary level. From the three-part RPA assessment, an instructional reading level was established for individual students, and they were then placed at appropriate levels of reading challenge within each component of the program. Students continued to be assessed on similar tasks throughout the intervention period with appropriate adjustments made to the level of reading selections as a result of their performances on these formative assessments. As students participated in this supplementary silent reading fluency intervention, they were provided reading lessons and continuous feedback about their silent reading in an individual computer-based, online environment.

Each lesson began with a perceptual accuracy and visual efficiency (PAVE) warm-up. This activity consisted of two parts, scan and flash. In the scan activity, students scanned the computer screen to count the number of times a target letter or number appeared on the screen. The target and other letters or numbers were flashed in a left-to-right presentation. The presentation speed increased in accordance with the student's proficiency. In the second activity, flash, a series of letters or numbers ranging in length from two to 12 depending on the students' placement level were flashed (one sixth of a second per flash, which does not permit moving

of the eyes and thus provides single fixation training). The amount of numbers or letters is increased in response to the students' ability to correctly recreate the sequence. This warm-up activity aimed to increase students' visual perception, attention, and automaticity in the discrimination and recognition of print. Studies conducted by numerous researchers (e.g., Brenner & Hiebert, 2010; Mirsky, 1999; Torgesen & Hudson, 2006) suggested that one of the defining characteristics of a proficient reader is the ability to sustain attention and keep their eyes on the text. According to Pikulski (2006), "instant, accurate, and automatic access to all these dimensions of a printed word is the needed elements of fluency that will allow readers to focus their attention on comprehension rather than on decoding" (p. 75).

The next part of the guided, silent reading session provided students with extensive structured silent reading practice to build fluency within an authentic reading experience where students read for meaning. During guided silent reading sessions, involving timed, guided, left-to-right reading practice, students read texts selected from a diverse collection of narrative and expository texts at each student's independent instructional reading level. The work of O'Connor et al. (2002), as reported by Allington (2006), showed that providing daily intervention lessons using grade-level texts was not nearly as successful as providing daily lessons using texts matched to the instructional reading levels of struggling readers. O'Connor et al. argued that selecting texts of appropriate challenge should be a first step in the design of effective supplementary reading instruction and intervention. This is no less true when designing effective silent reading practice for regular education students in elementary classrooms (Reutzel, Jones, et al., 2008).

Lesson text selections were matched to struggling readers' independent reading levels using Spache (1953), Dale and Chall (1948a, 1948b), and Fry (1968) readability formulas. The guided, silent reading supplementary intervention computer environment was programmed to continuously and dynamically monitor students' performance using reading rate measures and responses to comprehension questions, adjusting the reading content level to match each student's progress. In addition, the guided silent reading intervention program used a mix of instructional formats and scaffolds to further match individualized needs and rates of progress. These included variation in the presentation of text, the length of reading segments, the location and number of comprehension questions, and the use of repeated readings. Thus, students were able to progress through levels of reading challenge in this intervention based on several factors. Students had to be able to read passages at their present levels with grade-appropriate rates and good comprehension before they were advanced to subsequent levels. Past research on reading fluency and comprehension development has further demonstrated that struggling readers are the least likely to engage in effective silent reading practice that would provide them with the opportunity to integrate the varied reading instruction interventions they receive (Allington, 2006; Chinn, Waggoner, Anderson, Schommer, & Wilkin-

son, 1993; Eder & Felmlee, 1984; Hiebert, 1983; Hoffman, 1984; Wonder-McDowell, Reutzel, & Smith, 2011).

This supplementary, guided silent reading intervention provides approximately 600 reading selections ranging from preprimer to adult-level texts, including high-interest and low-readability selections for older struggling students. Selections represent a wide range of genres, such as "Miguel's Big Day," a family life story; "The Lighthouse Visitor," a mystery; and "Looking at Clouds," a science/nature story. As students progress through the varied guided silent reading levels, text becomes longer and more challenging, and content choices become more informational. Lesson texts were presented within both a guided silent reading format (a moving window guides students' eyes across lines of print from left-to-right) and an independent reading format without any left-to-right guidance. Regardless of the nature of the lesson or activity, the text was presented within a controlled format and rate parameter for each student in the online environment. Dynamically controlled by individual student performance, comprehension questions were either interspersed between individual reading segments or followed at the conclusion of the story. All comprehension questions were electronically coded by the system to continuously track student performance with 25 comprehension skills based on Bloom's taxonomy, including literal understanding, interpretation, analysis, evaluation, and appreciation. The format (wide vs. repeated readings) and rate at which text was presented on screen was then incrementally increased as a function of students' performance on these comprehension questions and reading rate performances during the reading events. As students progressed through the levels, the texts read became progressively longer and more challenging. The intent of the guided silent reading lesson is to provide students with authentic reading experiences that build comprehension, fluency and stamina at a level of difficulty that will provide them the maximum acceleration of progress. Additionally, given that the difficulty of texts was established using the Spache (for primary-level texts) and Dale-Chall (middle-level texts), both of which rely on high-frequency word lists, students have considerable opportunity to develop fluency with a core group of high frequency words reading these texts. Torgesen and colleagues (Rashotte, MacPhee, & Torgesen, 2001; Torgesen & Hudson, 2006) argued that limited sight vocabularies are a principal characteristic of students with reading disabilities beyond the initial phase of learning to read.

The guided silent reading component of the guided, silent reading supplementary intervention was also followed by the cloze vocabulary component. The cloze component used structured contextual analysis activities to assist struggling students develop comprehension competency. These cloze exercises are intended to encourage students to use context clues to complete the meaning of sentences as well as longer passages. Students also practice deriving the meaning of difficult or unfamiliar word meanings by analyzing the surrounding context in these cloze activities, thus potentially enhancing wide reading vocabulary learning strategies and skills.

Performance scores within each practice module, the interconnectedness of the various practice modules, integrated formative assessments following each lesson, and a highly sophisticated operating system inform just-in-time instructional decisions that are sensitive to student characteristics such as age, reading level, performance, progress, and instructional trajectory. The system not only dynamically adjusts each student's differentiated lesson format within each practice module but also provides unique adjustments for daily practice sessions. The integration of these modules allow for the system to provide each student with a practice environment that uniquely addresses his or her individual silent reading development needs at any moment in time during the implementation period.

Data Analyses

To assess the value-added of this silent reading fluency intervention with third-grade struggling readers, a propensity score analysis was used to match the 40 students from the sample of 158 who did not receive this supplementary silent reading fluency intervention to a group of 40 students who were similar with regard to demographics, prior FCAT achievement, and performance on the SAT-10 in this study. The 40 struggling students who received supplemental reading instruction with this silent reading fluency intervention completed an average of 71 lesson units during the study. The logistic regression used in this study to construct the propensity scores predicted group membership with race/ethnicity, limited English proficiency status, primary exceptional status, and reading performance on the previous year's FCAT-SSS and the SAT-10. Prior technical reports have indicated that the correlation between FCAT scores from year to year is approximately .75 in elementary schools (Florida Department of Education, 2001); moreover, the correlation between the FCAT-SSS and the SAT-10 in Grade 3 is .78. As such, while a strong correlation exists between the two assessments of reading comprehension, it was important to capture the unexplained covariance in scores. By using both measures in the propensity score matching, greater specificity could be attained. Resulting propensity scores were used in a secondary analysis to match students based on their designation as having received treatment or not. Once students were appropriately matched, they were designated to receive or not receive the supplementary silent reading fluency intervention (control vs. treatment group). After a full year, the resulting student scores were analyzed using a one-way analysis of variance (ANOVA) with a linear step-up to control for the false-discovery rate (Benjamini & Hochberg, 1995).

Results

A summary of the demographics (see Table 1) and descriptive statistics (see Table 2) for the FCAT and SAT-10 scores

TABLE 1. Demographic Comparison of Treatment and Matched Control Students

Demographics	Treatment (n = 40)	Control (n = 40)
% Black	65	58
% White	0	8
% Latino	35	35
% ELL	15	13
% ESE	5	25

Note. ELL = English language learner; ESE = exceptional student education.

for the treatment and matched controls groups is reported in Tables 1 and 2.

As can be seen by the reported indices, the two groups were reasonably matched from the propensity analysis. The mean pretest score for the matched control group on the FCAT-SSS was 814.90 ($SD = 217.92$) compared with the treatment group mean of 845.50 ($SD = 117.69$), corresponding to a standardized coefficient of $g = 0.17$. Similarly, the mean pretest score on the SAT-10 for the treatment group was 575.75 ($SD = 16.04$), compared with the control group mean of 570.73 ($SD = 18.90$), and corresponded to a standardized coefficient of $g = 0.28$.

Because students who participated in the program were from different classes and schools, and the analysis was based on available, archival data, the ratio of students to classes was small, precluding a mixed-effects modeling of the data to account for clustering at the classroom and school levels.

A one-way ANOVA was used to assess the extent to which the treatment and matched control students were statistically differentiated on the posttest scores for both the FCAT-SSS and the SAT-10. To control for the false discovery rate, a linear step-up procedure was used for any statistically significant finding.

TABLE 2. Descriptive Statistics for the Control and Treatment Groups on the FCAT and SAT-10 Pre- and Posttest Scores

Measure	Control group		Treatment group	
	M	SD	M	SD
FCAT Pretest	845.50	117.69	819.90	217.92
FCAT Posttest	1012.33	357.46	1322.63	171.24
SAT-10 Pretest	570.03	18.90	575.75	16.04
SAT-10 Posttest	597.93	34.95	608.53	24.43

Note. FCAT = Florida Comprehensive Assessment Test; SAT-10 = Stanford Achievement Test-10.

FCAT-SSS results indicated that a significant effect existed for treatment, $F(1, 79) = 24.52, p < .001$, suggesting that treatment students' scores on the posttest were significantly higher than the matched control. The mean posttest score for the silent reading fluency intervention students was 1322.63 ($SD = 171.24$) compared with the matched control's mean of 1012.33 ($SD = 357.46$). A more appropriate way to contextualize these results is to calculate an effect size, which communicates, in standard deviation units, how large the differences were between the means of the two groups regardless of sample size. A standardized effect size value $g = 1.09$ was estimated, indicating that the mean for the students who were receiving the silent reading fluency intervention were performing one full standard deviation above the mean for the matched controls. In context, Cohen (1988) provides guidelines stating that an effect size of 0.80 would be considered large. In practical terms, 80% of the treatment students who received the supplementary guided, silent reading fluency intervention in this study achieved reading proficiency as measured by the FCAT (achievement levels 3 or higher) and were promoted to the next grade level, as compared to 32% of the of the matched control students.

Conversely, no statistically important findings were observed for the SAT-10 differences in the ANOVA, $F(1, 79) = 2.59, p = .11$, despite a higher posttest SAT-10 score for students receiving the guided, silent reading supplementary intervention ($M = 608.53, SD = 23.43$) compared with the matched controls ($M = 597.83, SD = 34.95$). Important components to consider in these seemingly conflicting findings are the issues of power and baseline equivalence. Given the present total sample size in the design (i.e., $n = 80$), a potential reason for the lack of statistical significance in the SAT-10 analysis is due to a small effect size that could be observed, and not a sufficient sample size to detect it. Indeed, a power analysis with n of 80, Cronbach's alpha of .05, and power of 0.80 indicates that the minimum detectable effect size would be 0.63. As such, in the case of the FCAT, a statistically significant finding was observed with an estimated effect size difference of over 1.0. With the SAT-10 data, a quick calculation of the posttest mean differences would yield a standardized coefficient of 0.30, yet with minimum detectable effect size of only 0.67, it would not be possible to obtain a statistically meaningful finding with this group. However, this does not imply that if the sample size was larger or the baseline effect was smaller, a statistically significant effect would be obtained, as the pretest differences suggest that a more diverse sample could be used to provide a more accurate match. Notwithstanding this limitation, these results represent preliminary evidence that a moderate to strong relationship between the value-added of the guided silent reading fluency intervention, *Reading Plus*, and student performance in reading exists for retained third grade students in Florida, given the measured outcomes.

Discussion

Providing the highest quality reading instruction for all students is a central focus of current educational research. With the advent of the No Child Left Behind Act of 2001 (2002) and increasing use of response to intervention models in classrooms and schools, the urgency of identifying effective instructional interventions and practices to help struggling readers succeed has also increased. Both groups in this study of retained, struggling third-grade readers, treatment and control, were provided access to comprehensive core and supplementary reading instruction in all five essential elements as identified by the National Reading Panel (2000) and as a part of the mandated 2-hr reading instruction block in their school district. Much of past silent reading research has focused on comparing the results obtained from silent independent versus oral guided reading practice. Such studies have typically found that guided oral reading practice is more effective for students and is also preferred by teachers. This is the case because guided oral reading provides a check on whether students are actually reading and how well they do so. Prior to the turn of the millennia, studies of guided oral compared to independent silent reading practice contributed little to an understanding of how silent reading practice might become more effective.

Instead of providing yet one more comparison of independent, silent reading versus other, largely guided oral approaches to reading practice, we examined how changing silent reading practice conditions from silent independent to silent guided affected the reading comprehension and reading achievement of struggling third-grade readers. In this study, the focus was on comparing the reading comprehension and achievement of third-grade struggling readers who received guided practice during silent reading using *Reading Plus* to a group of matched control students who received a combination of other school district approved supplementary reading interventions—*Early Success*, *Soar to Success*, *Essential Elements of Reading: Vocabulary*, and *Voyager Passport*—using largely oral, guided reading practice. The goal of using the treatment intervention was to provide struggling third-grade students with sufficient guidance, intensity, consistency, and appropriateness of silent reading practice in an online environment to substantially increase their reading comprehension and reading rate achievement. Guided silent reading practice as provided in the treatment intervention was continuously adapted for format of reading practice (repeated vs. wide readings, short or long passages), pace and level of structure during reading (guided vs. independent reading) and level of reading challenge (readability and genre types) via the use of reading efficiency measures and comprehension assessments during online silent reading practice with leveled texts. Using guided silent reading practice not only frees the teacher to provide more instruction and assistance to targeted students during reading practice sessions but also assures that when the teacher is not present,

struggling readers who were reading silently, were on task and their eyes were on the page.

Statistically significant differences were identified in favor of the guided silent reading treatment group on struggling third-grade students' reading comprehension and reading achievement scores on the FCAT test. The effect sizes were large, slightly greater than a full standard deviation, favoring the guided, silent reading supplementary intervention as compared with other school district–approved supplementary reading interventions for use with these retained third-grade struggling readers.

The statistically significant findings and large effect sizes favoring the guided, silent reading practice provided to struggling third-grade readers can be at least partially explained by turning to other research on effective approaches for providing silent reading practice to students in schools. First, this type of guided, silent reading intervention increased this sample of third-grade struggling readers' opportunities to read. It did so in a number of ways. First, in past research on silent reading, struggling readers often selected books that were too difficult for them to read fluently. The guided, silent reading supplementary intervention computer environment monitored students' comprehension of texts and then automatically and continuously adjusted the format of practice, genre, and level of challenge to match the students' abilities to comprehend the texts they were reading silently. When students cannot read the texts they have selected for silent reading they do not read much. Allington (1977) reminded that "if they don't read much, how are they ever gonna get good?" When students do not read much during silent or oral reading practice time, they do not benefit in terms of achievement from the time allocated. When struggling readers cannot or do not read silently, they find it difficult to keep their eyes on the text and focus attention (Trainin, Wilson, Hiebert, Erikson, & Laughridge, 2007). The guided, silent reading intervention used in this study assured that students' eyes were on the text. It accomplished this aim by providing visual and perceptual modeling practice, monitoring their comprehension responses to the reading of increasingly challenging and longer text selections, and continuously adjusting the level of text and question challenge based on these indicators.

The guided, silent reading supplementary intervention used in this study also promoted student motivation. Because students are provided with a selection of appropriately leveled texts from which they can choose stories that most interest them (Fawson, Reutzell, Read, Smith, & Moore, 2009; Swan, Coddington, & Guthrie, 2010). In addition, students who read widely learn more vocabulary word meanings through reading and increase their abilities to manage and comprehend a variety of text structures and genres (Cunningham & Allington, 2010; Pressley, 2002). Providing struggling students with continuous feedback on their reading performance in terms of rates and comprehension was also helpful to students as a part of designing effective guided, silent reading practice conditions. Adjusting passage and lesson difficulty also seemed to help struggling students

make significant progress. Holding students accountable for their time spent reading by measuring students' reading rates, responses to comprehension questions, and cloze passages lets students know they are going to be monitored for the time spent in reading practice. Accountability assured that students' eyes were on the text, which has been shown to predict student reading achievement (Brenner & Hiebert, 2010). Finally, the guided, silent reading supplementary intervention tested in this study focused more time and practice on developing students' fluency, vocabulary, and comprehension skills than did the control programs that gave considerable time and practice to increasing students' word recognition automaticity through decoding practice. In focusing students' practice on fluency, vocabulary, and comprehension may have transported students more efficiently over the fluency bridge from decoding to comprehension than did more decoding practice.

No significant differences were found between the control and treatment groups of retained, struggling third-grade readers on the SAT-10 nationally norm-referenced reading achievement text and reading comprehension subtest. With respect to the SAT-10 findings, locating a sample size of retained third-grade struggling readers sufficiently large to power the analysis of SAT-10 reading scores proved to be daunting, even with an initial sample of over 1,200 third-grade students. A post hoc power analysis of the sample size for this study ($n = 80$) determined that the obtained sample size was too small to provide sufficient statistical power to detect a difference in third-grade students' SAT-10 reading comprehension and achievement scores. As a result we cannot be sure that this guided silent reading intervention was any more or less effective than other supplementary reading interventions provided to this sample of struggling third-grade readers as measured by the SAT-10 although posttest SAT-10 reading comprehension mean scores trended higher for the guided, silent reading supplementary intervention treatment group than for the control group. However, these results can also be used to argue that the guided silent reading intervention used in this study was at least as useful as were the other school district approved supplementary reading interventions provided to this group of struggling readers.

As a result, the evidence presented in this study demonstrates that providing struggling third-grade readers with a guided, silent reading intervention in an online environment via the *Reading Plus* supplementary reading intervention used in this study yielded large effects on reading achievement and comprehension scores on a high stakes state administered test, the FCAT, which is used by schools to determine both individual student progress and school progress toward meeting the requirements of Adequate Yearly Progress (AYP).

Limitations

The results of this study, comparing a matched sample of struggling third-grade readers who were retained in grade for poor reading performance, was limited by the total sample

size ($n = 80$). The criterion used to select struggling readers for this study was poor performance on the FCAT test at the end of Grade 3 resulting in retention in that grade for another year. These criteria were fairly narrow as compared to those used in other research focused on struggling readers. Very often struggling readers are selected based on performance that is at least one standard deviation below the mean on traditional reading or achievement measures. The study was also limited to a comparison of a single, guided silent reading intervention, *Reading Plus*, with a variety of other nationally marketed supplementary reading programs. It was not the purpose of this study to compare *Reading Plus* with any other specific interventions. Therefore, nothing can be said about this individual intervention's efficacy in comparison with other interventions not evaluated in this study. The study was also limited by its geographical location and demographics. The study took place in a large, predominantly Hispanic, southeastern urban school district environment. Therefore the results of this study may not be generalizable to other regions, types or sizes of school districts and to other ethnic groups across the nation. The tests used in this study were also a limitation. Although the use of criterion-referenced state reading tests have become the standard by which most schools are judged for achieving AYP under the No Child Left Behind Act of 2001 (2002), the FCAT represents only one of many such tests used nationally and may be more or less technically and psychometrically sound in comparison with other such tests used across the nation. Similarly, the SAT-10 is only one of many psychometrically sound, nationally distributed, and norm-referenced reading achievement tests available and sold nationally. Finally, the design of the study was a limitation as well. Even though the use of propensity scores provides a more exacting approach for matching student characteristics to form experimental groups, it is nevertheless limited by the characteristics selected by the researchers for doing so. It is not as strong a research design for making inferences as a true, randomized, controlled experimental study.

Implications

This study provided emerging evidence supporting the use of a guided, silent reading intervention known as *Reading Plus* for improving the reading comprehension and achievement scores of struggling third-grade readers on the FCAT. It did not provide similar evidence for the use of this guided, silent reading intervention for improving the reading comprehension and achievement scores of struggling third-grade readers on the SAT-10. Future researchers may want to broaden the criteria used to select struggling readers in order to enlarge the sample size. To increase the ability to generalize findings to other groups in others schools and classes across the nation, struggling readers should be selected from more than a single grade level, a single school district, and a single region of the country. For future researchers, a randomized, controlled trial would provide stronger evidence for making inferences about the potential efficacy of this guided, silent

reading intervention for struggling readers. Other supplementary intervention programs could also be used in future comparisons of the efficacy of the *Reading Plus* guided, silent reading intervention used in this study. Future evaluations of this intervention's efficacy could also be assessed with varied reading and achievement assessment instruments that would provide both more sensitive measurement as well as multiple, converging data points. Future researchers should also investigate the use of wave or growth modeling to examine the build-up effects for this intervention to determine optimal length of use to achieve maximum improvements in reading comprehension and achievement.

Despite these improvements and previously noted limitations, this study provides important evidence supporting the efficacy of a supplementary, guided, silent reading intervention with a sample of matched third-grade struggling readers who were retained at grade level. The guided, silent reading intervention not only afforded this group of struggling third grade students with appropriately challenging and varied reading genres to be motivating and within their reach, but it also resulted in the great majority of these students making sufficient progress so as to be promoted to the next grade level. This guided, silent reading intervention in this study provided students guidance in terms of visual and perceptual modeling and rate management during silent reading, formatting their reading practice individually, adapting the text to be read by type, genre, and level of challenge continuously monitoring their performance during silent reading practice. This combination of guided, silent reading intervention elements nested within an adaptive online presentation environment demonstrated efficacy with this group of struggling third-grade readers on the FCAT test after a full-year trial. Thus, the results of this study indicate that a guided, silent reading intervention employing a suite of instructional elements described can offer classroom teachers a potentially useful and efficacious tool for providing struggling third-grade student effective, supplementary, guided silent reading practice at school.

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