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Elev8 Baltimore Outcomes Study

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Table of Contents

List of Tables

List of Figures

Abstract

In this study, we examined the academic outcomes of students who participated in the Elev8 Baltimore community schools initiative, which offers out-of-school time (OST) programming, health services and family supports to middle school students and their families. Because the characteristics of students who use Elev8 supports are likely correlated with their academic outcomes, we employed methods of analysis that allowed us to take into account both measured and unmeasured differences between students who accessed supports and those who did not access supports. Our results showed that students who only participated in OST programming had reading and math test scores that were 0.10–0.20 standard deviations higher than those of students who did not use any supports. The size of these effects compares favorably with those found in other studies of the effects of educational reforms on student achievement. We also found that students who either only participated in OST programming, combined participation in OST programming with the use of health services, or used all three Elev8 supports had average attendance rates that were higher (though not substantially) than the average attendance rate of students who did not use any supports. Finally, we found that students who either only participated in OST programming, or who combined participation in OST programming with use of the health services, had mean GPAs that were higher (though, again, not substantially) than the mean GPAs of students who did not use any supports. Overall, these findings add to the growing evidence that community schools can have a positive impact on student outcomes, particularly among those who participate in OST.

Executive Summary

The Elev8 (originally Integrated Services in Schools) initiative is a school- and community-based services and supports model conceived and funded primarily by The Atlantic Philanthropies. It was implemented in four locations throughout the United States between 2007 and 2009: Chicago, IL; Oakland, CA; Baltimore, MD; and multiple sites in the state of New Mexico. As of fall 2017, it still operated at all four sites, although in fewer schools than in earlier years. All Elev8 sites offer supports in four main areas: (1) out-of-school time (OST) programming; (2) health care services provided by school-based health centers (SBHCs); (3) family economic and social supports; and (4) parent and community engagement.

This study (the Elev8 Baltimore Outcomes Study) addressed the following questions:

- Do students who utilize Elev8 supports (i.e., OST programming and health services) or have parents who receive family supports have better academic outcomes (attendance, grades, behavior, and test scores) than comparable students who do not utilize Elev8 supports or have parents who receive supports?
- Do students who attend Elev8 schools have better academic outcomes than comparable students attending other Baltimore public schools?
- Do students attending Elev8 schools after the introduction of Elev8 have better outcomes than students who attended the same schools before the introduction of Elev8?

Methods

To address the first question, we drew on Elev8 participation and student outcomes data collected by Carson Research Consulting, Inc., Research for Action, and McLanahan Associates, Inc. We compared the middle school academic outcomes of students who utilized Elev8 supports to the outcomes of students at Elev8 schools who did not utilize those supports. We call this the "within-school" analysis. The sample that we used for this analysis is comprised of approximately 1,500 students who were enrolled in one of the Elev8 Baltimore schools between the 2010–11 and 2015–16 school years.

The characteristics of students who use Elev8 supports are likely to be correlated with their academic outcomes, irrespective of their involvement with Elev8. Thus, we employed methods of analysis that allowed us to take into account both measured and unmeasured differences between users and nonusers.

To address the question about the effects of attending an Elev8 school on student outcomes, we drew on data we obtained from Baltimore City Public Schools (BCPS) and the Maryland

Department of Education (MDOE). We used these data to first identify a sample of comparison schools that were as similar as possible to the Elev8 schools at the beginning of the implementation of Elev8. We chose this sample based on neighborhood child poverty rates, grade levels, racial/ethnic composition of the student body, number of middle school students enrolled, and proportion of students receiving free or reduced-price lunch. We then constructed a comparison sample of students by matching each Elev8 student—based on race/ethnicity, gender, grade level, calendar year, and third/fourth grade test scores—to one or more students in the comparison schools. In our subsequent analyses (the "between-school analyses") we controlled for student and school-level differences that might have existed after the completion of this process.

To address the last question, we utilized the BCPS data to construct a sample comprised of students who were enrolled in grades 5 through 8 at the Elev8 schools during school years 2009–10 to 2016–17, plus fifth through eighth grade students who attended the same schools as early as school year 2003–4 through school year 2008-9. We used this dataset to compare the outcomes of students who attended the Elev8 schools after the introduction of Elev8 to the outcomes of those who attended prior to the introduction of Elev8. In the subsequent analyses, we controlled for student-level differences between the two sets of students.

Results

Overall, we found consistent evidence of positive, though generally small, effects of participating in Elev8 activities and supports. Specifically, we found that within the Elev8 schools:

- Students who either only participated in OST programming, combined participation in OST programming with use of the SBHC, or used all three Elev8 supports had average attendance rates that were higher (though not substantially) than the average attendance rate of students who did not use any supports.

- Students who either only participated in OST programming, or who combined participation in OST programming with use of the SBHC, had mean GPAs that were higher (though, again, not substantially) than the mean GPAs of students who did not use any supports. We also found some evidence that the mean GPAs of students who only used the SBHC, or who used all three supports, had mean GPAs that were higher than those of the no-supports group.

- Students who only participated in OST programming had reading and math test scores that were 0.10–0.20 standard deviations higher than the scores of students who did not use any supports. While seemingly small, the size of these effects compare favorably with those found in other studies of the effects of educational reforms on student achievement.

- Students who either only participated in OST programming, or who combined participation in OST programs with use of the SBHC, experienced significantly lower

suspension rates than students who used no supports. However, these differences do not account for unobserved differences between students that might be correlated with both the likelihood of being suspended and participation in Elev8 supports.

With respect to the school-level analyses, we found some evidence that students who attended the Elev8 schools after the implementation of Elev8 had test scores that were approximately 0.10 standard deviations higher than students who attended the Elev8 schools before the implementation of Elev8. However, we did not find any evidence of differences in attendance among these students. In addition, we did not find evidence of differences in any outcomes for students who attended the Elev8 schools when compared to students who attended a set of comparison schools that appeared, based on available data, to be similar to the Elev8 schools.

The lack of evidence for school-level effects of Elev8 may be due to the possibility that the comparison schools offered some programming similar to Elev8. We did not have access to this information for the time period covered by the study and thus could not incorporate it into the analysis. Additionally, the lack of evidence for school-level effects may also be related to the fact that the positive effects of participating in Elev8 supports tended to be concentrated among students who only participated in OST programming. Over the course of the study period, only about 12% of students participated in OST programs. Similarly, while there were some positive effects associated with both participating in OST programs and utilizing the SBHC, only about 28% of students fell into this category during the study period; further, the percentage of students in this category declined significantly over the period. In addition, the average student only completed about two middle school years at an Elev8 school, further limiting the potential for observing differences at both the student and school levels.

These observations suggest that, in order to increase the impact of initiatives such as Elev8, consideration should be given to extending the availability of supports to all grade levels, so that students might benefit from utilizing supports over a longer period of time . Emphasis might also be placed on continuously monitoring the proportion of students who are using supports and proactively taking steps to address significant changes in this proportion, with the overall intention of maximizing the proportion of students utilizing supports over time. Additionally, since student mobility significantly impacts the extent to which students can benefit from supports, consideration might be given to specifically targeting for support those families most likely to move due to economic or other reasons that may be beyond their control.

Introduction

This report examines the academic outcomes of students who attended the Elev8 Baltimore schools during the 2010–11 through the 2016–17 school year. It presents results of analyses that compare the outcomes of students who utilized Elev8 supports to students who did not utilize those supports. It also compares the outcomes of students who attended the Elev8 schools to those of students who attended other, similar schools in the city, and to the outcomes of students who attended the same schools prior to the introduction of Elev8.

The report begins with a brief description of the Elev8 initiative at both the national level and in the city of Baltimore. We then turn to a brief review of previous studies of initiatives similar to Elev8 and their impact on student academic outcomes, as well as a review of research on the impact of programs related to each of the main areas of Elev8 supports.[1] Following a description of the data used in the study, we then provide descriptive analyses of the students who comprise the samples we employed and an explanation of our methods and findings. We conclude with a summary of the findings and how they compare to those of other studies. We also address the limitations of this study.

Description of Elev8

The Elev8 initiative (originally Integrated Services in Schools) is a school- and community-based services and supports model conceived and funded primarily by The Atlantic Philanthropies (AP). The initiative has a focus on the middle school grades. It has been implemented in four locations throughout the United States: Chicago, IL; Oakland, CA; Baltimore, MD; and multiple sites in the state of New Mexico. All Elev8 sites offer supports in four main areas: (1) out-of-school time (OST) programming; (2) health care services provided by school-based health centers (SBHCs); (3) family economic and social supports; and (4) parent and community engagement. In addition to funding Elev8 programming, AP also engaged local evaluators in three of the national Elev8 sites (Chicago, Oakland, and New Mexico) to describe and analyze the successes, challenges, and lessons learned in Elev8 implementation. In 2008, Chapin Hall was selected as the local evaluator for the Elev8 Chicago sites. Subsequently, in 2013, Chapin Hall received additional funding from AP to conduct an outcomes study for the Chicago site. AP also engaged Public/Private Ventures and, later, Research for Action (RFA) and McClanahan Associates, Inc.

[1] We do not focus on the impact of parent and community engagement, however, since we do not have data on this particular area of support.

(MAI), to conduct a national evaluation across all four locations (see McClanahan & Piccinino, 2016).

Elev8 Baltimore was launched in the fall of 2009 at three preK through eighth grade schools (Collington Square, Rayner Brown, and Tench Tilghman) and at one school for kindergarten/first and fifth graders (East Baltimore Community School (EBCS)).[2] All of the schools were located in East Baltimore. Consistent with the vision of the national Elev8 model, Elev8 Baltimore focused on students in grades 5–8. Oversight for the project was initially provided by East Baltimore Development, Inc. (EBDI). In addition, Carson Research Consulting, Inc. (CRC) was engaged by the Annie E. Casey Foundation (AECF) to conduct an evaluation at this site. Information on the implementation of Elev8 Baltimore can be found in several reports completed by CRC (Carson Research Consulting, 2011; Prichard, 2012; Carson Research Consulting, 2016; Carson Research Consulting, 2017). Additionally, CRC also conducted an outcomes evaluation (Carson Research Consulting, 2015). In 2013, AECF asked Chapin Hall to conduct a supplementary outcomes evaluation, which is the focus of this report.

OST activities began at each of the four schools in the fall of 2009, although data on OST program attendance was not collected until the following school year. Additionally, Baltimore Medical Systems (BMS) began operating a "health suite" at Rayner Brown in the 2009–10 school year, as well as "Level 1 health centers" at Collington Square and Tilghman. However, no health services were provided at ECBS.[3] Finally, family support services were offered at all of the schools beginning with the 2009-10 school year. As part of these services, "family advocates" provided families with referrals to agencies offering housing and utility assistance, and provided help with job applications. Also, the nonprofit human services organization Humanim partnered with Elev8 to provide financial literacy workshops and workforce development services to families. Additional details about the implementation of the different Elev8 supports can be found in the CRC reports.

Key information about each of the original Elev8 schools is provided in Table 1. It shows that Collington Square and Tench Tilghman were larger than the other two schools—substantially so in the case of Collington Square. Additionally, all four schools had student bodies for which the percentage of African American students was significantly greater than that for Baltimore City Public Schools (BCPS) as a whole. The same was true with respect to the percentage of students receiving free or reduced-price lunch, although ECBS was closer to the city average than the other three schools.

[2] ECBS added 2nd and 6th grades in 2010–11 and grades 3 and 7 in 2011–12. At the end of the 2011–12 school year, ECBS was phased out of Elev8 and Commodore John Rogers took its place.

[3] As of the 2014-15 school year health services had not been provided at Commodore John Rogers either.

Table 1. Characteristics of Elev8 Baltimore Schools and BCPS, 2010–11

School name	Type of school	Grades	Enroll-ment	% African American	% Free/ Reduced-price lunch	Mobility rate (%)[1]	Atten-dance rate (%)[1]	Suspen-sion/ex-pulsion rate (%)[2]
Tench Tilghman	Trad. public	PK–8	422	96.9	>95	33.8	94.7	3.1
Dr. Rayner Brown	Trad. public	PK–8	252	97.6	>95	43.6	92.8	13.9
EBCS	Contract	K–2,5–6	206	97.6	88.7	22.4	94.2	39.0
Collington Square	Charter	PK–8	571	99.1	92.8	27.0	90.7	16.6
BCPS	**N/A**	**PK–12**	**83,800**	**86.6**	**82.3**	**30.6**	**93.6**	**13.1**

Notes:
1. Mobility and attendance rates are for middle school students.
2. The suspension/expulsion rate was calculated as the total number of students suspended or expelled divided by total enrollment.
Sources: Maryland Report Card: grade configurations, enrollment, percentage African-American, percentage free/reduced-price lunch, mobility and attendance rates; BCPS: numbers of students suspended or expelled

The student mobility rate was lower than the city average at ECBS, comparable to the city average at Collington Square and Tench Tilghman, and significantly higher at Rayner Brown. Suspension rates also varied, with EBCS and Tench Tilghman showing significantly higher and lower rates, respectively, compared to the city average.[4] Finally, for three of the schools the attendance rate was comparable to BCPS as a whole, while that for Collington Square was somewhat lower. Thus, overall, the four Elev8 schools differed from the typical BCPS school in terms of demographics (i.e., % African American and % receiving free/reduced-price lunch), but there weren't clear differences with respect to the other characteristics.

[4] It should be noted, however, that we don't have any information on the reliability of the data on suspensions and expulsions.

Figure 1. Percentage of Students Who Were Proficient on the Maryland School Assessment, by School in 2010–11

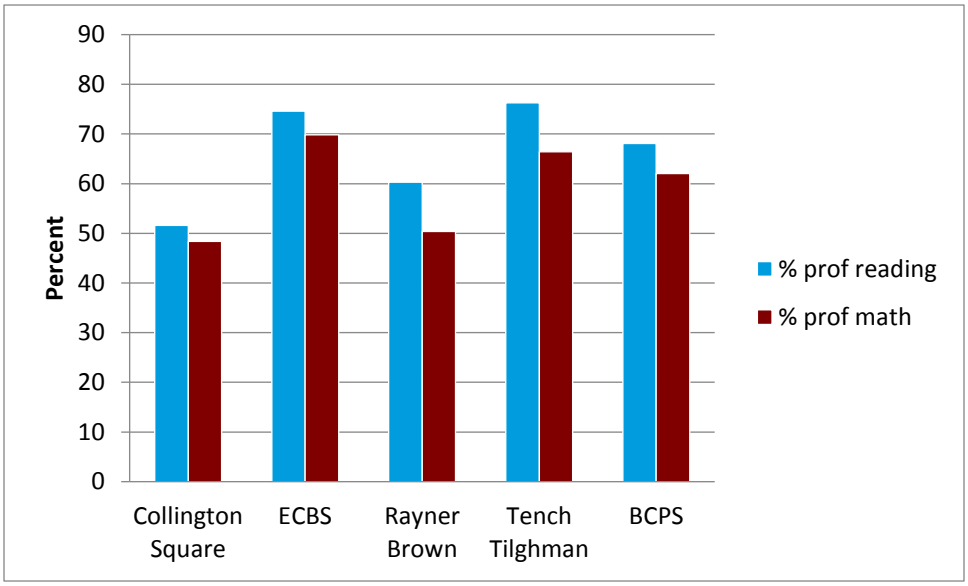


Figure 1 shows the percentage of students in each school who were proficient on the Maryland School Assessment (MSA). Students at ECBS and Tench Tilghman were substantially more likely than students at Collington Square to be proficient in reading; they were also more likely to be proficient in reading than students at Rayner Brown, although the gap was smaller. Additionally, the percentage of students at ECBS and Tench Tilghman who were proficient in reading exceeded the average for BCPS as a whole, while the percentages for Collington Square and Rayner Brown were below the BCPS average. As shown, the percentage of students proficient in math was similar.

Background

As noted, at the national level, all Elev8 sites share four common pillars of activity: (1) extended-day learning and academic enrichment; (2) preventative health care services; (3) family economic and social supports; and (4) parent and community engagement. In this section of the report, we briefly review recent research on the impact of initiatives similar to Elev8 on academic outcomes, as well as recent research on the impact of programs related to the first three of the four Elev8 pillars on academic outcomes.

Where possible, we draw on findings from meta-analyses. These kinds of analyses can be useful for synthesizing the results of studies with similar designs and that evaluate similar types of programs, but which may be based on samples that are too small to demonstrate a statistically significant effect. On the other hand, the extent to which conclusions can be drawn from these types of analyses is limited by the quality and rigor of the studies they examine.[5] In addition, the extent to which the studies selected for the meta-analyses examine similar types of programs varies.

Elev8's approach of providing an array of services and programs to support the whole child falls under the broad umbrella of "integrated student supports (ISS)," a school-based strategy for promoting students' academic achievement and educational attainment by coordinating a web of supports to address students' academic and nonacademic barriers to learning. In 2014, Child Trends published a review of research on ISS initiatives, noting that the evaluation basis for ISS "as an approach can best be described as emerging" (Moore, Caal, & Carney, 2014). In 2017, it published an updated report that examined research that became available after the 2014 report was completed (Moore et al., 2017).

The 2014 Child Trends report identified common components across many of the ISS models that have emerged in recent years: needs assessments, coordination of supports for students, integration of supports within schools, community partnerships, and data collection and tracking. The report stresses that initial and ongoing needs assessments are a critical component of ISS. Needs assessments can occur at different levels, including individual students, families,

[5] The most rigorous studies are random control trials (RCT) in which individuals who qualify for a program are randomly assigned to either participate in the program ("the intervention group") or not participate ("the control group"). Data is then collected on the intervention and control groups concerning potential outcomes of the program. If the intervention group's progress is better than the control group (and the difference is statistically significant), then there is strong evidence that the program has a positive impact on participants. However, RCT assessments are often not feasible and, in these cases, less rigorous assessments can provide evidence of impact, although the evidence is less reliable than RCT evidence. In these "quasi-experimental studies" participants are compared to nonparticipants and statistical analyses take into account other factors that may affect the outcome, such as age, gender, school, etc. Comparisons of outcomes at two or more points in time for one group or comparisons of an outcome in two groups, which do not take into account factors other than the intervention that may affect the outcome, provide very weak evidence of impact.

schools, or communities. Limited information is available on needs assessments undertaken by the Elev8 Baltimore site. This information includes descriptions contained in CRC's report (2011) regarding the efforts of Elev8 staff to ascertain the types of afterschool activities that would fit with the schools, as well as the interests and needs of the students. They did this by interviewing principals and other school staff, talking with students, and identifying activities that filled perceived gaps. Additionally, CRC evaluators recommended that Elev8 staff assess youth interest in programs on an annual basis and obtain their feedback on current programs. However, it is not clear from subsequent evaluation reports whether this recommendation was implemented.

The 2014 Child Trends report also reviewed findings from outcome evaluations for a group of key academic and nonacademic outcomes. Only randomized controlled trial (RCT) studies, which randomly assign schools to a treatment and control group, and rigorous, quasi-experimental design evaluations using a matched-comparison group were eligible for inclusion in their review. They identified 11 randomized controlled and quasi-experimental evaluations of three ISS models: City Connects, the Comer School Development Program, and Communities In Schools.

City Connects, which has been implemented in public schools in Boston, uses a case management approach by referring individual students and their families to prevention, intervention, and enrichment opportunities provided by community agencies and the school district. The Comer School Development Program was developed to improve the educational experience of poor ethnic minority youth and has been implemented across the country. The nine-component process model includes three mechanisms (School Planning and Management Team, Student and Staff Support Team, and Parent/Family Team), three operations (Comprehensive School Plan, Staff Development Plan, and Monitoring and Assessment), and three guiding principles (Collaboration, Consensus Decision Making, and No-fault Problem Solving). Thus, the model includes the case management model but also includes broader school-wide planning. Most similar to Elev8 is Communities In Schools (CIS), which has been implemented in schools serving low-income K through 12 students around the U.S. CIS seeks to reduce dropout rates through preventive support services like short-term counseling or annual health screenings for the entire school, alongside more intensive case-managed services, including tutoring, mentoring, and other services for students at high risk of dropping out.

The 2014 Child Trends review notes small but statistically significant effects of ISS on student academic progress across the majority of the evaluations, as measured by decreases in grade retention and dropout rates, increases in attendance, math, and English/language arts achievement, and increases in overall grade point averages.[6] However, they found that the effect sizes were larger in quasi-experimental studies than in more rigorous random assignment evaluations.

Because CIS is the model most similar to Elev8, a specific consideration of the findings of the CIS studies may provide a clearer understanding of the evidence base thus far for initiatives like

[6] Decreases in grade retention suggest a positive effect of ISS since retention in grade is generally viewed as a negative outcome.

Elev8.[7] ICF International (2010) conducted a five-year national evaluation of CIS that included a quasi-experimental school-level study and three youth-level randomized controlled trials (RCT). With respect to middle school academic outcomes, the quasi-experimental study showed small positive effects of CIS on middle school attendance rates, regardless of the level of implementation of the model. In addition, schools that implemented CIS with a high degree of fidelity achieved moderate effects on math and reading standardized test scores, while effects on math scores were small in size when measured across all schools. Results are not reported for grade point average or behavior. The RCTs showed a statistically significant moderate impact on middle school reading test scores, but no significant impact on attendance or behavior.

In the 2017 Child Trends report (Moore et al., 2017), three evaluations of CIS were reviewed. Two of the evaluations examined the effects of all CIS supports, while a third focused only on the more intensive supports. For this reason, we only consider the two former reports here. The first study, by Figlio (2015), analyzed data from a RCT involving 47 K–8 schools conducted by CIS of Chicago. He found that students who attended schools who were randomly assigned to receive CIS supports experienced small increases in reading and math scores when compared to students attending schools without CIS supports.[8] Further, gains were particularly strong for African American students and students who were new to their school. He also found small improvements in attendance in the first year of the experiment, but they did not persist into the second year. The second CIS evaluation was conducted by the Manpower Demonstration Research Corporation (MDRC; Somers & Haider, 2017). This study employed quasi-experimental methods to examine the effect of CIS schools located in Texas and North Carolina. It found that attending a CIS school did not have any effect on attendance in middle school. Additionally, it found that English/language arts test scores did not improve in CIS schools, although they did improve in a group of similar, comparable middle schools.

Among the types of programs and services that fall under the four pillars of Elev8, extended-day learning and academic enrichment programs, such as afterschool programs, have received the most attention from researchers. Below we briefly review the evidence base for these types of interventions as well as for programs and services that correspond to two of the other three pillars of Elev8: preventative health care services and family economic and social supports.

Extended-Day Learning and Academic Enrichment

Research on extended-day learning and academic enrichment has primarily focused on after-school programs. Thus, we focus on these types of programs in this review. After-school programming is thought to improve youth outcomes, in part, by reducing the amount of time that youth spend in unstructured and unsupervised activities in the hours after leaving school. This expectation is based on research showing that youth involved in unsupervised activities are more likely to engage in risky behaviors and to have poor academic outcomes (see, for example,

[7] However, one might expect the impacts of CIS to be larger than those of Elev8, given that, in addition to more universal supports, CIS aims to provide services to individual students that are tailored specifically to their needs.

[8] However, it should be noted that Figlio states CIS "produces very large gains in student outcomes per dollar spent."

Newman, Fox, Flynn, & Christeson, 2000; U. S. Department of Education & U. S. Department of Justice, 2000). At the same time, after-school programs are seen as increasing the amount of time that youth spend in positive, supervised academic and extracurricular activities that can promote academic, social and emotional, and behavioral growth (Zief, Lauver, & Maynard, 2006).

There has been a considerable amount of research conducted on the effects of OST programs over the past two decades, including a number of meta-analyses that seek to examine the effects of OST programs by combining the results obtained from previous studies. Kremer, Maynard, Polanin, Vaughn, and Sarteschi (2015) conducted the most recent meta-analysis on the effects of OST programs. These authors limited their meta-analysis to evaluations of a particular type of after-school program—those that operate on a regular basis after school during the school year and include some academic support services. They further limited the sample of studies to those examining the effects of after-school programming on attendance or behavior (in- and out-of-school) among at-risk youth. Finally, they only included studies that employed randomized control trials (RCTs), which are generally considered to provide the least biased estimates of program effects, or quasi-experimental methods. They identified 16 studies that met their criteria. The results of their meta-analysis indicated a small, nonsignificant effect of OST programs on both attendance and behavior. However, the authors noted several limitations of their study, including the fact that all of the included studies exhibited a number of methodological flaws, and the possibility that their analysis lacked sufficient statistical power to detect a significant effect.

Zief et al. (2006) conducted a similar meta-analysis that examined the effects of OST programs on a broader range of outcomes. These authors looked at evaluations of the same types of after-school programs as Kremer et al. (2015). However, they excluded studies that employed quasi-experimental methods and only reviewed RCTs that met rigorous standards. Of the studies they initially identified from the literature, only five studies fit their criteria, including the first-year findings of the national evaluation of the 21st Century Community Learning Centers program (U.S. Department of Education, 2003). Kremer and colleagues found that for the 97 outcomes measured in the studies, the after-school programs evaluated had no impact on 84% of the outcomes. More specifically, the five studies measured a total of 11 social and emotional outcomes and found only one significant social and emotional outcome: participants had greater college aspirations than nonparticipants. Most pertinent to this report, they found insignificant effects of OST programs on school grades and attendance.

Following the Zief et al. review, the final reports of the evaluations of the 21st Century Community Learning Centers program and the Maryland After-School Community Grant Program were published (Gottfredson, Soule, & Cross, 2004; James-Burdumy et al., 2005). Additionally, Lauer and colleagues conducted a meta-analysis of the effects of OST programs on at-risk students and Durlak and colleagues conducted a meta-analysis of the impact of OST programs designed to promote personal and social skills (Lauer et al., 2006; Durlak, Weisberg, & Pachan, 2010). Unlike the Zief analysis, these latter reviews were not limited to RCT studies.

The final report on the national evaluation of the 21st Century Community Learning Centers program, like the first-year report, provided no indication of the programs' positive impact on participants' supervision during after-school hours or on their reading or math grades or test scores. It is important to note, however, that program design and delivery varied widely between the programs included in the study. On average, students participated only two days per week. The meta-analyses summarized below suggest that one can find positive effects among groups of more homogeneous programs (James-Burdumy et al., 2005). The final report on the Maryland After-School Community Grant Program evaluation provided more reason for optimism about OST programs. The study of 951 fifth and sixth grade students found that the program positively impacted engagement with academic activities, reading, and problem solving on standardized tests (Hefner, 2013).

Lauer and colleagues' meta-analysis focused on evaluations of 35 OST programs that seek to assist at-risk students in reading, mathematics, or both (they did not look at attendance, grades, or behavior). Nine of the evaluations used random assignment. They found statistically significant, although small, positive effects of OST programs on both reading achievement (particularly for those in lower elementary grades) and mathematics achievement (particularly for those in middle and high school.) One-on-one tutoring also appeared to help improve reading achievement. Additionally, OST programs that were more than 45 hours in duration had larger statistically significant effect sizes than shorter programs. They also found that both academic and social OST programs had positive influences on student achievement (Lauer et al., 2006).

Durlak et al. (2010) conducted a meta-analysis on studies of 68 after-school programs that specifically seek to enhance the personal and social development of children and adolescents. Twenty-four of the 68 evaluations in the analysis used random assignment, and the remainder employed a quasi-experimental design. Across these studies, the authors found evidence that young people who participated in OST programs were more self-confident and had more positive feelings toward school and more positive social behaviors—and fewer negative ones—than those who did not participate. Additionally, the findings from the studies they reviewed suggested that OST programs help to boost school grades and achievement test scores. The only outcomes among those examined for which there was not a significant impact of OST programs were school attendance and drug use. The authors also concluded that programs that used evidence-based skill training approaches were consistently successful in producing multiple benefits for youth, while those that did not use such procedures were not successful in any outcome area.

It should be noted that none of the studies included in the meta-analyses reviewed above used school administrative data on discipline reports as we have in the present study. Instead, they measured student behavior based on responses to surveys administered to students and school staff.

Preventative Health Care Services

While there is a fair amount of evidence on the health-related impacts of school-based health centers (SBHCs) such as those established at several of the Elev8 schools, much less is known about the impacts of SBHCs on student academic outcomes. To our knowledge, the only rigorous studies that have been conducted to date are those of Walker, Kerns, Lyon, Bruns, and Cosgrove (2009) and Kerns, Pullmann, and Walker (2011).[9]

The Walker et al. study, which utilized data on student use of SBHCs in Seattle, found that students who used SBHC physical health services, beginning in the first semester of their freshman year in high school, experienced greater improvements in their attendance compared to students who did not initiate use of the SBHCs (for any reason) during the same time period. In addition, they found that students who used mental health services, beginning in the first semester of their freshman year, experienced greater improvements in their GPAs compared to nonusers of the SBHCs. They did not, however, find any association between SBHC use and the number of times a student was suspended or expelled.

The Kerns et al. study, which drew on the same data set as the Walker et al. study, examined the impact of SBHC use on the likelihood of a student dropping out of school between their first semester in high school and the semester in which they were expected to graduate. They did not find any association between SBHC use and the likelihood of dropping out.

While the Walker et al. study makes important contributions to the evidence base on the impact of SBHCs on academic outcomes, the results can only be generalized to students who initiate use of SBHC services in the first semester of their freshman year of high school.

Family Economic and Social Supports

The aim of the family economic and social supports pillar of Elev8 is to improve access to public benefits and social supports among parents of middle school students to help provide a stable base for their children. A large body of research provides evidence of a link between poverty and poor cognitive development and academic achievement (Duncan & Brooks-Gunn, 2000; Mullis, Rathge, & Mullis, 2003). Moreover, programs designed to reduce family poverty have been shown to improve children's performance in school. More recently, research has shown that children growing up in stressful environments—such as in families struggling to meet basic needs and in neighborhoods plagued by violence—may experience "toxic stress," which in turn can affect their neurological development and their ability to succeed in school (Sherman, Trisi, & Parrott, 2013). Thus, unlike the other three pillars, this pillar encompasses a range of activities,

[9] In addition, the Chapin Hall team recently completed a study of the Elev8 Chicago SBHCs (Rich, Winje, Kohm & Pacheco-Applegate, 2018). It found that, among students who were chronically absent in third grade (a proxy for health issues), students who used the SBHCS had significantly higher attendance rates than students who did not use the SBHCs.

which may *indirectly* impact children's outcomes by raising family income but do not have a direct influence on youth.

Research Questions and Data Sources

We addressed the following three research questions as part of the Elev8 Baltimore Outcomes Study:

- Do students who utilize Elev8 supports (i.e., OST programming and health services) or have parents who receive family supports (FS) have better academic outcomes than comparable students who do not utilize Elev8 supports or have parents who receive family supports?
- Do students who attend Elev8 schools have better outcomes than comparable students attending other Baltimore public schools?
- Do students attending Elev8 schools after the introduction of Elev8 have better outcomes than students who attended the same schools before the introduction of Elev8?

To address these questions we utilized data obtained from CRC, RFA, and MAI (via CRC); Baltimore City Public Schools (BCPS); and the Maryland Department of Education. These data, and their limitations (where applicable), are described below.

Data from Carson Research Consulting, Inc.

CRC provided us with deidentified data on: (1) student participation in OST activities, (2) student utilization of health services, and (3) family use of economic and social supports.[10] The OST program participation and family supports utilization data were collected by Elev8 Baltimore staff situated in the schools and then submitted to CRC for cleaning and compilation. Data on student utilization of health services were collected by Baltimore Medical Systems (BMS) and then reported to CRC.

Student participation in OST was measured as the number of days of participation in OST during each school year. Family use of economic and social supports was measured as the number of contacts the family had with an Elev8 family advocate; these contacts could involve direct services provided by the advocates and/or referrals to external agencies. Finally, through an agreement between BMS, CRC, and Elev8 Baltimore, CRC received data on the date and reason for each visit a student made to the health suite or health centers (Carson Research Consulting, 2016).

[10] Data was only collected and provided for students for whom CRC had obtained parental consent.

CRC also provided us with data on student demographics, grades, attendance, standardized test scores, suspensions/expulsions, and grade advancement. CRC obtained the data from BCPS and linked them with the Elev8 student and family participation data.

In general, the linked dataset provided by CRC spanned the school years 2009–10 through 2015–16, although there were a couple of exceptions. First, data on OST participation was not collected during the 2009–10 school year. Second, due to changes in BCPS policy regarding the release of student level suspensions/expulsions data, CRC was only able to provide us with this data for school years 2010–11 and 2012–13.

Finally, the dataset also included data from the student surveys conducted by RFA and MAI in the spring of 2012, 2013, 2014, and 2015. The target population for these surveys was all fifth through eighth graders enrolled in the Elev8 schools. The surveys gathered information on a variety of topics, including students' demographic characteristics, participation in out-of-school time activities, reasons for participation or nonparticipation in afterschool programs located at school, challenges faced in the past year (e.g., moving), perceived safety at school, educational expectations, and health care.

Data from Baltimore City Public Schools

BCPS provided us with the following data on all students who ever attended a Baltimore City public school between fifth and eighth grades during the school years 2003-04 through 2015-16:

- All schools attended in fifth through eighth grades
- Fifth through eighth grade attendance (days attended, days absent and days "not belonging")
- Third through eighth grade standardized test scores on the Maryland School Assessment (MSA)[11]
- Fifth through eighth grade standardized test scores on the PARCC test
- Fifth through eighth grade demographics and background characteristics: race/ethnicity, gender, limited English proficiency status, birthdate, home address

We also received fifth through eighth grade course grades for the school years 2009–10 through 2015–16. In addition, BCPS provided numbers of students suspended or expelled, by school, for the years 2003–04 through 2015–16.

[11] The MSA was administered in the 2003–04 through 2013–14 schools years. Beginning in the 2014–15 school year, it was replaced by the Partnership for Assessment of Readiness for College and Careers (PARCC) test.

Data from Maryland Department of Education

Aggregate school-level data on enrollment, proportion of students who were African American, proportion of students receiving free or reduced-price lunch, proportion of students who were limited English proficient (LEP), mobility rates, and attendance rates were downloaded from the website of the Maryland Department of Education (MDOE) or obtained from annual Maryland Report Cards.

Study Samples

Within-School Sample

The sample we used for the analyses comparing the outcomes of Elev8 participants to nonparticipants (within-school analyses) consists of all students who were enrolled in grades five through eight at the Elev8 schools during school years 2010–11 to 2015–16 for whom CRC received permission from parents/guardians to collect information on students. We used this sample to compare the middle school academic outcomes of students who participated in Elev8 activities to those who did not.

There were a total of 1,539 students in this sample who had the opportunity to participate (or whose parents had the opportunity to participate) in Elev8 activities (i.e., were "exposed to Elev8") during the study period.[12] Table 2 shows the grade at which students were exposed and the number of students in a grade who were first exposed to Elev8 in a given school year. For example, the second row of the table shows that, in SY15, there were 116 students who were first exposed to Elev8 as fifth graders; some proportion of these students reenrolled at their schools for sixth grade and would have been exposed to a second year of Elev8 (not shown in the table). Also, in SY16, there were 41 students who first enrolled at an Elev8 school in sixth grade, which was therefore their first year of exposure to Elev8. However, because the study period ends in SY16, these students will only have a total of one year of exposure. Adding up the numbers of students who were first exposed to Elev8 as eighth graders, or who were enrolled as middle schoolers in the final year of the study period, reveals that a minimum of one-quarter of all of the students in the sample were only exposed to Elev8 for one year. However, as will be shown below, the actual number of students who were only exposed for one year was significantly higher due to student mobility into and out of the schools.[13]

Figure 2 shows the actual number of years students in the sample were exposed to Elev8, taking into account mobility. It shows that 40% of the students in the sample were only exposed to Elev8 for one year, while another 30% were exposed for two years, and 19% were exposed for three years. Thus, during the study period, only a relatively small percentage of students (11%)

[12] We use the term "exposure to Elev8" to indicate the maximum number of years in which a student (or his or her parents, or both student and parent) could have participated in Elev8. For some students, this is equivalent to the number of years they attended one of the Elev8 schools. However, some students may have attended the Elev8 schools with grade levels K–8 before Elev8 was implemented. Therefore, thinking in terms of exposure to Elev8 avoids confusing mobility, which is related to the number of years a student attends a school, with the amount of time a student is observed during the study period.

[13] Some of the schools did extend the opportunity to participate in Elev8 to younger students. This calculation does not take these students into account. It also does not take into account the fact that Elev8 OST began in school year 2009–10, and some students counted as having first exposure to Elev8 in 2010–11 may have participated in the earlier year.

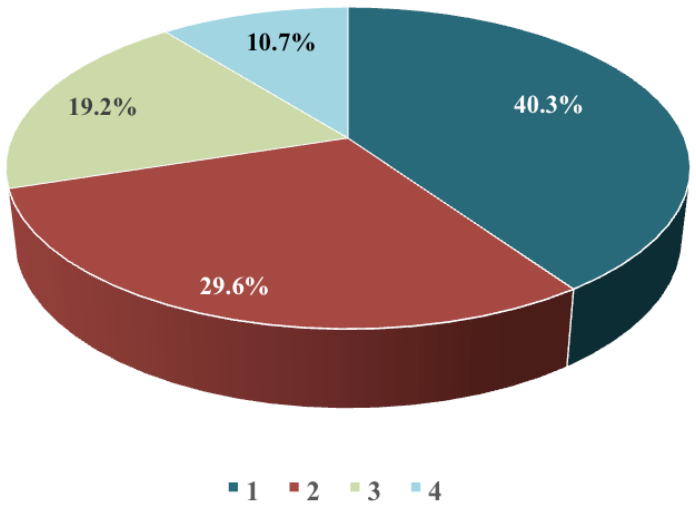
potentially had the opportunity to take advantage of Elev8 supports across all four of their middle school years.

Table 2. BCPS Students with at Least One Middle School Year of Exposure to Elev8

SY11	SY12	SY13	SY14	SY15	SY16
					5th (122)
				5th (116)	6th (41)
			5th (144)	6th (47)	7th (37)
		5th (138)	6th (29)	7th (14)	8th (24)
	5th (93)	6th (83)	7th (19)	8th (15)	
5th (106)	6th (25)	7th (62)	8th (10)		
6th (159)	7th (9)	8th (34)			
7th (117)	8th (3)				
8th (92)					

Notes:
1. School years in which Elev8 was implemented (and for which we have full participation data) are shaded in grey.
2. 5th, 6th, etc. refer to grades.
3. The numbers in parentheses indicate the number of students in the specified grade who were new to Elev8 in the corresponding school year. For example, there were 93 students who were new to Elev8 in 5th grade in school year 2011–12.

Figure 2. Percentage of All Students at Elev8 Schools (2010–16) by Years of Exposure to Elev8[a]



[a]Students in the study include those in grades 5-8 at an Elev8 school during 2010–16. How long a student stayed in the study depended on the grade when s/he enrolled at an Elev8 school, his/her mobility, and the grade range of the school s/he attended.

Patterns of Participation and Characteristics of Participants

Participation in Elev8 Supports

As shown in Figure 3, in the first school year in which all three Elev8 supports were available in the schools (2011), 45% of students both participated in OST and made use of the SBHC, and an additional 31% only utilized the SBHC.[14] Also, roughly equal proportions (approximately 5–7%) either only participated in OST, used all three supports, or used family supports, either alone or in combination with the SBHC or OST.[15] Approximately 10% did not use any supports. Notably, the first and second years were those in which the largest percentages of students (90–91%) used at least one Elev8 support.

Over time, the percentages of students participating only in OST increased and stabilized at approximately 15–16%, before falling slightly in the final year. At the same time, the percentages of students combining participation in OST with use of the SBHC fell by almost 30 percentage points during the study period. By the end of the period, the percentage combining OST and SBHC was only slightly higher than the percentage participating in OST only. By the end of the

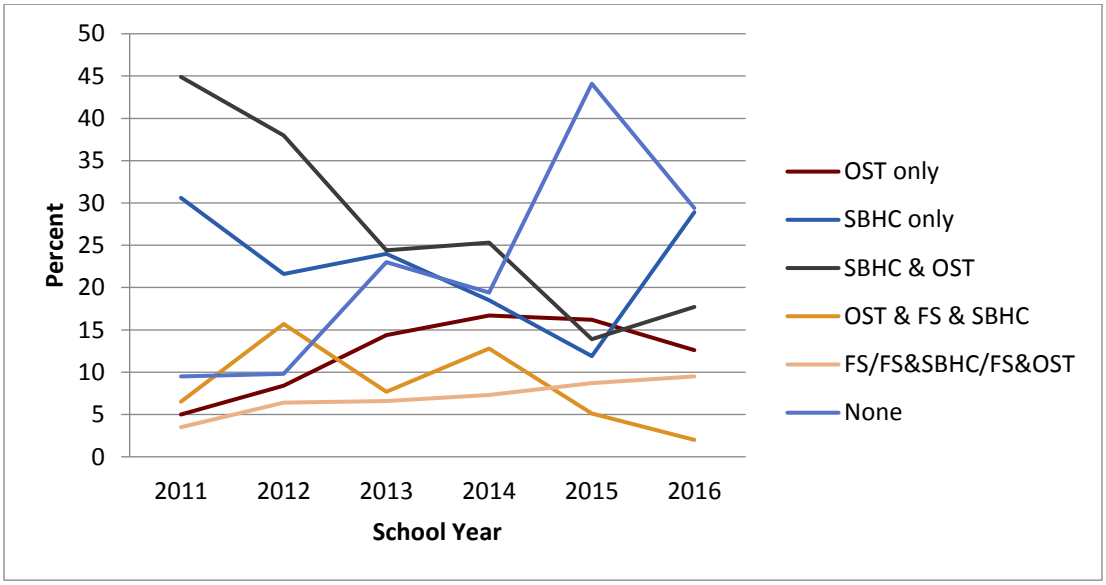
[14] In all of our analyses, we use the threshold of 15 days of participation in order to count a student as participating in OST. The overall patterns of participation are similar when the threshold is 1 day of participation.

[15] For this analysis, we combined students with (1) family supports only, (2) family supports and use of the SBHC, and (3) family supports and participation in OST into one category, due to the relatively small numbers of students in these individual categories over the course of the study period.

period, there were also approximately the same percentages using the SBHC only or using no supports at all, with a very small number combining the use of SBHC and OST with family supports (the highest proportion for the latter category was 16%, in 2012).

Overall, over the course of the study, the percentage of students using at least one support declined from a high of 91% in 2011 to 71% in 2016. On average, over the course of the study period, approximately 3 in 10 students combined participation in OST with use of the SBHC, and almost as many (23%) either only used the SBHC or did not use any supports. Additionally, an average of 12% of students only attended OST, while less than 10% of students used all three supports or fell into the category of FS only, FS and SBHC, or FS and OST.

Figure 3. Percentage of Students Participating in Elev8 Supports, 2011–16



Characteristics of Participants and Nonparticipants

Table 3 shows characteristics and outcomes (measured as of the end of the year) of students in their first middle school year at one of the Elev8 schools, according to their category of participation in Elev8 supports. Of particular interest in this table are potential differences in characteristics between the various categories of students who use supports and those who do not use any supports, since these differences may help to explain any differences in outcomes that we may see between these groups. For example, comparing students who only participate in OST to those who do not use any supports shows that students who don't use any supports are over twice as likely as their peers who only attend OST to receive special education. At the same time, students who do not use any supports are over twice as likely to have been suspended as students who only attend OST. Thus, it's possible that the lower percentage of OST-only students receiving special education partially explains their lower suspension rate. On the other hand, students who attend OST only appear to be more likely than students who don't use any supports to have changed schools in the past year. For this reason, we might expect

their outcomes to be somewhat worse than their peers who don't use any supports. In order to account for these possibilities, we control for these variables (in addition to others) in the regression analyses below.[16]

Another notable difference in Table 3 is the higher percentage of SBHC and OST and the higher percentage of SBHC, OST, and FS students who are African American, relative to those who don't use any supports. This is most likely a reflection of the fact that Commodore John Rogers Elementary, which joined the Elev8 initiative in the 2013 school year, did not have school-linked health services at that time and also had the lowest percentage of African American students among the Elev8 schools (77%).[17]

[16] It should be noted that many students in the sample were missing data on special education status and suspensions. We also account for this in the regression analyses.

[17] According to information obtained from CRC, Commodore John Rogers did not have school-linked health services as of the end of the 2015 school year. We do not know if these services were made available to students in the 2016 school year.

Table 3. Characteristics and Outcomes of Elev8 Participants and Nonparticipants (First year in Elev8 School)

	Elev8 Participants					Nonpar-ticipants
Characteristics	**OST only**	**SBHC only**	**SBHC & OST**	**SBHC, OST & FS**	**FS/FS& SBHC/FS & OST**	
Female (%)	54	55	57	55	50	48
African American (%)	90	82	92	95	79	80
Special education (%)	8	23	18	17	33	20
Free/reduced-price lunch (%)	86	94	94	84	75	84
Grade level: (%)						
Fifth	39	43	45	52	47	51
Sixth	27	25	26	21	22	23
Seventh	25	17	17	18	20	13
Eighth	9	14	11	9	10	14
Old for grade (%)	19	22	17	18	23	24
Changed schools past year (%)	38	27	28	27	31	27
Expects to attend college (%)	77	81	85	87	85	79
Outcomes						
Attendance rate (%)	94	92	94	92	92	92
Core GPA	74	74	76	72	70	74
Ever suspended (%)	8	15	9	21	27	23
N	164	350	421	95	116	321

Notes:

1. Data was missing on special education status (44% missing data), whether a student changed schools (52% missing data), whether a student expected to attend college (54% missing data), core GPA (13% missing data), and whether a student had ever been suspended (30% missing data).
2. In the sample, core GPA varies between the values of 30.5 and 96.5.

Between-School Sample

The between-school sample consists of all students who were enrolled in grades 5 through 8 at the Elev8 schools during school years 2009–10 through 2016–17. It also includes students who, during the same timeframe, attended a set of schools that were identified as being similar to the Elev8 schools at the beginning of the implementation of Elev8.[18]

We used a two-stage process to generate the comparison sample of students. First, we identified schools located in neighborhoods with child poverty rates similar to those of the Elev8 school neighborhoods. To do so, we used maps of Baltimore City Public Schools by neighborhood for SY2010 and maps of child poverty rates by community statistical area for 2008–12 (see Appendix A). We also used information on schools obtained from the 2011 Maryland Report Card.[19] Additionally, we attempted to select schools with grade level structures (i.e. PreK through eighth grade or K through eighth grade), enrollment levels, and proportions of African American students and students receiving free or reduced-price lunch that were similar to those of the Elev8 schools. Finally, we excluded a small number of alternative schools and schools that were not neighborhood schools. This process resulted in a sample of nine comparison schools.

Table 4 shows the neighborhoods in which the Elev8 and comparison schools were located. The table also shows the child poverty rates in the neighborhoods and the school grade level structures, SY2011 enrollment, and percentages of African-American students and students receiving free or reduced price lunch. It shows that the Elev8 schools were all located in neighborhoods with child poverty rates in the 50-72% range; most of the comparison schools were in neighborhoods with similar levels of poverty, but a few were in somewhat more advantaged neighborhoods with child poverty rates in the 39-50% range. The Elev8 schools also differ somewhat from the comparison schools in terms of overall enrollment. While the Elev8 schools range in size from approximately 200-570 students (or approximately 380, on average), the comparison schools range in size from approximately 250-840 students (or approximately 440, on average).

[18] For the between-school analyses we included students from school year 2009–10, since that is the year in which Elev8 officially launched. Adding students from this year resulted in a total sample of 1,907 Elev8 students.

[19] Ideally we would have liked to obtain school information from the 2010 Maryland Report Card but were unable to locate it online.

Table 4. Characteristics and Locations of Elev8 and Comparison Schools

School Name	Neighborhood	Child Poverty Rate (2010)	Grades	Enrollment (*n*) (SY 2011)	% African American (SY 2011)	% Free/ Reduced-price Lunch (SY 2011)
Tench Tilghman	McElderry Park/Middle East	50.3–71.9	PK–8	422	96.9	>95
Commodore John Rogers	Butcher's Hill	50.3–71.9	PK–8	442	77.1	91.2
Dr. Rayner Brown	Biddle Street	50.3–71.9	PK–8	252	97.6	>95
EBCS	Middle East	50.3–71.9	K–2,5–6	206	97.6	88.7
Collington Square	Broadway East	50.3–71.9	PK–8	571	99.1	92.8
Mount Royal Elem/Middle	Bolton Hill	50.3–71.9	K–8	836	98.4	81.3
Franklin Square	Franklin Square	39.4–50.2	PK–8	384	99.0	94.3
Steuart Hill Academy	Union Square	39.4–50.2	PK–8	396	83.1	90.6
Arundel Elem/Middle	Cherry Hill	50.3–71.9	PK–8	331	98.2	84.5
Dr. Carter Godwin Woodson	Cherry Hill	50.3–71.9	PK–8	359	98.9	90
Cherry Hill Elementary	Cherry Hill	50.3–71.9	PK–8	340	98.2	89.2
Harlem Park Elementary	Harlem Park	39.4–50.2	PK–8	357	99.2	94.8
Calverton Elementary	Bridgeview/ Greenlawn	39.4–50.2	PK–8	681	98.2	90.9
Lyndhurst Elementary	Edmondson Village	39.4–50.2	PK–6	253	98.8	91.4

Source: Baltimore schools and neighborhood map downloaded from https://www.baltimorecityschools.org/cms/lib/MD01001351/Centricity/Domain/137/PDF/MapSchoolsByNeighborhood_SY09_10.pdf; Maryland Report Card 2011

The second stage in generating a comparison sample entailed constructing a sample of students from the comparison schools with characteristics similar to the students in the Elev8 schools. In order to do this, we matched each Elev8 student to one or more students attending the comparison schools; the variables on which we matched were race/ethnicity, gender, grade level, calendar year and third and fourth grade test scores. Additionally, we conducted the match based on the year in which a student was first observed in an Elev8 school in grades 5, 6, 7, or 8.[20] Further, we kept each matched student in the sample as long as they remained enrolled in the same comparison school. This process resulted in a total sample of 4,589 comparison students, or approximately 2.4 comparison students for each Elev8 student.[21]

Table 5 shows descriptive statistics for middle school students in the Elev8 and comparison schools, for the first year in which they entered their respective schools as fifth through eighth graders. It shows that the Elev8 and comparison school students were similar in terms of gender, grade level, number of schools attended in the previous year, and the proportion who were old for grade. On the other hand, students attending the Elev8 schools were more likely to be Latino and somewhat more likely to have moved in the past year. In addition, they had test scores in the third and fourth grades that were approximately 0.25 standard deviations lower than the scores of students in the comparison schools.

Table 5. Characteristics of Students in the Between Schools Sample (First Year in School as Fifth through Eighth Grader)

Student Characteristics	Elev8 School	Comparison School
Female (%)	51	51
African American (%)	91	99
Latino (%)	8	1
Grade level	5.6	5.7
Old for grade (%)	19	18
Moved during past year (%)	32	25
Number schools attended previous year	1.2	1.2
Math test score in third/fourth grades (standardized)	-0.28	-0.14
Reading test score in third/fourth grades (standardized)	-0.29	-014
Total sample size	1,907	4,330

[20] Students who attended a comparison school but ever attended an Elev8 school were dropped as potential matches. In addition, students who attended an Elev8 school but switched to a comparison school were also dropped as potential matches for the remaining Elev8 students.

[21] When we identified Elev8 students we took account of the changes over the years in the schools that were participating in the Elev8 initiative.

Pre- and Post-Elev8 Sample

To construct the pre- and post-Elev8 sample, we began with all students who were enrolled in grades five through eight at the Elev8 schools during school years 2009–10 through 2016–17, plus all fifth through eighth grade students who attended the same schools as early as school year 2003–4 through school year 2008–9. We then removed a small number of students who spent part of their fifth through eighth grade years in the schools during the period before Elev8 was implemented, and part in the schools after Elev8 was implemented. This process yielded two nonoverlapping sets of students: one set who spent part or all of their fifth through eighth grade years at the schools before Elev8 was implemented, and another set who spent part or all of their fifth through eighth grade years at the schools after Elev8 was implemented.

Table 6 displays descriptive statistics comparing the characteristics of the students in their first year in the pre-Elev8 sample to those of students in their first year in the post-Elev8 sample.[22] It shows that there were relatively minor differences between pre- and post-Elev8 students. Reflecting demographic changes in the school district, students who attended the schools post-Elev8 were somewhat more likely to be Latino and less likely to be African American. In addition, students who attended the schools post-Elev8 were somewhat less likely to be old for grade and had third and fourth grade standardized test scores that were approximately 0.20 standard deviations higher than those of students who attended the schools prior to Elev8. Finally, post-Elev8 students were somewhat more likely to be in sixth grade in their first year in the sample and less likely to be in the eighth grade.

[22] We were not able to obtain information on IEP or free/reduced-price lunch status from BCPS for these students.

Table 6. Characteristics of Students in the Pre- and Post-Elev8 Samples (First Year in School as Fifth through Eighth grader)

Characteristics	Pre-Elev8	Post-Elev8
Female (%)	49	51
African American (%)	98	90
Latino (%)	2	10
Limited English Proficient (%)	1	5
Grade level: (%)		
Fifth	56	59
Sixth	16	22
Seventh	14	11
Eighth	14	8
Old for grade (%)	24	19
Moved during past year (%)	41	43
Number schools attended previous year	1.2	1.2
Math test score in third and fourth grades (standardized)	-0.45	-0.22
Reading test score in third and fourth grades (standardized)	-0.40	-0.21
Total sample size	1,559	2,025

Methods and Results

Methods: Within-School Analyses

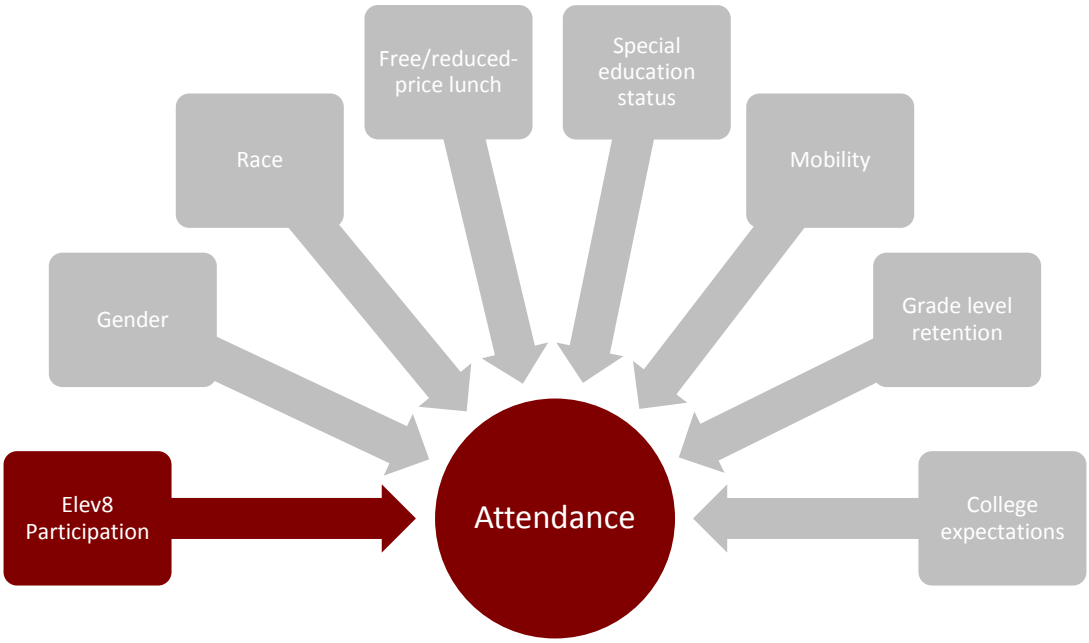
We addressed the focal questions in the within-Elev8 school analyses by estimating a series of statistical models that provide progressively stronger controls for potential "selection bias," which refers, in part, to the tendency for students who are already doing relatively well academically to be overrepresented among OST participants. It also refers to the possibility that students who are doing *less* well academically might be overrepresented among SBHC and/or FS participants.[23] Our models also correct for statistical errors that can arise from the fact that students appear in the data more than once (called "clustering") because we had multiple years of data for each student.[24]

In order to gain a sense of the extent to which selection bias might affect our results for the outcomes of attendance and core GPA, we first estimated linear regression (or ordinary least squares) models that included only the outcome variable and the measure of Elev8 participation. This model provides an indication of how participants and nonparticipants differ with respect to the outcome, before taking into account any differences between participants and nonparticipants that may explain differences in their outcomes (see Figure 4). Next, we added the variables in Table 3 that appeared to distinguish students who participated in one or more of the various combinations of Elev8 supports from students who didn't use any Elev8 supports (in a given year). These variables were gender, race/ethnicity, special education status, free/reduced-price lunch status, grade level, whether or not the student was old for their grade, whether the student had changed schools in the previous school year, or whether the student expected to attend college.

[23] For example, there is evidence that students with worse health are more likely to use the SBHC (McNall, Lichty & Mavis, 2010; Wade, Mansour, Line, Huentelman, & Keller, 2008). To the extent that health affects students' academic outcomes, we would expect that students with worse academic outcomes might be overrepresented among students who utilize the SBHC.

[24] This "clustering" violates the basic requirement that the data points used for the analysis be independent of each other.

Figure 4. Independent Variables in Regression Analyses



As background variables, race/ethnicity and gender were measured once. The remaining variables were measured for each year an individual student was observed in the sample. It should be noted that the variables included in the models only provide partial control for all of the differences that might exist between participants and nonparticipants, and which might influence any observed differences in outcomes. For this reason, there are likely to be numerous additional factors that are not or cannot be measured.

After estimating linear regression models, we then estimated "random-effects" models, which account for the fact that individual students appear in the data more than once. Subsequently, our final step for the analysis exploring the effect of Elev8 participation on attendance and GPA was to estimate linear fixed-effects models.

It should be noted that, in fixed-effects models, the standard errors on the estimated coefficients are often substantially larger than the standard errors obtained from random-effects models (Allison, 2009). This is because fixed-effects models only use information from individuals in the sample who experience a change in the variable(s) of interest; therefore, since the sample size used for the estimate decreases, the standard error of the estimate increases. This means, further, that even though the size of the coefficients in fixed-effects models might be comparable to those in random-effects models, they are less likely to attain conventional levels of statistical significance. Despite this, we can draw conclusions about the likely effects of variables by looking at how the coefficients change when moving from ordinary least squares to random-effects to fixed-effects models.

We used a similar approach for the models in which the likelihood of being suspended was the outcome variable. In this case, we started with a linear probability regression model, which is

appropriate when the outcome variable only takes on the values of 0 and 1. We then proceeded to estimate a random-effects linear probability model.[25] However, because we only had two years of suspension data (SY11 and SY13), and they were not adjacent years, we did not estimate a fixed-effects model for this outcome.[26]

Results of Within-School Analyses

Attendance

We first estimated a linear regression model with no controls for differences between participants and nonparticipants (see Figure 5). This model showed that students who participated only in Elev8 OST in a given year had an average attendance rate that was 2.4 percentage points higher than that of students who did not participate in any Elev8 supports. Also, students who combined participation in OST with utilization of the SBHC had an average attendance rate that was 1.8 percentage points higher than that of students who did not participate in any supports. In both cases, these differences were statistically significant. We also found that students who used all three supports had a somewhat higher average attendance rate than the no supports group, although the difference was not statistically significant.[27]

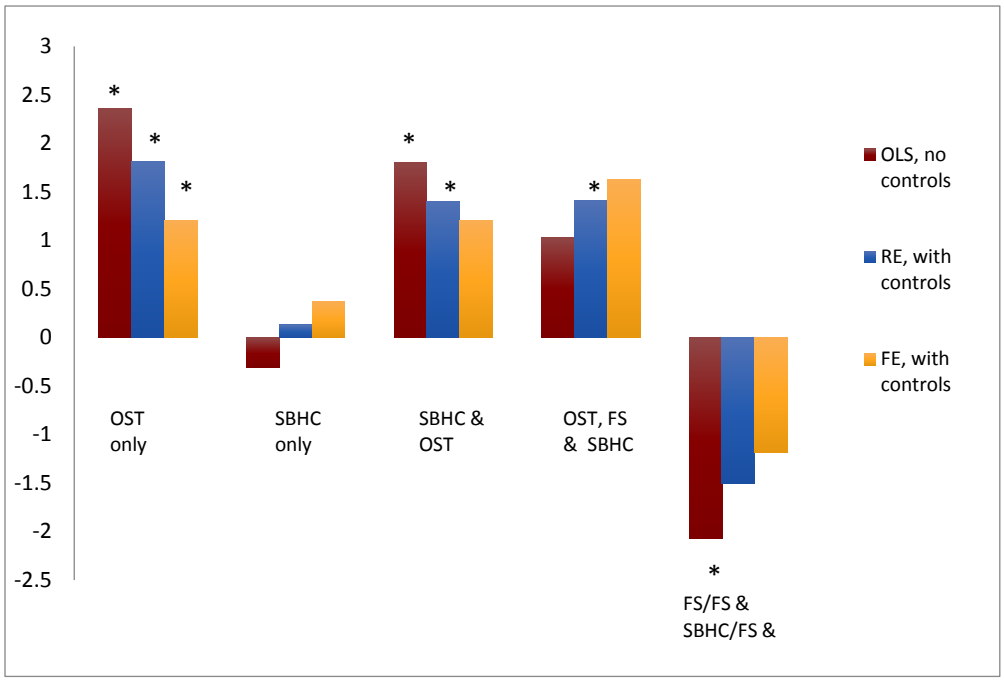
On the other hand, students who utilized family supports, either alone or in combination with OST or SBHC, had an average attendance rate that was 2 percentage points lower than that of students who did not use any supports. This might be a reflection of the fact that students whose families require supports face more challenges than other families, and these challenges may affect their children's ability to attend school regularly.

[25] We also estimated logistic regression and random-effects models. However, we decided to only present the results from the linear probability models, since they are easier to interpret. In addition, it has been shown that, unless the probabilities in the sample are extreme (i.e., close to zero or one), the linear and logistic models fit about equally well (von Hippel & Workman, 2016).

[26] As mentioned previously, the fixed-effects model only uses information on sample members for whom the independent variable of interest changes over time (in this case, participation in the various categories of Elev8 supports). Thus, it is not clear how to interpret or generalize from results obtained on the basis on individuals who change their Elev8 participation status over the course of two years.

[27] Full regression results can be found in Appendix B.

Figure 5. Estimated Differences in Attendance Rates between Elev8 Participants & Nonparticipants



Finally, the average attendance rate of students who only used the SBHC was very similar to that of students who did not use any supports. This suggests that there are limited positive effects of SBHC use among the general population of students, although there may be positive effects for the relatively small proportion of students with chronic health issues.[28]

Next we estimated a linear random-effects model that included demographic and other controls. This model controlled for measurable differences between the various categories of participants and nonparticipants but, in addition, corrected for the fact that students were observed more than once in the sample. This model showed that students who participated in OST only, and those who combined participation in OST with use of the SBHC, continued to show higher average rates of attendance than students who did not use any supports, although the sizes of the differences were somewhat lower. These differences also continued to be statistically significant. Additionally, the difference between students using all three supports and those using none grew more positive and became statistically significant, perhaps due to the fact that we controlled for characteristics of students using family supports that were negatively associated with attendance. However, the average attendance rate of students using

[28] The Chapin Hall team found some evidence for this in its study of the Elev8 Chicago school-based health centers. Specifically, it found that while there were no effects of SBHC use among students in general, students who were chronically absent in third grade (which was employed as a proxy for health issues) and utilized the SBHC attended school for about 1.5 weeks more than students who were chronically absent in third grade and did not utilize the SBHC.

only family supports, or family supports in combination with OST or SBHC, remained lower than that of students using no supports. In addition, there remained essentially no difference between the average attendance rates of students only using the SBHC and students using no supports.

Finally, we estimated a linear fixed-effects model that included demographic and other controls. As mentioned above, this model accounted for both measured and constant, unmeasured differences between students. This model showed that students who participated only in OST had an average attendance rate that was 1.2 percentage points higher than that for students who did not use any Elev8 supports. This is a bit lower than the effect found in the random-effects model. This difference was statistically significant. It implies that students who participated only in OST attended, on average, approximately 2 days more per year than students who did not utilize Elev8 supports (calculated with the formula 0.012*161, where 161 is the estimated average total days attended by students).

Students who combined OST and use of the SBHC also had an average attendance rate that was 1.2 percentage points higher than that for students who did not use any supports. In contrast to the result for the random-effects model, this difference was not statistically significant, due in part to the fact that the standard error of the estimated coefficient was considerably larger. Similarly, students who combined all three supports had an average attendance rate that was 1.6 percentage points higher than the rate for students who did not use any supports; however, this difference was also not statistically significant.

Overall, the results showed that students who used family supports, alone or in combination with OST or SBHC, had an average attendance rate that was 1.2 percentage points lower than the rate for students who did not use any supports. The fact that the coefficient on this category of supports remains negative could be an indication that there are unobservable differences between students that are not constant over time; for example, compared to students whose families do not use supports, students whose families use supports may experience a sudden and/or temporary change in circumstances that precipitates use of supports.

Grades

In the linear regression model with no controls for differences between Elev8 participants and nonparticipants (see Figure 6) we found that, on average, students who participated only in OST had a mean grade point average (GPA) that was 2.1 points higher than that of students who did not utilize any Elev8 supports.[29] Additionally, students who participated in OST and utilized the SBHC had a mean GPA that was 1.4 points higher than that of students who did not use any supports. In contrast, students who utilized family supports, alone or in combination with OST or

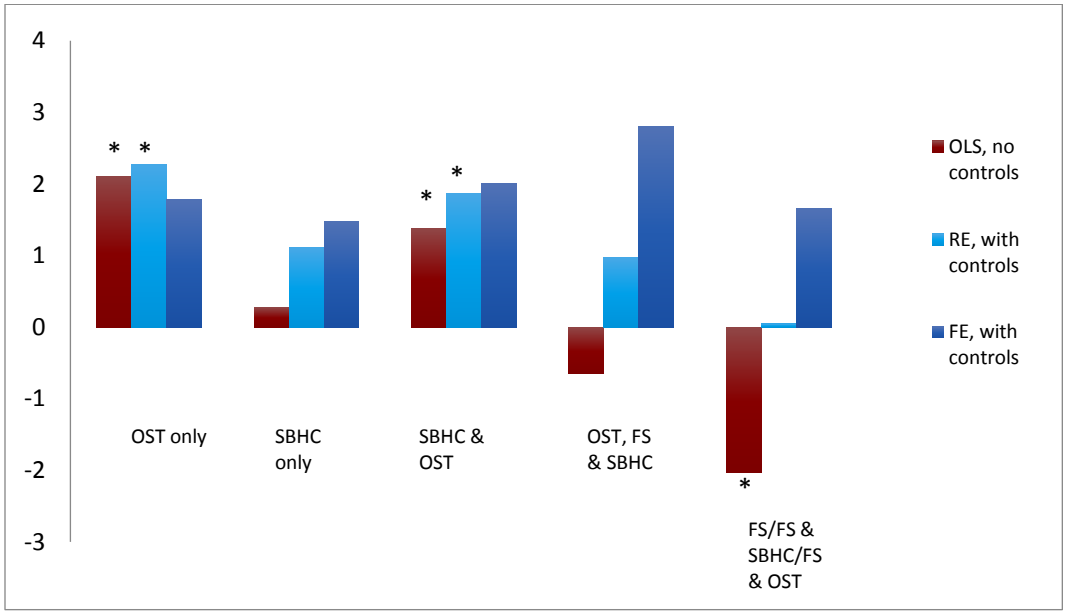
[29] Grade point averages in the sample ranged between 27 and 100, with an average of 73.5 and a standard deviation of 9.9. Therefore, a difference of 2.1 points translates into a .21 standard deviation difference, which would generally be considered to be a small difference.

SBHC, had a mean GPA that was 2 points lower than that of students who didn't use any supports. All of these differences were statistically significant.

In the random-effects model with controls for measurable differences between participants and nonparticipants, we found that the mean GPA of students who participated only in OST, or who combined participation in OST with use of the SBHC, continued to be higher than that of students who did not use any supports. In addition, the differences remained statistically significant. However, students who used family supports, alone or in combination with OST or SBHC, no longer appeared to have a lower mean GPA than students who did not use any supports (nonparticipants). In addition, the differences in mean GPAs between students who only used the SBHC, or who used all three supports, and nonparticipants became more positive, although they did not attain statistical significance.

Finally, in the fixed-effects model, the mean GPAs of OST-only and SBHC & OST participants continued to be higher than those of nonparticipants, although the differences were not statistically significant.[30] Also, the differences in GPAs between the remaining three groups of participants and nonparticipants again became more positive. These results suggest the presence of unobserved differences between the students in these categories and students who use no supports that are correlated with worse outcomes, so that, when they are accounted for, the former students actually have better outcomes than the latter. However, none of these differences were statistically significant.

Figure 6. Estimated Differences in GPA between Elev8 Participants and Nonparticipants



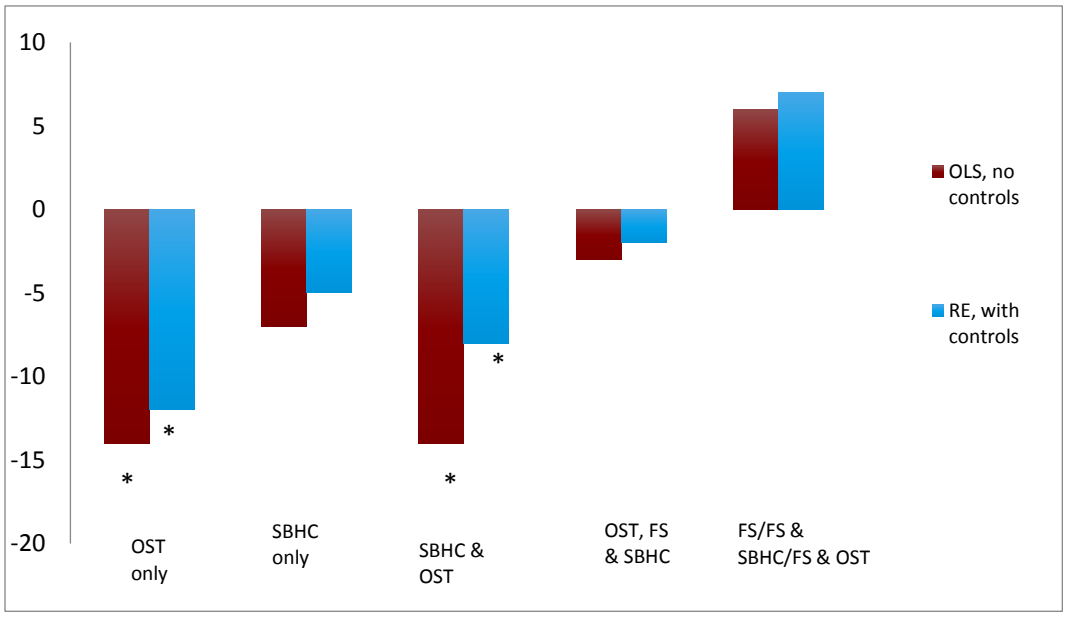
[30] Again, this could be due in part to the fact that standard errors in fixed-effects models tend to be considerably higher.

Suspensions

In the linear probability model, with no controls for differences between participants and nonparticipants, we found that the probability of being suspended for students who participated only in OST, or who combined participation in OST with use of the SBHC, was 14 percentage points lower than the probability for students who did not use any supports. These differences were statistically significant. In addition, students who only used the SBHC and those who combined all three supports also had lower suspension rates than students who did not use any supports, while those who used family supports (alone or in combination with SBHC or OST) had higher rates, although none of these differences were statistically significant.

In the random-effects model with controls for measurable differences between participants and nonparticipants, the OST-only and SBHC & OST groups continued to have lower suspension rates than the no supports group (12 and 8 percentage points lower, respectively), and these differences were statistically significant (see Figure 7). It should be kept in mind, however, that these differences do not account for unobserved differences between students that might be correlated with both the likelihood of being suspended and participation in certain Elev8 supports. Additionally, students who only used the SBHC or combined all three supports also continued to have lower suspension rates compared to the reference group (although, again, the differences were not statistically significant).

Figure 7. Estimated Differences in Suspension Rates between Elev8 Participants and Nonparticipants

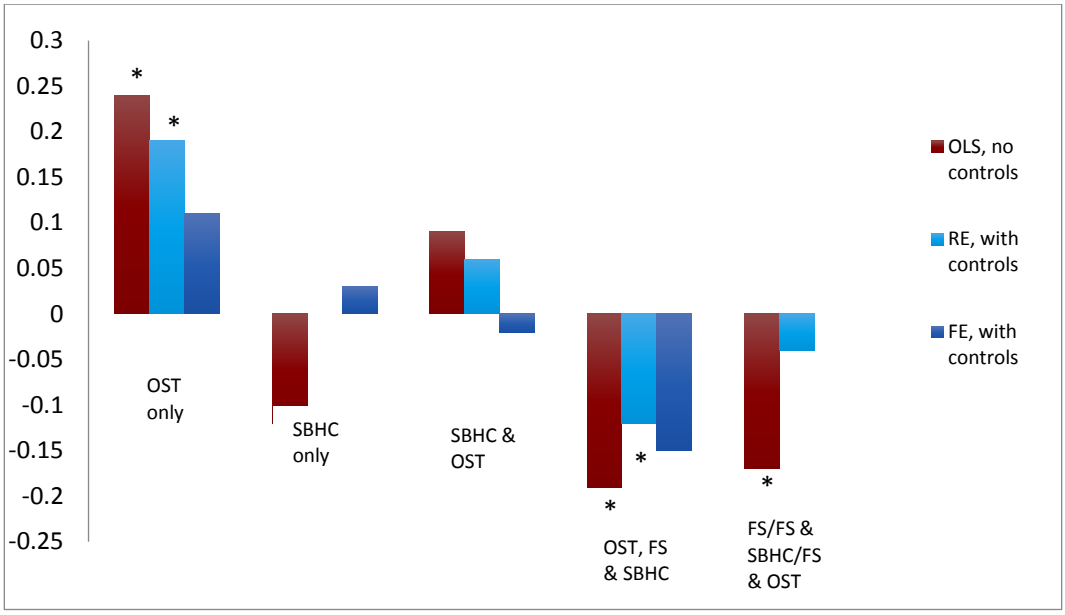


Test Scores

Figure 8 shows that, without any controls, students who only participated in OST had math test scores that were about a quarter of a standard deviation higher than the test scores of students

who did not utilize any supports. This difference was statistically significant. In addition, the math test scores of students who utilized both OST and the SBHC were slightly higher than those of students who did not use any supports, although the difference was not statistically significant. On the other hand, the math test scores of students who used all three supports were lower—by about a fifth of a standard deviation—than those of students who didn't use any supports, and this difference was statistically significant. Finally, the test scores of the remaining two groups of students who used supports were also lower than those of students who didn't use supports, but these differences were not statistically significant.

Figure 8. Estimated Differences in Math Test Scores between Elev8 Participants and Nonparticipants



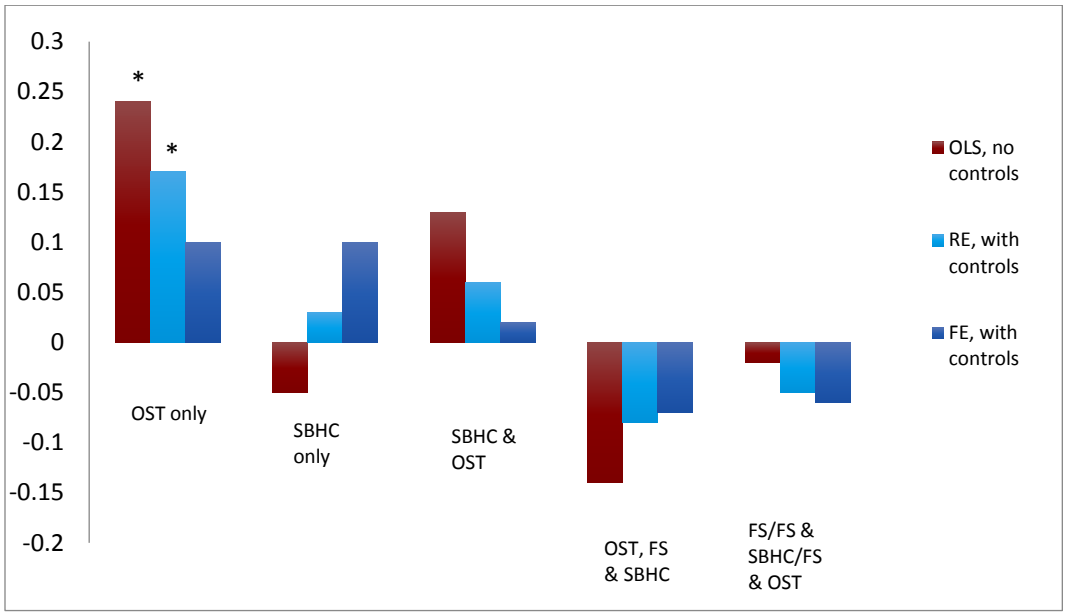
After controlling for measurable differences between students, we found that students who only participated in OST still had higher test scores than students who didn't use any supports. The size of the estimated coefficient was reduced somewhat; however, it remained statistically significant. Similarly, students who used all three supports continued to have test scores that were lower than those of students who didn't use any supports, and the difference remained statistically significant.

Finally, after controlling for constant, unmeasured differences between students, we found that students who only participated in OST continued to have higher math test scores than those of students who did not utilize any supports. However, the coefficient was about half the size of the coefficient in the OLS model with no controls. In addition, the standard error nearly doubled in size, and the coefficient was no longer statistically significant. It is worth noting, however, that the size of the estimated coefficient for the OST-only group is comparable to that of estimated coefficients found in some other studies of the effects of educational reforms on math and/or reading scores. For example, Krueger (1999) found that the effect of lowering class size from 24

to 16 students per teacher is approximately 0.22 standard deviations over 3 years on combined math and reading scores. Also, Fryer (2014) studied the effects of a reform that lengthened the school day, increased the skill levels of teachers and principals, provided tutoring or additional math/reading instruction to targeted students, encouraged teacher use of data to alter the scope and sequence of classroom instruction, and focused on instilling a culture of high expectations in a group of Houston public schools. He found that the reforms significantly increased math test scores, by 0.15 to 0.18 standard deviations a year. Finally, in his study of the Communities in Schools program in Chicago, Figlio (2015) found that students who attended a CIS school had math test scores that were 0.05 standard deviations higher than students who did not attend a CIS school.

Figure 9 shows that the size of the estimated effects of using Elev8 supports on reading test scores are generally similar to the effects found for math test scores. However, the only results that are statistically significant are those for students who only participate in OST.

Figure 9. Estimated Differences in Reading Test Scores between Elev8 Participants and Nonparticipants



Methods and Results: Between-School Analyses

For the between-school analyses we investigated the effect of being enrolled in an Elev8 school in a given year during middle school on student attendance, likelihood of passing ELA or math courses, and math and reading test scores.[31,32]

[31] Full regression results can be found in Appendix B.

[32] Because of the relatively small effects on GPA in the within-school analyses, we elected to examine the likelihood of passing math and ELA courses instead.

For these analyses we estimated random-effects models, which, as explained previously, account for the fact that individual students appear in the data more than once (i.e., because they may attend an Elev8 or a comparison school for up to 3 years). However, we were not able to use fixed-effects models for these analyses since the vast majority of students do not move back and forth between the Elev8 and the comparison schools; thus, we cannot take advantage of variation in Elev8 school status over time.[33]

Our primary independent variable was an indicator that took the value of one if the student attended one of the Elev8 schools and took the value of zero if the student attended one of the comparison schools. As with the within-school analyses, we controlled for a set of student characteristics—gender, race/ethnicity, average ISAT scores in grades 3 and 4, special education status, grade level, and whether or not the student was old for grade, had moved, or was an English language learner—that are related to student outcomes. In addition, because there were some significant differences in school-level characteristics, we included the following school-level variables as controls: proportion of English language learners, proportion receiving free or reduced-price lunch, proportion receiving special education, and total fifth through eighth grade enrollment.[34]

As shown in Table 7, in all of the regressions the coefficients on the Elev8 school indicator were small in size and statistically insignificant.

Table 7. Regression Results: Between-School Analyses

	Results for Elev8 School Indicator		
Outcome Variable	**Coefficient**	**Standard error**	**p-value**
Attendance	-0.70	1.06	0.51
Passed ELA course	0.04	0.04	0.26
Passed math course	-0.05	0.05	0.32
Math test score	0.03	0.05	0.61
Reading test score	0.06	0.09	0.48

We extended our analyses by estimating models with interactions between gender and the Elev8 school indicator, as well as between the number of years the student had attended their school and the Elev8 school indicator. We did not find any statistically significant interactions in any of these regressions.

[33] In addition, perhaps because of the relatively small number of students who failed math or English (approximately 6%), we were unable to get the random-effects logistic models to run. Therefore, we estimated random-effects linear models for the passed math or English outcomes.

[34] We also corrected the standard errors in these regressions to account for the fact that students are clustered within schools.

Methods and Results: Pre- and Post-Elev8 Analyses

For the pre- and post-Elev8 analyses, we investigated the effect of being enrolled in one of the Elev8 schools after the implementation of Elev8, as compared to being enrolled in the same schools prior to Elev8 implementation. As with the between-schools analyses, we estimated random-effects models to examine the association between attending an Elev8 school after implementation and student outcomes. It should be noted that we were unable to obtain information on course grades for the years SY04 through SY09 from BCPS; thus, we were restricted to examining attendance and test score outcomes for these analyses. Our primary independent variable was an indicator that took the value of one if the student attended one of the Elev8 schools after the implementation of Elev8, and took the value of zero otherwise. Additionally, we controlled for the same set of student- and school-level characteristics that we employed in the between-schools analyses.

As shown in Table 8, the estimated coefficients on the post-Elev8 indicator in all three regressions were small in size, although those for the test score regressions were statistically significant.[35] The coefficients in these regressions indicate that students who attended the Elev8 schools after Elev8 was implemented had test scores that were approximately 0.10 standard deviations higher than those of students who attended the Elev8 schools before Elev8 was implemented.

Table 8. Regression Results: Pre- and Post-Elev8 Analyses

	Results for Post-Elev8 Indicator		
Outcome Variable	**Coefficient**	**Standard error**	**p-value**
Attendance	-0.18	0.44	0.69
Math test score	0.11	0.04	0.01
Reading test score	0.12	0.05	0.00

Finally, we ran regressions that included interactions between post-Elev8 status and gender, as well as between post-Elev8 status and the number of years a student had been attending—as of a given year—their respective school. We did not find any statistically significant interactions in any of the regressions.

[35] We did not correct for clustering at the school level in these regressions because the number of schools is only five. As a general rule, it is typically suggested that correcting for clustering should be avoided when the number of clusters falls below 15–20. Despite this general rule, however, it may still be the case that the standard errors we obtained are underestimated; as a result, the p-values may be overestimated.

Conclusion

Summary and Discussion of Findings

Overall, we found consistent evidence of positive, though generally small, effects of participating in Elev8 activities and supports. Specifically, we found that within the Elev8 schools:

- Students who either only participated in OST, combined participation in OST with use of the SBHC, or used all three Elev8 supports had average attendance rates that were higher (though not substantially) than the average attendance rates of students who did not use any supports.

- Students who either only participated in OST, or who combined participation in OST with use of the SBHC, had mean GPAs that were higher (though, again, not substantially) than the mean GPA of students who did not use any supports. We also found some evidence that the mean GPAs of students who only used the SBHC, or who used all three supports, were higher than those of the no supports group.

- Students who only participated in OST had reading and math scores that were 0.10–0.20 standard deviations higher than the scores of students who did not use any supports. The size of these effects is comparable to that found in other studies of the effects of educational reforms on math and/or reading scores.

- Students who either only participated in OST, or who combined participation in OST with use of the SBHC, had significantly lower suspension rates than students who used no supports. However, these differences do not account for unobserved differences between students that might be correlated with both the likelihood of being suspended and participation in Elev8 supports.

As described in the literature review, existing findings with respect to the effects of participating in OST are mixed. Studies that focused on programs that specifically sought to enhance the personal and social development of youth, or on programs that targeted reading and math achievement, were more likely to find positive effects of participation. To the extent that Elev8 Baltimore OST programs can more fully adopt one or both of these emphases, they may be able to amplify the effects found in this study.

In addition, there is very limited evidence of the effects of using SBHC services on student academic outcomes. In this study, we did not see any evidence that using the SBHC had additional benefits above and beyond those of participating in OST and, in some cases, the findings suggested that students who combined SBHC use with OST participation may have had worse outcomes than students who only participated in OST. This may be because a proportion

of students who used the SBHC had health issues that impacted their outcomes. However, we did not have access to a measure of health problems that would allow us to test this hypothesis.

With respect to the school-level analyses, we found some evidence that students who attended the Elev8 schools after the implementation of Elev8 had higher test scores than did students who attended the Elev8 schools before the implementation of Elev8. In contrast, we did not find any evidence of differences in outcomes for students who attended the Elev8 schools when compared to students who attended a set of comparison schools that appeared, based on available data, to be similar to the Elev8 schools.

The lack of evidence for school-level effects of Elev8 may be due to the possibility that the comparison schools offered some programming similar to Elev8; we did not have access to this information for the time period covered by the study and thus could not incorporate it into the analysis. Additionally, the lack of evidence for school-level effects may also be related to the fact that the positive effects of participating in Elev8 supports tended to be concentrated among students who only participated in OST programming. Over the course of the study period, only about 12% of students fell into this category. Similarly, while there were some positive effects associated with both participating in OST and utilizing the SBHC, only about 28% of students fell into this category during the study period. Further, the percentage of students in this category declined significantly over the period. In addition, as described above, the average student only completed two middle school years at an Elev8 school, further limiting the potential for observing differences at both the student and school levels. This suggests that, in order to increase the impact of initiatives such as Elev8, consideration might be given to extending the availability of supports to all grade levels, so that there is a longer period over which students might benefit from utilizing supports. Emphasis might also be placed on continuously monitoring the proportion of students who are using supports and proactively taking steps to address significant changes in this proportion, with the overall intention of maximizing the proportion of students utilizing supports over time. Additionally, since student mobility significantly impacts the extent to which students can benefit from supports, consideration might be given to specifically targeting for support those families most likely to move due to economic and other reasons that may be beyond their control.

To put the school-level findings into perspective, the Communities in Schools (CIS) model is the integrated student supports (ISS) model that comes closest to Elev8. To date, three studies—two quasi-experimental and one experimental—have examined the school-level effects of this model. Similar to our findings, the experimental study found small, positive effects on math scores. In addition, one of the quasi-experimental studies found a small impact on attendance, while the second did not find any evidence of positive effects on student outcomes.

Strengths, Limitations, and Suggestions for Future Research

A major strength of this study, due to the extensive data collected by CRC, is that it was able to employ measures of participation in all three of the supports offered by the Elev8 Baltimore initiative. To our knowledge, no other evaluation of a community school initiative has had access

to comprehensive data of this nature. In addition, because the data for the within-schools analyses were longitudinal, we were able to employ statistical models that account for unmeasured (albeit constant) differences between students. Despite this, because Elev8 students/schools were not randomly assigned to intervention and comparison groups, we were ultimately limited to a quasi-experimental approach for this study. A significant limitation of this approach is self-selection bias. In other words, Elev8 participants, or their caregivers, choose to utilize Elev8 supports, and, as a result, participants may be different than those who choose not to use the supports. For example, participants may be more motivated and organized or have fewer challenges than those who choose not to participate. The same applies to schools that agreed to be a part of the Elev8 initiative, as compared to schools that did not. While we aimed to make the participant and nonparticipant groups as similar as possible by controlling for measured characteristics of students and schools (as well as, where possible, unmeasured characteristics that did not change over time), there may have been differences that remained that impacted the results.

Finally, we recommend that future studies on community school initiatives build on this one by continuing to pay attention to both student- and school-level effects and by making it a priority to collect data on all aspects of participation. In particular, while the Elev8 Baltimore site was relatively unique in terms of having access to data on student use of the SBHCs, the Chapin Hall study of the Elev8 SBHCs (Rich et al., 2018) demonstrates that it is possible, though certainly not without significant challenges, to work with health centers to obtain this data. The data can be obtained either by obtaining permission from parents and students or by obtaining an Institutional Review Board (IRB) waiver of the requirement to obtain permission.

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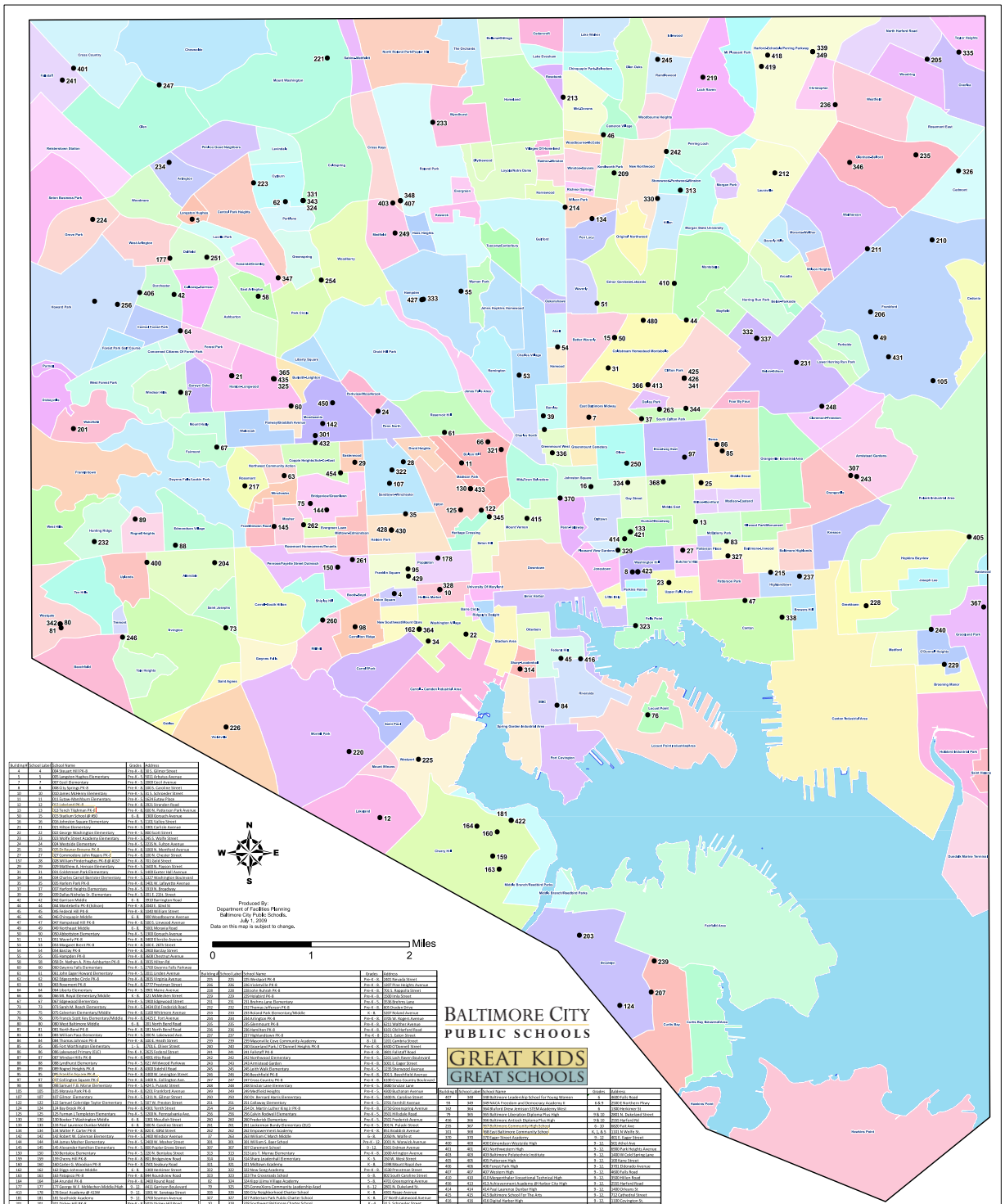
Appendix A

Maps


Baltimore City
Public Schools
With Neighborhoods
BALTIMORE CITY
PUBLIC SCHOOLS
GREAT KIDS
GREAT SCHOOLS
N
W
E
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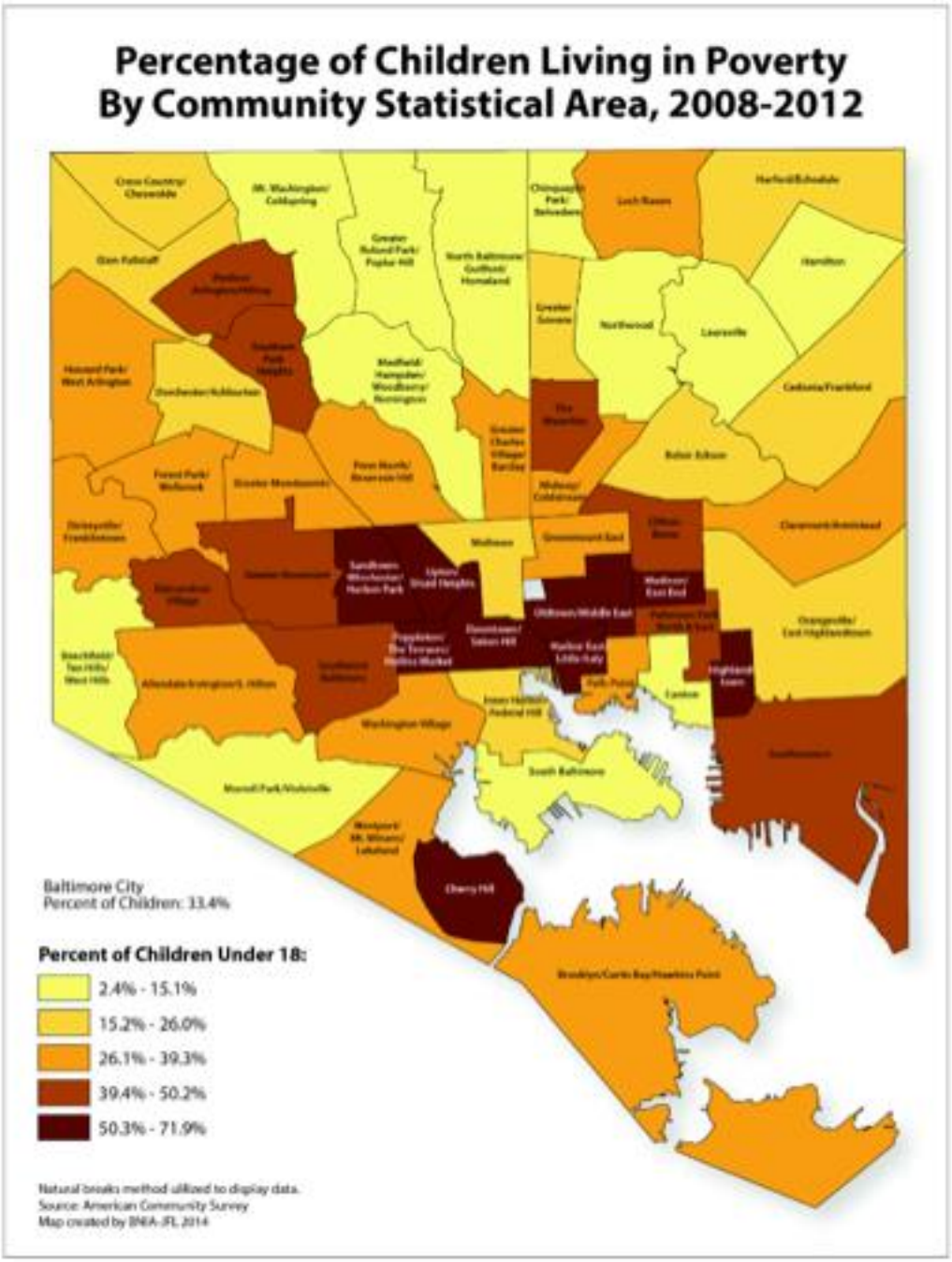
Produced By:
Department of Facilities Planning
Baltimore City Public Schools
July 1, 2009
Data on this map is subject to change.
0
1
2
Miles


Percentage of Children Living in Poverty
By Community Statistical Area, 2008-2012
Baltimore City
Percent of Children: 33.4%
Percent of Children Under 18:
2.4% - 15.1%
15.2% - 26.0%
26.1% - 39.3%
39.4% - 50.2%
50.3% - 71.9%
Natural breaks method utilized to display data.
Source: American Community Survey
Map created by BNIA-JFL 2014

Appendix B

Full Regression Results

Table B-1. Within-school Analysis: Attendance

Variable	Attendance (RE)		Attendance (FE)	
	Coefficient and standard error	p-value	Coefficient and standard error	p-value
SBHC only	0.131	0.803	0.365	0.705
	(0.526)		(0.964)	
OST & SBHC	1.400	0.001	1.208	0.140
	(0.424)		(0.818)	
OST only	1.805	0.000	1.210	0.051
	(0.383)		(0.620)	
OST, FS, & SBHC	1.407	0.020	1.624	0.142
	(0.604)		(1.105)	
FS/FS & SBHC/FS & OST	-1.500	0.077	-1.193	0.382
	(0.847)		(1.365)	
Female	-0.728	0.063	0	.
	(0.391)		(.)	
African American	-2.512	0.001	0	.
	(0.735)		(.)	
Special education	-1.509	0.008	-0.736	0.500
	(0.567)		(1.090)	
Special education missing	-0.134	0.654	-0.0517	0.918
	(0.300)		(0.504)	

Table B-1, cont'd

Old for grade	-2.990	0.000	-1.122	0.911
	(0.609)		(10.00)	
Changed schools	-0.785	0.096	-0.920	0.267
	(0.471)		(0.829)	
Changed schools missing	-1.405	0.012	-0.373	0.709
	(0.559)		(1.000)	
Fifth grade	0.375	0.345	0.960	0.262
	(0.397)		(0.856)	
Sixth grade	-0.0545	0.884	0.437	0.521
	(0.374)		(0.681)	
Seventh grade	-0.558	0.078	-0.362	0.467
	(0.316)		(0.497)	
Expects college	0.360	0.521	-0.362	0.734
	(0.560)		(1.066)	
Expects college missing	0.501	0.476	-0.0428	0.974
	(0.703)		(1.306)	
Free/reduced lunch	0.101	0.857	-0.162	0.860
	(0.559)		(0.918)	
Free/reduced lunch missing	-0.0899	0.890	-0.820	0.424
	(0.649)		(1.026)	
Number of observations	**2,596**		**2,596**	
R-squared	**0.068**		**0.034**	

Notes: Standard errors in parentheses, clustered at the individual level. Coefficients for variables that are constant are not estimated in fixed effects models.

Table B-2. Within-school Analysis: Grades

Variable	Core GPA (RE)		Core GPA (FE)	
	Coefficient and standard error	p-value	Coefficient and standard error	p-value
SBHC only	1.110	0.080	1.475	0.265
	(0.633)		(1.322)	
OST & SBHC	1.864	0.003	1.999	0.142
	(0.631)		(1.360)	
OST only	2.265	0.000	1.780	0.079
	(0.596)		(1.014)	
OST, FS & SBHC	0.969	0.214	2.812	0.070
	(0.779)		(1.551)	
FS/FS & SBHC/FS & OST	0.0508	0.956	1.656	0.406
	(0.911)		(1.992)	
Female	1.858	0.000	0	.
	(0.485)		(.)	
African-American	-5.567	0.000	0	.
	(1.179)		(.)	
Special Education	-3.254	0.000	-1.563	0.329
	(0.647)		(1.602)	
Special education missing	-1.467	0.000	-0.732	0.318
	(0.401)		(0.732)	
Old for grade	-2.962	0.000	-17.19	0.036
	(0.607)		(8.208)	
Changed schools	0.543	0.407	0.829	0.511
	(0.655)		(1.259)	

Table B-2, cont'd

Changed schools missing	-1.247	0.179	0.905	0.563
	(0.929)		(1.562)	
Fifth grade	2.883	0.000	7.500	0.000
	(0.513)		(1.359)	
Sixth grade	-1.976	0.000	1.009	0.275
	(0.436)		(0.924)	
Seventh grade	-0.295	0.482	1.223	0.092
	(0.419)		(0.725)	
Expects college	1.530	0.039	0.626	0.653
	(0.741)		(1.392)	
Expects college missing	-0.284	0.793	0.0790	0.965
	(1.084)		(1.813)	
Free/reduced-price lunch	1.988	0.008	0.624	0.690
	(0.746)		(1.563)	
Free/reduced lunch missing	3.072	0.001	4.036	0.020
	(0.884)		(1.731)	
Number of observations	**2,242**		**2,242**	
R-squared	**0.136**		**0.038**	

Note: Standard errors in parentheses, clustered at the individual level.

Table B-3. Within-school Analysis: Suspensions

	RE	
Variable	**Coefficient and standard error**	**p-value**
SBHC only	-0.045	0.222
	(0.037)	
OST & SBHC	-0.081	0.013
	(0.033)	
OST only	-0.116	0.003
	(0.04)	
OST, FS, & SBHC	-0.016	0.783
	(0.056)	
FS/FS & SBHC/FS & OST	.073	0.278
	(0.067)	
Female	-0.023	0.300
	(0.022)	
African American	0.083	0.118
	(0.053)	
Special education	0.118	0.018
	(0.050)	
Special education missing	0.063	0.015
	(0.026)	
Old for grade	0.087	0.006
	(0.031)	
Changed schools	0.064	0.057
	(0.033)	

Table B-3, cont'd

Changed schools missing	0.041	0.426
	(0.052)	
Fifth grade	-0.070	0.020
	(0.030)	
Sixth grade	-0.011	0.719
	(0.029)	
Seventh grade	0.021	0.521
	(0.033)	
Expects college	-0.04	0.279
	(0.04)	
Expects college missing	-0.008	0.892
	(0.06)	
Free/reduced-price lunch	0.05	0.403
	(0.06)	
Free/reduced-price lunch missing	-0.103	0.098
	(0.062)	
Number of observations	**1034**	
R-squared	**0.092**	

Table B-4. Within-school Analysis: Math Test Scores

	Math Test Score (RE)		Math Test Score (FE)	
Variable	**Coefficient and standard error**	**p-value**	**Coefficient and standard error**	**p-value**
SBHC only	0.00334	0.942	0.0247	0.772
	(0.0459)		(0.0850)	
OST & SBHC	0.0623	0.193	-0.0176	0.852
	(0.0479)		(0.0941)	
OST only	0.181	0.001	0.110	0.267
	(0.0544)		(0.0988)	
OST, FS15 & SBHC	-0.117	0.043	-0.151	0.180
	(0.0581)		(0.112)	
FS/FS & SBHC/FS & OST	-0.0375	0.565	-0.00175	0.988
	(0.0651)		(0.117)	
Female	-0.00178	0.970	0	.
	(0.0469)		(.)	
African American	-0.452	0.001	0	.
	(0.135)		(.)	
Special education	-0.248	0.000	0.118	0.307
	(0.0507)		(0.115)	
Special education missing	0.0442	0.148	0.113	0.024
	(0.0305)		(0.0499)	
Old for grade	-0.221	0.000	0	.
	(0.0556)		(.)	
Changed schools	-0.0253	0.623	0.00913	0.918
	(0.0516)		(0.0886)	

Table B-4, cont'd

Changed schools missing	-0.100	0.249	-0.0302	0.851
	(0.0872)		(0.161)	
Fifth grade	-0.154	0.001	0.0240	0.820
	(0.0469)		(0.105)	
Sixth grade	-0.128	0.001	-0.0311	0.687
	(0.0387)		(0.0772)	
Seventh grade	-0.0637	0.043	-0.00463	0.933
	(0.0316)		(0.0551)	
Expects college	0.0360	0.564	-0.0281	0.791
	(0.0625)		(0.106)	
Expects college missing	0.0103	0.920	0.0269	0.882
	(0.102)		(0.181)	
Free/reduced lunch	0.0158	0.881	0.140	0.529
	(0.106)		(0.222)	
Free/reduced lunch missing	0	.	0	.
	(.)		(.)	
Number of observations	**1692**		**1692**	
R-squared	**0.104**		**0.034**	

Notes: Standard errors in parentheses, clustered at the individual level. Coefficients for variables that

are constant are not estimated in fixed effects models.

Table B-5. Between-schools Analysis: Attendance

Variable	RE without interactions		RE with interactions	
	Coefficient and standard error	p-value	Coefficient and standard error	p-value
Elev8 school	-0.696 (1.056)	0.510	-0.734 (0.862)	0.394
LEP	4.443 (0.904)	0.000	4.501 (0.899)	0.000
LEP missing	0.947 (0.362)	0.009	1.039 (0.342)	0.002
Old for grade	-3.398 (0.398)	0.000	-3.405 (0.394)	0.000
Moved past year	-1.365 (0.253)	0.000	-1.374 (0.258)	0.000
Moved past year missing	-2.702 (0.588)	0.000	-2.698 (0.585)	0.000
African-American	1.314 (1.49)	0.378	1.248 (1.151)	1.409
Female	0.0470 (0.313)	0.880	0.170 (0.344)	0.621
Female*Elev8	---	---	-0.432 (0.793)	0.585
Number of years in school	1.069 (0.296)	0.000	1.010 (0.352)	0.004

Table B-5, cont'd

Number of years in School*Elev8	---	---	0.158	
			(0.372)	0.671
Math test score in 3rd-4th grade	1.163		1.160	
	(0.140)	0.000	(0.138)	0.000
Sixth grade	-3.992		-3.998	
	(0.635)	0.000	(0.635)	0.000
Seventh grade	-5.397		-5.392	
	(0.743)	0.000	(0.744)	0.000
Eighth grade	-5.435		-5.417	
	(1.12)	0.000	(1.13)	0.000
School-level free/reduced-price lunch	0.142		0.143	
	(0.041)	0.001	(0.041)	0.000
School-level LEP	-0.0302		-0.0425	
	(0.076)	0.693	(0.101)	0.673
School-level special education	-0.0687		-0.0699	
	(0.043)	0.109	(0.044)	0.111
School-level enrollment	0.00579		0.00580	
	(0.002)	0.000	(0.002)	0.000
Number of observations	**12,365**		**12,365**	
R-squared	**0.08**		**0.08**	

Notes: Standard errors in parentheses, clustered at the school level

Table B-6. Between-schools Analysis: Passed ELA

Variable	RE without interactions		RE with interactions	
	Coefficient and standard error	p-value	Coefficient and standard error	p-value
Elev8 school	0.0432 (0.039)	0.263	0.029 (0.043)	0.489
LEP	0.0676 (0.017)	0.000	0.0687 (0.0170)	0.000
LEP missing indicator	0.0727 (0.021)	0.000	0.0767 (0.0201)	0.000
Old for grade	-0.0416 (0.013)	0.001	-0.0417 (0.0129)	0.001
Moved past year	-0.00921 (0.008)	0.236	-0.00947 (0.00773)	0.220
Moved past year missing indicator	0.00634 (0.016)	0.683	0.00640 (0.0157)	0.683
African American	0.00460 (0.014)	0.734	0.00314 (0.0136)	0.817
Female	0.0316 (0.007)	0.000	0.033 (0.010)	0.001
Number of years in school	0.00792 (0.007)	0.223	0.00542 (0.00730)	0.458
Number of years in school*Elev8	---	---	0.007 (0.008)	0.338
Math test score in 3rd-4th grade	0.0279 (0.007)	0.000	0.0278 (0.00738)	0.000

Table B-6, Cont'd

Sixth grade	-0.0116		-0.0105	
	(0.106)	0.913	(0.107)	0.922
Seventh grade	-0.0221		-0.0208	
	(0.111)	0.842	(0.111)	0.852
Eighth grade	-0.0296		-0.0279	
	(0.803)	0.803	(0.119)	0.815
School-level free/reduced-price lunch	0.000613		0.000593	
	(0.0008)	0.442	(0.000796)	0.457
School-level LEP	-0.00538		-0.00557	
	(0.003)	0.116	(0.00349)	0.111
School-level special education	0.00185		0.00183	
	(0.002)	0.298	(0.00176)	0.298
School-level enrollment	0.000234		0.000232	
	(0.000)	0.029	(0.000107)	0.029
Number of observations	**9,311**		**9,311**	
R-squared	**0.06**		**0.06**	

Notes: Standard errors in parentheses, clustered at the school level

Table B-7. Between-Schools Analysis: Passed Math

Variable	RE without interactions		RE with interactions	
	Coefficient and standard error	p-value	Coefficient and standard error	p-value
Elev8 school	-0.0539		-0.102	
	(0.054)	0.323	(0.081)	0.210
LEP	0.0812		0.0851	
	(0.021)	0.000	(0.0211)	0.000
LEP missing indicator	0.122		0.133	
	(0.028)	0.000	(0.0321)	0.000
Old for grade	-0.0303		-0.0304	
	(0.030)	0.021	(0.0132)	0.021
Moved past year	-0.0118		-0.0123	
	(0.010)	0.248	(0.00994)	0.216
Moved past year missing indicator	0.00937		0.00949	
	(0.020)	0.635	(0.0196)	0.629
African American	-0.0325		-0.0346	
	(0.018)	0.078	(0.0200)	0.084
Female	0.0276		0.0215	
	(0.008)	0.001	(0.010)	0.028
Female*Elev8	---	---	0.020	
			(0.016)	0.198
Number of years in school	0.0120		0.006	
	(0.007)	0.074	(0.00980)	0.539
Number of years in school*Elev8			0.018	
	---	---	(0.016)	0.264

Table B-7, cont'd

Math test score in 3rd-4th grade	0.0397		0.0396	
	(0.010)	0.000	(0.0100)	0.000
Sixth grade	0.0494		0.0557	
	(0.149)	0.740	(0.146)	0.704
Seventh grade	0.0702		0.0772	
	(0.143)	0.622	(0.140)	0.582
Eighth grade	0.0741		0.0818	
	(0.139)	0.593	(0.137)	0.550
School-level free/reduced-price lunch	0.00213		0.00207	
	(0.002)	0.153	(0.00151)	0.173
School-level LEP	0.00138		0.000901	
	(0.005)	0.791	(0.00504)	0.858
School-level special education	0.00149		0.00141	
	(0.002)	0.513	(0.00231)	0.542
School-level enrollment	0.000277		0.000274	
	(0.000)	0.046	(0.000139)	0.048
Number of observations	**9,,259**		**9259**	
R-squared	**0.08**		**0.08**	

Notes: Standard errors in parentheses, clustered at the school level

Table B-8. Between-Schools Analysis: Reading Test Scores

Variable	RE without interactions		RE with interactions	
	Coefficient and standard error	p-value	Coefficient and standard error	p-value
Elev8 school	0.0595 (0.085)	0.483	0.019 (0.112)	0.866
LEP	-0.192 (0.027)	0.000	-0.184 (0.0234)	0.000
LEP missing indicator	0.00701 (0.066)	0.916	0.0190 (0.0587)	0.746
Old for grade	-0.0916 (0.022)	0.000	-0.0915 (0.0219)	0.000
Moved past year	-0.0131 (0.016)	0.424	-0.0136 (0.0168)	0.417
Moved past year missing indicator	0.0674 (0.033)	0.040	0.0677 (0.0330)	0.040
African American	-0.0998 (0.043)	0.020	-0.101 (0.0439)	0.021
Female	0.230 (0.02)	0.000	0.222 (0.02)	0.000
Number of years in school	0.057 (0.025)	0.023	0.0519 (0.0287)	0.071
Number of years in school*Elev8	---	---	0.015 (0.024)	0.524
Math test score in 3rd/4th grade	0.564 (0.029)	0.000	0.565 (0.0290)	0.000

Table B-8, cont'd

Sixth grade	0.118		0.117	
	(0.059)	0.047	(0.0591)	0.048
Seventh grade	0.0588		0.0586	
	(0.08)	0.462	(0.0801)	0.465
Eighth grade	-0.0454		-0.0446	
	(0.082)	0.582	(0.0827)	0.590
School-level free/reduced-price lunch	0.00405		0.00405	
	(0.005)	0.432	(0.00509)	0.426
School-level LEP	0.0128		0.0120	
	(0.006)	0.043	(0.00609)	0.049
School-level special education	-0.00839		-0.00851	
	(0.003)	0.010	(0.00324)	0.009
School-level enrollment	0.000250		0.000253	
	(0.000)	0.202	(0.000193)	0.189
Number of observations	**11,418**		**11,418**	
R-squared	**0.44**		**0.44**	

Notes: Standard errors in parentheses, clustered at the school level

Table B-9. Between-schools analysis: Math test scores

Variable	RE without interactions		RE with interactions	
	Coefficient and standard error	p-value	Coefficient and standard error	p-value
Elev8 school	0.0266		-0.104	
	(0.053)	0.613	(0.103)	0.308
LEP	-0.178		-0.154	
	(0.047)	0.000	(0.0376)	0.000
LEP missing indicator	-0.202		-0.154	
	(0.072)	0.005	(0.0629)	0.014
Old for grade	-0.105		-0.106	
	(0.024)	0.000	(0.0245)	0.000
Moved past year	-0.0140		-0.0167	
	(0.417)	0.417	(0.0175)	0.341
Moved past year missing indicator	-0.00899		-0.00935	
	(0.052)	0.861	(0.0518)	0.857
African American	-0.249		-0.258	
	(0.046)	0.000	(0.0459)	0.000
Female	0.0552		0.048	
	(0.022)	0.012	(0.027)	0.075
Female*Elev8	---	---	0.023	
			(0.039)	0.557
Number of years in school	0.0461		0.0204	
	(0.032)	0.152	(0.0429)	0.634
Number of years in school*Elev8	---	---	0.069	
			(0.040)	0.083

Table B-9, cont'd

Math test score in 3rd-4th grade	0.631		0.630	
	(0.045)	0.000	(0.0443)	0.000
Sixth grade	0.0609		0.0558	
	(0.032)	0.060	(0.0340)	0.101
Seventh grade	-0.0272		-0.0274	
	(0.042)	0.515	(0.0432)	0.527
Eighth grade	0.00851		0.0111	
	(0.052)	0.870	(0.0527)	0.833
School-level Free/reduced lunch	-0.00558		-0.00525	
	(0.008)	0.471	(0.00740)	0.478
School-level LEP	-0.00881		-0.0120	
	(0.005)	0.092	(0.00574)	0.036
School-level Special Education	-0.00426		-0.00468	
	(0.005)	0.381	(0.00492)	0.342
School-level Enrollment	0.000314		0.000325	
	(0.000)	0.145	(0.000207)	0.117
Number of observations	**11,090**		**11,090**	
R-squared	**0.50**		**0.50**	

Notes: Standard errors in parentheses, clustered at the school level

Table B-10. Pre- and Post-Elev8 Analysis: Attendance

Variable	RE without interactions		RE with interactions	
	Coefficient and standard error	p-value	Coefficient and standard error	p-value
Post-Elev8	-0.184		0.621	
	(0.437)	0.674	(0.680)	0.361
Female	-0.0717		0.561	
	(0.319)	0.822	(0.684)	0.412
Female*Post-Elev8			-0.809	
	---	---	(0.773)	0.296
African-American	-0.510		-0.551	
	(0.941)	0.588	(0.942)	0.558
Latino	0.908		0.877	
	(1.135)	0.424	(1.14)	0.440
LEP	2.01		1.98	
	(0.940)	0.031	(0.931)	0.033
LEP missing	-0.085		-0.084	
	(0.408)	0.834	(0.408)	0.836
Fifth grade	1.08		1.084	
	(0.383)	0.005	(0.383)	0.005
Sixth grade	0.940		0.940	
	(0.245)	0.000	(0.245)	0.000
Seventh grade	-0.151		-0.150	
	(0.237)	0.526	(0.237)	0.526

Table B-10, cont'd

Number of years in school	0.145		0.368	
	(0.088)	0.099	(0.214)	0.086
Number of years in school*	---	---	-0.268	
Post-Elev8			(0.234)	0.253
Old for grade	-3.420		-3.425	
	(0.376)	0.000	(0.377)	0.000
Moved past year	-0.212		-0.216	
	(0.291)	0.466	(0.291)	0.470
Moved past year missing	0.346		0.349	
	(0.317)	0.276	(0.317)	0.271
Attended two schools previous year	-3.62		-3.62	
	(0.349)	0.000	(0.349)	0.000
Attended three schools previous year	-10.49		-10.47	
	(1.35)	0.000	(1.35)	0.000
Math test score in 3rd-4th grade	0.80		0.804	
	(0.314)	0.011	(0.314)	0.010
Math test score in 3rd-4th grade missing	-0.729		-0.743	
	(0.368)	0.048	(0.368)	0.044
School-level free/reduced-price lunch	0.123		0.123	
	(0.024)	0.000	(0.024)	0.000
School-level LEP	-0.000		0.000	
	(0.0578)	0.994	(0.0578)	0.999
School-level special education	-0.072		-0.070	
	(0.022)	0.001	(0.0213)	0.001

Table B-10, cont'd

School-level enrollment	0.003		0.003	
	(0.002)	0.043	(0.00147)	0.043
Number of observations	**4,886**		**4,886**	
R-squared	**0.11**		**0.11**	

Notes: Standard errors in parentheses.

Table B-11. Pre- and Post-Elev8 Analysis - Test Scores

Variable	Test Scores (Reading)				Test Scores (Math)			
	Coefficient and standard error	p-value	Coefficient and standard error	p-value	Coefficient and standard error	p-value	Coefficient and standard error	p-value
Post-Elev8	0.118	0.010	0.050	0.48	0.114	0.01	0.091	0.184
	(0.045)		(0.071)		(0.044)		(0.068)	
Female	0.213	0.000	0.140	0.049	0.0976	0.002	0.087	0.207
	(0.033)		(0.071)		(0.032)		(0.069)	
Female*Post-Elev8	---	---	0.094	0.238	---	---	0.014	0.654
			(0.080)				(0.078)	
African-American	-0.351	0.001	-0.347	0.001	-0.390	0.000	-0.390	0.000
	(0.103)		(0.103)		(0.098)		(0.098)	
Latino	-0.420	0.001	-0.417	0.001	-0.151	0.204	-0.15	0.206
	(0.127)		(0.127)		(0.119)		(0.119)	
LEP	-0.336	0.004	-0.335	0.004	-0.420	0.000	-0.42	0.000
	(0.004)		(0.116)		(0.098)		(0.099)	
LEP missing	0.002	0.96	0.002	0.968	-0.042	0.303	-0.042	0.301
	(0.042)		(0.04)		(0.041)		(0.041)	
Fifth grade	-0.058	0.157	-0.058	0.157	-0.130	0.001	-0.131	0.001
	(0.041)		(0.041)		(0.039)		(0.039)	
Sixth grade	0.065	0.011	0.065	0.011	-0.057	0.020	-0.057	0.02
	(0.026)		(0.026)		(0.025)		(0.025)	
Seventh grade	0.003	0.909	0.003	0.901	-0.104	0.000	-0.104	0.000
	(0.025)		(0.025)		(0.024)		(0.024)	
Number of years in school	0.018	0.052	0.007	0.765	0.005	0.547	-0.003	0.601
	(0.009)		(0.022)		(0.009)		(0.021)	

Table B-11, cont'd

Number of years in school*Post-Elev8	---	---	0.013	0.579	---	---	0.01	0.601
			(0.024)				(0.023)	
Old for grade	-0.237	0.000	-0.236	0.000	-0.193	0.000	-0.193	0.000
	(0.040)		(0.04)		(0.038)		(0.038)	
Moved past year	-0.038	0.216	-0.038	0.215	-0.02	0.495	-0.020	0.493
	(0.031)		(0.031)		(0.03)		(0.03)	
Moved past year missing	0.062	0.073	0.062	0.073	0.025	0.444	0.025	0.446
	(0.034)		(0.034)		(0.033)		(0.033)	
Reading test score in 3rd-4th grade	0.565	0.000	0.563	0.000	---	---	---	---
	(0.036)		(0.036)					
Reading test score in 3rd-4th grade missing	-0.228	0.000	-0.228	0.000	---	---	---	---
	(0.038)		(0.038)					
Math test score in 3rd-4th grade	---	---	---	---	0.50	0.000	0.50	0.000
					(0.031)		(0.031)	
Math test score in 3rd-4th grade missing	---	---	---	---	-0.157	0.000	-0.156	0.000
					(0.037)		(0.037)	
Attended two schools previous year	-0.076	0.041	-0.076	0.042	-0.072	0.046	-0.072	0.047
	(0.037)		(0.037)		(0.036)		(0.036)	
Attended three schools previous year	-0.326	0.036	-0.318	0.04	-0.326	0.038	-0.326	0.038
	(0.155)		(0.155)		(0.157)		(0.157)	
School-level free/reduced-price lunch	0.001	0.651	0.001	0.653	-0.014	0.000	-0.014	0.000
	(0.003)		(0.003)		(0.002)		(0.002)	
School-level LEP	0.024	0.000	0.024	0.000	0.001	0.822	0.001	0.821
	(0.006)		(0.006)		(0.006)		(0.006)	
School-level special education	-0.001	0.572	-0.001	0.526	-0.003	0.194	-0.003	0.188
	(0.002)		(0.002)		(0.002)		(0.002)	

Table B-11, cont'd

School-level Enrollment	-0.000	0.345	-0.000	0.343	-0.000	0.856	-0.000	0.849
	(0.000)		(0.000)		(0.000)		(0.000)	
Number of observations	**4,422**		**4,422**		**4,445**		**4,445**	
R-squared	**0.19**		**0.19**		**0.17**		**0.17**	

Notes: Standard errors in parentheses.