

Executive Summary

Supporting Student Success in Middle Schools: Examining the Relationship between Elementary Afterschool Program Participation and Subsequent Middle School Attainments

Young children come to school with a desire to learn (National Research Council, 1998). However, by the time they reach middle school, students often take only the minimum science and mathematics courses that are required of them (National Center for Educational Statistics, 2007a, 2007b). This is partly due to the fact that advanced science and mathematics courses at these grade levels are usually very demanding and require self-efficacy, good organizational skills, and critical thinking skills. Students who do not perceive themselves to be successful will not select and attend these classes. This perception, or academic self-efficacy, actually starts to form, not in middle or high school, but far earlier in elementary school. Thus, students' elementary experiences lay the foundation for their future learning choices and performance.

However, schools cannot control all the factors that influence student's learning, especially in disadvantaged, low-income neighborhoods where students attend low-performing schools. Recently, studies have shown that participation in high-quality afterschool programs can reduce these disadvantages. There is evidence that afterschool programs increase students' day school attendance (Schinke, Cole, & Poulin, 2000) and academic and social development (Durlak & Weissberg, 2007; Huang, Leon, La Torre, & Mostafavi, 2008; Lauer et al., 2006; Naftzger, Kaufman, Margolin, & Ali, 2006; National Research Council, 2003). This study extends these findings and examines whether participation in afterschool programs during students' elementary years affects their course-taking patterns, academic performances, and day school attendance in their middle school years. The study follows the afterschool program, Los Angeles' Better Educated Students for Tomorrow (LA's BEST), the largest afterschool program in California within the second largest school district (Los Angeles Unified School District) across the nation, as an example. Accordingly, the main research questions for the study are as follows:

1. Does participation in the LA's BEST afterschool program during elementary years have an effect on students' academic outcomes (i.e., primary course-taking, elective course-taking, grades and CST test scores) during their middle school years?
2. Does participation in LA's BEST directly or indirectly affect students' middle school attendance? What are the relationships between LA's BEST participation

and subsequent middle school attendance, middle school course grades, and end-of-middle school CST performances?

LA's BEST: The Program

LA's BEST was first implemented in the fall of 1988. This non-profit afterschool program is under the auspices of the mayor of Los Angeles, the superintendent of the Los Angeles Unified School District (LAUSD), a board of directors, and an advisory board consisting of leaders from business, labor, government, education, and the community.

LA's BEST seeks to provide a safe haven for at-risk students in neighborhoods where gang violence, drugs, and other types of anti-social behaviors are common. The program is housed at 180 LAUSD elementary schools and is designed for students in kindergarten through fifth/sixth grade. The LA's BEST sites are chosen based on certain criteria, such as low academic performance and their location in low-income, high-crime neighborhoods.

How LA's BEST Prepares the Students for Middle Schools

Middle school is a very different environment than elementary school. Proper preparation for this big change is important for the success of the students. For example, in middle school, students are expected to follow a much stricter behavioral expectation—they need to be able to follow the teacher's commands the first time without warnings. Students are also going to experience many environmental and workload changes in middle school. They will be switching to different classes throughout the day, and they will be expected to keep their work organized and to work to a higher standard. In other words, to be successful in middle school, students are expected to maintain a higher level of self-efficacy and to be more self-motivated and self-regulated. The LA's BEST afterschool program seeks to provide opportunities for students to develop these skills.

Promoting Self-efficacy at LA's BEST

According to Bandura (1982), self-efficacy can be acquired in a social learning environment in four ways: through performance attainment, by vicariously observing the experiences of others, through verbal persuasion by influential persons and allies, and by experiencing physiological states that are associated with self-appraisal across various situations. With the support of its caring staff members, LA's BEST can provide these conditions by engaging students with performances in arts, science projects, and physical activities; providing positive role models; supporting students with high expectations and

encouragement; and offering extra-curricular activities like group competition, public speaking, and so on, so that they can practice to become better at.

Promoting Self-regulation at LA's BEST

Self-efficacy is also related to self-regulation (Pintrich, 2004). Self-regulated students are effective at seeking help, group management, and other aspects of communication and teamwork (Newman, 2008).

LA's BEST provides students with activities to develop team skills such as conflict resolution. Furthermore, the program offers many opportunities to engage in hands-on, experiential activities that require teamwork and collaboration, such as team projects for a science fair. Consequently, collaborative skills are fostered, such as the ability to work effectively and respectfully with diverse teams, the flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal, and the assumption of shared responsibility for collaborative work as well as the value of individual contributions made by each team member.

Promoting Self-motivation and Self-evaluation at LA's BEST

One of the goals of LA's BEST is to provide a variety of experiences that are meaningful to the students in order to inspire their interests and propel their motivation to learn. Studies have indicated that they are more likely to be self-motivated if they (1) know what is expected of them, (2) think the effort is worthwhile, and (3) feel they will benefit through effective performances (Pajares, 2007; Russek, 2006). A study on LA's BEST students' 21st century skills (Huang et al., 2010) found that LA's BEST students who participated regularly had better self-monitoring and self-evaluation skills.

Promoting School Attendance at LA's BEST

Since all the LA's BEST programs are located on school sites, LA's BEST staff work in collaboration with school teachers to engage students in school and afterschool activities. The LA's BEST staff attend the day school staff meetings when appropriate, help participating students and families that have a language barrier resolve communication problems at school, and assist students with homework so that students may develop positive attitudes towards school and learning.

Study Design

The study employed a quasi-experimental design that consisted of a longitudinal sample of academic, day school, and LA's BEST program data. The study sample was

composed of roughly 20,000 students from LAUSD schools that offered the LA's BEST program. The sample included a cohort of students who were in third grade during the school year of 2004-05. The students were further separated into two groups based on whether they did or did not participate in LA's BEST during the period from 2004-05 to 2006-07. Propensity-based weighting method was employed to minimize existing differences in student background characteristics between the participants and non-participants. Once this was completed, HLM analyses were applied to this panel structure to examine student academic outcomes during the students' middle school years. Students' outcomes were examined based on their level of intensity of participation in LA's BEST at third, fourth, and fifth grade. The study also used structural path models to examine the relationships among the students' middle school outcomes.

Defining the Study Sample

Since the formation of LA's BEST in 1988, the National Center for Research on Evaluation, Standards, & Student Testing (CRESST) has been conducting evaluations of the program. As a result, CRESST has collected and stored a longitudinal database on the students since 1992. This database includes student demographics, attendance information, and academic information such as CST achievement scores on English-language arts (ELA) and mathematics standardized tests. In this study, the database was combined with middle-school data obtained from LAUSD for the 2007-08 through 2009-10 school years.

These combined datasets are the basis for the study sample. The first step in generating a sampling frame consisted of going back through the historical records and tracking four years of background and CST achievement data for all students who were in third grade during the 2004-05 school year. This cohort of students was selected because seven years of consistent achievement data (2003-04 to 2009-10) was available. In addition, CRESST also used the LA's BEST participation data from the 2001-02 through the 2003-04 school years to identify students who did ($n = 10,104$) or did not participate ($n = 9,840$) in the program prior to their third grade year. Since self-selection into LA's BEST presents a major challenge when making comparisons with non-participants, this data from prior to the study period served an important role in reducing selection bias.

Defining Attendance Intensity

Recent studies have shown that intensity of participation is related to student outcomes (Frankel & Daley, 2007; Huang et al., 2008, 2009). In this study, an empirical approach very similar to sensitivity analysis was employed so that the outcome measures could be more carefully examined at gradually increasing increments (or thresholds) of the participation

intensity at LA's BEST. More specifically, for all outcome measures, analyses were conducted to examine the value added for LA's BEST participants beginning with a minimum average of 50 days per year of LA's BEST participation and gradually increasing the increments by an average of 10 days per year up to a maximum of 150 days per year of LA's BEST participation. These per-year participation averages were applied to the three-year treatment period.

Controlling for Existing Population Differences

Since random assignment is not possible for this study, a propensity-based weighting method was used. In this study, since multiple treatment groups (based on different intensities of participation in LA's BEST) were compared to the non-participants, multiple binomial logistic regression models were employed to create a propensity score for each comparison.

Weighting of the Sample

The purpose behind the creation of the propensity score was to control for differences in background characteristics that existed between the LA's BEST participants and non-participants. Indicators employed in this study included baseline achievement, parental education, ethnicity (% Hispanic and % Black), gender (% female), Limited English Proficient (LEP) status, and participation in LA's BEST in the pretreatment period. Additionally, a variable was included to indicate missing Grade 8 CST data to help account for selection issues of non-response. School-level variables indicating the percentage of students participating in LA's BEST in the pretreatment period were also included. The desired result was a sample with background characteristics very similar to what would be expected from a randomly controlled design. If a significant relationship between a given background variable and participation intensity was still present after this process, it was included as a covariate in the HLM model.

Data Analysis Methods

To address the first research question, HLM models were used to produce value added estimates. Path analyses were used to examine the second research question.

Hierarchical Linear Modeling

For all HLM models, students (Level 1) were nested within middle schools (Level 2). The primary Level 1 (student level) variable was used as an indicator for treatment status. This indicator had a value of one when a student attained the level of LA's BEST

participation being tested and a value of zero when a student did not participate in LA's BEST during the three-year treatment period. The value added estimates were based on the resulting model coefficient for this treatment indicator. In addition, variables for student baseline CST performance in ELA and mathematics were also included in each model.

Structural Equation Modeling

Path analyses were then used to examine the second research question. Structural equation modeling using EQS software was employed to test whether or not the models (two for math and one for ELA) fit the data well. In the models, it was hypothesized that consistent LA's BEST participation would influence day school attendance in middle school. In addition, it was hypothesized that consistent LA's BEST participation would influence middle school course performance either directly or indirectly through its influence on day school attendance.

Study Findings

Using an HLM approach off the weighted sample, value added estimates were produced for increasing thresholds of LA's BEST participation. The estimates were produced for Grade 8 school grade point averages (GPAs) in math, language arts, science, and history, as well as for CST results in math and language arts.

Estimated Value Added of LA's BEST Attendance on Middle School Achievement

Student Grades. Value added results for course GPA in math and language arts are shown in Table 1. Students who participated in LA's BEST for a minimum of 50 days showed a statistically significant ($p < 0.01$) benefit of 0.21 math GPA points based on their value added estimate. The value added estimate associated with algebra GPA gradually increased at each of the 10-day thresholds and peaked at 0.24 GPA points for students who attended LA's BEST for a minimum of 140 days.

Similarly, the value added estimate associated with language arts GPA gradually increased. The value added estimate became significant ($p < 0.05$) for students who participated in LA's BEST for a minimum of 140 days at 0.12 GPA points.

For students who participated in LA's BEST for a minimum of 140 days, all three value added estimates (ELA, general math, and algebra) were positive and statistically significant, although the effect size for language arts was small and about one half the size of the estimate in the math courses.

Table 1

Estimated Impact of LA’s BEST Intensity of Participation on Grade 8 Math and ELA GPAs

Level of LA’s BEST participation	Estimated Value Added in GPA Points on Grade 8 GPAs		
	ELA GPA	General Math GPA	Algebra GPA
Less than 50 days average	-0.08 *	0.07	-0.07 *
Minimum 50 day average	0.00	0.21 **	0.04
Minimum 60 day average	0.01	0.19 **	0.05
Minimum 70 day average	0.02	0.19 **	0.08 *
Minimum 80 day average	0.02	0.21 **	0.09*
Minimum 90 day average	0.04	0.22**	0.12**
Minimum 100 day average	0.05	0.24**	0.13**
Minimum 110 day average	0.06	0.24**	0.15**
Minimum 120 day average	0.09	0.24**	0.17**
Minimum 130 day average	0.10	0.25**	0.18**
Minimum 140 day average	0.12*	0.25**	0.24**
Minimum 150 day average	0.11*	0.30**	0.19**

Note. ELA = English-language arts; GPA = Grade point average.

* p < .05. ** p < .01.

Table 2 displays the value added results for Grade 8 course GPA in science and history. As with math and language arts courses, there was a gradually increasing value added estimate associated with increases in the LA’s BEST participation intensity threshold. For science and history, the value added estimate did not become statistically significant until the participation intensity threshold reached a minimum of 70 days in science and 80 days in history. The value added estimate for both science (0.24 GPA points) and history (0.19 GPA points) peaked for students who participated a minimum of 140 days.

Table 2

Estimated Impact of LA's BEST Intensity of Participation on Grade 8 Science and History GPAs

Level of LA's BEST Participation	Estimated Value Added on Grade 8 GPA	
	Science GPA	U.S. History GPA
Less than 50 day average	-0.04	-0.04
Minimum 50 day average	0.07	0.06
Minimum 60 day average	0.08	0.06
Minimum 70 day average	0.09*	0.08
Minimum 80 day average	0.09*	0.10*
Minimum 90 day average	0.11*	0.12**
Minimum 100 day average	0.13**	0.13**
Minimum 110 day average	0.15**	0.14**
Minimum 120 day average	0.18**	0.16**
Minimum 130 day average	0.20**	0.15**
Minimum 140 day average	0.24**	0.19**
Minimum 150 day average	0.24**	0.17**

Note. ELA = English-language arts; GPA = Grade point average.

* $p < .05$. ** $p < .01$

CST Scores. Value added results for Grade 8 CST scores in math and ELA are shown in Table 3. In general, similar to GPA results, there was a gradually increasing value added estimate associated with increases in the LA's BEST intensity of participation threshold.

The value added estimate became statistically significant at the intensity threshold of a minimum of 50 days in general math and 120 days in algebra. For algebra, the value added estimate peaked for students who participated a minimum of 140 days (7.30 scale score points), while in general math CST, the value added estimate peaked for students who participated a minimum of 150 days (7.91 scale score points). Value added results in general math were less stable than in algebra, likely due to a smaller sample size.

Table 3

Estimated Impact of LA's BEST Intensity of Participation on Grade 8 Math and ELA CST Scores

Level of LA's BEST Participation	Estimated Value Added on Grade 8 CST (scale score units)		
	ELA CST	General Math CST	Algebra CST
Any attendance	-0.28	2.00	-1.78
Minimum 50 day average	1.46	3.96*	2.59
Minimum 60 day average	1.53	3.39	3.37
Minimum 70 day average	1.60	3.34	3.76
Minimum 80 day average	2.11	4.28*	4.03
Minimum 90 day average	1.79	4.74**	4.56
Minimum 100 day average	1.87	5.79**	4.63
Minimum 110 day average	1.70	7.19**	4.77
Minimum 120 day average	2.42	6.60**	5.85*
Minimum 130 day average	2.69	6.69**	6.10*
Minimum 140 day average	3.13	6.27*	7.30*
Minimum 150 day average	2.29	7.91**	5.4

Note. CST = California Standards Test; ELA = English-language arts.

* $p < .05$. ** $p < .01$.

Based on these analyses, results reveal that achievement increases as LA's BEST participation intensity increases. Effect begins to take place when students attended a minimum of 50 days per year, and the positive effect increases incrementally and peaks at a minimum of 140 days of participation per year. These two thresholds (<50 and <140) were used for the rest of the analyses in this report.

Value Added Estimates of Middle School Course-Taking Patterns

Middle school course-taking percentages and value added odds ratios for math and English are presented in Table 4.

Math. The general course-taking pattern is for students to take four core math classes in Grades 6 and 7, followed by either algebra readiness or algebra in Grade 8. Over 80% of the students who participated in LA's BEST at either a minimum of 50 and 140 days per year

took all four core math classes as required in Grades 6 and 7. There were no significant value added differences for this benchmark.

In Grade 8, more students completed the algebra sequence as opposed to algebra readiness. The value added odds ratio for students participating in LA's BEST for a minimum of 140 days was significant, indicating that these students were 1.26 times more likely to take both algebra classes (Algebra AB) as compared to non-participants.

English-language Arts. The general course-taking pattern in English classes is for students to take six core English classes in Grades 6 through 8. In cases when determined to be beneficial to students, they may take English as a Second Language (ESL) classes in place of the core classes. In addition to the core English classes, students may also take English intervention or English elective classes. Close to 70% of the students who participated in LA's BEST at either a minimum of 50 or 140 days per year took all six core English classes. There were no significant value added differences for this benchmark.

There were also no significant value added differences for either the ESL or the intervention class benchmark. However, for LA's BEST students who participated at either at the 50 or 140 days thresholds, the value added odds ratio was significant for taking English elective classes, indicating they were somewhat less likely to take any elective English classes (such as creative writing, creative expression, humanities, etc.) as compared to those students who did not participate in LA's BEST.

It should be noted that the offering of elective classes varies across schools, and not many electives classes are offered across the study school sites. Other elective classes students may take include arts, computer, and technology classes that were examined separately. Some students may opt to take these choices rather than English electives.

Table 4
Middle School Math and English Course-Taking Patterns

Variable	Average LA's BEST intensity of participation (2004-05 to 2006-07)			
	<u>Minimum 50 day model (n = 4,212)</u>		<u>Minimum 140 day model (n = 1,309)</u>	
	% taking	Value Added Odds Ratio	% taking	Value Added Odds Ratio
% taking CST in Grade 8	73.8	---	81.3	---
Math - Of those taking CST in Grade 8				
% taking four core classes in Grades 6, 7	83.3	1.00	82.4	0.98
% taking both Algebra Readiness Classes	36.7	0.95	33.3	0.87
% taking both Algebra Classes	55.3	1.05	60.8	1.26*
English Arts - Of those taking CST in Grade 8				
% taking six core classes in Grades 6-8	67.7	1.01	71.8	1.09
% taking any ESL classes in Grades 6-8	21.1	0.91	17.8	0.83
% taking any intervention classes in Grades 6-8	28.4	1.07	27.3	1.04
% taking any English elective classes in Grades 6-8	20.6	0.88*	19.9	0.85*

Note. CST = California Standards Test; ESL = English as a second language.

*p < .05.

Effect of Participation on Course-taking and Academic Achievement

Middle school academic achievement results for math and English are presented in Table 5. Results include GPA and CST scale score means along with the estimated value added for LA's BEST participation.

Math. Students who participated in LA's BEST for a minimum of 50 days and took the algebra readiness sequence with the general math CST had significant and positive value added estimates. Estimates indicate that these students received a 0.21 benefit to their GPA, and about a four-scale-point benefit to their general math CST attributable to their LA's BEST participation.

Students who participated in LA's BEST a minimum of 140 days had significant and positive value added estimates associated with all middle school math outcomes. The value added in the Grade 6 and 7 core math classes was smaller (0.15 points). In Grade 8, these students had stronger and similar value added estimates whether they took algebra readiness (0.25 GPA points) or algebra (0.24 GPA points). As for math CST performance in Grade 8, those taking the general math CST received about a six-scale-point benefit versus non-participants, while those taking algebra received about a seven-scale-point benefit attributable to their LA's BEST participation.

English-language Arts. Students who participated in LA's BEST at the threshold of a minimum of 50 days did not show any significant findings relative to their value added estimates in language arts. For students who participated in LA's BEST at the threshold of a minimum of 140 days, estimates indicate that these students received a small benefit of 0.15 GPA points on their core English classes in Grades 6 and 7 and a very small benefit of 0.12 GPA points in the Grade 8 core English class in comparison to the non-participants. There was no significant finding in value added to English CST scale scores at either intensity threshold.

Table 5

GPA by LA's BEST Attendance Intensity, of the Grade 3 Cohort

Variable	Average LA's BEST intensity of participation (2004-05 to 2006-07)			
	<u>Minimum 50 day sample</u>		<u>Minimum 140 day sample</u>	
	GPA/Mean	Value Added	GPA/Mean	Value Added
Math				
GPA in four core classes in Grades 6, 7	2.19	0.03	2.33	0.15**
GPA in algebra readiness classes	1.87	0.21**	1.87	0.25**
GPA in algebra classes	2.05	0.04	2.27	0.24**
Grade 8 general math CST	307.4	3.96*	312.2	6.27*
Grade 8 algebra math CST	329.6	2.58	337.5	7.30*
English Arts				
GPA in core classes in Grades 6, 7	2.30	0.05	2.44	0.15**
GPA in core classes in Grades 8	2.19	0.00	2.33	0.12*
GPA in ESL classes in Grades 6-8	2.04	-0.01	2.11	0.06
GPA in intervention classes in Grades 6-8	2.51	-0.02	2.62	0.08
GPA in elective classes in Grades 6-8	2.64	-0.07	2.21	0.06
Grade 8 ELA CST	326.8	1.46	332.4	3.13

Note. CST = California Standards Test; ELA = English-language arts; ESL = English as a second language; GPA = Grade point average.

* $p < .05$. ** $p < .01$

Path Model Results of LA's BEST Attendance Intensity on Middle School Outcomes

To fully examine the sequential relationships between LA's BEST participation, day school attendance in 6th grade, middle school course performance in math and language arts, and performance on the CSTs in the spring of 2009-10, three path models were hypothesized. Each of the path models was produced to test the effects for the two thresholds of LA's BEST intensity of participation. For math, two models were applied: one for students who took algebra readiness and the general math CST; and the other model for students who took algebra in Grade 8 along with the algebra CST. Only one model was necessary for ELA. In each of the three models, variables for baseline student and school mean CST performances were included as covariates. These covariate paths are not displayed in the path diagrams;

additionally, non-significant paths are not presented in the model for better visual interpretation. All path model comparisons were propensity weighted. Figure 1 presents the algebra model. The other two models are shown in the full report.

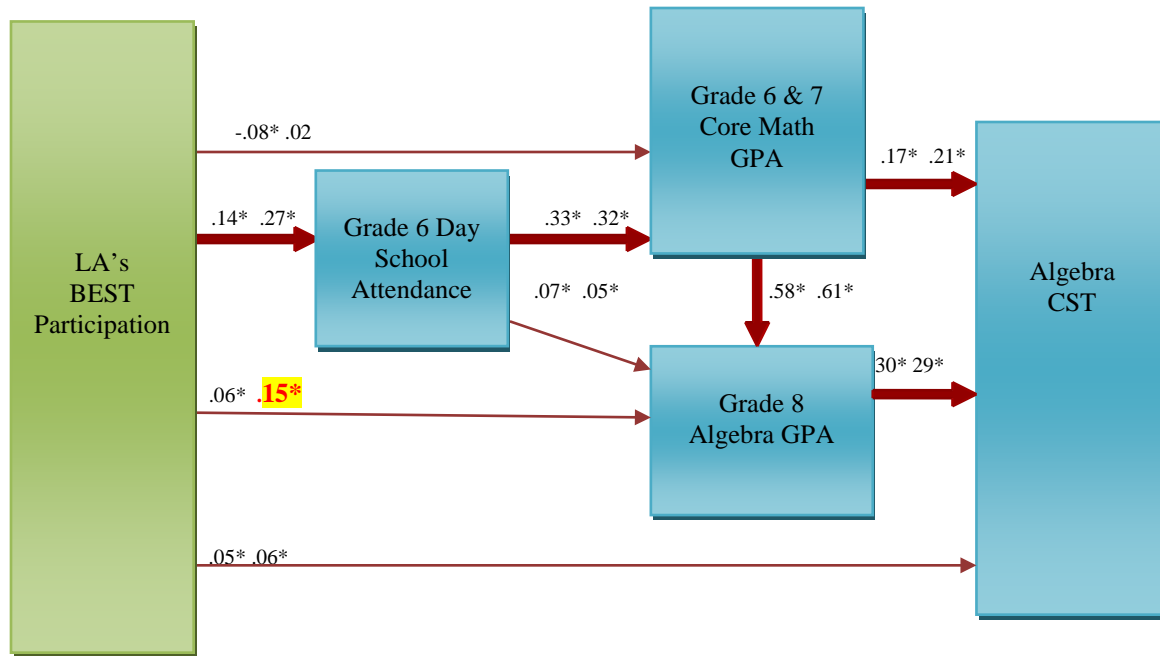


Figure 1. The algebra CST model.

Path Model Results for Students Taking Algebra CST. For the Algebra CST Model, there is a significant direct effect of LA's BEST participation on day school attendance in Grade 6. This is true for both thresholds of intensity of participation, although the effect size for students who participated a minimum of 140 days is nearly double that of those who participated a minimum of 50 days.

In addition, there is a small direct effect of LA's BEST participation on the algebra GPA in Grade 8 for students who participated a minimum of 140 days. All other direct effects of LA's BEST participation, though significant, are of small and close to negligible effect sizes.

As shown in the bolded paths, the model results indicate that most of the important effects of LA's BEST participation appear to occur indirectly through the positive effect of LA's BEST participation on day school attendance. As expected, day school attendance in Grade 6 has a positive direct effect on GPA in the core math classes in Grades 6 and 7, and the core math GPA in Grades 6 and 7 has a positive direct effect on the algebra GPA in

Grade 8. Algebra GPA then has a positive direct effect on the algebra CST scores. Additionally, the core math GPA in Grades 6 and 7 also has a positive direct effect on the algebra CST scores.

Path Model Results for Students Taking General Math CST. Similar to the algebra model, the general math model also shows that those who took general math exhibited a significant positive direct effect of LA's BEST participation on day school attendance. Also similar to the algebra model, most important effects of LA's BEST participation appear to occur indirectly through the LA's BEST participation effect on day school attendance.

In this model, day school attendance in Grade 6 has its positive direct effect associated with GPA in the core math classes in Grades 6 and 7, and the core math GPA in Grades 6 and 7 has a direct positive effect on the algebra readiness GPA. Algebra readiness GPA in turn has a direct positive effect on the general math CST scores. The core math GPA in Grades 6 and 7 also has a direct positive effect on the general math CST scores.

Path Model Results for Students Taking English-language Arts CST. Also similar to the above models, for this model there is a significant direct effect of LA's BEST participation on students' day school attendance in Grade 6. This is true for both thresholds of participation intensity, although the effect size for students who participated at a minimum of 140 days is higher than for those who participated at a minimum of 50 days.

Similarly, students' day school attendance in Grade 6 has its significant positive effects associated with GPA in the core ELA classes in Grades 6 and 7 that, in turn, directly impact the students' Grade 8 ELA GPA outcomes. It should be noted that both the core GPA in Grades 6 and 7 and the GPA in Grade 8 has positive direct effects on the Grade 8 CST ELA performances.

Discussion and Conclusion

Research indicates that school attendance is strongly associated with students' academic and social development (Balfanz & Byrnes, 2006; Johnson, 2000). At the same time, it has been suggested that the supportive environment fostered by high-quality afterschool programs stimulates more sense of belonging and interest in school for the afterschool participants (Palmer et al., 2009), thus leading to association with higher attendance during the school day (Schinke et al., 2000). The findings of this study support and further this notion by indicating that participation in LA's BEST in the elementary years has a long-term effect on these participants' sixth grade school attendance. Through this

association, LA's BEST participants are also anticipating a better academic experience in their middle school years, such as getting better grades.

It is important for students to obtain good grades during their middle school years. Research in Philadelphia indicates that approximately 50% of the eventual dropouts in high school could be identified based on course grades or attendance, or both, before entering high school (Neild & Balfanz, 2006a, 2006b). Furthermore, research has noted significant declines in academic achievement following the elementary to middle school transition (Gutman & Midgley, 2000). Along with achievement declines, students' self-concept of ability and motivation also suffer (Mizelle & Irvin, 2000). Significantly, these negative effects have been found to be most pronounced in students' achievement in and attitudes toward mathematics (Eccles, Wigfield, Harold, & Blumenfeld, 1993).

With these evidences, it is encouraging for this study to find that participation in LA's BEST during the elementary years helped to improve students' math performance both at the GPA and the CST levels. Additionally, this study also reveals that higher intensity of participation in LA's BEST also leads to higher GPAs in science and history in eighth grade. As for middle school course taking patterns, the LA's BEST participants of a minimum of 140 days have a significant positive value added estimate in their taking algebra in eighth grade, which indicates that these students were 1.26 times more likely to take algebra classes as compared to the non-participants. These findings are particularly reassuring in light of the anticipated decline in math efficacy and attitudes towards math upon entrance into middle school. Also encouraging is the fact that these findings come at a time when a solid foundation and interest in math is so critical to future academic studies and careers in science, technology, and engineering—the areas with great shortages of talent in our country (Committee on Prospering in the Global Economy of the 21st Century, 2006).

In comparison, while participation in LA's BEST does have its value added to participants' middle school English GPA, the effect is smaller than math. The demographic profile revealed that the majority of LA's BEST participants are English Learners. Perhaps this language barrier played a role in the benefits the participating students received. Future studies should examine this phenomenon in more detail. Meanwhile, it is highly encouraging that LA's BEST participants reaped benefits in math for both math GPA (whether they took the general math or algebra) and math CST scores (whether CST general math or CST algebra) in middle school. LA's BEST can add more program elements to specifically target English-language arts development so that participants can receive similar benefits.

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