

# The Evaluation of Enhanced Academic Instruction in After-School Programs

Findings After the First Year of Implementation

Executive Summary



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**June 2008**

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This study represents a collaborative effort among the authors and the staff from the participating school districts and schools, the curriculum developers — Harcourt School Publishers and Success for All (SFA), our colleagues at MDRC and Public/Private Ventures (P/PV), and Institute of Education Sciences (IES) staff. The study has benefited especially from the time, energy, and commitment put forth by staff in the participating school districts and community-based organizations to implement the two enhanced after-school programs used in the Evaluation of Enhanced Academic Instruction in After-School Programs, to allow access to after-school classrooms, and to respond to requests for data.

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The Authors

## **Disclosure of Potential Conflicts of Interest<sup>1</sup>**

The research team for this evaluation consists of a prime contractor, MDRC, Inc., of New York City, NY, and three subcontractors, Public/Private Ventures (P/PV) of Philadelphia, PA, Survey Research Management (SRM) Corporation of Boulder, CO, and Bloom Associates, Inc. of New York. None of these organizations or their key staff has financial interests that could be affected by findings from the evaluation of the two enhanced after-school interventions considered in this report. No one on the Expert Advisory Panel, convened by the research team to provide advice and guidance, has financial interests that could be affected by findings from the evaluation.

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<sup>1</sup>Contractors carrying out research and evaluation projects for IES frequently need to obtain expert advice and technical assistance from individuals and entities whose other professional work may not be entirely independent of or separable from the particular tasks they are carrying out for the IES contractor. Contractors endeavor not to put such individuals or entities in positions in which they could bias the analysis and reporting of results, and their potential conflicts of interest are disclosed.

## Executive Summary

This report presents findings, after one year of program implementation, from the Evaluation of Enhanced Academic Instruction in After-School Programs — a two-year intervention and random assignment evaluation of adapted models of regular-school-day math and reading instruction in after-school settings for students in grades 2 through 5. The study, which is being conducted by MDRC in collaboration with Public/Private Ventures and Survey Research Management, was commissioned by the National Center for Education Evaluation and Regional Assistance at the U.S. Department of Education’s Institute of Education Sciences (IES).

Federal support for after-school programs is provided through the 21st Century Community Learning Centers (21st CCLC) program, established in 1999 and now a state-administered grant program. A primary purpose of the 21st CCLC program, as expressed in Title IV, Part B, is to “provide opportunities for academic enrichment” to help students meet state and local standards in core content areas. Findings from a previous National Evaluation of the 21st CCLC program indicate that, on average, the 21st CCLC program grants awarded between 1999 and 2002 had a limited academic impact on participating elementary school students’ academic achievement.<sup>1</sup> A possible factor is the finding that most academic activities at the evaluation sites consisted of homework sessions in which students received limited additional academic assistance (such as reading instruction or assistance with math homework). In addition, participant attendance was limited and sporadic. However, analyses comparing the academic outcomes of frequent and infrequent participants suggest that increasing attendance alone is unlikely to improve the academic findings. Therefore, the limited academic effects in combination with the low levels of formal academic assistance offered in these programs highlight the need for improved academic programming.

In response, IES has supported the development and evaluation of instructional resources for core academic subjects that could be used in after-school programs. This study tests whether an intervention of structured approaches to academic instruction in after-school programs (for reading and math) produce better academic outcomes than regular after-school services that consist primarily of help with homework or locally assembled materials that do not follow a structured curriculum.<sup>2</sup>

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<sup>1</sup>M. Dynarski et al., *When Schools Stay Open Late: The National Evaluation of the 21st Century Community Learning Centers Program, First-Year Findings*. Report submitted to the U.S. Department of Education. (Princeton, NJ: Mathematica Policy Research, Inc., 2003).

<sup>2</sup>The evaluation is not studying the impacts of the overall after-school program or the enrichment and youth development aspects of after-school services.

## Overview of the Interventions

The two interventions being tested in this evaluation involve providing 45 minutes of formal academic instruction during after-school programs to students who need help meeting local academic standards. The model includes the use of research-based instructional material and teaching methods that were especially designed to work in a voluntary after-school setting. Two curriculum developers — Harcourt School Publishers and Success for All — were selected through a competitive process to adapt their school-day materials to develop a math model and a reading model, respectively. The developers were asked to create material that is engaging for students, challenging and tied to academic standards, appropriate for students from diverse economic and social backgrounds, and relatively easy for teachers to use with a small amount of preparation time.

- **Harcourt School Publishers** adapted and expanded its existing school-day materials to develop Harcourt *Mathletics*, in which students progress through material at their own rate, with pretests at the beginning of each topic to guide lesson planning and posttests to assess mastery or the need for supplemental instruction. The model also includes games to build math fluency; hands-on activities; projects; and computer activities for guided instruction, practice, or enrichment.
- **Success for All Foundation (SFA)** adapted its existing school-day reading programs to create *Adventure Island*, a structured reading model with daily lessons that involve switching quickly from one teacher-led activity to the next. It includes the key components of effective reading instruction identified by the National Reading Panel and builds cooperative learning into its daily classroom routines, which also include reading a variety of selected books and frequent assessments built into lessons to monitor progress.

As part of the intervention, these models were also supported by implementation strategies related to staffing, training and technical assistance, and attendance that were managed and supported by Bloom Associates, Inc.

- Sites hired certified teachers and operated the enhanced programs with the intended small groups of students, approximately 10 students per instructor.
- Instructors received upfront training, multiple on-site technical assistance visits, continued support by locally based staff, and daily paid preparation time.
- Efforts were made to support student attendance through close monitoring of attendance; follow-up with parents and students when absences occur, to en-



courage attendance and address issues preventing attendance; and attendance incentives to encourage and reward good attendance.

## Research Questions

The primary research question that this evaluation examines is:

- Does the enhanced after-school instruction improve math or reading proficiency over what students would achieve in regular after-school programs, as measured by test scores?

In addition, the evaluation looks at two secondary questions:

- What are the impacts of the enhanced after-school instruction for subgroups of students based on their prior academic performance and grade level?
- Does the enhanced after-school instruction affect other in-school academic behavior outcomes, as measured by reports from regular-school-day teachers of student engagement, behavior, and homework completion?

Subgroup analysis can provide information that might allow for better targeting of the intervention. In particular, the research team hypothesized that the instructional strategies may impact students in the second and third grades (when basic reading and math skills are still being taught during the school day) differently than those in the fourth and fifth grades *and* that those entering the program with higher levels of achievement in the relevant subject may be impacted differently than those entering with lower preintervention achievement levels because of different educational needs.

The final question is important because the enhanced after-school program could change students' behavior in several ways. For example, because the regular after-school program focuses on homework help, one hypothesis is that substituting structured instruction for homework help in the after-school setting has a negative effect on homework completion. On the other hand, improved academic performance might help students in completing homework. There are also theories associating students' behavior in the classroom with their academic performance. One possible hypothesis is that if a student can better understand the academic subject, he or she might be more attentive or less disruptive in class.<sup>3</sup> Another competing hypothesis is that lengthening the academic instruction would introduce fatigue and induce students to act out during class.

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<sup>3</sup>T. J. Kane, *The Impact of After-School Programs: Interpreting the Results of Four Recent Evaluations*. William T. Grant Foundation Working Paper. (New York: William T. Grant Foundation, January 16, 2004).

## Study Design

This study employs a student-level random assignment design.<sup>4</sup> By randomly assigning students, by grade, within each after-school center to either the enhanced program group to receive 45 minutes of the formal academic instruction or the regular program group to receive the regular after-school services for those 45 minutes, researchers are able to eliminate systematic differences between the two groups of students. Though chance variation may still exist, differences between the groups on the outcomes measured can be attributed to the effect of the enhanced program.

This report presents findings for the first of two years of program operations (school year 2005-2006) on the two parallel studies (one of reading and one of math). The enhanced instruction was implemented in 50 after-school centers — 25 to test the reading program and 25 to test the math program. After-school centers were chosen based on their expressed interest and their ability to implement the program and research design. Assignment of centers to either the reading or the math enhanced program was based on a combination of local preferences, including knowledge of their student needs, sufficient contrast between current academic offerings in the subject area and the enhanced program, and their ability to meet the study sample needs. The centers had to affirm that they were not already providing academic support that involved a structured curriculum or that included diagnostic assessments of children to guide instruction in the subject that they would be implementing (that is, math or reading). The after-school centers are located in 16 sites within 13 states and include schools and community-based organizations in rural areas, in towns, and within the urban fringe of or in midsize to large cities across the country. Participating centers draw students from schools with an average of 78 percent of students receiving free or reduced-price lunches (a measure of low-income status).

The target population for the study is students in second through fifth grades who are behind grade level but not by more than two years. The study sample was recruited from students enrolled in after-school programs who were identified by local staff as in need of supplemental academic support to meet local academic standards. Given that instruction in these programs is provided in a small-group format and is not specifically developed for special needs, students with severe learning disabilities or behavioral problems were excluded from the sample selected. The sample students also had to be able to receive instruction in English. Students who applied to participate in the study were randomly assigned, by grade within their center, to re-

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<sup>4</sup>Random assignment was conducted at the student, rather than a higher, level because random assignment at the student level provided more power with which to detect impacts for a given number of after-school programs. Additionally, implementation did not need to be the whole after-school center in order for it to operate. The study team was not concerned about control group contamination because use of the programs required specific training and materials not available to the control group teachers. Furthermore, treatment and control conditions were monitored throughout the study for potential cross-contamination.

ceive either the enhanced model of academic instruction or the services of the regular after-school program. The analysis sample for math includes 1,961 students, and the sample for reading comprises 1,828 students.

Impact findings from the first year are based on data collected from students, regular-school-day teachers, and school records. The Stanford Achievement Test, Tenth Edition (SAT 10), abbreviated battery for math or reading (depending on the intervention implemented), was administered to students at the beginning and end of the school year to measure the gains in achievement. For second- and third-grade students in the reading sample, the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) was also administered to measure fluency. A survey of regular-school-day teachers was used to measure student academic behavior.

To help interpret the impact findings, this study also examines how well the special academic services were implemented and whether the enhanced program actually produced a service contrast with what the control group received in the regular after-school program. Thus, the study answers these two questions:

- **Implementation.** How are the after-school academic interventions implemented in the study centers?
- **Service contrast.** What are the measurable differences between services received by students in the enhanced program group and services received by students in the regular after-school program (or control) group?

In addition, the enhanced program was offered in a variety of types of schools. Because the effectiveness of after-school instruction may be related to what the students experience during the regular school day, a third issue is also examined:

- **Linking local school context to impacts.** Are factors related to local school-day context associated with program impacts?

## Early Findings for Math

In the first year of the study, Mathletics, the math model put in place in 25 after-school centers, had the following findings:

- The enhanced math program was implemented as intended (in terms of staff characteristics, training, and usage of instructional materials).
- Students received an average of 179 minutes of math instruction per week.

- Math instructors reported that the intended pace of the daily lesson plan was easy to follow.
- The enhanced program provided students with 30 percent more hours of math instruction over the school year, compared with students in the regular after-school program group.
- There are positive and statistically significant impacts for the enhanced math program on student achievement, representing 8.5 percent more growth over the school year for students in the enhanced program group, as measured by the SAT 10 total math score.
- The math program did not produce statistically significant impacts (either positive or negative) on any of the three school-day academic behavior measures: student engagement, behavior, or homework completion.

### **Implementation of the Enhanced Math Program**

Overall, the enhanced math program was implemented as intended in the 25 centers. Each center was expected to hire four certified teachers and to operate with 10 students per instructor. Across the 25 centers, 97 percent of staff were certified, and the programs operated with the intended small groups of students — on average, 9 students per instructor. Staff were trained by Harcourt staff at the beginning of the year and were provided ongoing assistance.<sup>5</sup> They also received paid preparation time. Structured protocol observations of implementation of after-school classes conducted by local district coordinators indicate that 93 percent of observed classes covered the intended content and used the recommended instructional strategies and kept pace with the daily lesson schedule.

### **The Service Contrast in Math**

Students in the enhanced math program were offered and attended a different set of services during the after-school academic time slots than the regular program group.

The enhanced program offered its students academic instruction in math, whereas 15 percent of students in the regular after-school program group were offered academic instruction in math, and the other students received primarily homework help and/or tutoring on multiple subjects. Ninety-seven percent of staff members providing the instruction to the enhanced group

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<sup>5</sup>Enhanced math program staff received two full days of upfront training on how to use the math materials, including feedback from the developers in practice sessions using the materials. Ongoing support given to the enhanced program staff consisted of multiple on-site technical assistance visits (an average of three), continued support by locally based staff, and daily paid preparation time of 30 minutes.

students were certified teachers, compared with 62 percent of the regular after-school program staff. Additionally, 94 percent of enhanced program staff received upfront training, and 95 percent received ongoing support, compared with 55 percent and 70 percent of the regular program staff, respectively. These differences are statistically significant at the 0.05 level.

Students in the enhanced program group attended, on average, 49 more hours of academic instruction in math over the course of the school year than the regular program group received (57.17 hours, compared with 8.57 hours). Given estimates of average school-day instruction, this represents an estimated 30 percent more hours of math instruction for students in the enhanced program. Students in the enhanced program group attended 20 percent more days than those in the regular after-school program group, and this difference is statistically significant (effect size = 0.38).

### **Impacts of the Enhanced Math Program**

The main objective of the enhanced after-school math program is to improve student academic performance in math. The analysis looks at impacts on all students in the sample, as well as impacts on two sets of subgroups: students in the two lower grades (second and third) separately from those in the higher grades (fourth and fifth) *and* students who came to the program with higher levels of prior achievement in math separately from those with lower preintervention achievement levels as defined by SAT 10 performance standards of “below basic,” “basic,” and “proficient.”<sup>6</sup>

Access to the enhanced academic after-school math program improved the math performance of students, on average, as measured by the SAT 10, and this finding is statistically significant. In the absence of the intervention, students would have improved their average total math test score by 33.0 scaled score points over the school year.<sup>7</sup> With the intervention, the enhanced program group was able to increase its average test score by 35.8 scaled score points. Therefore, the estimated difference between the enhanced and the regular after-school math

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<sup>6</sup>The performance standards are available as part of the SAT 10 scoring. The cut points are criterion-referenced scores. The cuts are created by a panel of teachers based on what they feel a student should be able to do at a particular level of proficiency.

<sup>7</sup>A “scaled score” is a conversion of a student’s raw score on a test to a common scale that allows for numerical comparison between students across different forms and levels of the test. The fall-to-spring growth in test scores for the control group (33 scaled score points, based on the abbreviated SAT 10 test) was bigger than the weighted average growth for students in grades 2 through 5 in a nationally representative sample (18 scaled score points, based on the full-length SAT 10 test). Compared with the national sample, both the enhanced program group and the regular program group in the study sample have a higher proportion of low-performing students. (In the math program sample, 78 percent of the students were performing below proficient in math at the beginning of the program.)

program groups is 2.8 scaled score points (effect size = 0.06),<sup>8</sup> which reflects an 8.5 percent difference in growth. Figure ES.1 illustrates this impact.

These statistically significant math impacts are also present across multiple subtests and subgroups. The average scores on the math subtests — problem-solving and procedures — for the enhanced program group are 2.5 scaled score points higher (effect size = 0.05) and 4.3 scaled score points higher (effect size = 0.08), respectively, than the average scores of the regular program group students.

The impact in total math scores from the program for the fourth- and fifth-grade subgroup is 3.9 scaled score points and is statistically significant. For second- and third-graders, the impact is not statistically significant (1.8 scaled score points), although the impacts for the higher and lower grades could not be statistically distinguished. Similarly, the impacts for the prior-achievement subgroups (below basic, basic, and proficient) could not be statistically distinguished. The program impacts on total math scores are 2.9 scaled score points (effect size = 0.06) for the below-basic group; 3.3 scaled score points (effect size = 0.07) for the basic group; and 3.0 scaled score points (effect size = 0.07) for the proficient group. All but the estimate for the basic group (which is approximately half the sample) are not statistically significant.

The analysis also looks at impacts on three measures of student academic behavior — How often do they not complete homework? How often are they attentive in class? How often are they disruptive in class? — for all students in the sample as well as for the two sets of subgroups. Contrary to concerns that the instruction could “overload” students with its academic focus, the findings suggest that enrollment in the enhanced math program did not adversely affect homework completion or the two classroom behavior measures for the full analysis sample or for any of the subgroups, nor did it lead to statistically significant differences in these measures for the enhanced versus the regular program group.

### **Linking Local School Context to Math Impacts**

While the average impact on math test scores is 2.8 scaled score points, not all 25 centers in the study sample experienced this exact difference. Though the study was not designed with the power to detect impacts at the level of individual centers, 17 of the 25 centers did have positive point estimates of Mathletics impacts; 8 of 25 had negative point estimates. Thus, the analysis explored the possibility of variation in impacts for students who attended different types of schools and experienced different program implementation.

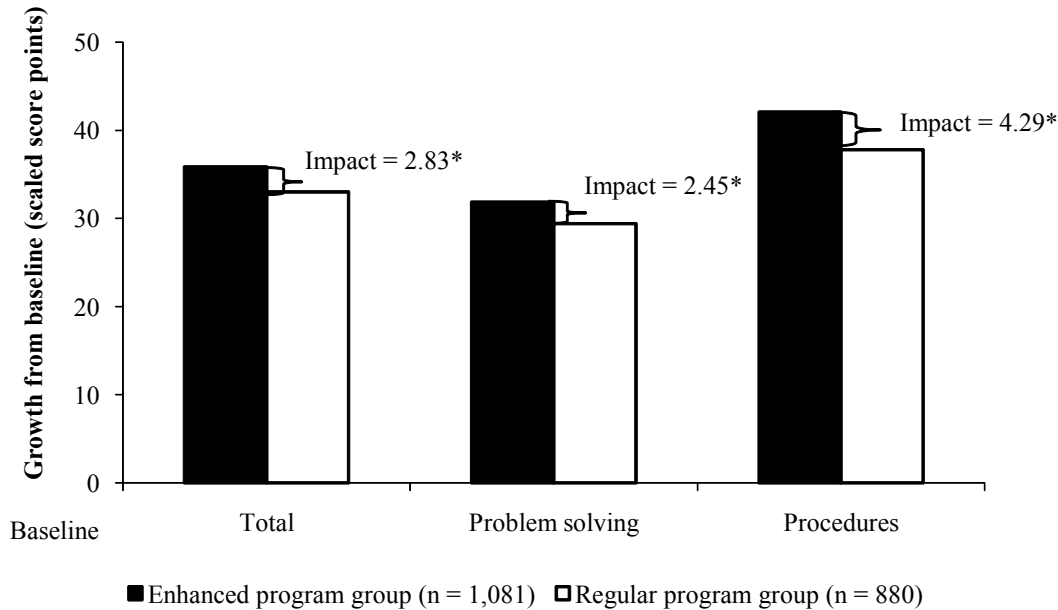
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<sup>8</sup>“Effect size,” which is used widely for measuring the impacts of educational programs, is defined as the impact estimate divided by the underlying population’s standard deviation of the outcome measure; effect size is usually measured by the control group’s standard deviation.

## The Evaluation of Academic Instruction in After-School Programs

Figure ES.1

### Student Growth on Test Scores from Baseline to Follow-Up and the Associated Impact of the Enhanced Math Program



SOURCES: MDRC calculations are from baseline and follow-up results on the Stanford Achievement Test Series, 10th ed. (SAT 10) abbreviated battery.

NOTES: The estimated impacts on follow-up results are regression-adjusted using ordinary least squares, controlling for indicators of random assignment, baseline math total scaled score, race/ethnicity, gender, free-lunch status, age, overage for grade, single-adult household, and mother's education. Each dark bar illustrates the difference between the baseline and follow-up SAT 10 scaled scores for the enhanced program group, which is the actual growth of the enhanced group. Each light bar illustrates the difference between the baseline SAT 10 scaled score for the enhanced program group and the follow-up scaled score for the regular program group (calculated as the follow-up scaled score for the enhanced group minus the estimated impact). This represents the counterfactual growth of students in the enhanced group.

A two-tailed t-test was applied to each impact estimate. Statistical significance is indicated by (\*) when the p-value is less than or equal to 5 percent.

The estimated impact effect sizes, which are calculated for each outcome as a proportion of the standard deviation of the regular program group, are 0.06, 0.05, and 0.08 for the math total, problem solving, and procedures scores, respectively.

Because the effectiveness of after-school instruction may be related to factors associated with program implementation or what the students experience during the regular school day, a correlational analysis examined the moderating effects of school characteristics and factors of program implementation. It is worth emphasizing that this analysis is nonexperimental and exploratory. Thus, the inference that a particular factor caused or did not cause the impact to be larger or smaller cannot be determined. For example, there could exist factors unaccounted for in the analysis that are correlated with both the program impact and certain school characteristics and that thus account for an observed relationship.

Nonetheless, this analysis uses a regression framework to link program impacts to the following school characteristics: the hours of in-school instruction in the relevant subject, the similarity of the in-school curriculum to the intervention materials, whether the school met its Adequate Yearly Progress (AYP) goals, the proportion of students receiving free or reduced-price lunch, and the in-school student-to-teacher ratio. The analysis also links impacts to two factors of program implementation: the number of days over the course of the school year that the enhanced math program was offered and whether a teacher from the enhanced program left during the school year. Specifically, a regression with interactions between the treatment indicator and each of these school characteristics and factors of program implementation is run to examine how the program impact is moderated by these variables. A chi-square test indicates that, overall, this set of school and implementation characteristics is associated with program impacts on the total math SAT 10 score ( $p$ -value = 0.05).

A t-test from the regression analysis shows that, controlling for all these characteristics, centers meeting AYP goals are associated with a higher program impact ( $p$ -value = 0.01). Centers serving schools that employ a direct instructional approach organized by lessons with a spiraled curriculum experience lower program impacts than centers that employ a curriculum similar to Mathletics ( $p$ -value = 0.03). With the available information, it is not possible to explain the reasons for these relationships.

Finally, individual t-tests from the regression analysis indicate that none of the other measures has a statistically significant relationship to the impacts of the enhanced math program.

## **Early Findings for Reading**

Adventure Island, the reading model put in place in 25 after-school centers, had the following first-year findings:

- The enhanced reading program was implemented as intended (in terms of staff characteristics, training, and usage of instructional materials).



- Students received an average of 176 minutes of reading instruction per week in the reading centers.
- Reading instructors reported that it was difficult to include all aspects of the reading program and maintain the intended pace of the daily lesson plan.
- The enhanced program provided students with 20 percent more hours of reading instruction over the school year, compared with students in the regular after-school program group.
- The students in the enhanced reading program did not experience a statistically significant impact on their performance on the SAT 10 reading test; there are positive and statistically significant program impacts on one of the two measures in the DIBELS fluency test.
- The reading program did not produce statistically significant impacts (either positive or negative) on any of the three school-day academic behavior measures: student engagement, behavior, or homework completion.

### **Implementation of the Enhanced Reading Program**

Overall, the strategies supporting the reading intervention were implemented as intended. Specifically, centers hired certified teachers (across the 25 centers, 99 percent of staff were certified) and operated the programs with the intended small groups of students — on average, 9 students per instructor. Instructors were trained by SFA at the beginning of the year and were provided ongoing assistance and paid preparation time.<sup>9</sup> The district coordinator reports from classroom observations of implementation indicate that 19 percent of Alphonie’s Lagoon and Captain’s Cove classes included four or fewer of the six elements identified as key to intended implementation by the developer; 13 percent of Discovery Bay and Treasure Harbor classes included three or fewer of the five core elements. Observations that included fewer than 70 percent of the core elements indicate that teachers had difficulty delivering specific aspects of the program — in particular, the methods to improve fluency and the ability to cover all the intended lesson elements in the allotted time. In addition, enhanced after-school program staff indicated that the expected pacing of instruction was problematic for daily lessons.

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<sup>9</sup>Enhanced reading program staff received two full days of upfront training on how to use the reading materials, including feedback from the developers in practice sessions using the materials. Ongoing support given to the enhanced program staff consisted of multiple on-site technical assistance visits (an average of three), continued support by locally based staff, and daily paid preparation time of 30 minutes.

## **The Service Contrast in Reading**

Students in the enhanced reading program were offered and attended a different set of services during the after-school academic time slot than students in the regular after-school program.

The enhanced program offered its students academic instruction in reading, whereas 12 percent of those in the regular after-school program group were offered academic instruction in reading, and the other students received primarily homework help and/or tutoring on multiple subjects. Ninety-nine percent of staff members providing the instruction to the enhanced group students were certified teachers, compared with 60 percent of the regular after-school program staff. Additionally, 97 percent of enhanced staff received high-quality training to carry out their work, and 95 percent received ongoing support, compared with 58 percent and 55 percent of the regular program staff, respectively. These differences are statistically significant at the 0.05 level.

Students in the enhanced program group attended, on average, 48 more hours of academic instruction over the course of the school year than the regular program group received (55.0 hours compared with 6.54 hours). Given estimates of average school-day instruction, this statistically significant finding represents an estimated 20 percent more hours of reading instruction for students in the enhanced program. Students in the enhanced program group attended 10 percent more days than those in the regular after-school program group, and this difference is statistically significant (effect size = 0.19).

## **Impacts of the Enhanced Reading Program**

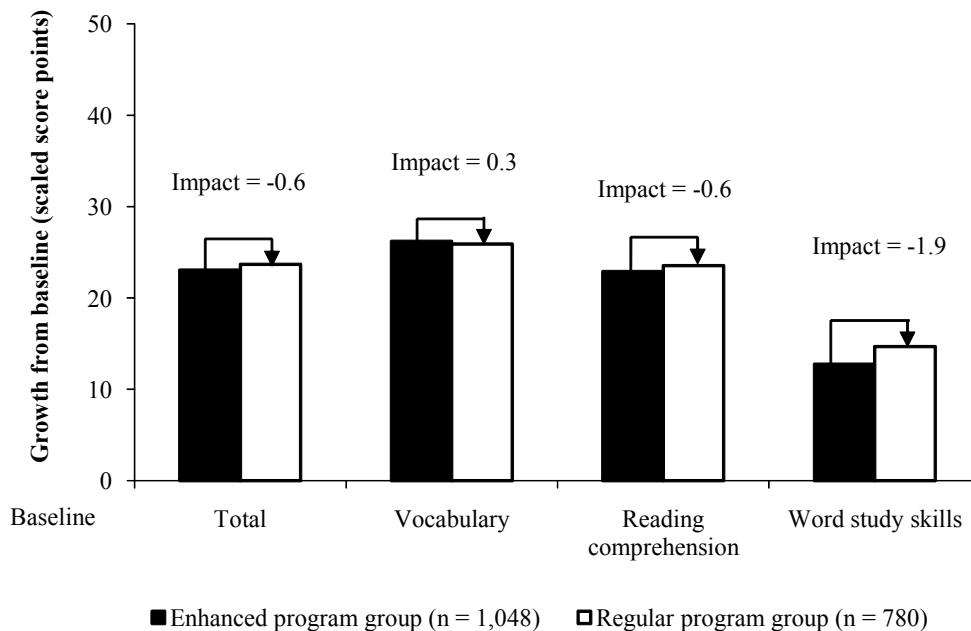
Overall, the students in the first year of the enhanced reading program did not experience a statistically significant impact on their performance level on SAT 10 reading tests (total and subtests), above and beyond the level that they would have achieved had there been no enhanced program. This is true for both the full analysis sample and the subgroups defined by grade level and prior achievement. Figure ES.2 illustrates the amount of growth for both the enhanced and the regular program groups in reading over the school year and the lack of a statistically significant difference.

On the other hand, analysis shows that the enhanced reading program produced statistically positive gains in one of two measures of fluency for the younger students in the study sample. The enhanced program group scored 3.7 points higher (effect size = 0.12) in the non-sense word fluency subtest of DIBELS, which targets the alphabetic principle. However, after

**The Evaluation of Academic Instruction in After-School Programs**

**Figure ES.2**

**Student Growth on Test Scores from Baseline to Follow-Up and the Associated Impact of the Enhanced Reading Program**



SOURCES: MDRC calculations are from baseline and follow-up results on the Stanford Achievement Test Series, 10th ed. (SAT 10) abbreviated battery.

NOTES: The estimated impacts on follow-up results are regression-adjusted using ordinary least squares, controlling for indicators of random assignment, baseline reading total scaled score, race/ethnicity, gender, free-lunch status, age, overage for grade, single-adult household, and mother's education. Each dark bar illustrates the difference between the baseline and follow-up SAT 10 scaled scores for the enhanced program group, which is the actual growth of the enhanced group. Each light bar illustrates the difference between the baseline SAT 10 scaled score for the enhanced program group and the follow-up scaled score for the regular program group (calculated as the follow-up scaled score for the enhanced group minus the estimated impact). This represents the counterfactual growth of students in the enhanced group.

A two-tailed t-test was applied to each impact estimate. Statistical significance is indicated by (\*) when the p-value is less than or equal to 5 percent.

Spring administration of the SAT 10 to fifth-graders does not include word study skills. Thus, the sample of students reporting follow-up scores on the word study skills subtest differs from the sample with baseline scores as well as from the sample with follow-up scores on the vocabulary and reading comprehension subtests, which do include fifth-graders.

accounting for multiple comparisons, the estimate is no longer statistically significant.<sup>10</sup> The estimated impact for the oral fluency measure is not statistically significant but is positive (effect size = 0.07).

The analysis also looks at impacts on three measures of student academic behavior — How often do they not complete homework? How often are they attentive in class? How often are they disruptive in class? — for all students in the sample as well as for the two sets of subgroups. Enrollment in the enhanced program did not produce statistically significant impacts on any of these measures for either the full analysis sample or the various subgroups.

### **Linking Local School Context to Reading Impacts**

While there was no overall statistically significant impact on academic achievement for all students in the analysis sample in the first year of the enhanced reading program, not all 25 centers in the study sample experienced this exact impact. Though the study was not designed with the power to detect impacts of Adventure Island at the level of individual centers, 11 of the 25 centers did have positive point estimates; 14 of the 25 had negative point estimates. Thus, the analysis explored the possibility of variation in impacts for students who attended different types of schools and experienced different program implementation.

Because the effectiveness of after-school instruction may be related to factors associated with program implementation or what the students experience during the regular school day, a correlational analysis was conducted to shed light on the possible moderating effects of school characteristics and factors of program implementation. Note that this analysis is nonexperimental and, thus, not causal; inferences drawn from it need to be interpreted with caution. The school characteristics included in the analysis are the hours of in-school instruction in the relevant subject, whether the school met its AYP goals, the proportion of students receiving free or reduced-price lunch, and the in-school student-to-teacher ratio. The analysis also links impacts to two factors of program implementation: the number of days over the course of the school year that the enhanced reading program was offered and whether a teacher from the enhanced program left during the school year.<sup>11</sup> No evidence was found linking the program impact on total reading scores to any of these school environment or implementation characteris-

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<sup>10</sup>The DIBELS nonsense word fluency subtest is one of six reading measures estimated for second- and third-grade students. When accounting for multiple test corrections using the Benjamini-Hochberg procedure, this estimate is no longer statistically significant. See Y. Benjamini and Y. Hochberg, “Controlling the False Discovery Rate: A New and Powerful Approach to Multiple Testing,” *Journal of the Royal Statistical Society, Series B*(57): 1289-1300 (1995).

<sup>11</sup>The types of reading curricula in use in schools during the regular school day were not available in a form that allowed the grouping of centers into categories.

tics. Additionally, the full set of characteristics is not correlated with the program impacts on the total reading SAT 10 score (p-value = 0.71).

## **Next Steps**

The original design of the Evaluation of Enhanced Academic Instruction in After-School Programs called for studying one year of program implementation. However, the study was expanded to include a second year of implementation and data collection using a sample of 15 math centers and 12 reading centers. This sample includes students who were part of the study in the first year and students who were new to the study in the second year, allowing the new wave of data collection to shed light both on the cumulative impact of the enhanced after-school program on returning students and on the impact of a more mature program on new students. Those results will be presented in the final report of the evaluation.



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