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The Relationship Between a Silent Reading Fluency Instructional Protocol on Students' Reading Comprehension and Achievement in an Urban School Setting

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Abstract

Reading fluency has been identified as a key component in effective literacy instruction (National Reading Panel, 2000). Instruction in reading fluency has been shown to lead to improvements in reading achievement. Reading fluency instruction is most commonly associated with guided repeated oral reading instruction. In the present retrospective study we examine the effects of a computer-based silent reading fluency instructional system called Reading Plus (Taylor Associates, Winooski, Vermont, USA) on the reading comprehension and overall reading achievement of a large corpus of students in an urban school setting. Findings indicate that the program resulted in positive, substantial, and significant improvements in reading comprehension and overall reading achievement on a criterion referenced reading test for Grades 5, 6, 7, 8, and 9 and on a norm-referenced test of reading achievement for Grades 4, 5, 6, 7, 8 and 10. Moreover, mean gains made by students in the Reading Plus intervention were greater than mean gains for all students at the state and district level. The findings were generally positive for all subpopulations studied, including special education and regular education students. Qualitative reports from teachers who participated in the study were also supportive of the program. Implications for the study are explored for particular subgroups of students and for the role of fluency instruction with struggling adolescent readers.

Reading fluency has been defined as the ability to simultaneously process written texts accurately, automatically, with appropriate prosody and comprehension (National Reading Panel, 2000; Rasinski, 2003, 2004, 2006). Although relatively neglected in reading curricula and instruction for years (Allington, 1983; Rasinski & Zutell, 1996), recent reviews of empirical research have identified fluency as a critical element in successful literacy instruction (Chard, Vaughn, & Tyler, 2002; Kuhn & Stahl, 2003; National Reading Panel, 2000; Rasinski & Hoffman, 2003).

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Chall's (1996) model of reading development posits reading fluency as a task to be mastered in the primary grades. Most research to date on fluency has focused on the primary grades. For example, several studies report significant correlations between predictive ability of measures of oral reading fluency and third-grade student performance on the reading portion of Florida Comprehensive Assessment Test (FCAT)–Sunshine State Standards, a criterion-referenced test of reading achievement (Buck & Torgesen, 2003; Roehrig, Petscher, Nettles, Hudson, & Torgesen, 2008). Similarly, instructional research into fluency has generally focused on the primary grades (e.g., Rasinski, Padak, Linek, & Sturtevant, 1994; Rasinski & Stevenson, 2005; Stahl & Heubach, 2005). This research has consistently found positive effects for fluency instruction on students' word recognition, reading fluency, comprehension, and overall reading achievement.

More recently, scholars have suggested that reading fluency may be an important concern for students beyond the elementary grades (Schatschneider et al., 2004; Torgesen, Nettles, Howard, & Winterbottom, 2005). Rasinski et al. (2005), for example, reported a robust and significant correlation between a measure of high school students' reading fluency (automaticity) and a measure of silent reading comprehension. Moreover, significant numbers of high school students in the study were found to be substantially below norms of acceptable performance in reading fluency. Rasinski, Rikli, and Johnston (2009) reported significant and substantial correlations between measures of fluency (prosody) among upper elementary and middle school students and a standardized test of silent reading comprehension. Moreover, the magnitude of the correlation is roughly the same at the three grade levels studied—Grades 3, 5, and 8. Reading fluency, it appears, is not an issue solely for the primary grades. Fluency is associated with reading achievement beyond the primary grades, and significant numbers of students beyond the primary grades have yet to achieve appropriate levels of fluency in their reading. As a result, students also experience difficulties in comprehension and general reading achievement. Wexler, Vaughn, Edmonds, and Reutebuch (2008) have identified fluency interventions that have shown to be effective for struggling readers at the secondary level.

Most definitions of reading fluency tend to associate it with oral reading. Prosodic or expressive reading, for example, one aspect of fluency, is most often associated with and observed in oral reading. When a reader reads, orally prosody, or a lack of prosody, is clearly apparent. Prosody is not observable during silent reading. Moreover, most instructional methods for fostering fluency in students involve some form of oral reading.

Despite the focus on oral reading for fluency development, all fluency instruction presupposes a link to silent reading and silent reading comprehension (Rasinski, 2003, 2006). More to the point, oral fluency and oral fluency instruction presume that improvements in oral fluency and comprehension will also be manifested in silent reading fluency and silent reading comprehension. Because silent reading is such a ubiquitous form of reading beyond the elementary grades, instruction in oral reading is worthwhile primarily to the extent that it can positively impact readers' silent reading comprehension.

Oral reading instruction does pose some serious practical limitations, however. Because oral reading is not as common a form of reading as silent reading beyond the primary grades,

oral reading may not have the same degree of face validity or authenticity as silent reading. In group instructional settings oral reading is most often done one student at a time; other students in the group usually do not read while another student is reading. Efficiency in the use of time for reading is thus diminished. In addition, oral reading by one student may cause disruptions for other students. Listening to classmates read orally may cause students in a classroom to become distracted and devote less attention to their own reading or learning task. Finally, by the middle grades, fear and embarrassment as a result of miscues made while reading orally can further diminish the effectiveness of oral reading activities and students' confidence in their own reading.

These limitations beg the question, then: is it possible to promote fluency in reading, and thereby improve comprehension, through silent reading instruction? In an initial study into this question Reutzel, Jones, Fawson, and Smith (2008) reported positive results to silent reading fluency instruction. Using an instructional method called scaffolded silent reading (ScSR) with third-grade students, Reutzel and his colleagues found gains in word recognition, reading rate, prosody, and comprehension that were essentially equal to Guided Oral Repeated Reading instruction. Scaffolded silent reading was designed to counter concerns and limitations that have been raised about independent or sustained silent reading (National Reading Panel, 2000). Embedded in the ScSR instructional framework are teacher guidance in selecting appropriately challenging materials, high levels of engagement in reading during time allotted for reading, teacher interaction with students after reading, feedback given to students about the quality and quantity of their reading, and student accountability for the time spent in silent reading.

The present study extends Reutzel and colleague's (2008) work by exploring an approach for improving silent reading fluency, comprehension, and overall reading achievement in students in Grades 4 through 10. More precisely, the present retrospective study tests the effects of a program designed to teach and improve silent reading fluency on the reading comprehension and overall reading achievement of elementary, middle school, and high school students in a large urban school district.

BACKGROUND

This study was conducted in cooperation with Miami–Dade County, Florida, Public Schools to determine the relationship between student participation in a silent reading instructional program and student achievement in Grades 4 through 10, as measured by the FCAT with selected schools in Regions II and III of the Miami–Dade County Public Schools.

The experimental treatment employed in the study was Reading Plus (RP), a computer-based reading fluency and comprehension intervention system that develops silent reading fluency and overall reading proficiency. The purpose of the present study was to test the effects of the experimental treatment designed to improve students' silent reading fluency on Grade 4 through 10 students' silent reading comprehension and overall reading achievement as measured by a standardized test of reading achievement.

METHOD

Subjects

A total of 16,143 students from Grades 4 through 10 in 23 schools in Regions II and III in the Miami–Dade County School System participated in the study; 5,758 students made up the treatment group and the remaining 10,385 students constituted the control group. As the following statistics indicate, both regions have significant populations of minority students: Black (34% of total student population, 2,668 participating students, 2,856 nonparticipating); Latino American (56% of total, 2,703 participating, 6,336 nonparticipating); White (7% of total, 288 participating, 961 nonparticipating). Subpopulations in the sample included learning-disabled (6% of total, 541 participating, 491 nonparticipating) and English-language learner (ELL) students (3% of total, 176 participating, 286 nonparticipating).

The 23 schools were distributed as follows: 11 elementary and 12 middle/secondary. In a number of schools, only those students who scored achievement level 1 or 2 (nonproficient) on the 2006 Reading portion of the FCAT were assigned to RP. In other schools, specific grades or subpopulations were assigned. Most nonparticipating students who engaged in alternative interventions were assigned to Scholastic's *Read 180*, and/or Renaissance Learning's *Accelerated Reader*. Elementary-level students (Grades 4–5) received reading and language arts reading instruction in their regular curriculum.

In all cases, treatment students were those who had (a) completed one or more RP lessons during the 2006–2007 school year and (b) had valid 2006 and 2007 FCAT Reading scores as recorded in the Miami–Dade County Student Information System (SIS). As the data in Table 1 indicate, students who were chosen for the RP intervention were performing significantly lower than their classmates in the control condition.

Procedures

During August of the 2006–2007 school year, teachers in the two regions of the school district were trained on the intent and use of the Reading Plus program and were guided in identifying appropriate students from their classes to participate in the intervention. Implementation began soon after and continued until administration of the 2007 FCAT in early March 2007. Treatment schedules varied within the 23 schools, but most schools followed a schedule of either two 45-minute sessions per week or three 30-minute sessions per week for approximately 6 months. Each RP lesson required approximately 30 minutes to complete. Students who were part of the 45-minute session schedule generally completed more than one guided reading lesson per session.

The RP intervention involved students in a series of online lessons, each approximately 30 minutes in length. A specific sequence of activities is followed during this 30-minute period. The difficulty level of the activities is adjusted as a function of a student's progress. Students complete a reading assessment (Reading Placement Appraisal, RPA) to establish the initial placement level in Reading Plus. The 20-minute placement test assesses independent reading rate, comprehension, and vocabulary to determine the most appropriate starting level. RPA consists of three parts. Part 1 presents students with 100-word selections

followed by a set of literal recall questions. Content difficulty is adjusted according to a student's reading rate and comprehension to ascertain the independent reading level. Part 2 presents 300-word selections followed by a set of diverse comprehension questions to confirm the independent reading level. Part 3 assesses a student's vocabulary. From these an instructional reading level is established and students are placed at appropriate levels within each component of the program. Students continue to be assessed on similar tasks throughout the program, with appropriate adjustments made to the level of activities as a result of their performances on these formative assessments. Students are provided the lessons in individual computer environments.

Each lesson begins with a perceptual accuracy and visual efficiency (PAVE) warm-up. This activity consists of two parts, scan and flash. In the scan activity, students scan the computer screen to count the number of times a target letter or number appears on the screen. The target and other letters or numbers are flashed in a left to right presentation. The presentation speed increases in accordance with the student's proficiency. In the second activity, flash, a series of letters or numbers ranging in length from 2 to 12 depending on the student's placement level is flashed (1/6 of a second per flash). The length of the flash increases in response to the student's ability to correctly recreate the sequence. This warm-up activity aims to increase students' visual perception, attentional skills, and automaticity in the recognition of print. Studies conducted by numerous researchers (e.g., Mirsky, 1999; Torgesen & Hudson, 2006), suggest that one of the defining characteristics of a proficient reader is the ability to sustain attention. According to Pikulski and Chard (2005), "... instant, accurate, and automatic access to all these dimensions of a printed word is the needed fluency that will allow readers to focus their attention on comprehension rather than on decoding" (p. 512).

The next Reading Plus activity, guided reading, provides students with extensive structured silent reading practice in order to build fluency within an authentic reading experience where students read for meaning. During guided reading sessions, students read texts selected from a diverse collection of narrative and expository stories at their instructional reading level. The work of O'Connor and colleagues (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 the struggling readers. O'Connor and colleagues argued that selecting texts of appropriate complexity should be a first step in the design of effective instruction and intervention.

Reading Plus selections are leveled using Spache, Dale-Chall, and Fry readability formulas. RP is programmed to continually and dynamically monitor student performance and progress, adjusting the reading content level to match each student's achievement. In addition, the program uses a mix of instructional formats and scaffolds to further match individualized needs and rates of progress. These include variation of the length of reading segments, number of comprehension questions, use of repeated readings, and the assignment of prereading techniques. Research on fluency development has further demonstrated that struggling and developing readers are the least likely to engage in the effective practice that would provide them the opportunity to integrate the varied reading instruction they receive

(Allington, 2006; Chinn, Waggoner, Anderson, Schommer, & Wilkinson, 1993; Eder & Felmlee, 1984; Hiebert, 1983; Hoffman, 1984). Students are able to progress through RP levels based on several factors. Students must be able to read passages at their current levels with grade-appropriate rates and good comprehension before they are advanced to subsequent levels.

The Reading Plus program contains approximately 600 reading selections ranging from preprimer to adult-level texts, including high content/low readability selections for older struggling students. A wide range of genre includes selections such as, “The Lighthouse Visitor,” a mystery on a 3rd-grade level, a 5th-grade selection about, “How Basketball Was Born,” and a 10th-grade nonfiction selection on “Peer Counseling.” As students progress through the levels, the content becomes increasingly informational. Lesson texts are presented in either a guided or independent manner, each within controlled presentation formats and rate parameters. Following each reading selection are comprehension questions coded for specific comprehension skills including literal understanding, interpretation, analysis, evaluation, and appreciation. The rate at which the text is presented is incrementally increased as a function of students’ comprehension performance on these questions. As students progress through the levels, the texts become progressively more challenging. The intent of the guided reading activities is to provide students with authentic reading experiences that build comprehension and fluency at a level of difficulty that will provide maximum acceleration of progress. Additionally, given that the difficulty of texts was established using the Spache (for primary-level texts) and Dale-Chall (middle grade-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. Torgesen and colleagues (Rashotte, MacPhee, & Torgesen, 2001; Torgesen & Hudson, 2006) argued that limited sight vocabularies are a principle characteristic of students with reading disabilities beyond the initial phase of learning to read.

The guided reading component is followed by a cloze comprehension activity. The cloze activity uses structured context analysis activities to develop comprehension competency. It employs a dual approach that combines focuses on improving students’ comprehension and vocabularies. Each cloze activity requires students to use context to complete the meaning of sentences and passages, thus enhancing comprehension. Students must also derive the meaning of difficult or unfamiliar words by analyzing the information in the surrounding context, thus enhancing vocabulary.

The vocabulary component of the RP lesson format teaches students 240 key vocabulary words per grade level. Students complete contextual word meaning activities on words that were missed in a pretest of the words. Each word is first presented in a sentence that is read orally to the student. Next, the word is used within a paragraph to contextually introduce the word meaning. Finally, students are asked to select the sentences from choices provided that demonstrate proper usage and meaning of the target word. The passage is available for rereading with clues from the passage highlighted after an incorrect response.

Assessments

The FCAT is part of a state-wide initiative to raise academic standards for students in the State of Florida. The FCAT consists of two kinds of tests. The first is a criterion-referenced test (CRT), which measures how well students are meeting the Sunshine State Standards in reading, writing, mathematics, and science. The second is a norm-referenced test (NRT), which permits a comparison of Florida student performance on reading and mathematics with the performance of students nationwide. The NRT used during the time of this study was the Stanford Achievement Test–10). The reading section evaluates students' abilities to understand the meaning of informational and literary passages. Both portions of the FCAT are administered to all students in Grades 3 through 10 and results are reported publicly in summary form. Pretesting occurred during the spring 2006 administration of the FCAT. Post-testing occurred during the spring 2007 administration of the FCAT.

RESULTS

Data Analysis

A $3 \times 7 \times 3 \times 2 \times 2$ (Group \times Grade \times Minority \times ELL \times LD) analysis of variance (ANOVA) was used to test whether differences existed in the simple difference score of the posttest minus the pretest among the groups receiving different levels of treatment. Contrasts were conducted in the ANOVA pertaining to the main effects of grade level, minority status, ELL, and LD identification to examine whether groups differed in their mean gain score across levels of the intervention. To control for multiple statistical tests being employed on the FCAT CRT and NRT on the same sets of students, Benjamini and Hochberg's (1995) linear step up procedure was employed. This procedure differs slightly from other Type 1 error control procedures in that it attempts to control the false discover rate (FDR). In its simplest form, it attempts to keep the ratio of false rejections to total rejections at 5%. Specifically, when all null hypotheses are true, the linear step up procedure will control the experiment-wise error rate at .05 (just as other traditional approaches attempt). However, when some of the null hypotheses are false, the linear step up will ensure that the false rejection rate does not go above 5%. The benefit to this approach is that it appears to be more powerful than traditional approaches such as the Bonferroni correction (Maxwell & Delaney, 2004). In addition to hypothesis testing of means among groups, a standardized effect size (i.e., Cohen's *d*) was used to express the distributional differences in standard deviation units. Cohen (1988) has provided guidelines that suggest that an effect size of 0.20 is small, 0.50 is medium, and 0.80 is large; however, he is quick to note that the qualitative designation for the magnitude of the effect is largely contextual. This has been echoed more recently by Hill, Bloom, Black, and Lipsey (2008), who argued that these guidelines are somewhat inefficient for interpreting achievement or intervention effects in education.

It is important to note that in instances where random assignment does not occur, covarying preexisting differences on the pretest is not necessarily the most appropriate procedure, because variability on baseline scores may be attributed to the lack of random assignment and reflect meaningful initial values (Maxwell & Delaney, 2004). Though some opt to use a posttest-only approach to the analyses of group differences, doing so ignores the value of the baseline score. An alternative strategy is to utilize initial performance to calculate a gain

score that allows a meaningful comparison of change between two time points. Though the difference score has been often maligned as a poor index of change (Cronbach & Furby, 1970), Rogosa (1995) has shown that the gain score is as reliable as a covariance adjusted score and is more appropriate to use in quasi-experimental studies than posttest only. Moreover, it has been well established that results from a one-way ANOVA of gain scores are identical to results from a repeated measures ANOVA with two time points and two groups (Huck & McLean, 1975; Maxwell & Delaney).

A summary of the ANOVA results for the FCAT CRT and NRT are reported in Table 1, with subsequent post hoc data reported for subgroups in Tables 2–7. Results indicated that significant main effects existed for grade level, ELL status, and LD identification, with interactions between grade and group, ELL status and group, and LD identification and group also statistically significant for the FCAT Reading CRT measure. Somewhat similar findings were observed for the NRT analyses, whereby significant effects occurred for grade, ELL status, Grade \times Group, and ELL \times Group.

Table 2 presents FCAT Reading (CRT) Developmental Scale gain scores and SAT-10 gain scores by grade level for all students who participated in 1–39 RP lessons, students who participated in 40 or more RP lessons, and students who received no RP lessons. RP students had significantly greater gains than non-RP students in Grades 5, 6, 7, 8, and 9 on the CRT and in Grades 4, 5, 6, 7, 8, and 10 on the NRT. Students receiving RP intervention experienced significantly greater reading achievement gains than non-RP students at all grade levels on at least one reading achievement measurement (in Grades 5, 6, 7, and 8 significantly greater achievement gains were found on both tests). Effect sizes by grade level ranged from .03 to .34 (small to moderate in magnitude). None of the gain score comparisons of all students (Table 2) demonstrated significantly greater gain scores in favor of the non-RP students. Moreover, the trends in gain scores are worth noting. Students receiving the intermediate number of RP lessons (1–39) tended to have gains that were greater than students receiving no lessons but had gains that were less than students receiving 40 or more lessons. This suggests that the effects of the RP lessons are cumulative—more instruction using RP led to greater gains in reading achievement.

Table 8 presents statewide and district mean developmental scale scores for the criterion referenced test for Grades 4 through 10 statewide and for the individual school district from which the RP schools were drawn. Mean gain scores for statewide and district-level criterion referenced test are also presented. The mean gain scores for students engaged in the RP intervention for 40 or more lessons (Table 2) were greater than the statewide and district level gains (Table 8) at every grade level for which a comparison was possible. Moreover, mean gain scores for students engaged in the RP intervention for 1–39 lessons (Table 2) also were greater than that the statewide and district level gains (Table 8) at every grade level except for Grade 5.

Tables 3 through 7 report FCAT Reading (CRT) Developmental Scale gain scores and SAT-10 gain scores by grade level for African American (Table 3), Latino American (Table 4), White (Table 5), learning-disabled (Table 6), and ELL (Table 7) students. Aside from the

ELLs, the data indicate that students receiving RP instruction made generally greater gains on the FCAT Criterion Referenced Test and the NRT test than students not receiving RP.

DISCUSSION

The present retrospective study examined the effects of a silent reading fluency and proficiency intervention system on the comprehension and overall reading achievement of students in Grades 4 through 10 in a large urban school district. Results indicated that students participating in the program for a minimum of 40 lessons (20 hours of instruction) over approximately 6 months made significantly greater gains on both the criterion-referenced and norm-referenced reading tests that are part of the Florida Comprehensive Achievement Test than students who did not participate in the program. Students participating in the program also demonstrated gains on the criterion-referenced reading test that were greater than the mean gains for the state and district level. The gains were found generally in all grade levels studied and in all subpopulations except for ELLs. Moreover, greater involvement in the RP intervention was associated with greater gains for students.

In many cases the gains were not only statistically significant with substantive effect sizes; the contrasts between RP and non RP groups provided interesting information regarding the magnitude of performance differences. For example, in Grades 6, 7, and 8 the mean gains on the CRT portion of the FCAT were more than double the gains of nonparticipating students. For the same grade levels, gains on the norm-referenced test (SAT-10) by the RP intervention students were 55, 82, and 60% greater than nonparticipating students.

Comments made by principals, teachers, and other educators in the schools that participated in the study were close to universally positive in support of the intervention system. Teachers and administrators using RP noticed the positive impact the program had on student achievement and attitudes toward learning.

The results of the study suggest that reading programs such as RP that are aimed at improving silent reading fluency and proficiency through extensive, focused, wide, and repeated reading in which students are held accountable for their work can have a significant and substantial positive effect on student reading comprehension and overall reading achievement.

Positive results were also demonstrated for various subpopulations often considered at risk for reading difficulties. African American, Latino American, special education, and learning-disabled students who participated in the RP intervention generally demonstrated significantly and substantially greater gains in measures of reading achievement on both the CRT and NRT portions of the FCAT than students not participating in the intervention.

The only students who did not appear to benefit from the RP intervention were ELLs (Table 7). ELL students in Grades 4, 5, 6, 7, and 8 did not appear to benefit from RP. The best explanation for this lack of positive effects may lie in the fact that ELL students more than any other subpopulation of students are in the process of learning a new language, particularly the sounds of the language. Until the oral form of English becomes familiar and word decoding skills are mastered, ELL students may find oral reading where they hear and

decode the written language into its oral form most beneficial. It is also worth noting that in the present study the sample size of ELL students was relatively small.

Aside from ELL students, however, the RP intervention, and, we assume, similar silent reading fluency and comprehension programs hold great potential for significantly improving student reading achievement at a variety of grade levels. The results of the study also suggest that although fluency is normally considered within the domain of oral reading, silent reading fluency is a salient concept in reading. Moreover, the study suggests that instruction aimed at improving silent reading fluency can have similarly positive effects on reading achievement as oral reading instruction, without some of the limitations that are associated with oral reading.

A third finding from the study supports previous work by Rasinski et al. (2005) and Rasinski et al. (2009) that indicates that reading fluency is an important goal for reading instruction beyond the primary grades. In the previous work cited, Rasinski and his colleagues noted that reading fluency continues to be an important predictor of reading achievement in the upper elementary through secondary grade levels and that significant numbers of students have not attained sufficient levels of fluency in their reading. The present study demonstrates that instruction in fluency, albeit silent reading fluency, for students beyond the primary grades can result in positive outcomes in reading comprehension and overall reading achievement. Though current interest in reading seems to be shifting to helping middle and secondary school students improve their reading comprehension and achievement, the present study suggests that fluency-oriented instruction has great potential for making this goal a reality.

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Table 1

ANOVA Results for Florida CRT and NRT Outcomes

Measure	Source	<i>df</i>	<i>F</i>	<i>p</i> value
CRT	Grade	6	68.94	<.001
	Minority	2	3.35	.035
	ELL	1	88.31	<.001
	LD	1	3.89	.032
	Group	2	4.14	.160
	Grade × Group	12	3.29	<.001
	Minority × Group	4	0.62	.649
	ELL × Group	2	8.92	<.001
	LD × Group	2	3.11	.044
	Error	7,538		
NRT	Grade	6	133.79	<.001
	Minority	2	0.69	.503
	ELL	1	6.61	.010
	LD	1	3.22	.079
	Group	2	0.33	.721
	Grade × Group	12	2.07	.016
	Minority × Group	4	1.55	.184
	ELL × Group	2	4.50	.011
	LD × Group	2	2.54	.095
	Error	7,897		

Note. *p* Values reflect linear step up adjustments.

Table 2

Gain Scores on the FCAT Reading Developmental Scale Scores (Criterion-Referenced Test) and SAT-10 (Norm-Reference Test) for all Students Receiving 40+ Lessons of the RP Intervention Versus Students Receiving No RP Lessons

Measure	Grade	No Lessons			1-39 Lessons			40+ Lessons			Contrast			Effect Size		
		N	M	SD	N	M	SD	N	M	SD	F	p Value	d1	d2	d3	
CRT	4	529	158.75	224.69	461	162.18	220.81	340	181.42	200.85	2.05	.160	0.02	0.09	0.10	
	5	449	71.43	216.53	393	78.37	200.07	364	117.46	209.16	9.32	.006	0.03	0.20	0.21	
	6	1,423	48.03	216.19	563	80.45	237.77	217	130.06	240.08	28.60	.002	0.15	0.21	0.38	
	7	1,256	46.27	199.35	508	109.19	212.73	307	157.78	212.40	88.25	.002	0.32	0.23	0.56	
	8	1,546	44.76	180.50	502	128.45	195.77	403	137.20	185.51	113.58	.002	0.46	0.04	0.51	
	9	2,803	66.48	190.09	406	84.31	202.17	328	107.23	203.30	14.85	.002	0.09	0.11	0.21	
	10	2,379	33.78	215.55	521	22.70	207.14	445	20.39	182.12	2.16	.160	-0.05	-0.01	-0.06	
	NRT	4	528	5.05	26.17	459	7.04	24.07	337	11.74	21.82	14.76	.002	0.08	0.19	0.26
		5	445	13.60	22.10	391	20.33	25.03	360	21.19	23.40	21.94	.002	0.30	0.03	0.34
		6	1,416	11.36	24.35	560	11.77	23.05	217	17.06	23.62	8.78	.006	0.02	0.25	0.26
7		1,239	5.06	23.21	497	5.64	22.60	303	9.22	22.37	6.66	.024	0.02	0.16	0.18	
8		1,530	7.46	25.13	482	10.20	25.68	393	11.97	22.57	12.25	.002	0.11	0.07	0.18	
9		2,719	13.06	28.12	383	7.12	31.47	324	14.17	27.01	0.86	.363	-0.21	0.22	0.04	
10		2,267	0.45	29.29	465	6.60	28.15	415	8.24	24.16	35.95	.002	0.21	0.06	0.27	

Note. p Values reflect linear step up adjustments.

Table 3

Gain Scores on the FCAT Reading (CRT) Developmental Scale Scores for African American Students Receiving 40+ Lessons of the RP Intervention Versus Students Receiving No RP Lessons

Measure	Grade	No Lessons			1-39 Lessons			40+ Lessons			ANOVA		Effect Size			
		N	M	SD	N	M	SD	N	M	SD	F	p Value	d1	d2	d3	
CRT	4	263	147.01	243.59	234	133.47	224.47	162	176.31	211.79	1.19	.310	-0.06	0.19	0.12	
	5	158	69.93	229.94	193	60.77	194.51	235	90.20	204.82	1.14	.310	-0.04	0.15	0.09	
	6	480	12.77	203.35	267	38.50	223.58	113	89.80	229.47	11.87	.003	0.13	0.23	0.38	
	7	310	34.55	160.09	234	100.80	199.30	167	143.91	211.69	40.30	.003	0.41	0.22	0.68	
	8	447	28.85	172.17	211	95.86	201.78	208	126.10	180.07	45.38	.003	0.39	0.15	0.56	
	9	760	52.08	182.64	110	50.77	235.27	113	85.08	217.77	2.22	.200	-0.01	0.15	0.18	
	10	465	16.62	227.29	195	13.69	221.68	226	-4.59	186.62	1.33	.310	-0.01	-0.08	-0.09	
	NRT	4	236	7.47	27.75	232	4.78	24.69	161	13.39	21.77	3.96	.092	-0.10	0.35	0.21
		5	155	14.92	22.40	193	20.77	25.26	232	19.43	24.11	1.62	.172	0.26	-0.05	0.20
		6	475	10.46	24.18	266	9.25	21.70	113	17.12	22.76	3.69	.093	-0.05	0.36	0.28
7		311	1.64	22.63	228	6.25	22.11	165	10.20	21.58	16.84	.030	0.20	0.18	0.38	
8		439	7.37	24.22	200	7.70	23.96	205	14.61	21.35	11.42	.003	0.01	0.29	0.30	
9		740	13.53	25.38	108	8.58	30.08	110	14.54	24.47	0.10	>.500	-0.19	0.20	0.04	
10	436	1.56	27.89	170	10.72	27.63	210	8.13	22.40	11.67	.003	0.33	-0.09	0.24		

Note. *p* Values reflect linear step up adjustments.

Table 4

Gain Scores on the FCAT Reading (CRT) Developmental Scale Scores for Latino American Students Receiving 40+ Lessons of the RP Intervention Versus Students Receiving No RP Lessons

Measure	Grade	No Lessons			1-39 Lessons			40+ Lessons			ANOVA			Effect Size		
		N	M	SD	N	M	SD	N	M	SD	F	p Value	d1	d2	d3	
CRT	4	261	172.09	208.66	206	194.21	206.21	160	183.09	192.18	0.46	.500	0.11	-0.05	0.05	
	5	257	63.47	204.15	189	93.24	207.88	110	181.68	215.96	22.63	.002	0.15	0.43	0.58	
	6	842	70.66	217.61	271	124.06	240.62	94	167.21	248.43	23.34	.002	0.25	0.18	0.44	
	7	802	49.42	217.78	218	118.21	226.99	120	171.46	223.43	42.11	.002	0.32	0.23	0.56	
	8	935	58.07	186.99	245	165.63	184.04	175	151.53	195.10	66.74	.002	0.58	-0.08	0.50	
	9	1,686	70.17	198.09	259	95.46	188.81	178	120.52	202.56	12.93	.002	0.13	0.13	0.25	
	10	1,553	35.92	218.24	288	21.57	193.29	190	45.94	176.45	0.01	.500	-0.07	0.13	0.05	
	NRT	4	260	3.89	24.78	206	9.68	22.80	158	10.46	22.11	8.87	.007	0.23	0.03	0.26
		5	256	12.34	22.45	187	19.80	24.74	109	25.79	20.77	28.89	.002	0.33	0.24	0.60
		6	839	11.69	24.49	269	14.45	23.09	94	17.13	24.54	6.01	.061	0.11	0.12	0.22
7		786	6.80	23.64	215	5.17	23.54	119	8.66	23.44	0.07	.500	-0.07	0.15	0.08	
8		927	7.52	25.64	237	11.96	26.98	168	8.93	23.04	2.18	.163	0.17	-0.11	0.06	
9		1,626	11.95	29.26	238	6.82	32.10	177	13.59	28.49	0.20	.651	-0.18	0.21	0.06	
10		1,484	1.42	29.70	259	5.31	28.53	178	8.08	25.68	10.84	.002	0.13	0.10	0.22	

Note. p Values reflect linear step up adjustments.

Table 5

Gain Scores on the FCAT Reading (CRT) Developmental Scale Scores for White Students Receiving 40+ Lessons of the RP Intervention Versus Students Receiving No RP Lessons

Measure	Grade	No Lessons			1-39 Lessons			40+ Lessons			ANOVA		Effect Size			
		N	M	SD	N	M	SD	N	M	SD	F	p Value	d1	d2	d3	
CRT	4	20	120.05	220.68	15	180.47	299.45	9	216.89	201.07	1.11	.500	0.27	0.12	0.44	
	5	25	101.68	200.66	9	116.78	129.20	11	118.27	115.22	0.09	.500	0.08	0.01	0.08	
	6	65	53.82	249.75	21	11.76	273.90	6	307.33	165.52	1.70	.500	-0.17	1.08	1.02	
	7	131	49.97	166.95	35	67.26	212.11	18	189.72	141.61	8.08	.032	0.10	0.58	0.84	
	8	118	6.92	156.06	33	81.88	214.94	16	113.19	148.35	8.90	.032	0.48	0.15	0.68	
	9	302	78.11	158.26	31	107.10	178.94	32	132.28	149.32	3.98	.185	0.18	0.14	0.34	
	10	300	38.62	177.59	30	39.43	176.71	22	50.50	172.80	0.07	.500	0.00	0.06	0.07	
	NRT	4	20	-3.65	22.59	15	4.53	26.40	9	5.11	22.03	1.07	.500	0.36	0.02	0.39
		5	25	14.88	16.64	9	17.22	25.34	11	19.91	19.19	0.55	.500	0.14	0.11	0.30
		6	66	14.15	24.81	21	7.24	30.40	6	29.17	27.62	0.35	.500	-0.28	0.72	0.61
7		130	2.93	21.40	33	3.61	21.67	17	1.82	22.28	0.01	.500	0.03	-0.08	-0.05	
8		119	7.01	23.67	32	6.78	23.02	16	7.69	25.38	0.01	.500	-0.01	0.04	0.03	
9		298	16.92	28.46	30	0.80	33.94	32	16.69	29.11	1.20	.500	-0.57	0.47	-0.01	
10	288	-4.87	28.03	27	-4.11	22.11	20	11.80	23.36	5.41	.032	0.03	0.72	0.59		

Note. *p* Values reflect linear step up adjustments.

Table 6

Gain Scores on the FCAT Reading (CRT) Developmental Scale Scores for Learning-Disabled Students Receiving 40+ Lessons of the RP Intervention Versus Students Receiving No RP Lessons

Measure	Grade	No Lessons			1-39 Lessons			40+ Lessons			ANOVA			Effect Size		
		N	M	SD	N	M	SD	N	M	SD	F	p Value	d1	d2	d3	
CRT	4	32	275.44	242.57	39	134.69	383.83	24	166.25	287.98	1.93	.500	-0.58	0.08	-0.45	
	5	23	60.52	399.07	19	53.84	260.44	29	100.72	204.83	0.26	.500	-0.02	0.18	0.10	
	6	67	109.82	243.18	78	-10.95	298.95	20	148.70	288.44	0.48	.500	-0.50	0.53	0.16	
	7	51	131.02	317.02	17	43.82	272.88	18	127.44	276.30	0.08	.500	-0.28	0.31	-0.01	
	8	80	92.93	297.24	74	157.54	206.27	31	117.03	249.77	0.76	.500	0.22	-0.20	0.08	
	9	149	48.01	256.80	62	42.37	279.07	22	75.91	130.70	0.09	.500	-0.02	0.12	0.11	
	10	89	-29.31	276.77	85	-18.89	284.61	23	-47.74	217.10	0.01	.500	0.04	-0.10	-0.07	
	NRT	4	90	-3.52	27.86	44	-1.20	26.27	7	-1.43	17.16	0.30	.500	0.08	-0.01	0.08
		5	69	12.39	25.22	51	18.12	27.19	28	28.71	26.90	1.21	.500	0.23	0.39	0.65
		6	282	11.83	28.00	40	8.05	24.37	7	19.71	31.92	0.11	.500	-0.14	0.48	0.28
7		270	5.45	23.36	115	1.80	21.94	11	17.18	16.35	0.57	.500	-0.16	0.70	0.50	
8		384	7.49	25.39	58	4.31	32.33	12	7.75	21.35	6.35	.083	-0.13	0.11	0.01	
9	414	20.30	30.30	20	9.85	22.93	5	17.20	28.01	0.02	.500	-0.35	0.32	-0.10		
10	445	-9.16	25.75	22	13.55	28.10	19	2.63	26.49	0.67	.500	0.88	-0.39	0.46		

Note. *p* Values reflect linear step up adjustments.

Gain Scores on the FCAT Reading Developmental (CRT) Scale Scores for English-Language Learners Receiving 40+ Lessons of the RP Intervention Versus Students Receiving No RP Lessons

Table 7

Measure	Grade	No Lessons			1-39 Lessons			40+ Lessons			ANOVA			Effect Size		
		N	M	SD	N	M	SD	N	M	SD	F	p Value	d1	d2	d3	
CRT	4	25	466.72	388.73	27	296.81	284.58	14	276.79	162.04	4.18	.043	-0.44	-0.07	-0.49	
	5	16	284.38	504.17	37	137.76	316.82	23	247.74	278.86	0.01	.500	-0.29	0.35	-0.07	
	6	65	308.68	315.45	18	184.39	364.18	11	164.18	214.91	3.22	.102	-0.39	-0.06	-0.46	
	7	89	263.81	286.30	7	247.00	390.93	15	253.00	261.51	0.03	.500	-0.06	0.02	-0.04	
NRT	8	91	198.20	274.16	7	129.57	250.81	17	252.71	176.50	0.36	.500	-0.25	0.49	0.20	
	4	26	24.12	24.97	27	23.81	15.30	14	17.00	20.70	0.01	.500	-0.01	-0.45	-0.28	
	5	16	8.69	24.48	37	22.70	27.43	22	32.68	21.70	0.77	.500	0.57	0.36	0.98	
	6	64	25.59	28.55	18	21.61	19.48	11	24.18	30.11	0.24	.500	-0.14	0.13	-0.05	
7	89	19.87	24.03	7	33.57	27.57	15	12.07	12.07	2.53	.500	0.57	-0.78	-0.32		
	8	92	15.20	31.13	6	-6.33	20.87	16	10.06	10.06	0.23	.500	-0.69	0.79	-0.16	

Note. *p* Values reflect linear step up adjustments.

Table 8

Dade County Reading Mean Development Scale Scores (DSS; Criterion-Referenced Test)

Grade	Mean 2006 DSS	Mean 2007 DSS	Mean DSS Gain
4	1,554 (1,573)	1,393 (1,420)	161 (154)
5	1,618 (1,659)	1,537 (1,557)	81 (101)
6	1,644 (1,694)	1,583 (1,624)	61 (70)
7	1,773 (1,801)	1,694 (1,722)	79 (78)
8	1,814 (1,862)	1,730 (1,786)	84 (76)
9	1,851 (1,912)	1,789 (1,844)	62 (68)
10	1,881 (1,947)	1,864 (1,931)	17 (16)

Note. Values in parentheses are statewide mean reading development scale scores.

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