

# Effectiveness of Selected Supplemental Reading Comprehension Interventions: Findings from Two Student Cohorts

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## **DISCLOSURE OF POTENTIAL CONFLICTS OF INTEREST**

The research team for this evaluation consists of a prime contractor, Mathematica Policy Research, and two major subcontractors: RG Research Group and RMC Research Corporation. None of these organizations or their key staff members have financial interests that could be affected by findings from the study. None of the members of the Technical Working Group, convened by the research team to provide advice and guidance, have financial interests that could be affected by findings from the study.

## EXECUTIVE SUMMARY

### EFFECTIVENESS OF SELECTED SUPPLEMENTAL READING COMPREHENSION INTERVENTIONS: FINDINGS FROM TWO STUDENT COHORTS

Improving the ability of disadvantaged students to read and comprehend text is an important element in federal education policy aimed at closing the achievement gap. Title I of the No Child Left Behind Act (NCLB) calls on educators to close the gap between low- and high-achieving students using approaches that scientifically based research has shown to be effective. Such rigorous research is relatively scarce, however, so it is difficult for educators to determine how best to use Title I funds to improve student outcomes. Identifying interventions that improve reading comprehension is part of this challenge.

There are increasing cognitive demands on student knowledge in middle elementary grades where students become primarily engaged in reading to learn, rather than learning to read (Chall 1983). Children from disadvantaged backgrounds often lack general vocabulary, as well as vocabulary related to academic concepts that enable them to comprehend what they are reading and acquire content knowledge (Hart and Risley 1995). They also often do not know how to use strategies to organize and acquire knowledge from informational text in content areas such as science and social studies (Snow and Biancarosa 2003). Instructional approaches for improving comprehension are not as well developed as those for decoding and fluency (Snow 2002). Although multiple techniques for direct instruction of comprehension in narrative text have been well demonstrated in small studies, there is not as much evidence on the effectiveness of teaching reading comprehension within content areas (National Institute of Child Health and Human Development 2000).

The Institute of Education Sciences (IES) of the Department of Education (ED) has undertaken a rigorous evaluation of curricula designed to improve reading comprehension as one step toward meeting that research gap. In 2004, ED contracted with Mathematica Policy Research and its subcontractors to conduct the study.<sup>1</sup> The study team worked with ED to refine the study design and select the curricula to be tested, and then recruited districts and schools, collected data on implementation and outcomes in two consecutive school years, and analyzed the data. The study was conducted based on a rigorous experimental design for assessing the effects of four reading comprehension curricula on reading comprehension in selected districts across the country, where schools were randomly assigned to use one of the four treatment curricula in their fifth-grade classrooms or to a control group. The four curricula included in the study are: (1) Project CRISS, developed by CRISS (Santa et al. 2004), (2) ReadAbout, developed by Scholastic (Scholastic 2005), (3) Read for Real, developed by Chapman University and Zaner-Bloser (Crawford et al. 2005), and (4) Reading for Knowledge, developed by the Success for All Foundation (Madden and Crenson 2006).

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<sup>1</sup>These subcontractors were RMC Research Corporation, RG Research Group, the Vaughn Gross Center for Reading and Language Arts at the University of Texas at Austin, the University of Utah, and Evaluation Research Services.

The experimental design ensures a valid basis for answering the study’s key research questions:

1. What is the impact of the reading comprehension curricula as a whole on reading comprehension, and how do the impacts of the individual curricula compare to one another?
2. How are student, teacher, and school characteristics related to impacts of the curricula?
3. Which instructional practices are related to impacts of the curricula?
4. What is the impact of the curricula on students one year after the end of the intervention implementation?
5. Are impacts larger after schools and teachers have had one year of experience with the curricula?

The study’s first report—based on the first year of data collected in 2006-2007 for the first cohort of fifth-grade students and released in May 2009 (James-Burdumy et al. 2009)—focused on the first three research questions. The findings indicated that, after one school year, there were no statistically significant positive impacts of the interventions, based on comparisons of fifth-grade student test scores in schools that were randomly assigned to use the interventions and schools that were randomly assigned to not use the interventions. Four statistically significant negative impacts of the curricula were observed. There was no clear pattern to the relationship between student, teacher, and school characteristics and the effectiveness of the interventions.

#### SECOND YEAR STUDY COMPONENTS AT A GLANCE

- **Fifth-grade component** – In this component, a second cohort of fifth-grade students from a subset of the study’s original schools was added to the study, maintaining the original treatment assignments. Fifth-grade teachers in treatment schools implemented their assigned interventions and fifth-grade teachers in control schools continued teaching reading using methods they would have used in the absence of the study. Pre-tests and post-tests administered to students were used to assess the impact of the interventions on the second cohort of students. The rationale for including this component in the study is that impacts may be larger after schools and teachers have had one year of experience using the curricula.
- **Sixth-grade component** – In this component, the first cohort of students (all but 64 of whom were in sixth grade in the study’s second year) was tracked for one additional year and follow-up tests were administered at the end of the school year to assess whether the interventions had statistically significant impacts one year after the end of their implementation. Fourteen sixth-grade students (0.2 percent) had the same teacher in sixth grade as in fifth grade, but the study interventions were *not* implemented in the second year when first cohort students were in sixth grade. There are two main rationales for including this component in the study: (1) it is possible that impacts of the interventions could emerge in the second year even after the intervention implementation has ended and (2) to examine whether the negative effects of Reading for Knowledge observed in the first year continued into the second year.

This report focuses on the fourth and fifth research questions, based on a second year of data collected for the study. The second year of the study focuses on (1) the impact of the interventions on Cohort 2 fifth-graders after one school year of implementation and (2) the impact of the interventions on Cohort 1 sixth graders one year *after the end* of the intervention implementation. In particular, it presents findings related to whether the curricula had an impact on students one year after the end of the intervention implementation based on follow-up student assessment data collected in spring 2008 for the first cohort of students (enrolled in the study in the 2006-2007 school year). The component of the study addressing this research question is referred to as the sixth-grade component of the second year of the study throughout the report (see box). This report also presents findings related to whether impacts are larger after *teachers* and *schools* had one year of experience using the curricula (the distinction between teachers and schools is due to mobility of teachers – some teachers in the second year are new to the study schools, but they might still benefit from the experience of their colleagues who had previously implemented the curricula). These findings are based on data collected for a second cohort of fifth-grade students (enrolled in the study in the 2007-2008 school year, after treatment schools, and some treatment teachers, had one year of experience using the curricula). The component addressing this research question is referred to as the fifth-grade component of the second year of the study throughout the report.

The main findings are:

- **The curricula did not have an impact on students one year after the end of their implementation.** In the second year, after the first cohort of students was no longer using the interventions, there were no statistically significant impacts of any of the four curricula.
- **Impacts were not statistically significantly larger after schools had one year of experience using the curricula.** Impacts for the second cohort of students were not statistically significantly different from zero or from the impacts for the first cohort of students. (Treatment students in the *second* cohort attended schools that had one prior year of experience using the study curricula, while treatment students in the *first* cohort attended schools with no prior experience using the study curricula. Reading for Knowledge was not implemented with the second cohort of students.)
- **The impact of one of the curricula (ReadAbout) was statistically significantly larger after teachers had one year of experience using the curricula.** There was a positive, statistically significant impact of ReadAbout on the social studies reading comprehension assessment for second-cohort students taught by teachers who were in the study both years (effect size: 0.22). This impact was statistically significantly larger than the impact for first-cohort students taught by the same teachers in the first year of the study.

In summary, our findings do not support the hypothesis that these four supplemental reading comprehension curricula improve students' reading comprehension, except when ReadAbout teachers have had one prior year of experience using the ReadAbout curriculum.

## Curricula Included in the Second Study Year

The curricula included in the two second-year study components differed. The design of the study did not call for the interventions to be implemented in the sixth-grade component of the study, and, indeed, the interventions were not implemented in that component.<sup>2</sup> Rather, the design called for following first-cohort students for one additional year after the *end* of the implementation of the interventions in the study's first year, to assess whether implementation in the study's first year had longer-term effects on students' outcomes (measured in the study's second year when first-cohort students were in sixth grade). Therefore, the sixth-grade component focused on examining the impacts of the interventions implemented in the study's first year, which include Project CRISS (developed by CRISS) (Santa et al. 2004), ReadAbout (developed by Scholastic) (Scholastic 2005), Read for Real (developed by Chapman University and Zaner-Bloser) (Crawford et al. 2005), and Reading for Knowledge (developed by the Success for All Foundation) (Madden and Crenson 2006).

Three of the four curricula (Project CRISS, ReadAbout, and Read for Real) were included in the fifth-grade component of the second year, which involves a new cohort of fifth-grade students. Reading for Knowledge was not included in this component because 9 of the 18 schools that had been assigned to implement Reading for Knowledge elected not to continue implementing the intervention in the second year.

## Study Design

The study's second year (2007-2008) design builds on the study's first year design (2006-2007). Before the start of the first year, schools in districts that agreed to participate were randomly assigned to one of the five study arms (four intervention groups and one control group). In both years of the study, fifth-grade teachers in schools assigned to an intervention group developed their own strategies for incorporating the assigned reading comprehension curriculum into their daily schedules and their core reading instruction. (The curricula being evaluated in this study were designed to supplement—not replace—the core curriculum being used by each teacher.) Teachers in control group schools continued to teach reading using whatever methods they had been using before the study began. Due to the experimental design, differences in outcomes of students in the treatment and control groups are attributable to the curricula being tested.<sup>3</sup>

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<sup>2</sup>Thirty percent of sixth-grade students attended the same school in sixth grade as they did in fifth grade (because their school's grade structure included sixth grade). Very few sixth-grade students (0.2 percent) had the same teacher in sixth grade as in fifth grade. As noted above, none of the sixth-grade students received instruction in the study interventions in sixth grade.

<sup>3</sup>The study design just discussed is also described in James-Burdumy et al. (2006). Early study design proposals are laid out in Glazerman and Myers (2004).

## SUMMARY OF FIRST- AND SECOND-YEAR EVALUATION DESIGN

### Intervention:

- **First Year:** Four reading comprehension curricula (Project CRISS, ReadAbout, Read for Real, and Reading for Knowledge) were implemented with first-cohort students.
- **Second Year:**
  - **First-cohort students:** Interventions were *not* implemented with first-cohort students.
  - **Second-cohort students:** Due to attrition of schools assigned to the Reading for Knowledge group, only three curricula (Project CRISS, ReadAbout, and Read for Real) were implemented with second-cohort students.

### Participants:

- **First Year:** 10 districts, 89 schools, 268 teachers, and 6,349 fifth-grade students in the study's first cohort. Districts were recruited from among those with at least 12 Title I schools, and schools were recruited only if they did not already use any of the four selected curricula. Students in those schools were eligible to participate if they were enrolled in fifth-grade classes as of January 1, 2007. Students in combined fourth-/fifth- or fifth-/sixth-grade classes were excluded, as were those with language barriers or in special education classes, although special education students mainstreamed in regular fifth-grade classes were eligible.
- **Second Year:**
  - **First-cohort students:** In the second year, the 6,349 students from the first year attended 252 schools, 176 of which agreed to permit follow-up testing of students.
  - **Second-cohort students:** 10 districts, 61 schools, 182 teachers, and 4,142 fifth-grade students in the study's second cohort. The same eligibility and exclusion restrictions were used with the first and second cohorts of students.

### Research Design:

- **First Year:** Within each district, schools were randomly assigned to an intervention group that would use one of the four curricula or to a control group that did not have access to any of the curricula being tested. Control group teachers could, however, use other supplemental reading programs. The study administered tests to Cohort 1 students near the beginning and end of the 2006-2007 school year, observed classrooms, and collected data from teacher questionnaires, student and school records, and the intervention developers.
- **Second Year:** Schools and students maintained the same treatment (or control) group status in the second year. The study administered tests to Cohort 1 students at the end of the 2007-2008 school year and to Cohort 2 students near the beginning and end of the 2007-2008 school year, observed classrooms, and collected data from teacher questionnaires, student and school records, and the intervention developers. Cohort 2 impact analyses examined the effect of one year of exposure to the interventions after treatment schools and teachers had one year of experience using them. Cohort 1 impact analyses examined the longer-term effects of the implementation of the interventions in the first study year.

**Outcomes:** Impact estimates in both years focused on student reading comprehension test scores.

Schools participating in the fifth-grade component of the study's second year were in the same treatment or control group in the second year as in the first year. Students in the study's sixth-grade component were classified according to their treatment or control status from the study's first year. See box for a summary of the evaluation design.

There were three key distinctions between the first and second years of the study. First, fewer curricula were included in the fifth-grade component of the study's second year due to the attrition of schools assigned to implement Reading for Knowledge. Project CRISS, ReadAbout, and Read for Real were included in this component in the second year, while Reading for

Knowledge was not.<sup>4</sup> Second, fewer schools participated in the fifth-grade component of the study's second year (61 of the 89 schools that participated in the first year continued participating in Year 2).<sup>5</sup> Third, more schools participated in the study's second year than in the first year due to the study's sixth-grade component, in which follow-up tests were administered to Cohort 1 students at the end of the 2007-2008 school year in a total of 176 schools.

This study provides educators with a sense of the effectiveness of these curricula when used by teachers in “real-world” conditions. Although the study team worked to facilitate study activities such as the collection of data in study schools, the developers provided teacher training and follow-up support to teachers throughout the two study years, and teachers and schools could discontinue use of the curricula during the study period if they believed they were ineffective or too challenging to use. Therefore, the study conditions may be comparable to those many districts might face if they implemented these curricula in their schools.

## Collecting Data

Addressing the study questions required information about the curricula and how they were implemented, study participants, and students' performance outcomes. Information about teaching and implementation of the curricula was collected to support an examination of the fidelity of implementation to each curriculum design, the ways the curricula affected more general (non-curriculum-specific) teaching practices related to comprehension and vocabulary instruction, the resources required to implement the curricula, and the way in which the curricula affected teachers' allocation of time during the school day. Data on all three “levels” of study participants—schools, teachers, and students—were collected as a basis for describing their characteristics as they entered the study. Outcomes for the first cohort of students were measured through assessments administered towards the end of the 2006-2007 and 2007-2008 school years. Outcomes for the second cohort of students were measured through assessments administered towards the end of the 2007-2008 school year. More information on the study's key data sources is provided below.

**Information About Teaching and Implementation of the Curricula.** Five data collection activities focused on teachers, teaching, and implementation of the four reading comprehension curricula. Two of these involved classroom observations, conducted in spring 2007 and spring 2008 for two purposes. To support interpretation of the impact estimates, intervention-specific “fidelity” observations of fifth-grade classes taught by treatment group teachers were conducted to determine the extent to which the teachers adhered to the curriculum content and procedures prescribed by each developer. To describe more general teacher practices related to comprehension and vocabulary instruction (as opposed to practices linked to a specific

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<sup>4</sup>Reading for Knowledge was examined as part of the sixth-grade component of the study, because the sixth-grade component focused on examining the longer-term effects of the four curricula implemented in the study's first year with Cohort 1 students (all four study curricula, including Reading for Knowledge, were implemented in the first year).

<sup>5</sup>Of the 28 schools that left the study, 18 were assigned to Reading for Knowledge, 2 were assigned to Project CRISS, 2 were assigned to ReadAbout, 5 were assigned to Read for Real, and 1 was assigned to the control group.

intervention) and determine whether these practices were correlated with intervention impacts, Expository Reading Comprehension (ERC) observations were carried out in both treatment and control group fifth-grade classrooms to record the frequency with which teachers engaged in behaviors that research suggests are effective comprehension and vocabulary teaching practices. The third data collection activity that addressed the implementation of the curricula was a survey of developers on the cost of their curriculum to school districts. The fourth data collection activity related to teaching was a survey of fifth-grade teachers in the study's second year, administered to collect data on the amount of time students spent using informational text in a typical week. The last data collection activity related to teaching was a time allocation form administered to fifth-grade teachers in the second study year to collect data on teachers' allocation of time during the school day.

To help summarize the large amount of ERC observation data collected on general (non-intervention-specific) teaching practices related to comprehension and vocabulary instruction, the following three summary scales were created (for details on these scales, see Chapter II and Appendix F):

- ***Traditional Interaction.*** This scale captures interactive teaching practices, primarily focused on vocabulary instruction and drawing inferences from text, that have been in use for many decades in American schools (Durkin 1978-1979; Brophy and Evertson 1976).
- ***Reading Strategy Guidance.*** This scale captures teachers' use of aspects of strategy instruction (such as using text structure and generating summaries to improve comprehension) to build students' comprehension ability.
- ***Classroom Management and Student Engagement.*** This scale captures teaching practices related to the management of student behavior and students' engagement.

**Data on Teacher Characteristics.** The fifth-grade Teacher Survey, conducted in early fall 2006, was used to create two scales for examining the relationship between teacher characteristics and impacts (see Appendix F for details):

- ***School Professional Culture.*** The School Professional Culture scale is intended to capture conditions in schools that affect the quality of instruction (Consortium on Chicago School Research 1999; Carlisle 2003). The scale's 35 items—which were included in the Teacher Survey developed for this study—reflect teachers' perceptions of the culture in their school, including relationships with colleagues, access to professional development, experiences with changes being implemented in their school, and leadership support in their school.
- ***Teacher Efficacy.*** The Teacher Efficacy scale is intended to capture teachers' ability to benefit from professional development (Sparks 1988; permission to use scale provided by Hoy and Woolfolk 1993). The scale's 12 items, included in the Teacher Survey developed for this study, ask about teachers' attitudes concerning student engagement, instructional strategies, and classroom management.

**Data on Students’ Baseline Achievement Levels.** Two student assessments administered at the start of the 2006-2007 and 2007-2008 school years allowed the study team to characterize the achievement level of the two cohorts of study students at baseline:

- **Passage Comprehension subtest of the Group Reading Assessment and Diagnostic Evaluation (GRADE).** This assessment, published by Pearson Learning Group, measures a student’s ability to comprehend text passages (Williams 2001).
- **Test of Silent Contextual Reading Fluency (TOSCRF).** This assessment yields a score that reflects skills such as word identification, word meaning, and sentence structure, all of which are important skills for reading comprehension (Hammill et al. 2006).

**Data on Student Outcomes.** Data on students’ post-test outcomes were collected from two sources at the end of the fifth-grade year (spring 2007 for Cohort 1 and spring 2008 for Cohort 2). First, students were retested using the GRADE (Williams 2001). In addition, students were tested for comprehension of social studies and science informational text, using assessments specially developed by the Educational Testing Service (ETS) for the study (Educational Testing Service 2007a and 2007b). To reduce burden, half the students were randomly assigned to take the science test and half to take the social studies test. Data on students’ follow-up outcomes were collected from these same assessments at the end of the sixth-grade year (spring 2008) for the first cohort of students.

	Cohort 1 Students	Cohort 2 Students
Study Year 1 (2006-2007 school year)	<ul style="list-style-type: none"> <li>• Cohort 1 students enter study as fifth graders</li> <li>• Interventions implemented with Cohort 1 treatment students</li> <li>• Administer pre-tests and post-tests</li> </ul>	<ul style="list-style-type: none"> <li>• Not yet included in study</li> </ul>
Study Year 2 (2007-2008 school year)	<ul style="list-style-type: none"> <li>• Cohort 1 students remain in study as sixth graders</li> <li>• Interventions are not implemented with Cohort 1 students</li> <li>• Administer follow-up tests</li> </ul>	<ul style="list-style-type: none"> <li>• Cohort 2 students enter study as fifth graders</li> <li>• Interventions implemented with Cohort 2 treatment students</li> <li>• Administer pre-tests and post-tests</li> </ul>

### Summary of Findings from the Study’s First Year

The key findings from the first year of the study focus on curriculum implementation and impacts on student achievement. The implementation analyses document treatment teachers’ training and feelings of preparedness to implement the curricula, adherence to their assigned curriculum, and teaching practices observed among teachers in the treatment and control group classrooms. The impact analyses examine how student outcomes were affected by the curricula and how the impacts relate to conditions and practices in study schools and classrooms. The key findings from the first year of the study were:

- **At the time of the classroom observations in spring 2007, over 80 percent (81 to 91 percent) of treatment teachers reported using their assigned curriculum.** Eighty-one percent of Read for Real teachers, 83 percent of Reading for Knowledge teachers, 87 percent of ReadAbout teachers, and 91 percent of Project CRISS teachers reported using their assigned curriculum.
- **Classroom observation data from the first year of intervention implementation showed that teachers implemented 55 to 78 percent of the behaviors deemed important by the developers for implementing each curriculum.** ReadAbout and Project CRISS teachers implemented, on average, 71 and 78 percent of such behaviors, respectively. Reading for Knowledge teachers implemented 58 and 65 percent of the behaviors deemed important for the two types of instructional days that are part of the curriculum. Finally, Read for Real teachers implemented 55 and 71 percent of the behaviors deemed important for the two types of instructional days that are part of that curriculum.
- **Two of three teacher practice scales were not statistically significantly different between the treatment and control groups.** There were no statistically significant differences in the Reading Strategy Guidance and Classroom Management and Student Engagement scales. Scores on the third scale, Traditional Interaction, were statistically significantly lower for the treatment group than the control group (effect size: -0.52).
- **No statistically significant positive impacts of the curricula on student outcomes were observed in the study's first year.** Reading comprehension test scores were not statistically significantly higher in schools using the selected reading comprehension curricula than in control schools.
- **There was some evidence of statistically significant negative impacts on student test scores in the study's first year.** The treatment group as a whole scored lower than the control group on the GRADE assessment (effect size: -0.08), and the Reading for Knowledge group scored lower than the control group on the ETS science comprehension assessment (effect size: -0.21). On the composite test score, the treatment group as a whole scored lower than the control group and the Reading for Knowledge group scored lower than the control group (effect sizes: -0.08 and -0.14, respectively).

### **Summary of Implementation Findings from the Study's Second Year**

The second year implementation analyses focused on documenting treatment teachers' training, adherence to their assigned curriculum, teaching practices observed among teachers in the treatment and control group classrooms, and understanding teachers' allocation of time during the school day. The key implementation findings from the study's second year are:

- **During summer and early fall 2007, 50 to 91 percent of treatment teachers were trained to use the curricula.** Fifty percent of Read for Real teachers, 89 percent of Project CRISS teachers, and 91 percent of ReadAbout teachers were trained in the use of the curricula.

- **In the spring of the second year of the study, over 80 percent (83 to 96 percent) of treatment teachers reported using their assigned curriculum.** Eighty-three percent of Read for Real teachers, 92 percent of Project CRISS teachers, and 96 percent of ReadAbout teachers reported using their assigned curriculum. The percentage of teachers who reported using each of the three interventions did not differ significantly between the first and second years.
- **Classroom observation data from the second year of intervention implementation showed that teachers implemented 65 to 94 percent of the behaviors deemed important by the developers for implementing each curriculum.** Project CRISS and ReadAbout teachers implemented, on average, 65 and 94 percent of such behaviors, respectively, and Read for Real teachers implemented 75 and 76 percent of the behaviors deemed important for the two types of instructional days that are part of that curriculum. There were no statistically significant differences in average fidelity levels between the first and second study years.
- **Two of three teacher practice scales were not statistically significantly different between the treatment and control groups.** There were no statistically significant differences in the Reading Strategy Guidance and Classroom Management and Student Engagement scales. Scores on the third scale, Traditional Interaction, were statistically significantly lower for the Project CRISS treatment group than the control group (effect size: -0.54).
- **Project CRISS teachers were statistically significantly less likely than control teachers to report engaging in enrichment activities (such as art, music, or physical education), non-curricular activities (such as lunch, recess, or arrival/dismissal activities), and other activities.** Similar patterns were observed for ReadAbout and Read for Real, but those differences were not statistically significant.

### **What Is the Impact of the Curricula on Students One Year After the End of the Intervention Implementation?**

No effects of the curricula on Cohort 1 students were observed in comparisons of outcomes measured one year after the end of the intervention implementation (in the study's second year). For the three intervention groups that had no effect in the first year, effects in the second year remained indistinguishable from zero. For the intervention group that had evidence of a negative effect in Year 1 (Reading for Knowledge), the effect in the second year was indistinguishable from zero. Figures 1 to 4 show impacts of the curricula on Cohort 1 students' follow-up test scores from spring 2008 (impacts on spring 2007 post-test scores are also shown for comparison purposes). Follow-up reading comprehension test scores in spring 2008 were not statistically significantly higher for students who attended treatment schools in the study's first year relative to students who attended control schools in the study's first year.

Figure 1. Effects of Curricula on GRADE Scores, Cohort 1 Students

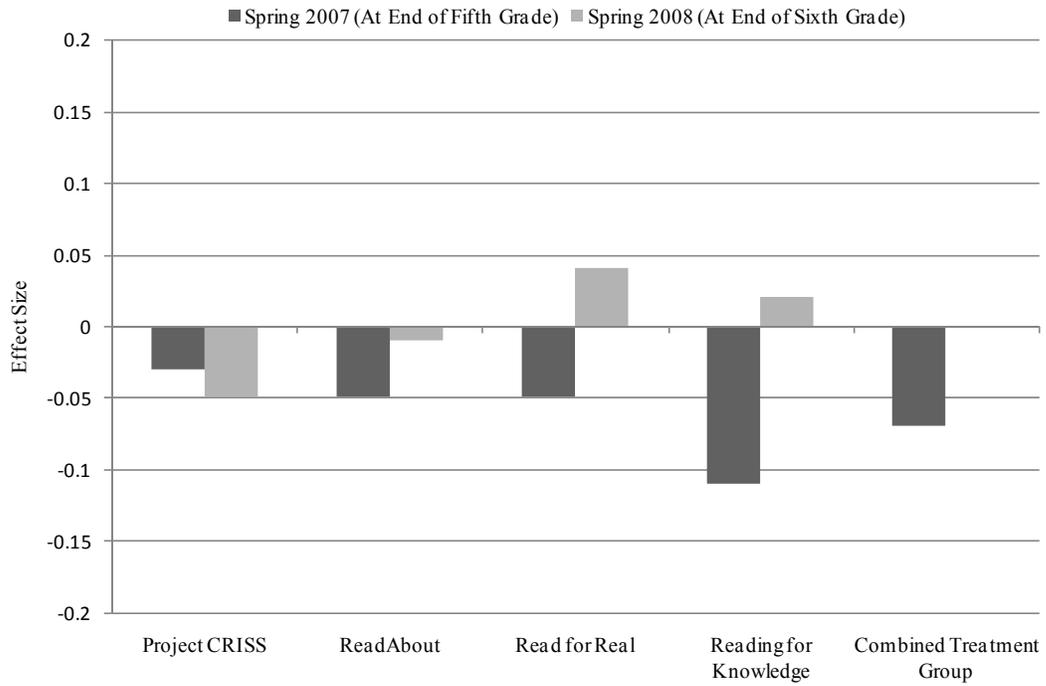


Figure 2. Effects of Curricula on Social Studies Reading Comprehension Scores, Cohort 1 Students

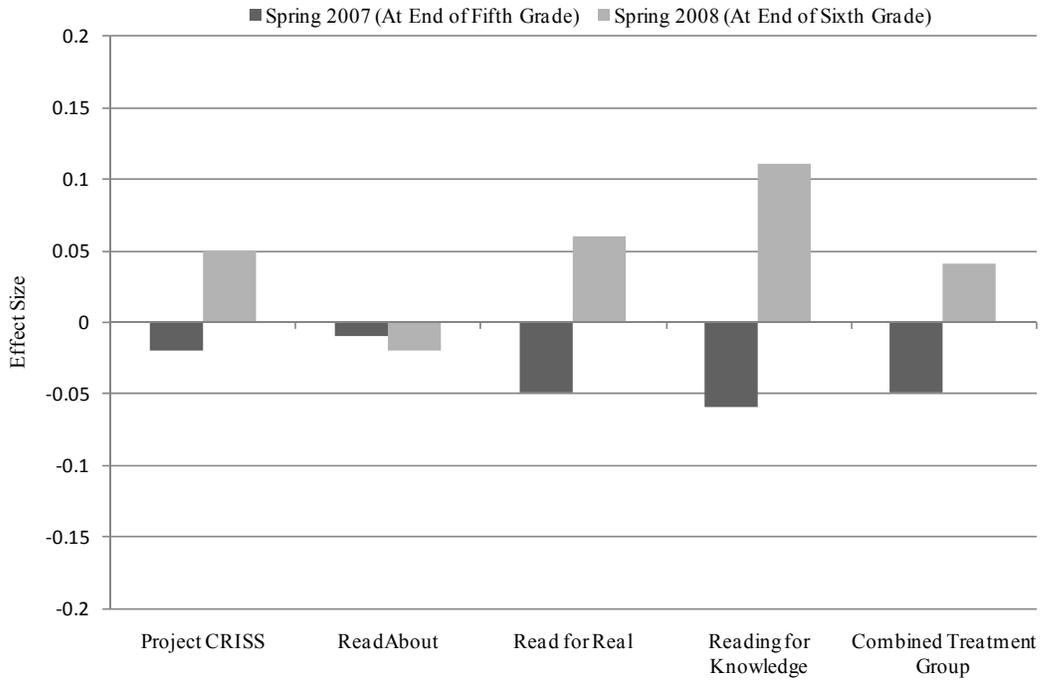


Figure 3. Effects of Curricula on Science Reading Comprehension Scores, Cohort 1 Students

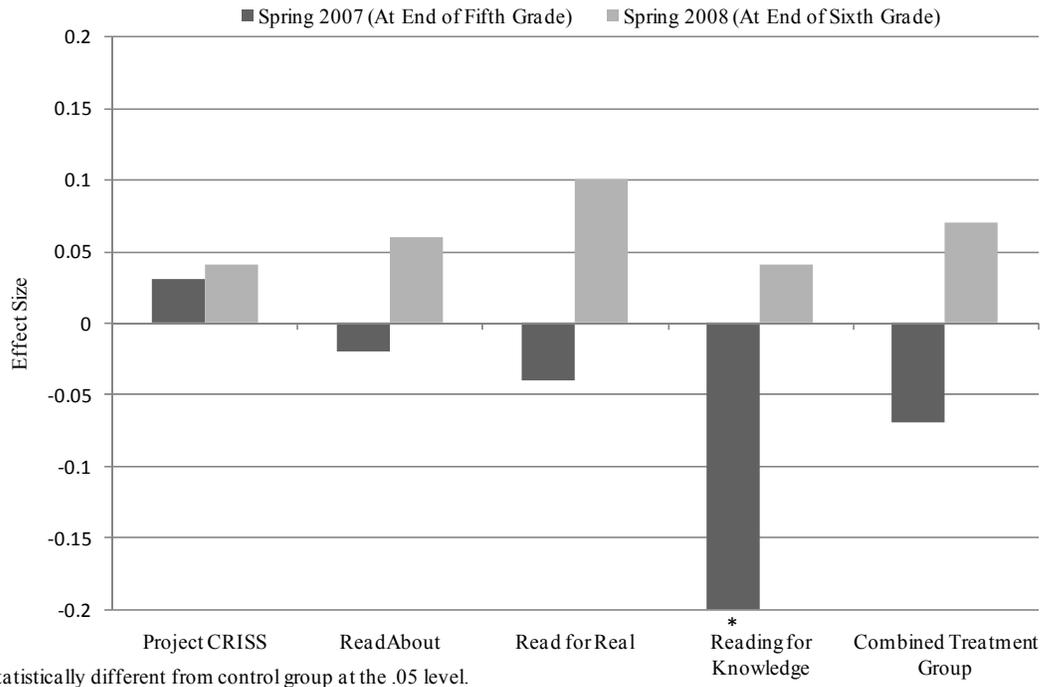
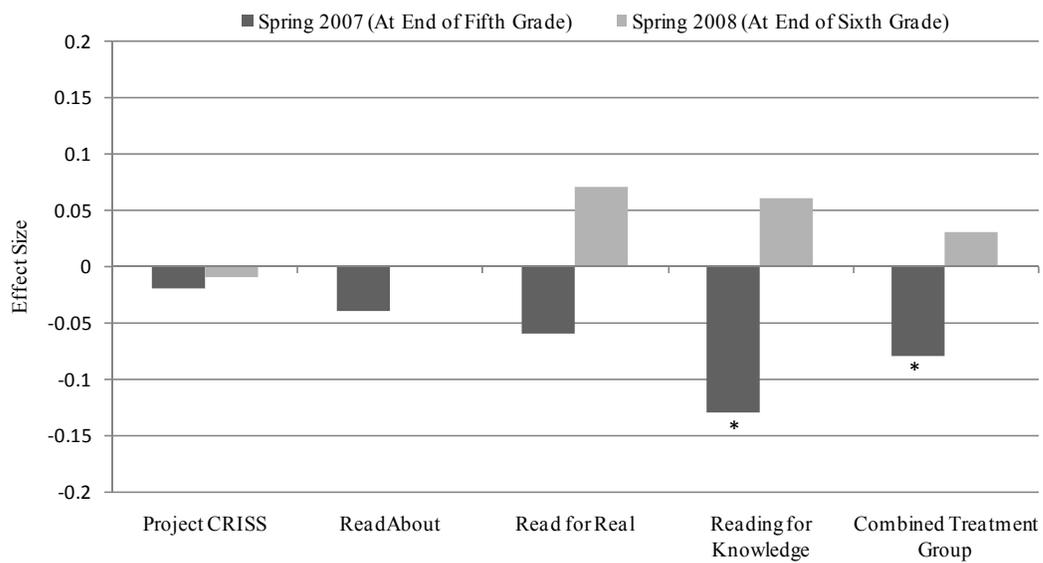


Figure 4. Effects of Curricula on Composite Scores, Cohort 1 Students



Note: The composite scores are based on the GRADE scores, social studies reading comprehension scores, and science reading comprehension scores.

\* Statistically different from control group at the .05 level.

## Were Impacts Larger After Schools and Teachers Had One Year of Experience with the Curricula?

The second key research question examined in the second year of the study was whether impacts of the curricula were larger after schools and teachers had one year of experience using the curricula. As mentioned above, we distinguish between schools and teachers due to the mobility of teachers in and out of study schools. (Focusing on schools that participated in the study in both years, 76 percent of control group teachers and 72 percent of treatment group teachers remained in the study in both years. There were no statistically significant differences in the percentage of teachers remaining in the study across the treatment and control groups.)

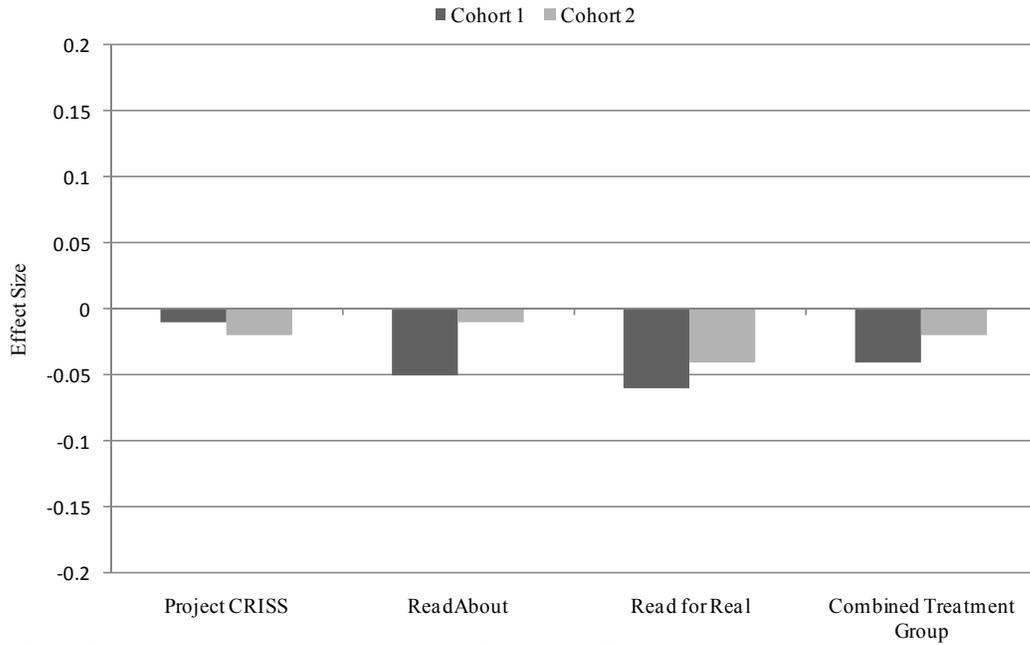
Impacts were not significantly larger after *schools* had one year of experience using the curricula. Overall, we found no statistically significant impacts of the interventions on any of the three student test score outcomes for the second cohort of fifth grade students, and there were no statistically significant differences between the one-year impacts for the first and second cohorts of students (Figures 5 to 8).

To address the research question related to *teacher* experience, the study team focused on post-test data (measured at the end of fifth grade) from first and second cohort students whose teachers were in the study in both the first and second years to assess whether the one-year impacts for the second group of students were larger than the one-year impacts for the first group.

The impact of one of the curricula (ReadAbout) was statistically significantly larger after *teachers* had one year of experience using the curricula (see Figures 9 to 12). When focusing on students of teachers who participated in the study for two years, we found one positive, statistically significant impact among students in the second cohort. In particular, there was a positive, statistically significant impact of ReadAbout on the social studies reading comprehension assessment (effect size: 0.22; Figure 10). To put this in perspective, for a student at the 50th percentile, an effect size of 0.10 represents about 4 percentile points, an effect size of 0.15 represents about 6 percentile points, and an effect size of 0.20 represents about 8 percentile points. To provide additional perspective, a meta-analysis by Rosenshine and Meister (1994) found an average effect size of 0.32 across nine studies examining the impact of multiple reading comprehension strategy instruction on standardized test scores (this meta-analysis focused on reciprocal teaching, which involves the use of guided practice and dialogue between students and teachers to teach students about four comprehension strategies including question generation, summarization, prediction, and clarification). Another meta-analysis by Rosenshine, Meister, and Chapman (1996) found an average effect size of 0.36 across 13 studies examining the impact of question generation on standardized test scores.

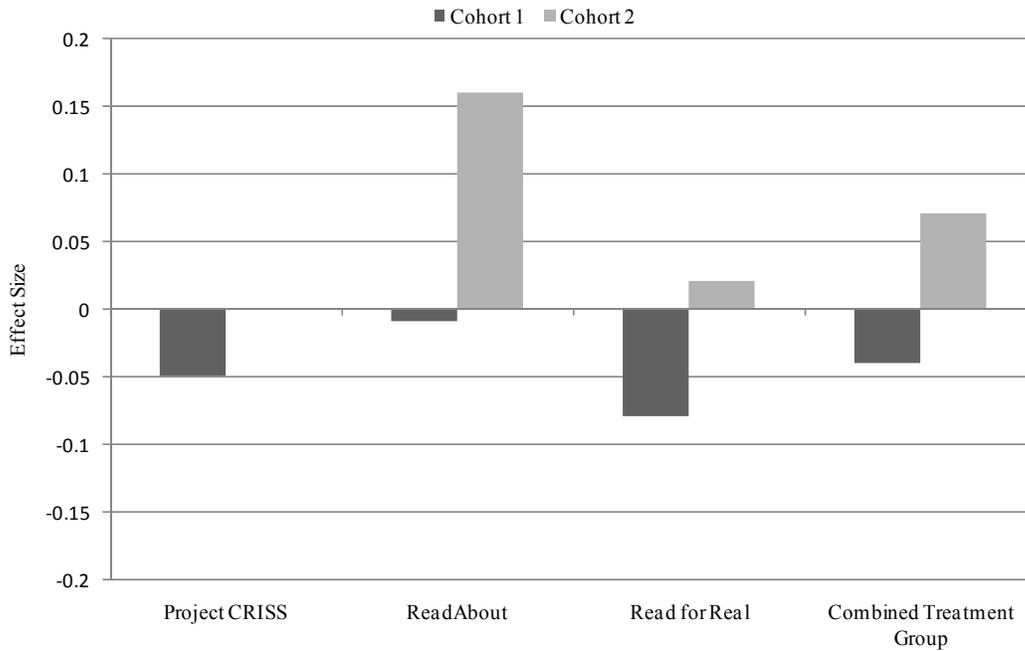
The impact of ReadAbout on the social studies reading comprehension post-test assessment for the second cohort of students was statistically significantly greater than the impact of ReadAbout on this outcome for the first cohort of students taught by the same teachers in the first year of the study (effect size difference: 0.28). ReadAbout's impacts on the other assessments (GRADE and science comprehension) were not statistically significant.

Figure 5. Effects of School Experience with the Curricula on Post-Test GRADE Scores of Fifth-Grade Students



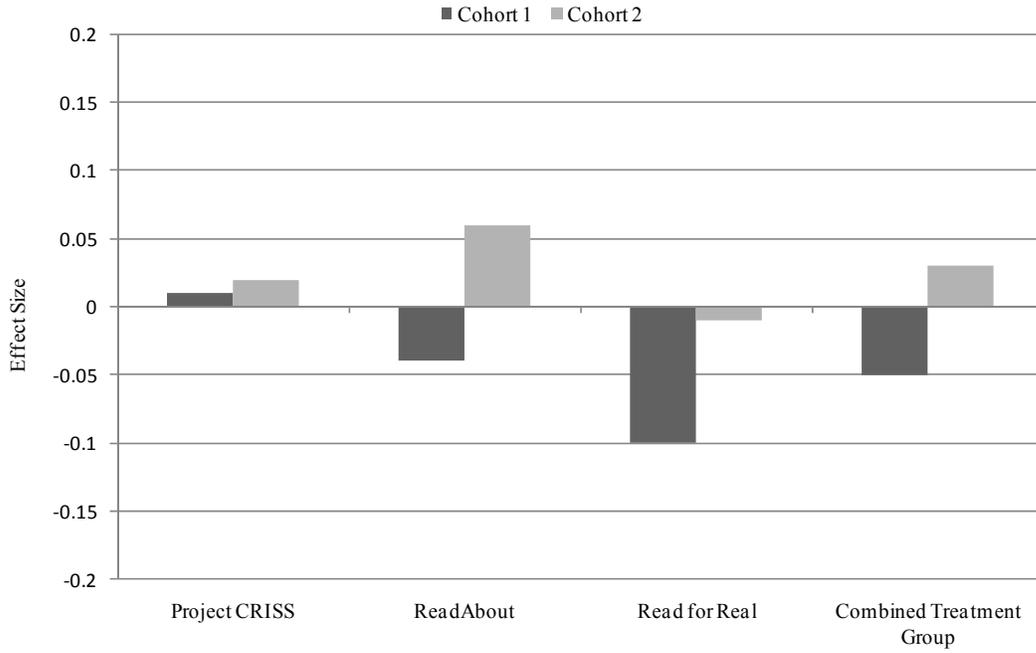
Note: These effects represent impacts of the interventions after one year of implementation.

Figure 6. Effects of School Experience with the Curricula on Post-Test Social Studies Reading Comprehension Scores of Fifth-Grade Students



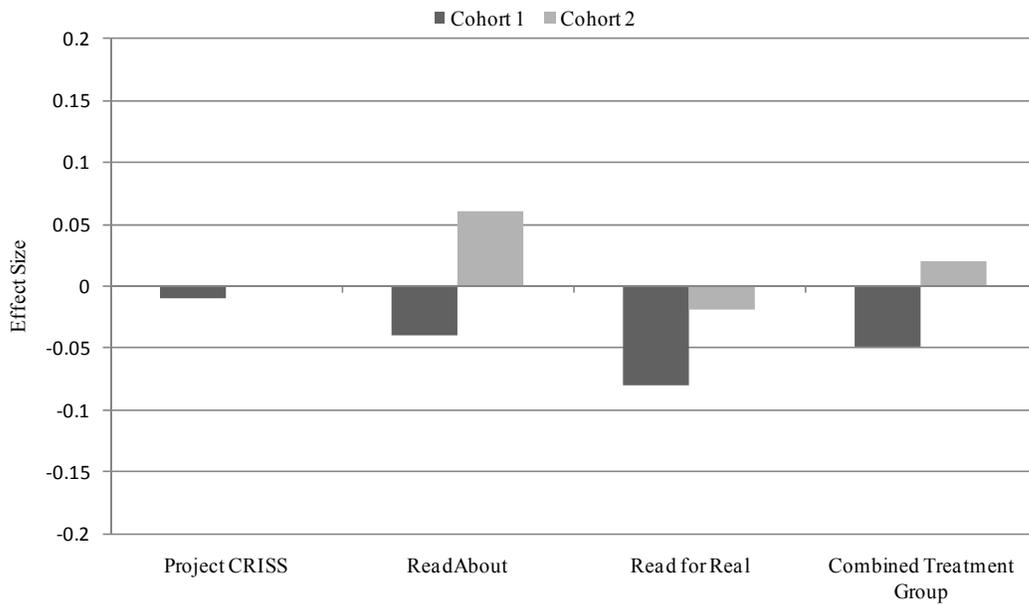
Note: These effects represent impacts of the interventions after one year of implementation.

Figure 7. Effects of School Experience with the Curricula on Post-Test Science Reading Comprehension Scores of Fifth-Grade Students



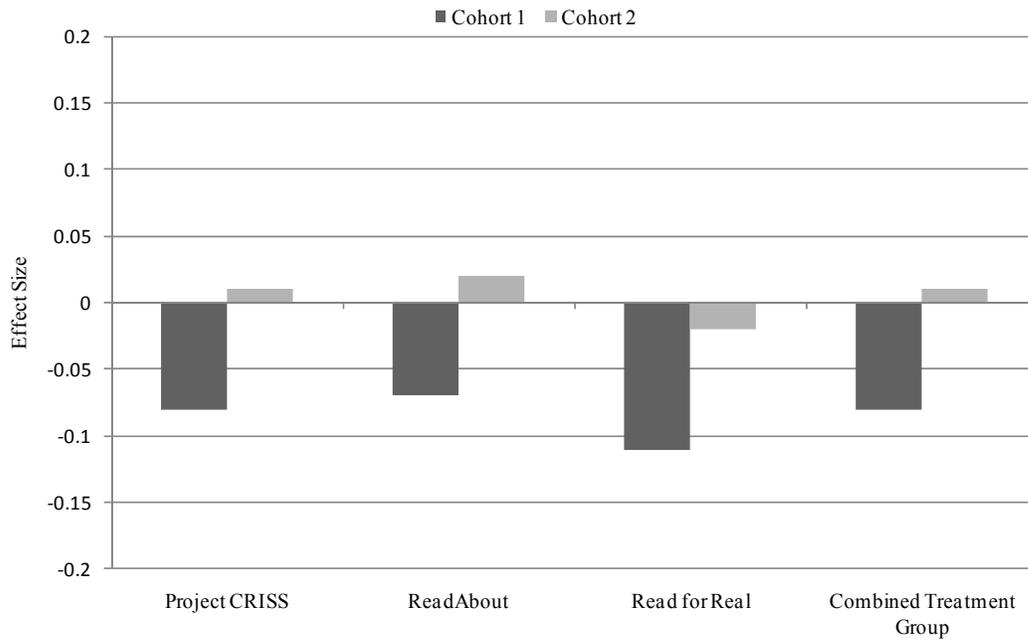
Note: These effects represent impacts of the interventions after one year of implementation.

Figure 8. Effects of School Experience with the Curricula on Post-Test Composite Test Scores of Fifth-Grade Students



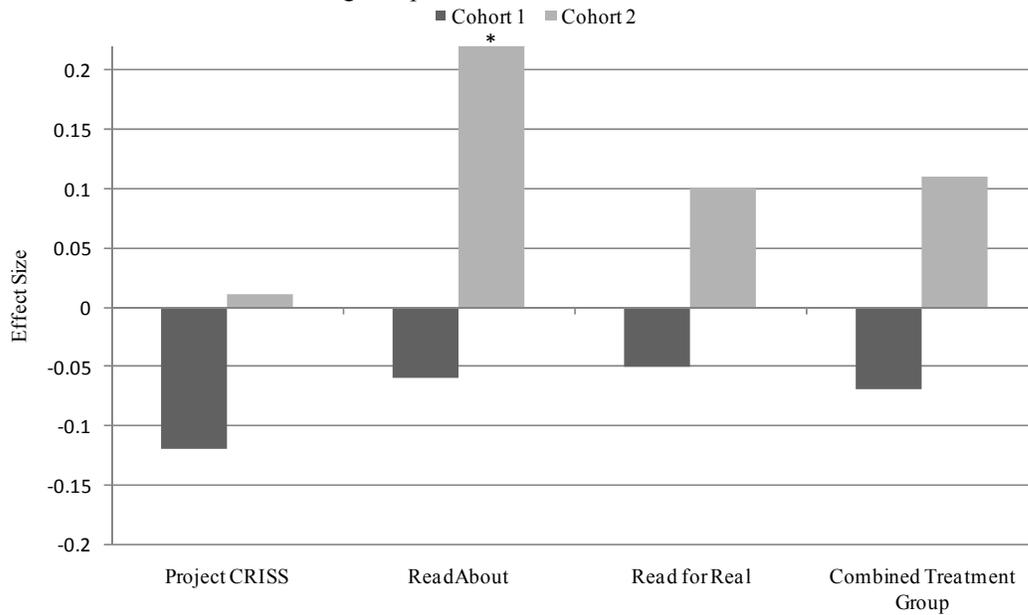
Note: These effects represent impacts of the interventions after one year of implementation. The composite scores are based on the GRADE scores, social studies reading comprehension scores, and science reading comprehension scores.

Figure 9. Effects of Teacher Experience with the Curricula on Post-Test GRADE Scores of Fifth-Grade Students



Note: These effects represent impacts of the interventions after one year of implementation.

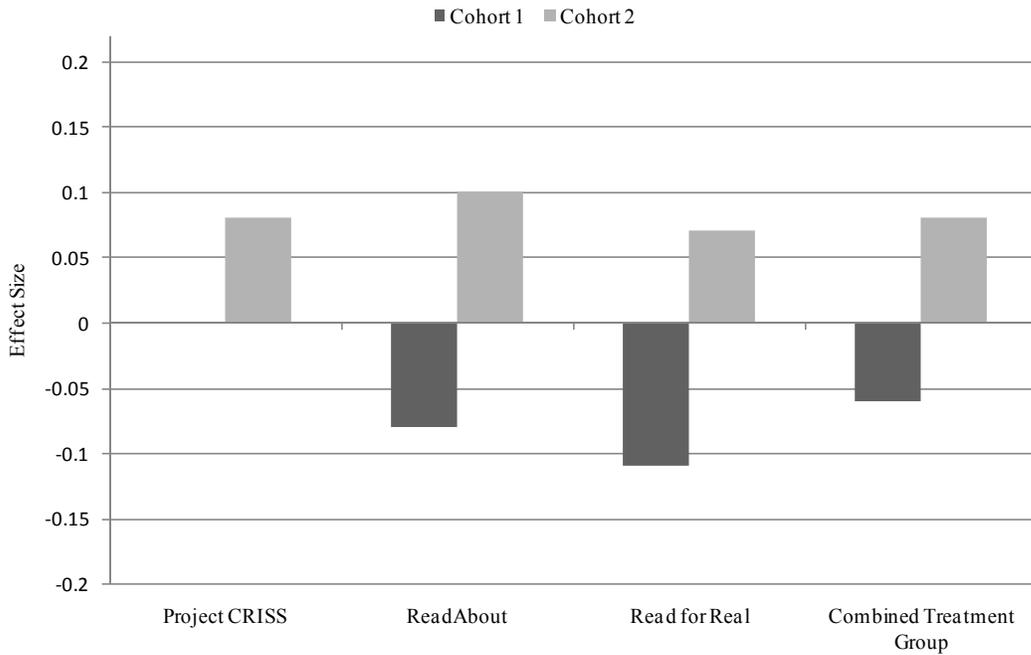
Figure 10. Effects of Teacher Experience with the Curricula on Post-Test Social Studies Reading Comprehension Scores of Fifth-Grade Students



Note: These effects represent impacts of the interventions after one year of implementation.

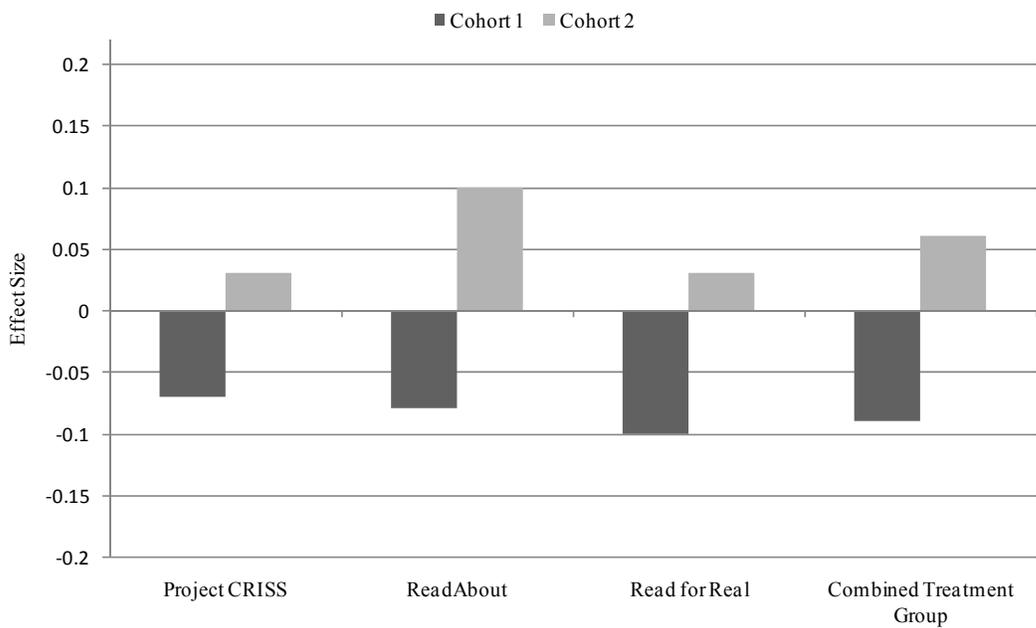
\* Statistically different from control group at the .05 level.

Figure 11. Effects of Teacher Experience with the Curricula on Post-Test Science Reading Comprehension Scores of Fifth-Grade Students



Note: These effects represent impacts of the interventions after one year of implementation.

Figure 12. Effect of Teacher Experience with the Curricula on Post-Test Composite Test Scores of Fifth-Grade Students



Note: These effects represent impacts of the interventions after one year of implementation. The composite scores are based on the GRADE scores, social studies reading comprehension scores, and science reading comprehension scores.

## Findings from Nonexperimental Analyses

For this report, the study team conducted a set of nonexperimental analyses to examine the relationship between students' test scores and classroom practices, teacher efficacy in the classroom, teacher professional development, and time students spent using informational text. The study team also examined the correlation of impacts and school characteristics. These findings must be interpreted with caution, as they are correlational in nature and, therefore, do not provide causal evidence of the relationship between the variables examined.

The key findings from these analyses are:

- **Two of the three teacher practice scales were correlated with test scores.** There is evidence of a positive and statistically significant relationship between post-test scores and Classroom Management (14 of 16 correlations were statistically significant) and Reading Strategy Guidance (10 of 16 correlations were statistically significant) scales. The Traditional Interaction scale was not statistically significantly related to post-test scores.
- **Three sets of individual items from the ERC were found to have the largest number of statistically significant positive correlations with test scores (48 of 64).** These items included teaching practices related to (1) explicit comprehension strategy instruction (16 of 24 correlations were positive and statistically significant), (2) teachers' management and responsiveness (18 of 24 correlations were positive and statistically significant), and (3) student engagement (14 of 16 correlations were positive and statistically significant). Among the other individual ERC items, just 15 of 344 correlations were positive and statistically significant.
- **No statistically significant relationships were found between test scores and teacher efficacy, hours of professional development reported by teachers, or time teachers spent with students in reading activities or using informational text.**

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