

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

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TABLE OF CONTENTS

Chapter I: Introduction.....	5
Importance of School Attendance and Middle School Success.....	6
Chapter II: How LA’s BEST prepares Its Students for Middle School.....	8
Los Angeles’ Better Educated Students for Tomorrow	8
Promoting Self-efficacy at LA’s BEST	9
Promoting Self-regulation at LA’s BEST.....	9
Promoting Self-motivation and Self-evaluation at LA’s BEST	9
Promoting School Attendance at LA’s BEST	10
Chapter III: Getting started: course-taking patterns in middle school.....	12
Core Curriculum	12
Supplementary/Elective Curriculum.....	12
Honor & Advanced Placement Classes	13
Importance of Taking Algebra in 7 th Grade.....	13
Chapter IV: Study Design and Methodology.....	15
Defining the Study Sample	15
Defining Attendance Intensity	16
Controlling for Existing Population Differences	16
Weighting of the Sample	17
Data Analysis Methods.....	17
Hierarchical Linear Modeling.....	17
Structural Equation Modeling.....	18
Chapter V: Analysis RESULTS.....	19
Student Demographic Characteristics and Intensity of Participation	19
HLM Results - Estimated Value Added of LA’s BEST Attendance Intensity on Middle School Achievement: Grades and CST scores.....	20
Student Grades	21
CST Scores.....	23
Value Added Estimates of Middle School Course-Taking Patterns.....	24
Math and English Course-Taking Patterns	25
Additional Course-Taking Patterns.....	27
Effect of Participation on Course-taking and Academic Achievement	27
Path Model Results of LA’s BEST Attendance Intensity on Middle School Outcomes	29
Chapter VI: Discussion and Conclusion.....	34
Importance of School Attendance.....	34
Importance of Course Grades in Middle School.....	34
Taking Algebra by Eighth Grade	35
Conclusion and Recommendation	37
References.....	39

INDEX OF TABLES

Table 1	Core Middle School Curriculum
Table 2	Electives Available for LAUSD Middle Schools
Table 3	Pathways for Math in LAUSD Middle Schools.
Table 4	Background Variables by LA's BEST Intensity of Participation, Weighted Sample of the Grade 3 Cohort
Table 5	Estimated Impact of LA's BEST Intensity of Participation on Grade 8 Math and ELA GPAs
Table 6	Estimated Impact of LA's BEST Intensity of Participation on Grade 8 Science and History GPAs
Table 7	Estimated Impact of LA's BEST Intensity of Participation on Grade 8 Math and ELA CST Scores
Table 8	Middle School Math & English Course-Taking Patterns
Table 9	Middle School History, Science, and Additional Course-Taking Patterns
Table 10	GPA by LA's BEST Attendance Intensity, of the Grade 3 Cohort

CHAPTER I: INTRODUCTION

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.

Research has shown that high-performing elementary schools often provide various opportunities for students to develop their efficacies, study habits, and aspirations through extracurricular activities and rigorous course work; these activities also foster the development of social, communication, collaboration, and critical thinking skills that employers value (Partnership for 21st Century Skills, 2003 and 2007). However, with the strict accountability measures of the No Child Left Behind Act, struggling schools in disadvantaged neighborhoods are increasingly cutting extracurricular programs and activities in order to focus almost exclusively on achieving adequate yearly progress on state-mandated standardized tests. These schools seem to assume that if schools just teach and test the basic skills, students are going to do much better in school and in life. Yet, evidence has shown that to be successful as independent learners, students need to develop a more comprehensive set of skills, such as self-efficacy and self-regulation, rather than focus exclusively on the development of the basic skills (Partnership for 21st Century Skills, 2008).

Fortunately, the literature on afterschool programs provides evidence of a positive relationship between participation in afterschool programs and the development of work and study habits, increased day school attendance (Palmer, Anderson, & Sabatelli, 2009), and future academic achievement (Durlak & Weissberg, 2007; Huang, Leon, La Torre, & Mostafavi, 2008; Lauer et al., 2006; National Research Council, 2003; Partnership for 21st Century Skills, 2008). Based on 2004-2005 survey data of 21st CCLC centers, Naftzger and his associates (2006) report that 33% of regular afterschool attendees increased their math proficiency and 33% increased their literacy proficiency. While the positive short-term effects of afterschool programs have been publicly recognized, there is a dearth of literature examining the long-term effect of participation during elementary school on subsequent middle school attainment. This study

intends to reduce this research gap by investigating the effect of afterschool participation during elementary school on day school attendance, course-taking patterns, course grades, and California Standards Test (CST) achievement in middle school.

Importance of School Attendance and Middle School Success

Students' school attendance, middle school course grades, and course-taking patterns are important factors for academic success.

Regarding school attendance, literature indicates that it is strongly associated with student achievement (Balfanz & Byrnes, 2006; Johnson, 2000). Several studies have deemed attendance as important enough to be evaluated as an academic outcome on its own (Lehr, Sinclair, & Christenson, 2004; Sheldon, 2007), thereby suggesting that increased attendance is a direct indicator of school success. Conversely, there are many dire consequences associated with constant absenteeism in school. For example, having consistently low levels of school attendance is correlated with higher future academic risks, including retention (Neild & Balfanz, 2006a, 2006b) and dropping out (Rumberger & Thomas, 2000). There are also sociological and economic consequences as well. Sociologically, decreased attendance is related to increased alienation from classmates, teachers, and schools (Johnson, 2005) and is also correlated with current and future risky behaviors, such as tobacco, alcohol, and drug use (Halfors et al., 2002; Wang, Blomberg, & Li, 2005). Economically, students who do not attend school as frequently tend to face greater future financial hardships such as unemployment (Broadhurst, Patron, & May-Chahal, 2005; Kane, 2006). Therefore, improving day school attendance is necessary to ensure students' positive academic and social development.

Examining middle school course grades and course-taking patterns is also important because middle school marks the beginning in charting the education courses for students. The education students receive in high school is influenced by their middle school grades and coursework. According to the National Education Longitudinal Study (U.S. Department of Education, 2008), approximately 60% of the students who took calculus in high school took algebra in eighth grade. In addition, the typical high school sequence of rigorous science courses (biology, chemistry, and physics) also necessitates an early background of successes in algebra and geometry. Students who do not complete prerequisite and required courses satisfactorily early enough not only risk being unable to take more rigorous courses in high school, such as Advanced Placement (AP) and Honor classes, but also may not have time in their schedules to take other courses that can help prepare them for college or a career.

Since literature provides evidence of a positive relationship between participation in afterschool programs and the development of work and study habits, this 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 across the Nation (Los Angeles Unified School District), 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?

CHAPTER II: HOW LA'S BEST PREPARES ITS STUDENTS FOR MIDDLE SCHOOL

Middle school is a very different environment from 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.

Los Angeles' Better Educated Students for Tomorrow

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.

LA's BEST is a free program open to all students in the selected sites on a first-come, first-serve basis. The program supports day school attendance through its policies, which encourage students to attend five days a week in order to reap the full benefits of the program offerings.

Since its inception in 1988, LA's BEST has adapted and updated its goals in response to educational policies, research, and theory. Over the years, the program has moved past its initial emphasis on providing a safe environment and educational enrichment to an emphasis on the development of the whole-child. In developmental theory, a whole-child curriculum is one that cultivates the development of students' intellectual, social, and emotional well-being so that children can achieve their full potential (Hodgkinson, 2006; Schaps, 2006).

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:

- Performance attainment can be promoted by offering activities that foster students' confidence and perceived competence (e.g., performances in arts, science projects, and physical activities).
- Vicarious observation can be achieved by offering students positive experiences and interactions with accomplished individuals at the program who share commonalities with the students (e.g., afterschool personnel who are attending a four-year college).
- Verbal persuasion can take place when staff offers encouragement and appraisal of the students and of teacher/parent expectations.
- Since physiological states such as anxiety, stress, fatigue, and mood also contribute to efficacy beliefs, LA's BEST can also offer opportunities for students to practice regulating these physiological states and to improve their cognitive self-appraisal by allocating time and space for challenging activities (e.g., participation in public speaking or competitive sports).

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, the following collaborative skills are fostered:

- the ability to work effectively and respectfully with diverse teams,
- a 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 students 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).

Additionally, 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. According to Bandura (1997), Pajares (1996), and Schunk (1995), there are four stages in teaching students self-evaluation:

1. Helping students define the criteria that will be used to evaluate their work,
2. Helping students apply the criteria to their work,
3. Providing feedback to students' self-evaluation, and
4. Helping students develop productive goals and action plans using these evaluations.

Many LA's BEST activities engage students in learning these skills. The following are example activities that expose LA's BEST students to lessons of self-regulation and self-evaluation.

Adventures in Peacemaking is a curriculum that uses The Peaceable Program approach toward teaching tolerance and conflict resolution skills to young people. The program, which teaches through reading activities and group discussions, emphasizes cooperation, emotional expression, communication, appreciation for diversity, and conflict resolution.

Junior Achievement teaches the LA's BEST students the basic concepts of business, economics, and work readiness. The program includes six sequential themes for kindergarten through fifth grade students that lay the groundwork for financial literacy and productive citizenship in a global economy.

LA's BEST Celebrate Science Program provides opportunities for LA's BEST students to have fun, engaging, interactive science experiences under a "team inquiry" model—developed under the guidance of NASA/Jet Propulsion Laboratory. This program culminates with the citywide Celebrate Science Fair, where winning teams are awarded all-expenses-paid trips to a parent-child weekend at the U.S. Space Camp in Huntsville, Alabama.

Promoting School Attendance at LA's BEST

Since all the LA's BEST programs are located on school sites, LA's BEST staff works 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 to resolve communication problems at school,

and assist students with homework so that students may develop positive attitudes towards school and learning.

These LA's BEST experiences are tailored to develop positive attitudes towards school and learning, self-efficacy, and self-regulation.

The following chapter describes the courses available in the Los Angeles Unified School District (LAUSD) middle schools.

**CHAPTER III:
GETTING STARTED: COURSE-TAKING PATTERNS IN MIDDLE SCHOOL**

This study investigates whether participation in the LA’s BEST afterschool program helps prepare students for success in middle school by examining the participants’ course-taking patterns and achievement patterns during their middle school years. This chapter describes the types of courses and sequences available in the LAUSD middle schools.

Core Curriculum

The middle school curriculum has traditionally included both core and supplementary/elective courses. Core courses generally include language arts, social studies, science, mathematics, and sometimes reading. A list of the core curriculum required by LAUSD for middle school students is provided in Table 1.

Table 1
Core Middle School Curriculum

Grade 6	Grade 7	Grade 8
Eng/Read 6AB	English 7AB	English 8AB
World History and Geography: Ancient Civilization 6AB	World History and Geography: Medieval and early Modern Times 7AB	United States History and Geography: Growth and conflict 8AB
Math 6AB	Math 7AB	Algebra 1AB (or Algebra Readiness AB)
Science/Health 6AB	Science 7A Health AB	Science 8AB
Physical Education	Physical Education	Physical Education
Elective	Elective	Elective

Note. A = First part of the course, taken during the fall semester of the school year; B = Second part of the course, taken during the spring semester of the school year.

Supplementary/Elective Curriculum

Supplementary/elective courses such as drama, foreign language, music, art, health, life skills, and technology provide middle school students with experiences in areas beyond the core subjects. These curricula are designed to give students a more rounded educational experience that provides exposure to many aspects of the humanities, the arts, and the sciences. A list of the classes provided by LAUSD to their middle schools is provided in Table 2.

Table 2

Electives Available for LAUSD Middle Schools

Electives	Grade 6	Grade 7	Grade 8
Arts	Varies by school site	Varies by school site	Varies by school site
Computer	Varies by school site	Varies by school site	Varies by school site
Humanities	<ul style="list-style-type: none"> • Exploratory Global World • Our World and Our Place AB 	<ul style="list-style-type: none"> • Exploratory Global World 	<ul style="list-style-type: none"> • Exploratory Global World • American Intercultural Heritage • Youth and Law • Youth and the administration of Justice • Consumer Economics and Law

Note. A = First part of the course, taken during the fall semester of the school year; B = Second part of the course, taken during the spring semester of the school year.

Honor & Advanced Placement Classes

Honor courses provide enriching, challenging curricula that engage high-achieving students. Subject matter in these courses is more sophisticated and complex, requiring good organizational skills, self-monitoring, and the ability to work both independently and in a team. Honor courses prepare students for the rigor of high school AP courses. Availability of these classes varies by school and by local needs.

Importance of Taking Algebra in 7th Grade

In middle school, due to the typically stratified nature of the courses to which students are assigned, students' initial math placement in middle school has a direct impact on their educational trajectories in mathematics (American School Counselor Association, 2005). Beginning in middle school, mathematics content and the mathematics course sequence become less fluid and less changeable. Once in a track, a student's placement is not likely to change to a higher-ability placement unless there is parental intervention (Trusty & Niles, 2003). This has a cumulative effect for post-secondary schooling because of its impact on college opportunities and career possibilities.

As shown in Table 3, there are three different pathways for mathematics courses in the LAUSD middle schools.

Table 3

Pathways for Math in LAUSD Middle Schools.

Pathways	Grade 6	Grade 7	Grade 8
A	Math 6 AB	Math 7 AB	Algebra Readiness AB
B	Math 6 AB	Math 7 AB	Algebra 1AB
C	Math 6 AB	Algebra 1AB	Geometry AB

Note. A = First part of the course, taken during the fall semester of the school year; B = Second part of the course, taken during the spring semester of the school year.

The next chapter will provide the study methods this study employed.

CHAPTER IV: STUDY DESIGN AND METHODOLOGY

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 between 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 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 ($n = 9840$) 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 was not possible for this study, a propensity-based weighting method was used. 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. Typically, these designs employ logistic regression to estimate the probability of a subject being in the treatment group versus being in the control group. The estimated propensity outcome was then used to create balance among the subject's background characteristics. This procedure can be completed using matching, stratum, or weighting techniques.

In this study, rather than a simple dichotomous treatment (LA's BEST participation), multiple treatment groups (different thresholds of participation in LA's BEST) were compared to the comparison group (non-LA's BEST participants). Thus, multiple binomial logistic regression models were used to model the relationships between the student background characteristics and the likelihood of membership in the treatment groups. These analyses resulted in a propensity score estimate for each student. 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. Three school-level variables (% of LA's BEST participants in kindergarten, Grade 1, and Grade 2) indicating the percentage of students participating in LA's BEST in the pretreatment period were also included. Each intensity level (threshold) of LA's BEST participation is compared to non-participants.

Furthermore, a general rule of thumb for statistics is that variables that may be affected by membership in the treatment group should not be included in the propensity models (Caliendo & Kopeinig, 2005). Since the LA's BEST programs are hosted by the schools that the students attend, participation in the program has the potential to influence the number of days a student attends school. Conversely, it is unlikely that LA's BEST participation would influence student enrollment in one of these host schools. Thus, the number of days enrolled in these schools during the treatment period, rather than day school attendance, is included in the propensity models.

Weighting of the Sample

After creation of the propensity score, each student from the comparison group was inversely weighted relative to their propensity outcome. For example, a comparison student (non-participant) with a high probability of belonging to the treatment group (LA's BEST) was weighted more heavily than a comparison student with a low probability of belonging to the treatment group. The treatment group did not receive any model weight. The weighted cases were also normalized so that the final weighted sample was the same size as the original unweighted sample. Because the treatment group was left unweighted, the analyses in this report reflect an average treatment effect on the treated. This weighting procedure is described in detail by Busso, Dinardo, and McCrary (2009). 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

The following describes the strategies and procedures used to examine the effects of LA's BEST on students' attendance, course-taking patterns, and achievement outcomes during middle school.

Hierarchical Linear Modeling

To address the first research question, HLM models were used to produce value added estimates. First, performance outcomes such as grade point averages and CST scale scores were treated as continuous measures with the assumption of a normal distribution. For these continuous outcomes, the typical two-level HLM regression model was applied. Second, the middle-school course-taking benchmarks were included as outcome measures. Each course-taking benchmark was a dichotomous (zero or one) outcome and required a two-level HLM logistic regression. All HLM regressions were calculated with the propensity weight applied to the non-participant population.

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 English-language arts and mathematics were also included in each model.

Structural Equation Modeling

Path analyses were 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 English-language arts) 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 (see Figure 1).

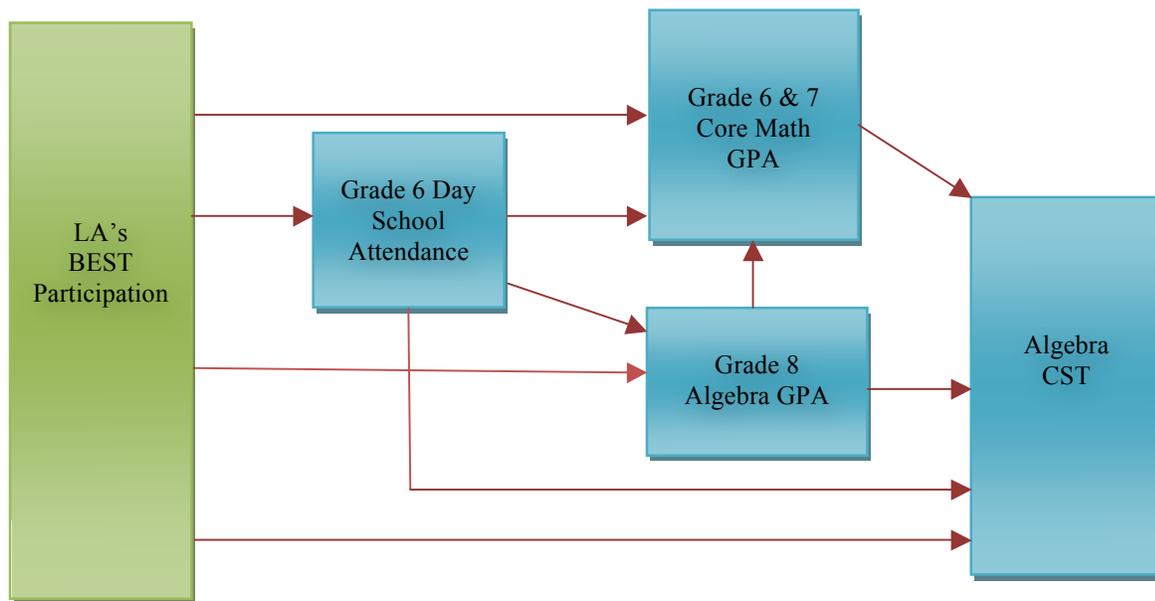


Figure 1. The hypothesized model for Algebra CST. CST = California Standards Test; GPA = Grade point average.

CHAPTER V: ANALYSIS RESULTS

Student Demographic Characteristics and Intensity of Participation

The student background characteristics before and after weighting are presented in Table 4. Characteristics for non-participants are displayed (1) without weight in the first column, (2) propensity-weighted for non-participants in comparison to students attending LA's BEST for a minimum of 50 days in column two, and (3) propensity-weighted for non-participants in comparison to students attending LA's BEST for a minimum of 140 days in column three.

Initially, most of the unweighted non-participant student background characteristics (9 of the 14) were significantly different from the characteristics of students who participated in LA's BEST for a minimum of 50 days. Similarly, 11 of the 14 unweighted non-participant student background characteristics were significantly different from the characteristics of students who participated in LA's BEST for a minimum of 140 days. Thus, in order to attribute differences in achievement outcomes solely due to intensity level of participation, it is necessary to control for these background differences. As shown in Table 4, after propensity weighting was applied, there was no significant difference between non-participants and participants with a minimum average participation of 140 days. However, when comparing participants with a minimum of 50 days to non-participants, even though the effect sizes were small, a few student background characteristics remained significantly different. These variables included the baseline CST scores, the percentage of Black students, and the percentage of students who participated in LA's BEST when they were in kindergarten. To ensure that these variables were fully controlled, they were included as covariates in the HLM models for students who participated in LA's BEST for a minimum of 50 days. In addition, the baseline CST scores were included as covariates in the HLM models for students who participated in LA's BEST for a minimum of 140 days due to their strong association with the outcome measures.

Table 4

Background Variables by LA's BEST Intensity of Participation, Weighted Sample of the Grade 3 Cohort

Variable	Average LA's BEST intensity of participation (2004-05 to 2006-07)				
	Non- participants unweighted (n = 8,544)	<u>Minimum 50 day sample</u>		<u>Minimum 140 day sample</u>	
		Minimum 50 days (n = 4,212)	Non- participants weighted (n = 8,544)	Minimum 140 days (n = 1,309)	Non- participants weighted (n = 8,544)
Male %	52.9	47.1*	47.3	44.9*	44.3
Black %	5.5	9.1* [†]	10.4	7.3*	7.6
Hispanic %	84.9	84.9	85.1	85.6	86.9
LEP %	73.6	66.7*	65.7	63.5*	61.6
Parent < HS education %	29.2	29.6	30.0	29.8	29.3
Parent HS grad/No college %	18.6	19.5	19.5	20.0	20.0
Parent had some college %	12.7	16.4*	17.2	17.9*	19.0
Days enrolled (4-05 to 06-07)	431.3	453.3*	453.7	488.1*	488.4
% in LA's BEST grade 2	12.2	63.3*	64.2	74.4*	74.9
% in LA's BEST grade 1	4.3	37.8*	38.2	46.9*	46.9
% in LA's BEST grade K	4.7	13.5* [†]	11.9	15.5*	13.6
% missing grade 8 CST	29.2	26.2*	25.7	18.7*	16.9
CST Math, 2003-04	343.6	342.9 [†]	339.9	348.6*	346.1
CST ELA, 2003-04	312.7	314.0 [†]	311.1	319.1*	316.9

Note. CST = California Standards Test; ELA = English-language arts; HS = High school; LEP = Limited English Proficient

* p < .05, significant compared to the unweighted control. [†] p < .05, significant compared to the weighted control.

HLM Results - Estimated Value Added of LA's BEST Attendance Intensity on Middle School Achievement: Grades and CST scores

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 course grade point averages (GPAs) in math, language arts, science, and history, as well as for CST results in math and language arts.

It should be noted that as the threshold for LA's BEST participation increases, the sample size of those who meet the threshold decreases. The sample size decreases from 8,449 for those with less than 50 days of participation to 4,212 for those with a minimum of 50 days per year of LA's BEST participation and to 1,104 for those with a minimum of 150 days per year of LA's BEST participation. Similarly, the sample size of those who meet the threshold and have CST scores in Grade 8 decreases as the threshold increases. The sample size decreases from 6,146 for those with less than 50 days of participation to 3,107 for those with a minimum of 50 days per year of LA's BEST participation and to 901 for those with a minimum of 150 days per year of LA's BEST participation.

Student Grades

Value added results for GPA in math and language arts are shown in Table 5. Value added represents an estimate of the difference in a GPA outcome that can be attributed to the students' participation in LA's BEST. Results indicate that in comparison to non-participants, students who had less than 50 days of LA's BEST participation in Grades 3, 4, or 5 did not show meaningful value added differences in their math and language arts GPAa. Although the findings indicate statistically significant value added estimates in algebra (-0.07) and language arts (-0.08), the effect sizes of these estimates were too small to be meaningful.

More importantly, students who participated in LA's BEST for a minimum of 50 days showed a statistically significant ($p < 0.01$) benefit of 0.21 general math GPA points based on their value added estimate. Moreover, 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 and peaked for students who participated in LA's BEST for a minimum of 140 days. For students who participated in LA's BEST for a minimum of 140 days, the value added estimates for language arts, general math, and algebra were all positive and statistically significant, although the effect size for language arts was small and about half the size of the estimate in the math courses.

Table 5

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 day 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 6 displays the value added results for Grade 8 course GPAs 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 6

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 GPAs	
	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 English-language arts are shown in Table 7. 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 7

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 attend 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.

Next, the value added effect of LA's BEST participation on course-taking patterns is examined.

Value Added Estimates of Middle School Course-Taking Patterns

Based on the above analyses, value added estimates of course-taking patterns were produced using logistic regression with an HLM design for two thresholds of LA's BEST participation intensity: (1) students participating in LA's BEST for a minimum of 50 days per year and (2) students participating in LA's BEST for a minimum of 140 days per year. With the HLM approach, these estimates controlled for the context of the middle school a student attended

in Grade 8 and for the student's baseline CST performance in math and language arts. The course-taking pattern results presented in this section were based on the sample of students who stayed with the district throughout the treatment period and took math and language CST assessments in Grade 8. Value added estimates are presented in the form of odds ratios alongside the percentage of students who reached the course-taking benchmarks.

Math and English Course-Taking Patterns

Middle school course-taking percentages and value added odds ratios for math and English are presented in Table 8.

Math. The general course-taking pattern in math (as shown in Table 8) is for students to take four core math classes in Grades 6 (Grade 6 math AB) and 7 (Grade 7 math AB), 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 those students who did not participate in LA's BEST.

There were only a small number of students taking algebra in seventh grade and geometry in eighth grade. There were also very few students taking the honor or AP classes under all subject matters. Thus, these courses were not examined due to the small sample sizes.

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 (English 6AB, 7AB, 8AB). 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.

Approximately one in five (20%) LA's BEST students at either intensity thresholds took some ESL and English elective classes. The percentage of LAUSD students taking intervention classes was slightly below 30%. Again, there were no significant value added differences for either the ESL or the intervention class benchmark.

However, for LA’s BEST students who participated at either a minimum of 50 or 140 days thresholds, the value added odds ratio was significant for taking English elective classes. This indicates that 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 varied across schools, and not many elective classes were offered across the study school sites. Other elective classes that students were able to take included arts, computer, and technology classes that were examined separately. Some students may have opted to take these choices rather than English electives.

Table 8
Middle School Math & English Course-Taking Patterns

Variable	Average LA’s BEST intensity of participation (2004-05 to 2006-07)			
	<u>Minimum50 day model (n = 4,212)</u>		<u>Minimum140 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.

Additional Course-Taking Patterns

Middle school course-taking patterns for history, science, physical education, computer, and arts classes are presented in Table 9. More than 80% of LA’s BEST students participating at either a minimum of 50 or 140 days threshold took all six core classes in history, science, and physical education. Close to one third of these students took computer classes, while over 60 percent took arts classes. There are no significant value added differences for any of the history, science, physical education, computer, or arts benchmarks when comparing participants to non-participants.

Table 9

Middle School History, Science, and Additional 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 six core history classes in Grades 6-8	84.1	0.97	86.4	1.05
% taking six core science classes in Grades 6-8	83.5	0.95	84.5	0.95
% taking six core physical education classes in Grades 6-8	81.0	0.98	82.8	1.00
% taking any computer classes in Grades 6-8	31.4	1.08	30.6	1.08
% taking any arts classes in Grades 6-8	63.8	0.93	62.7	0.85

Effect of Participation on Course-taking and Academic Achievement

Value added estimates of middle school academic achievement for different course-taking patterns were produced using regression with an HLM design as detailed earlier. Middle school academic achievement results for math and English are presented in Table 10. Results included 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 GPAs 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 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 for their core English classes in Grades 6 and 7. They also received a very small benefit of 0.12 GPA points in their 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 10

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 and day school attendance in sixth 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 (see model diagrams in Figures 2, 3, and 4). 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 English-language arts. 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, for better visual interpretation, non-significant paths are not presented in the model. All path model comparisons have been propensity weighted.

Path Model Results for Students Taking Algebra CST. For the Algebra CST Model shown in Figure 2, there is a significant direct effect of LA's BEST participation on day school attendance in Grade 6. This is true of 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 participated a minimum of 50 days.

In addition, there is a small direct effect of LA's BEST participation on algebra GPAs 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.

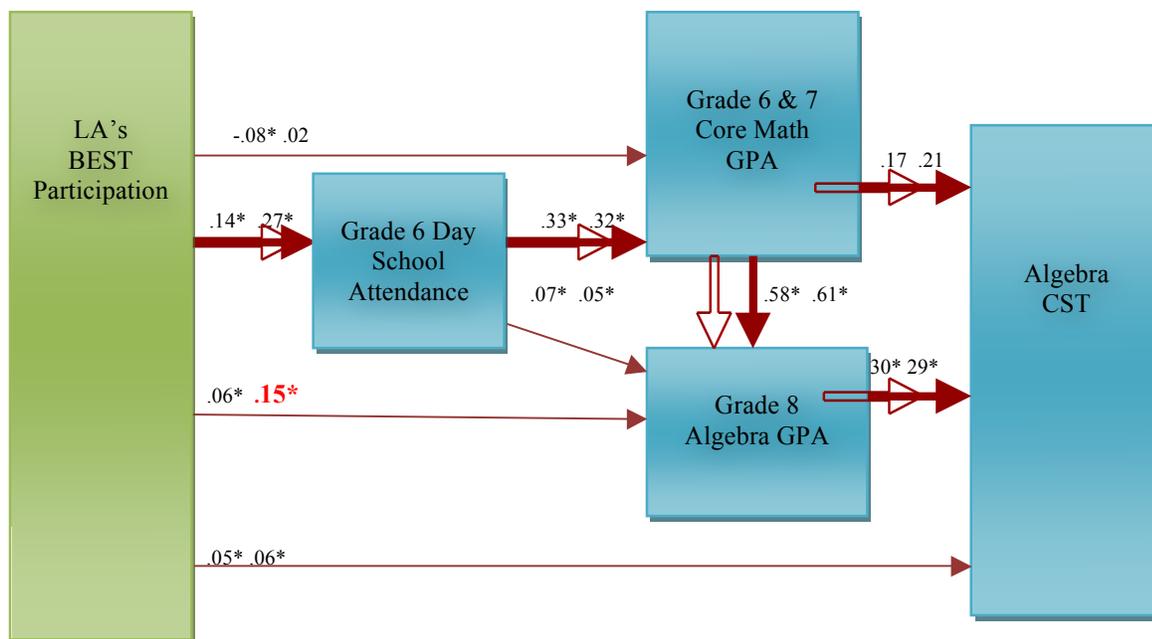


Figure 2. The Algebra CST Model. The numbers presented on the pathways contain the parameter estimates for each path of interest. The first number represents the LA's BEST participants with a minimum of 50 days, and the second number represents the LA's BEST participants with a minimum of 140 days. All variables other than LA's BEST participation have been standardized for simple interpretations of effect sizes. As a rule of thumb, estimates smaller than 0.1 can be considered as a very small and almost negligible effect size, while those less than 0.2 but greater than 0.1 can be considered a small effect. An estimate of 0.5 represents a medium effect size. * $p < .05$

Path Model Results for Students Taking General Math CST. Similar to the model in Figure 2, the model in Figure 3 shows that those who took general math exhibited a significant positive direct effect of LA's BEST participation on day school attendance. However, in this model, the effect size for students attending a minimum of 140 days is only slightly larger (0.31) than that of those attending a minimum of 50 days (0.26). All other direct effects of LA's BEST participation on the math outcomes, though significant, are very small and have close to negligible effect sizes. Again, the most important effects of LA's BEST participation appear to occur indirectly through the positive effect of LA's BEST participation on day school attendance.

Also similar to the above model, in this model day school attendance in Grade 6 has a 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.

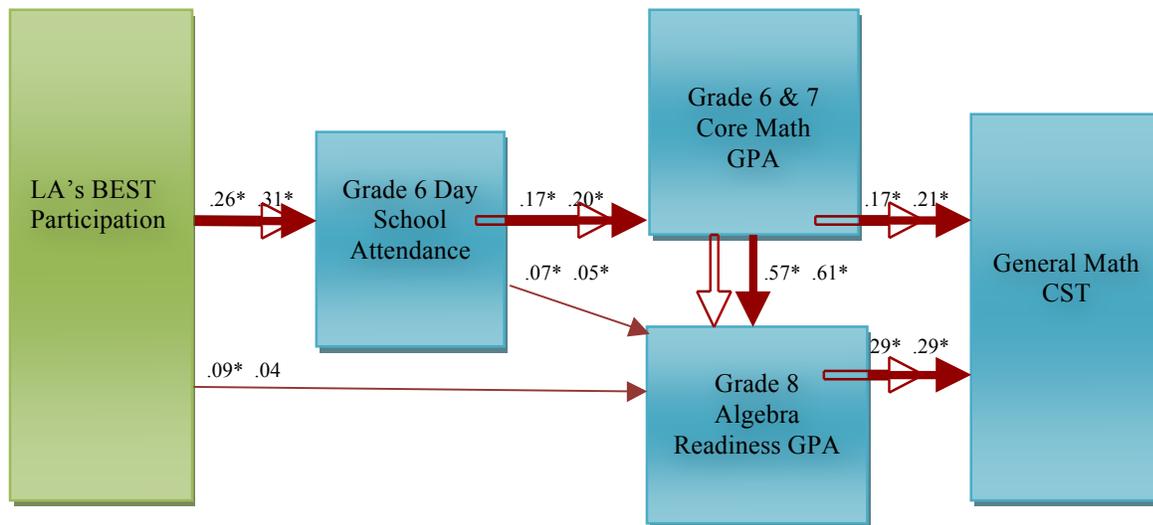


Figure 3. General math CST model. The numbers presented on the pathways contain the parameter estimates for each path of interest. The first number represents the LA's BEST participants with a minimum of 50 days, and the second number represents the LA's BEST participants with a minimum of 140 days. All variables other than LA's BEST participation have been standardized for simple interpretations of effect sizes. As a rule of thumb, estimates smaller than 0.1 can be considered as a very small and almost negligible effect size, while those less than 0.2 but greater than 0.1 can be considered a small effect. An estimate of 0.5 represents a medium effect size. * $p < .05$

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 of both thresholds of participation intensity, although the effect size for students who participated for a minimum of 140 days is higher than the effect size for those who participated for a minimum of 50 days. All other direct effects of LA's BEST participation, though significant, are very small and have close to negligible effect sizes.

As expected, 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 had positive direct effects on the Grade 8 CST ELA performances.

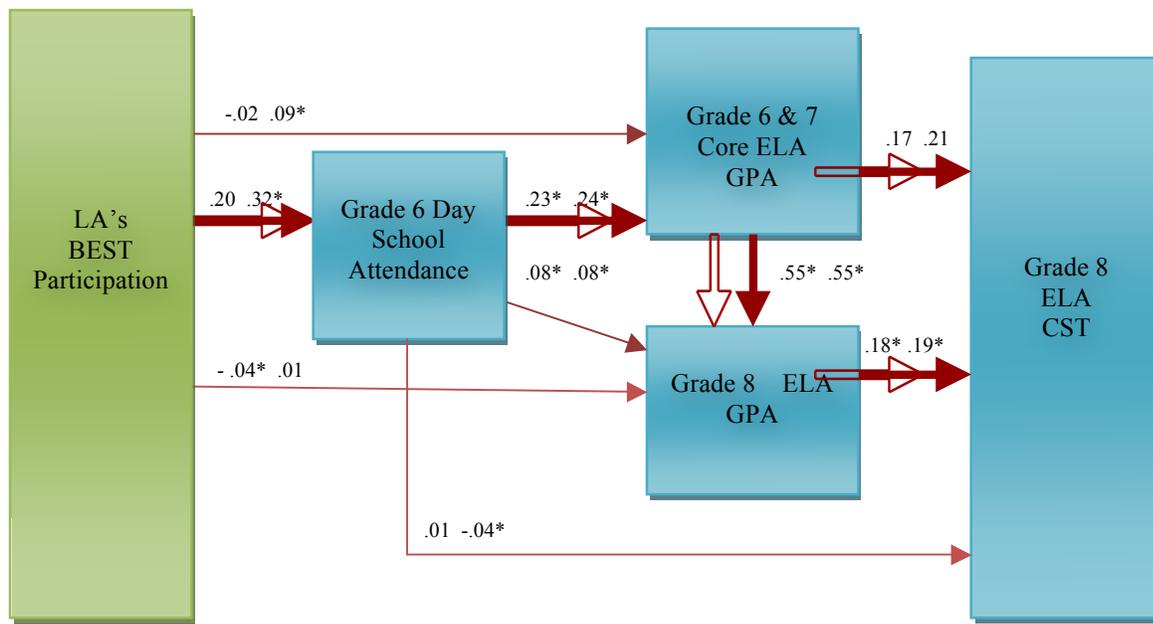


Figure 4. ELA CST Model. The numbers presented on the pathways contain the parameter estimates for each path of interest. The first number represents the LA's BEST participants with a minimum of 50 days, and the second number represents the LA's BEST participants with a minimum of 140 days. All variables other than LA's BEST participation have been standardized for simple interpretations of effect sizes. As a rule of thumb, estimates smaller than 0.1 can be considered as a very small and almost negligible effect size, while those less than 0.2 but greater than 0.1 can be considered a small effect. An estimate of 0.5 represents a medium effect size.
* $p < .05$

Based on these findings, it can be summarized that LA's BEST participation for a minimum of 140 days has a small direct effect on these students' algebra GPAs in Grade 8. Additionally, LA's BEST participation of a minimum of 50 days has a positive direct effect on participants' day school attendance in Grade 6, which, in turn, indirectly and positively influences participants' core math and ELA GPAs in Grades 6 and 7. From there on there are two paths for the students: (1) one that leads directly from Grade 6 and 7 GPAs to better performance in the CSTs in Grade 8 and (2) another which leads directly to higher GPAs in Grade 8 and then indirectly to better performances in their CSTs in Grade 8.

CHAPTER VI: DISCUSSION AND CONCLUSION

According to Zimmerman, Bandura, and Martinez-Pons (1992), students' self-efficacy and self-regulation of academic performance are linked to their awareness of covert and overt outcomes of their behavioral functioning. Self-regulated students are significantly more likely than non-self-regulated students to know how well they did on a test before it is graded by their teachers. Furthermore, self-efficacy, goal setting, self-monitoring, use of learning strategies, and self-reflection all have consistently been shown to be good predictors of academic outcomes such as math, writing performance, and course grades (Cleary, 2006; Graham, Harris, & Troia, 2000; Pajares & Urdan, 2006; Schunk, Pintrich, & Meece, 2008). Thus, the LA's BEST program's focus on developing students' positive academic attitudes, self-efficacies, and self-regulation skills during their elementary years may have benefited students in their ability to attend school more regularly and obtain better course grades and CST test scores in their middle school years.

Importance of School Attendance

As stated previously, research indicates that school attendance is strongly associated with students' academic and social development. 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). Studies have also shown that participation in high-quality afterschool programs often is associated 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.

Importance of Course Grades in Middle School

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). In fact, approximately 40% of the dropouts studied could be identified using these indicators as early as sixth grade. Additionally, studies of cohorts of Philadelphia students revealed that failing math or English in the middle grades was a better predictor than standardized test scores of academic difficulties in ninth grade (Balfanz, Herzog, & Mac Iver, 2007).

Furthermore, prior research has identified 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 improve students' math performance both at the GPA and the CST levels. For the students who participated for a minimum of 50 days, there were positive value added estimates associated with their algebra readiness GPAs in eighth grade and with their general math CST scores. For the students who participated 140 days, there were positive and significant value added estimates associated with all their middle school math outcomes. The benefits for math GPA started in Grades 6 and 7. In eighth grade, these students had even stronger value added benefits to their GPAs regardless of whether they took algebra readiness or algebra classes. Participation in LA's BEST also benefited these students in obtaining higher CST scores regardless of whether they took the general math CST or the algebra CST.

In comparison to math, the benefits for English-language arts were smaller. Estimates indicate that students who participated in LA's BEST for a minimum of 140 days received a small benefit of 0.15 GPA points for English courses in Grades 6 and 7 and a very small benefit of 0.12 GPA points in Grade 8 that was attributable to their participation in LA's BEST. Moreover, 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.

Taking Algebra by Eighth Grade

Taking algebra by eighth grade has been an indicator of students' college readiness. For more than a decade now, "algebra for everyone" has been a high-minded mantra for the idea that virtually all students should take algebra by eighth grade. Ever since the mid-1990s, schools nationwide have encouraged more and more students to take challenging middle-school math courses. Consequently, there are more eighth graders taking algebra today than any other math course.¹

Following a similar trend, more eighth grade students (both LA's BEST participants and non-participants) in this study sample completed the algebra sequence as opposed to algebra

¹ Data available on the main NAEP data explorer: <http://nces.ed.gov/nationsreportcard/nde/>.

readiness. However, participation in LA’s BEST does have an added benefit. Students who had participated in LA’s BEST for a minimum of 140 days were even more likely than non-participants to take the algebra sequence. The value added odds ratio indicates they were 1.26 times more likely to take both algebra classes (Algebra AB) as compared to the non-participants.

These positive findings in math are especially reassuring in light of the anticipated decline in math efficacy and attitudes towards math upon entrance into middle school. Additionally, these findings are important since 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).

The following paragraphs address the research questions.

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 scores) during their middle school years?

To address the first research question, there is not much difference in middle school course-taking patterns between LA’s BEST participants and non-participants. Most students took all necessary course benchmarks. Across the schools, variations and choices for extracurricular, honor, and AP classes were limited. However, more LA’s BEST participants with a minimum of 140 days per year were taking algebra in eighth grade as compared to non-participants, and more non-LA’s BEST students were taking English-language arts electives than the participants.

For middle school GPA, participation in LA’s BEST does have its added value. 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. Moreover, the intensity of participation also mattered. 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 and peaked for students who participated in LA’s BEST for a minimum of 140 days. As for history and science, 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 estimates for both science (0.24 GPA points) and history (0.19 GPA points) also peaked for students who participated for a minimum of 140 days. These findings indicate that participation in LA’s BEST benefits students’ middle school experiences.

2. Does participation in LA's BEST directly or indirectly affects 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?

More importantly, LA's BEST participation is associated with higher middle school attendance when the participants were in sixth grade. As discussed in the literature and shown in the path models, this higher school attendance leads to higher GPAs in math and English-language arts courses during middle school and to higher general math or algebra CST and English-language arts CST scores in eighth grade.

Furthermore, it is noted that participation of a minimum of 140 days showed a direct significant path to higher GPAs in students' eighth grade algebra courses, which is directly attributable to LA's BEST. Thus, in addressing the second research question, participation in LA's BEST has a positive influence on participants' end-of-middle-school outcomes in both GPA and CST scores.

Conclusion and Recommendation

These findings are important. A study conducted by Saunders, Silver, and Zarate (2008) reported that students who begin high school with relatively good records of middle school academic performance (less than two Ds or Fs) most often graduate four years later (71%). Students who entered ninth grade well prepared to take and pass the first semester of college preparatory algebra were also far more likely to graduate in four years and graduate with college-ready A-G² course completion. This study's findings indicate that participation in LA's BEST has its value added benefits to students' GPA achievement in middle school math courses, science courses, history courses, and English-language arts courses, plus CST test scores in math. Although the students who participated for a minimum of 140 days per year gained most, value added benefits may begin to accumulate as low as a minimum of 50 days of participation per year. These added values provide students with a good start in their middle and high school performances.

On the same note, while participation in LA's BEST does have its value added to participants' middle school English GPAs, the effect is smaller than for 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 that the participating students received. It may be that more than facilitating participants' self-efficacies and self-regulations, English learners also needed more focused content work on basic skills such as comprehension, vocabulary, and

² "A-G" is the course code that indicates the student followed the approved University of California and California State University course description and used the approved text(s).

fluency. Future studies might want to explore this phenomenon further. Meanwhile, LA's BEST can also investigate strategies and curriculums to better benefit participants in their English-language arts development. Such improvements may bring the influence of the LA's BEST program on English-language arts to the same high level as its positive influence on math.

In conclusion, evidences show that participation in LA's BEST has added values for students' middle school achievement in course GPA and math CST scores. Students who participated in LA's BEST during their elementary years attended school more often than non-participants in sixth grade, and in turn had higher GPAs in sixth and seventh grade, which leads to higher GPAs in eighth grade and to higher CST test scores in eighth grade.

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