CRESST REPORT 825

EVALUATION OF GREEN DOT'S LOCKE TRANSFORMATION PROJECT: SUPPLEMENTAL REPORT ON COHORT 2 STUDENT OUTCOMES

FEBRUARY, 2013

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February 2013

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The work reported herein was supported by grant number 52306 from the Bill and Melinda Gates Foundation with funding to the National Center for Research on Evaluation, Standards, and Student Testing (CRESST).

The findings and opinions expressed in this report are those of the authors and do not necessarily reflect the positions or policies of the Bill and Melinda Gates Foundation.

We would like to thank the Los Angeles Unified School District, especially the Office of Data and Accountability, for its continuing support of this study. We would also like to thank David Silver for reviewing the report and for his thoughtful feedback.

Our special thanks go to Laquita Stewart and Fred Moss. Without their assistance, this project would not have been possible.

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Abstract

With funding from the Bill and Melinda Gates Foundation, CRESST conducted a multi-year evaluation of a major school reform project at Alain Leroy Locke High School, historically one of California's lowest performing secondary schools. Beginning in 2007, Locke High School transitioned into a set of smaller, Green Dot Charter High Schools, subsequently referred to as Green Dot Locke (GDL) in this supplemental report. This report extended the previous report, which tracked the first and second cohorts of 9th-graders who entered GDL in fall 2007 and 2008 respectively thru the 2010-11 school year, by bringing the second cohort of students to graduation. The CRESST evaluation, employing a rigorous quasi-experimental design with propensity score matching, found statistically significant, positive effects for the GDL transformation including improved achievement, school persistence, graduation, and completion of college preparatory courses.

Introduction

With funding from the Bill and Melinda Gates Foundation, the National Center for Research on Evaluation, Standards, and Student Testing (CRESST) was charged with monitoring the progress of Green Dot Public Schools' transformation of Alain Leroy Locke High School. A CRESST report released in May 2012 (Herman et al., 2012) documents the results of this evaluation effort for students who attended Locke High School during the first four years of the transformation: 2007-08 through 2010-11 school years. In particular, the report focused on the first cohort of Green Dot Locke (GDL) students,[1] as they entered 9th grade in 2007-08 and progressed through 12th grade in 2010-11. The report also tracked and analyzed the performance of the second cohort of GDL students, who started 9th grade in 2008-09. Using a quasi-experimental design with propensity score matching to analyze a range of student performance outcomes, the study documented GDL's statistically significant, positive effects on student achievement, school persistence, and completion of college preparatory courses. The report also documented that the positive effects were more prevalent for Cohort 2 than for Cohort 1 students.

[1] The Green Dot Locke Transformation Project began with two small, off-site schools in 2007-08 and completed in Fall 2008. The first cohort consisted of the students who started at these two small, off-site schools in 2007-08.

This report follows up the earlier study by examining how the second cohort of students fared through 12th grade and timely graduation. Because results for Cohort 2 students in years 1 through 3 were presented in the previous CRESST report, the main contribution of this supplemental report is the addition of effect estimates for year 4 outcomes.

This report—using the same outcome measures and analytic methods described in the prior report—presents the findings from the follow-up analysis. The findings for Cohort 2 students continue to reflect the positive and statistically significant results found for Cohort 1 students. In particular, students who attended GDL, compared to demographically similar students attending demographically similar schools, were statistically more likely to stay at the same school for four years, take and pass key college preparatory courses, perform better on mathematics California Standards Tests (CST), pass the California High School Exit Exam (CAHSEE), and graduate within four years while meeting the course requirement to enter California state universities. While causal attribution is not straightforward given the study design, the study's rigorous, quasi-experimental methods provide consistent, positive, and statistically significant evidence of Green Dot's effectiveness in achieving its goals for improving public school education.

In the following sections of this report, we review the evaluation methodology and present the findings.

Evaluation Methodology

Extending the findings of prior CRESST evaluation reports on the Locke Transformation Project the current study addresses the following overarching question:

> *Relative to their matched counterparts in LAUSD, how well did Cohort 2 students perform in terms of school persistence, attendance, course-taking and completion, as well as achievement on standardized tests in ELA and math during the first four years of high school?*

In this section, we review the available data, analytic strategy used to address this question, and the limitations of our evaluation methodology.

Available Data

This follow-up study combines new, student-level data acquired from LAUSD and Green Dot for the 2011-12 school year with available student-level data from the prior study. Together, these data incorporate students in Green Dot Public Schools and students in LAUSD local school districts 5, 7, 8, and T for the 2007-08, 2008-09, 2009-10, 2010-11, and 2011-12 school years. In addition to demographic data, student outcome data included:

- **School Persistence.** Semester-by-semester indicator for whether the student stayed in the same school from the start of 9th grade through four years of high school. For GDL, "same school" was defined as enrolling in any of the GDL academies.
- **School Attendance.** Annual school attendance rate.
- **Course-taking.** Annual indicators, based on by-semester records, for the number of key college-ready courses a student enrolled in and whether they successfully completed those courses with a grade of C or better. For this report, we expanded the list of courses eligible for completion of key college-ready course requirements to better capture the extent to which students satisfy specific requirements within four years of high school. See the appendix for the list of courses included in our analysis.
- **Student Achievement.** Multiple measures of student learning based on the California Standards Test (CST) scale scores and on the California High School Exit Examination in English language arts (ELA) and mathematics. For the CAHSEE, we examined performance for a student's first time taking the test (both scale score and whether the student passed or not) and whether a student passed CAHSEE by the end of their fourth year in high school.[2]
- **End-of-High School Measures.** Indicators for whether students graduated from high school by the end of their fourth year (2011-12), and whether students graduated with completed A-G required courses, the coursework required for entry to California state universities.

Analysis Strategy

A quasi-experimental matching-based design was used to examine the transformation effects on GDL students. To estimate how GDL students would have performed on the various outcome measures in the absence of the GDL transformation, we matched GDL students to non-GDL students with similar 8th grade characteristics and academic performance. Cohort 2 GDL students were identified as attending GDL as a 9th grader in the fall semester of 2008-09 and attending one of six LAUSD feeder middle schools as an 8th grader in 2007-08. The pool of comparable non-GDL students were identified as attending one of three neighboring LAUSD high schools as a 9th grader in the fall semester of 2008-09 and attending one of the six LAUSD feeder middle schools as an 8th grader in 2007-08.[3,4]

[2] Passing the CAHSEE was defined as scoring 350 or above and students who do not take the CAHSEE are considered not passing. This is a slight change in definition from previous GDL CRESST reports. This change was made to improve comparability of CAHSEE pass rates between GDL and LAUSD schools, but did not result in substantive differences in findings between this and previous reports.

[3] The three comparison high schools (Fremont, Jordan, or Washington Preparatory) for non-GDL students were identified as the LAUSD high schools that most students in the Locke feeder middle schools attended if they did not attend GDL. Feeder middle schools were defined as schools having at least five students in the first GDL 9th grade cohort and at least ten students in the second cohort. The following six middle schools were identified as LAUSD feeder middle schools that Locke students graduated from: Bethune, Clay, Drew, Gompers, Harte, and Markham. In the previous CRESST reports, the analysis included students who did not attend one of the feeder

From the available pool of non-GDL students, control students were selected by matching them to GDL students on a number of 8th grade demographic and academic performance measures. A combination of exact matching and nearest-neighbor propensity score matching was implemented via the MatchIt package for R (Ho, Imai, King, & Stuart, 2009). Students were matched exactly by gender, ethnicity, parents' education, poverty status, language classification, and 8th grade CST math subtest taken. Within each exact match, a control student was identified for each treatment student based on nearest-neighbor propensity score matching (where the estimated propensity score was determined by the student's 8th grade CST scale scores for ELA and math as well as the student's 8th grade attendance rate). By matching students based on their 8th grade characteristics, we can rule out concerns that differences in outcomes between the matched GDL and control students were due to these measured pre-existing differences between GDL and control students. As with most non-randomized designs, however, we cannot rule out concerns that group differences were due to unobserved student characteristics (e.g., motivation) rather than the GDL transformation.

Since we examined a wide array of outcomes and not all students were measured on each outcome, we created different analytic matched samples based on the outcome(s) of interest. For the student persistence outcome, the Cohort 2 9th Grade Entry sample included students enrolled in high school as 9th graders in the 2008-09 fall semester and whose 8th grade CST scores and demographics (from the 2007-08 school year) were available for matching. The other student outcome measures—namely attendance, CST, and course-taking and completion—were missing if a student was not enrolled in a given year. As a result, for the analysis of these end-of-year outcomes we defined the student sample of interest for each year as students who met the criteria for inclusion in the Cohort 2 persistence analysis and had course-taking information for both the fall and spring semesters, as well as ELA and math CST scores in the same school year as the outcome(s) of interest. For example, the year 3 achievement outcomes for Cohort 2 students were based on students for whom we had: (1) 8th grade demographic and CST data on both ELA and math in 2007-08; (2) course-taking information for the fall and spring semesters of the 2008-09, 2009-10, and 2010-11 school

middle schools. This was primarily to ensure adequate sample sizes for the Cohort 1 analysis. Since this report focused on Cohort 2, which included more than twice as many students as Cohort 1, we restricted the analysis to students from the six feeder middle schools. This restriction did not substantively change the findings, but provides some assurances that the results are not biased by factors outside the local Locke neighborhoods and schools.

[4] In fall 2011, Green Dot took over the joint management of Jordan High with Mayor Villaraigosa's Partnership for Los Angeles Schools (PLAS). At the Jordan school site in 2011-12, both Green Dot and PLAS accepted enrollments independently; Green Dot accepted students in grades 9-11 and PLS accepted students in grades 9-12.

years; and (3) CST scores for the 2008-09, 2009-10, and 2010-11 school years. The one exception is that the sample for year 4 outcomes (i.e., the 12th grade year) did not require available CST scores in that year. This approach raises some concerns (discussed in the limitations section), but offers a way to focus the analysis on annual effects.

This approach provides us with five matched samples for Cohort 2:

- 9th Grade Entry sample;
- Year 1 (2008-09) end-of-year outcomes sample;
- Year 2 (2009-10) end-of-year outcomes sample;
- Year 3 (2010-11) end-of-year outcomes sample; and
- Year 4 (2011-12) end-of-year outcomes sample.

Student characteristics for each of these matched samples are summarized in Table 1. As designed, the matching process produced treatment (i.e., GDL) and control (i.e., non-GDL) groups with identical student characteristic profiles and nearly identical average 8th grade CST and attendance records. For the Cohort 2 Year 4 sample, 248 of the 296 GDL students (84%) where matched to a non-GDL student.

Limitations of Evaluation Methodology

Like all studies, our analysis was constrained by available data and the conditions under which the GDL transformation was implemented. These overall constraints pose limitations in regards to the depth with which we could explore trends in academic outcomes and the extent to which one should interpret the effect estimates as causal. As we detailed these limitations in the earlier reports and as this is a supplemental report, the following is a brief discussion on the general limitations of the study's design and the caveats to the causal interpretations of the results.

Missing Data. Our analyses required the processing of student-level data from both Green Dot Public Schools and LAUSD. We did not have data on students who left GDL and LAUSD during the time period examined for this report, unless they subsequently attended another school represented in the provided data (i.e., another Green Dot school or an LAUSD school in local district 5, 7, 8, or T). As a result, we cannot examine outcomes for these students. Similarly, we did not have pre-high school data for students who entered GDL from outside the four local districts from which we received LAUSD data. Thus, our analyses examined students from specific local districts and who attended GDL at defined points in time; this did not capture all students exposed to the GDL transformation.

Data Comparability. Course taking is one of the most challenging outcomes to examine as the data were not aligned across GDL and LAUSD data sources (particularly in terms of course names/codes) and as we did not have access to summer school or intersession course-taking for LAUSD students. We attempted to address these two concerns by examining course enrollment and completion rates for broad subject areas rather than specific courses and we restricted our analysis to only fall and spring semesters. Given GDL's heavy use of intercession courses for struggling students, this omission may underestimate the reported course-taking and pass rate effects for the GDL transformation.

There could be some possible differences in how Green Dot and LAUSD track their students' graduation and A-G completion data. In prior years we had to request additional or revised graduation and A-G data from both LAUSD and Green Dot after identifying inconsistencies in the data. Since we are comparing data from two separate systems, it is possible that some differences in outcomes are simply due to differences in data definitions and/or quality across the two systems.

Casual Effects. In the absence of random assignment, observed differences between GDL and non-GDL students could also be due to pre-existing differences between the students (e.g., ability and motivation) rather than exposure to the transformation alone. However, by matching GDL students to non-GDL students with similar 8^{th} grade characteristics and test performance observed in the data, we were able to rule out these measured factors as causing outcome differences between matched GDL and non-GDL students. This provided some credibility to claims that the observed differences were due to the GDL transformation. We were not, however, able to rule out the possibility that some unavailable pre-existing factors (absent from the available data and the matching process) explained the observed group differences instead of the transformation.

Table 1

Comparison of Matched Non-Green Dot Locke & Green Dot Locke Students by 8th Grade Characteristics (Cohort 2)

Characteristics	9th Grade Entry		Year 1		Year 2		Year 3		Year 4	
	Non-GD	GD	Non-GD	GD	Non-GD	GD	Non-GD	GD	Non-GD	GD
Number of students in cohort	1,460	578	1,265	524	991	428	745	338	681	296
Number of matched students	512	512	444	444	362	362	282	282	248	248
% Female	52%	52%	51%	51%	49%	49%	51%	51%	53%	53%
Race/Ethnicity (%):										
Black / Afr. Am.	25%	25%	22%	22%	19%	19%	17%	17%	16%	16%
Latino / Hispanic	75%	75%	78%	78%	81%	81%	83%	83%	84%	84%
Parent's education (%):										
High school graduate	22%	23%	22%	24%	22%	25%	24%	25%	23%	24%
Less than high school	31%	31%	30%	30%	32%	32%	34%	34%	37%	37%
Unknown	44%	44%	43%	43%	40%	40%	37%	37%	35%	35%
% Free/reduced lunch	88%	88%	88%	88%	89%	89%	91%	91%	92%	92%
Language classification (%):										
English Only or IFEP	31%	31%	27%	27%	24%	24%	22%	22%	21%	21%
RFEP	34%	34%	35%	35%	38%	38%	40%	40%	44%	44%
English Learner	35%	35%	38%	38%	38%	38%	38%	38%	35%	35%
% Students w/ disabilities	8%	8%	7%	7%	6%	6%	5%	5%	3%	3%
Mean attendance rate	94%	94%	95%	95%	95%	95%	96%	95%	96%	96%
Mean ELA CST scale score	294	295	293	294	297	297	300	302	304	305
Took Algebra 1 CST:										
% Took test	52%	52%	54%	54%	55%	55%	59%	59%	58%	58%
Mean scale score	279	282	281	284	283	286	284	288	288	293
Took General Math CST:										
% Took test	48%	48%	46%	46%	45%	45%	41%	41%	42%	42%
Mean scale score	270	276	272	271	275	273	278	275	284	276

Effects of GDL on Student Performance

Despite limitations described above, the current evaluation provides consistent and important evidence that GDL had positive effects on Cohort 2 students on a range of student

outcomes, as we found previously. In this section we present specific estimates of GDL effects for the Cohort 2 matched samples. We present two types of effect estimates: (1) mean (raw) differences between the matched GDL and non-GDL groups; and (2) regression adjusted differences based on linear regression models that adjust for potentially lingering 8th grade CST and/or attendance rate differences between the matched GDL and non-GDL students. In just about every instance the two types of estimates provide substantively similar findings, which partially validate the matching approach.[5]

School Persistence

Findings from the previous CRESST report indicated that GDL students in Cohort 1 were no more or less likely to stay in the same school during their first four years of high school compared to similar non-GDL students. For both the matched GDL and non-GDL students in Cohort 1, only 49% of the students who started 9th grade in the fall of 2007-08 remained in the same school through the spring of 2010-11. For Cohort 2, however, the prior report suggested that GDL students were more likely to stay in the same school through the first three years of high school. The current report sought to determine whether this positive trend for Cohort 2 continued through the fourth year of high school.

Results based on four years of Cohort 2 student data confirm the prior findings that GDL had a positive effect on school persistence. The percent of matched Cohort 2 students who stayed in the same school over the four year period (2008-09 to 2011-12) was about eight percentage points higher for GDL students compared to the matched non-GDL students (59% vs. 51%). Semester-by-semester results are presented in Table 2, while the persistence trend for Cohort 2 is displayed in Figure 1. The average persistence rate difference between GDL and non-GDL students increased over the first two years of high school, then remained relatively steady during the last two years. This suggests that GDL's effect on school persistence was particularly important during those critical first two years of high school.

The adjusted effect estimates are summarized in Figure 2 with their approximate 95% confidence intervals. Estimates with a confidence interval that does not intersect with the zero line are considered statistically significant. For Cohort 2, the difference between the GDL and non-GDL matched students was positive and statistically significant in all semesters during the four year period. It is important to note, however, that Cohort 2's

[5] We also present p-values in the tables and approximate 95% confidence intervals in the figures for interpretation of statistically significant differences. These statistical significance indicators are based on ordinary least squares (OLS) regression model estimates. In cases where the outcome is a dichotomous indicator (e.g., graduate or not), we also tested for statistical significance using a more statistically appropriate logistic regression model. We note instances where the two significance tests result in different conclusions.

overall persistence rate, while higher than for Cohort 1, remains low; 51% for non-GDL students and 59% for GDL students. Additional research is needed to understand what specific factors produced the positive findings and how those factors can be mobilized to raise persistence rates for all students.

Table 2

Estimated Effect of Green Dot Locke on Proportion of Students Staying in Same School, by Semester (Cohort 2 Matched 9th Grade Entry Sample)

	Control group		Green Dot group		Raw difference		Adjusted difference*	
Year/Semester	*N*	Mean	*N*	Mean	Estimate	(*p*-value)	Estimate	(*p*-value)
Year 1 Fall	512	1.00	512	1.00	--	--	--	--
Year 1 Spring	512	0.91	512	0.95	0.04	(0.016)	0.04	(0.016)
Year 2 Fall	512	0.78	512	0.84	0.05	(0.026)	0.05	(0.027)
Year 2 Spring	512	0.72	512	0.80	0.08	(0.003)	0.08	(0.004)
Year 3 Fall	512	0.63	512	0.73	0.10	(0.001)	0.09	(0.001)
Year 3 Spring	512	0.60	512	0.67	0.07	(0.023)	0.07	(0.025)
Year 4 Fall	512	0.54	512	0.61	0.08	(0.014)	0.07	(0.015)
Year 4 Spring	512	0.51	512	0.59	0.08	(0.010)	0.08	(0.011)

Note. Results are for students in the matched sample for a given year. * The adjusted difference controls for a student's 8th grade ELA CST scale score.

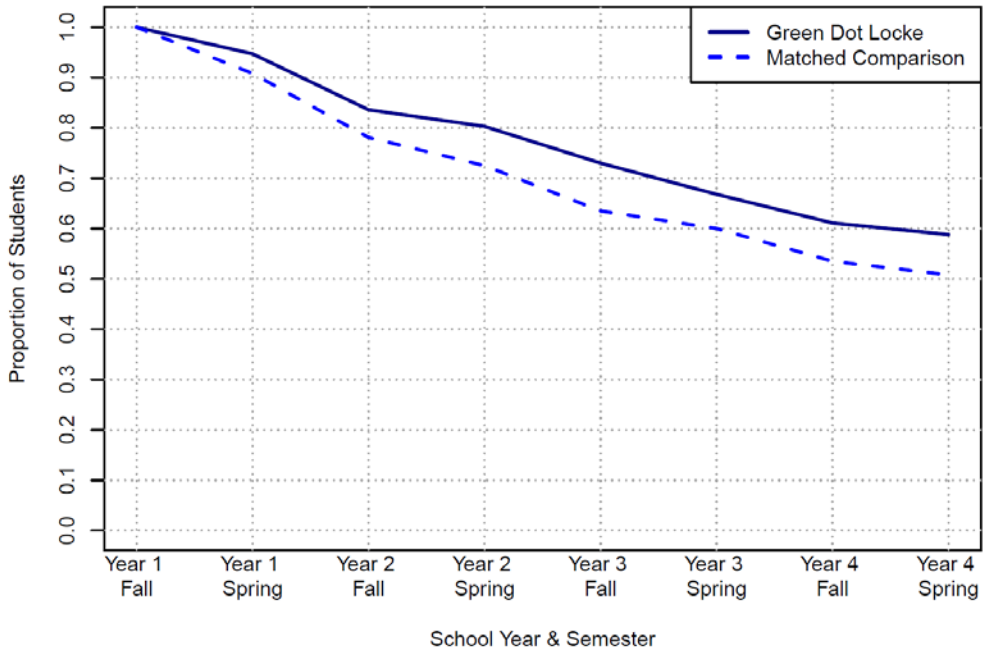

Figure 1. Proportion of students in matched 9th Grade Entry Sample who stayed in the same school by semester (Cohort 2)

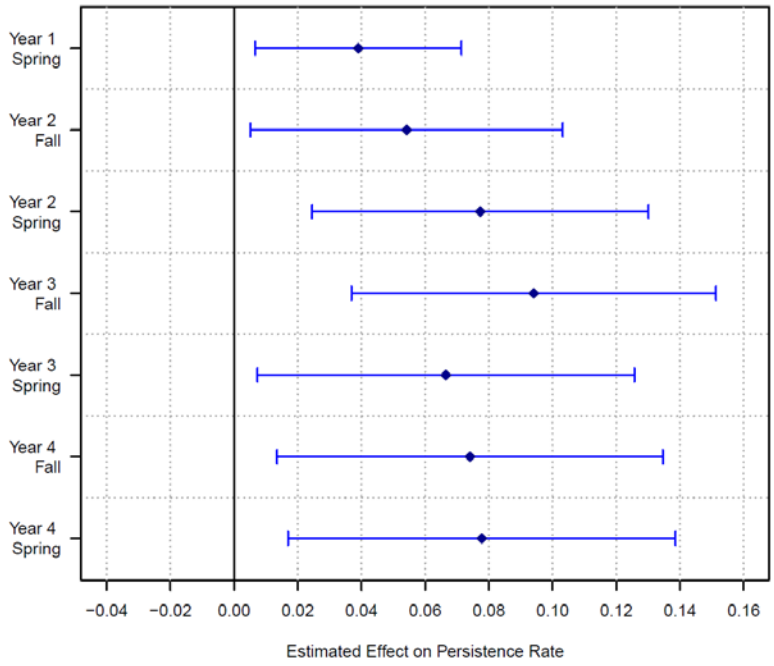

Figure 2. Summary of estimated Green Dot effects on proportion of students staying in same school, by semester (Cohort 2 matched 9th Grade Entry Sample). Reported point estimates (diamonds) and approximate 95% confidence intervals (horizontal bars) are based on the adjusted regression probability estimates.

School Attendance

Findings from the previous CRESST report indicated that GDL and non-GDL school attendance rates were similar during the first three years of high school for Cohort 1 and Cohort 2 matched samples. The prior report did find a statistically significant positive GDL effect in the fourth year for Cohort 1, however. For this report we sought to determine whether this positive year 4 effect held for Cohort 2 students.

The school attendance rate results for Cohort 2 (see Table 3) support findings from the previous report. During the first three years of high school, GDL and non-GDL students had similar attendance rates, on average. In the fourth year, the attendance rate for GDL students was slightly higher than for matched non-GDL students (94% vs. 93%). While small, this positive difference is statistically significant (see Figure 3). Additional research is needed to understand why fourth-year students have slightly higher attendance rates in GDL.

Table 3

Estimated Effect of Green Dot Locke on School Attendance Rate, by Year (Cohort 2 Matched Samples)

	Control group		Green Dot group		Raw difference		Adjusted difference*	
Year	*N*	Mean	*N*	Mean	Estimate	(*p*-value)	Estimate	(*p*-value)
Year 1	444	0.93	444	0.92	0.00	(0.732)	0.00	(0.660)
Year 2	356	0.93	362	0.93	0.00	(0.970)	0.00	(0.871)
Year 3	282	0.94	282	0.94	0.00	(0.988)	0.00	(0.939)
Year 4	248	0.93	248	0.94	0.02	(0.021)	0.01	(0.024)

Note. Results are for students in the matched sample for a given year. *The adjusted difference controls for a student's 8th grade attendance rate and ELA CST scale score.

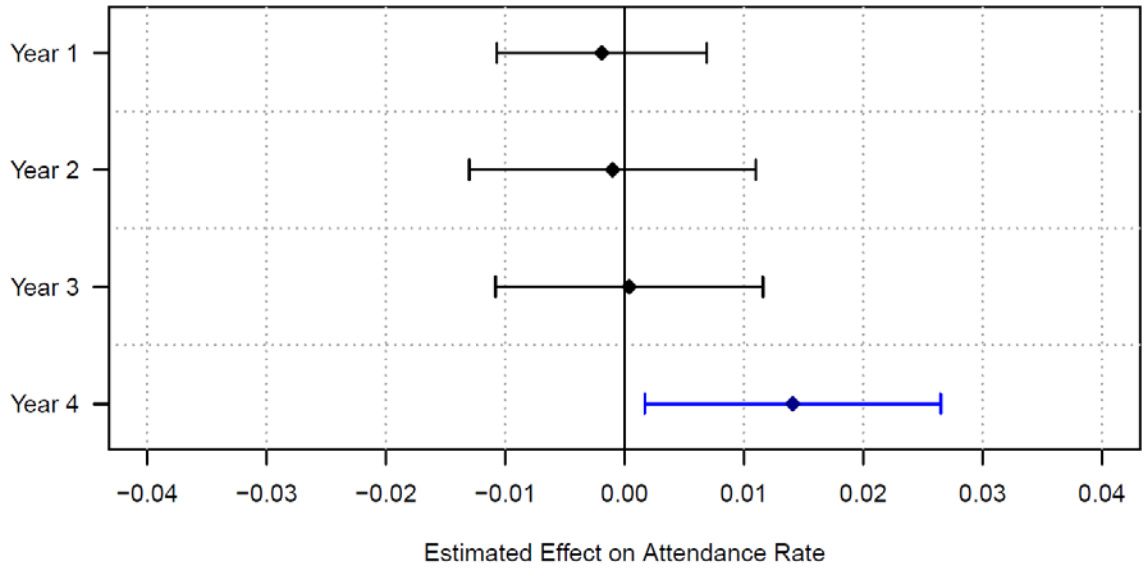

Figure 3. Summary of estimated Green Dot effects on school attendance rate, by year (Cohort 2 matched samples). Reported point estimates (diamonds) and approximate 95% confidence intervals (horizontal bars) are based on the adjusted regression probability estimates.

Course-Taking and Completion

To gauge whether the Green Dot transformation increased exposure and successful completion of important high school courses, we examined the frequency with which students took and passed some of the key college-ready courses within the English, math, science, and social science subject areas. Findings from the previous CRESST report indicated that GDL students were as likely, or more likely, to take and pass key courses that

meet the UC/CSU A-G requirements.[6] For this report, we focused on the number of A-G eligible courses students in Cohort 2 took and passed with a C or better by the end of their fourth year of high school. The results presented below are based on Cohort 2 Year 4 matched sample[7].

Results for the Year 4 sample (see Table 4) support the positive GDL findings from the previous report. Overall, GDL students were more likely to take and pass the number of courses recommended for college eligibility. Over the four years of high school, 93% of GDL students in the Year 4 sample and only 64% of matched non-GDL students took all the key academic courses per our definition.[8] The significant difference in course enrollment and completion between GDL and non-GDL students was particularly true when it came to the courses students likely took in their junior and senior years. For example, among Cohort 2 students in the matched Year 4 sample, 47% of the GDL students took and passed 4+ English courses compared to 35% of non-GDL students, and 59% of the GDL students took and passed 3+ math courses compared to 43% of non-GDL students. GDL students were also much more likely to take 3+ science courses (88% vs. 38%), with a third science course not required for college eligibility but recommended by some higher education institutions. For the Year 4 sample, the estimated GDL effect on course enrollments are displayed in Figure 4, and the estimated effect on course pass rates are displayed in Figure 5.

Table 4

Estimated Effect of Green Dot Locke on Course-Taking and Completion Rates, by Subject (Cohort 2 Year 4 Matched Sample)

	Control group		Green Dot group		Raw difference		Adjusted difference*	
Year	*N*	Mean	*N*	Mean	Estimate	(*p*-value)	Estimate	(*p*-value)
English								
Took 2+ Courses	248	1.00	248	1.00	0.00	(1.000)	0.00	(0.985)
Passed 2+ Courses	248	0.79	248	0.83	0.04	(0.257)	0.04	(0.267)
Took 3+ Courses	248	0.99	248	0.99	0.00	(1.000)	0.00	(0.986)
Passed 3+ Courses	248	0.58	248	0.65	0.07	(0.117)	0.07	(0.120)
Took 4+ Courses	248	0.89	248	0.97	0.08	(0.000)	0.08	(0.000)

[6] For freshmen admission to UC and CSU system, students are required to have four years of English, three years of math, two years of social science, two years of science, one year of visual and performing arts, and two years of foreign language. Please refer to http://www.cde.ca.gov/ci/gs/hs/hsgrtable.asp for more details.

[7] We also examined course-taking for the matched 9th Grade Sample, which includes students who left school during the four year period, and found similar results.

[8] Our complete list of key academic courses includes four or more English courses, three or more math courses, two or more science courses, and two or more history/social science courses.

Passed 4+ Courses	248	0.35	248	0.47	0.12	(0.006)	0.12	(0.005)
Math								
Took 2+ Courses	248	1.00	248	0.99	-0.01	(0.157)	-0.01	(0.147)
Passed 2+ Courses	248	0.68	248	0.74	0.06	(0.139)	0.06	(0.139)
Took 3+ Courses	248	0.85	248	0.95	0.10	(0.000)	0.10	(0.000)
Passed 3+ Courses	248	0.43	248	0.59	0.16	(0.000)	0.16	(0.000)
Science								
Took 2+ Courses	248	0.99	248	1.00	0.01	(0.157)	0.01	(0.161)
Passed 2+ Courses	248	0.53	248	0.75	0.22	(0.000)	0.21	(0.000)
Took 3+ Courses	248	0.38	248	0.88	0.50	(0.000)	0.49	(0.000)
Passed 3+ Courses	248	0.14	248	0.51	0.37	(0.000)	0.36	(0.000)
History/Social Science								
Took 2+ Courses	248	0.87	248	1.00	0.13	(0.000)	0.13	(0.000)^
Passed 2+ Courses	248	0.49	248	0.69	0.21	(0.000)	0.20	(0.000)
Key Academic Courses†								
Took All	248	0.64	248	0.93	0.29	(0.000)	0.29	(0.000)
Passed All	248	0.17	248	0.40	0.23	(0.000)	0.23	(0.000)

Note. Course completion/pass defined as passing with a C or better.
* The adjusted difference controls for a student's 8th grade ELA CST scale score.
^ not statistically significant at $p < 0.05$ level when tested with a logistic regression model.
† Key academic courses defined as 4 or more English courses, 3 or more math courses, 2 or more science courses, and 2 or more history/social science courses.

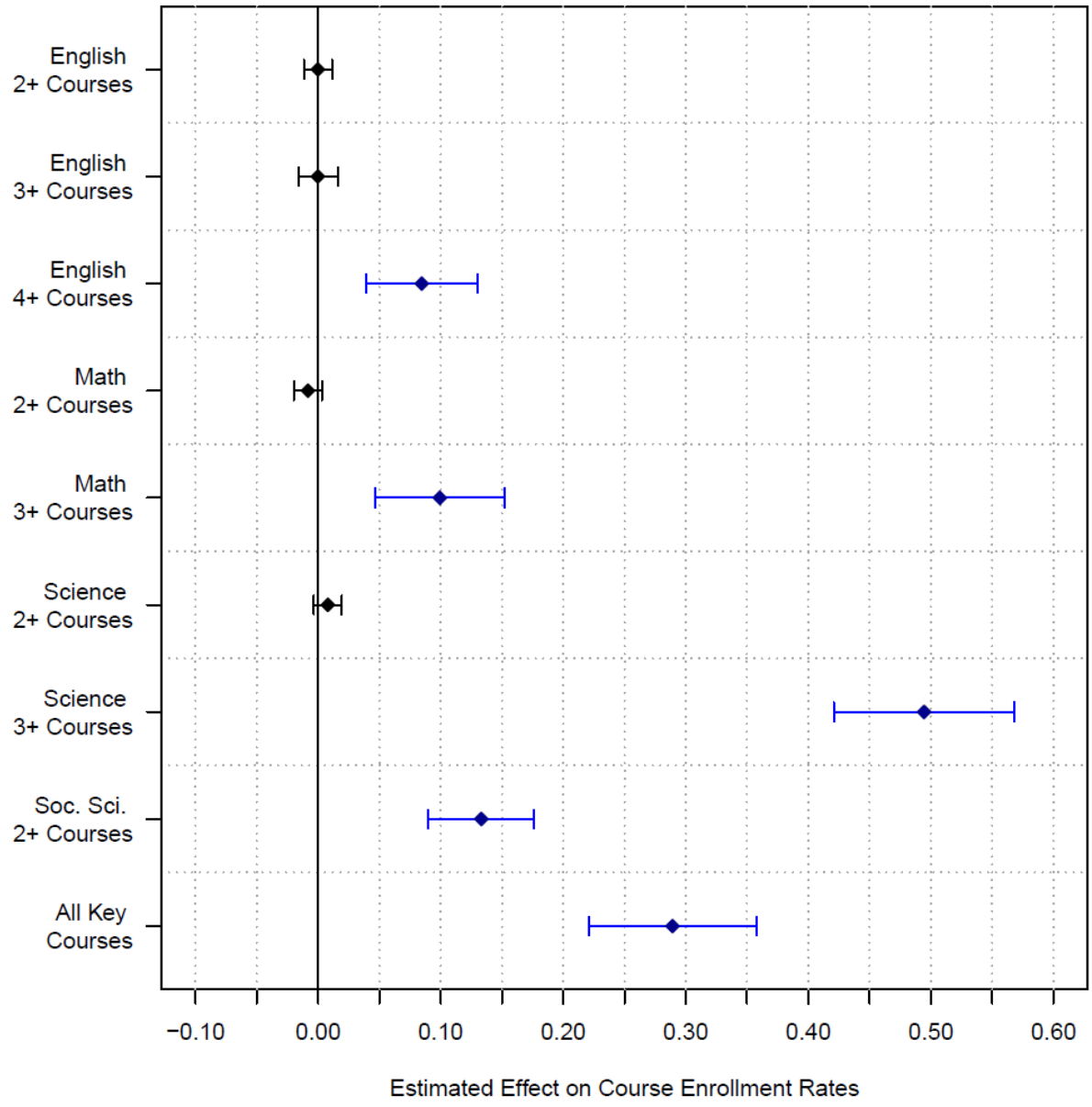

Figure 4. Summary of estimated Green Dot effects on course enrollment rates, by subject (Cohort 2 Year 4 matched sample). Reported point estimates (diamonds) and approximate 95% confidence intervals (horizontal bars) are based on the adjusted regression probability estimates. Notes: effect on taking 2+ social science courses is not statistically significant at $p < 0.05$ level when tested with a logistic regression model. Key academic courses defined as 4 or more English courses, 3 or more math courses, 2 or more science courses, and 2 or more history/social science courses.

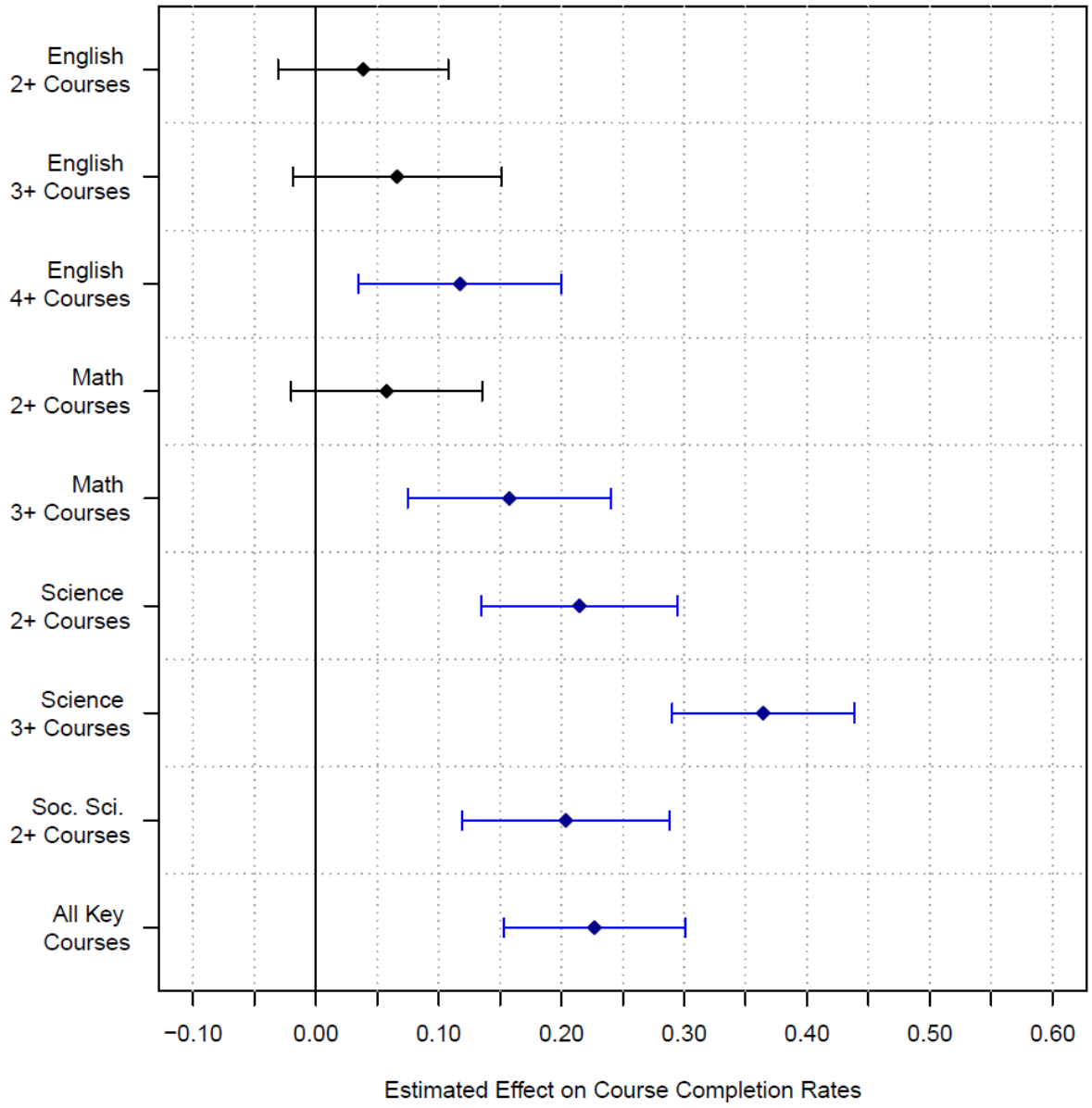

Figure 5. Summary of estimated Green Dot effects on course completion rates, by subject (Cohort 2 Year 4 matched sample). Completion rates defined as passing with a C or better. Reported point estimates (diamonds) and approximate 95% confidence intervals (horizontal bars) are based on the adjusted regression probability estimates. Notes: Key academic courses defined as 4 or more English courses, 3 or more math courses, 2 or more science courses, and 2 or more history/social science courses.

Student Achievement: California Standards Test

Since students only take the CST in grades 9-11, CST performance results for Cohort 2 were included in the previous CRESST report. For completeness in this supplemental report, however, we replicated the CST analysis for Cohort 2. As discussed in the prior report, GDL

students performed similarly on the ELA CST compared to the matched non-GDL students and outperformed non-GDL students on most of the math CSTs.

Cohort 2 results from the CST analysis are presented in Table 5 by year and test for the matched samples. For the math tests, only those tests that represented the two main math courses in each grade are reported. Estimated effects and their corresponding approximate 95% confidence intervals are displayed in Figure 6.

Table 5

Estimated Effect of Green Dot Locke on CST Scale Scores, by Year and Test (Cohort 2 Matched Samples)

	Control group		Green Dot group		Raw difference		Adjusted difference*	
Year	*N*	Mean	*N*	Mean	Estimate	(*p*-value)	Estimate	(*p*-value)
Year 1								
ELA	444	301	444	305	3.92	(0.184)	3.42	(0.073)
Algebra 1	339	267	375	267	0.61	(0.817)	-0.30	(0.900)
Geometry	90	270	69	295	24.57	(0.000)	17.48	(0.000)
Year 2								
ELA	362	296	362	300	3.71	(0.268)	3.82	(0.098)
Geometry	203	252	205	255	3.52	(0.251)	3.12	(0.259)
Algebra 2	116	257	113	270	12.33	(0.039)	10.99	(0.022)
Year 3								
ELA	282	298	282	305	6.59	(0.127)	4.71	(0.107)
Algebra 2	128	245	172	254	9.22	(0.021)	11.01	(0.003)
Sum. Math	66	244	73	273	28.84	(0.000)	26.80	(0.000)

Note. Results are for students in the matched sample for a given year. * The adjusted difference controls for a student's 8th grade ELA CST scale score for ELA outcomes and 8th grade ELA and Math CST scale scores for Math outcomes.

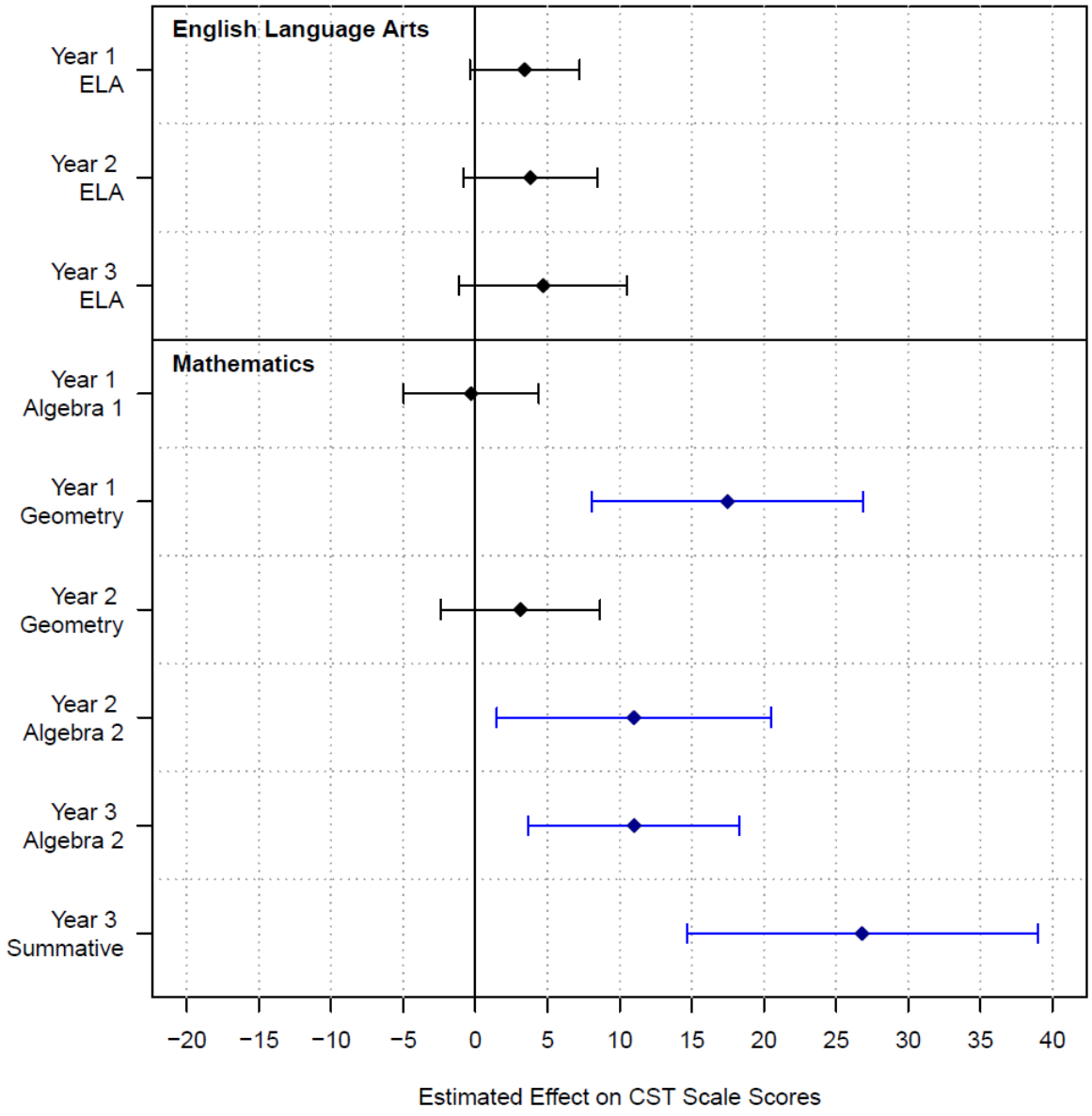

Figure 6. Summary of estimated Green Dot effects on school attendance rate, by year and test (Cohort 2 matched samples). Reported point estimates (diamonds) and approximate 95% confidence intervals (horizontal bars) are based on the adjusted regression probability estimates.

Student Achievement: California High School Exit Exam

In the previous CRESST report, we found that Cohort 1 GDL students were no more, or less, likely to pass the California High School Exit Exam (CAHSEE) compared to matched non-GDL students. This null finding occurred for first time test-takers and for the overall pass rate after four years of high school. For Cohort 2 students, however, results from the previous report indicated GDL students outperformed their matched non-GDL counterparts on their first CAHSEE attempt and were more likely to have passed CAHSEE

by the end of their third year. For this report, we examined whether the positive Cohort 2 findings held through four years of high school.

Cohort 2 results for first attempt CAHSEE performance and pass rate by the end of four years are presented in Table 6. To improve comparability between GDL and non-GDL students, as well as retain as many students as possible in the analysis, we made some minor definition changes to our analysis of CAHSEE performance in this report.[9] These minor modifications to our analytic approach did not substantively change the findings from the previous report.

Table 6

Estimated Effect of Green Dot Locke on CAHSEE Performance, by Attempt and Test (Cohort 2 Matched Samples)

	Control group		Green Dot group		Raw difference		Adjusted difference*	
Year	*N*	Mean	*N*	Mean	Estimate (*p*-value)		Estimate	(*p*-value)
1st Attempt (Year 2 Sample):								
ELA Scale Score	348	353	357	356	2.67	(0.244)	2.94	(0.064)
Math Scale Score	346	354	353	362	8.38	(0.000)	8.47	(0.000)
% Passed ELA	362	0.51	362	0.59	0.07	(0.044)	0.08	(0.012)
% Passed Math	362	0.51	362	0.59	0.08	(0.025)	0.08	(0.016)
Ever Passed (Year 4 Sample):								
% Passed ELA	248	0.90	248	0.94	0.04	(0.073)	0.04	(0.070)
% Passed Math	248	0.91	248	0.96	0.05	(0.033)	0.05	(0.025)^
Ever Passed (9th Grade Entry Sample):								
% Passed ELA	512	0.61	512	0.70	0.09	(0.003)	0.08	(0.002)
% Passed Math	512	0.61	512	0.71	0.10	(0.001)	0.08	(0.005)

Note. Results are for students in the matched sample for a given year. Pass rates were determined based on a student scoring at or above 350 on a given test. *The adjusted difference controls for a student's 8th grade ELA CST scale score for ELA outcomes and 8th grade ELA and Math CST scale scores for Math outcomes. ^ Not statistically significant at $p < 0.05$ level when tested with a logistic regression model.

[9] For the previous report, we limited the CAHSEE analysis to include only students who took CAHSEE and limited the analysis of first-time CAHSEE test takers only to 10th graders. For this report, we consider students who did not take CAHSEE as not passing CAHSEE and the analysis of first-time test takers included students who took CAHSEE in any year as long as it was their first recorded CAHSEE score. For example, students who were retained in 9th grade for their second year of high school may not have taken CAHSEE in their second year, but did take CAHSEE for the first time in their third year (when they were officially promoted to 10th grade).

For both ELA and math, GDL Cohort 2 students had higher average scale scores than the matched non-GDL students on the first attempt, although the difference was only statistically significant for math. GDL students were also more likely to pass CAHSEE on their first attempt. Additionally, for students who remained in the same schools for four years (Year 4 Sample), a higher proportion of GDL students passed the ELA test (94% vs. 90%) and the math test (96% vs. 91%) by the end of their fourth year. The pass rate difference was only statistically different for math, however (see Figure 7). While almost all of the Year 4 sample students passed CAHSEE after one or multiple attempts, it is important to note that of all the students in the matched sample who started in 9th grade (9th Grade Entry Sample) less than three-fourths passed CAHSEE. For GDL students in the 9th Grade Entry Sample, 70% and 71% passed ELA and math, respectively, within four years, while 61% of non-GDL students in the 9th Grade Entry Sample passed ELA and math.

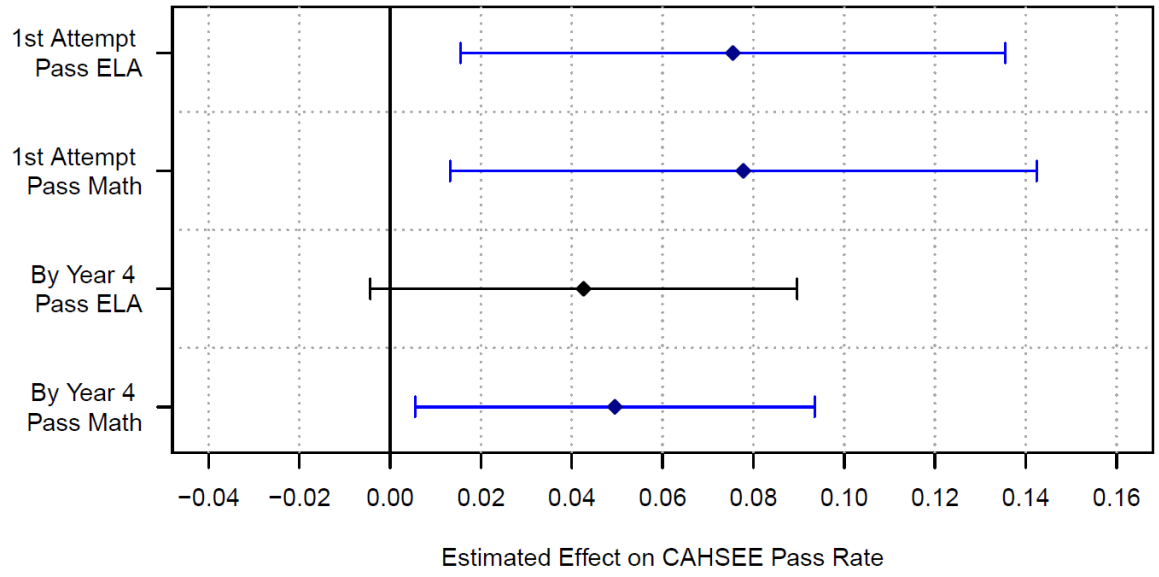

Figure 7. Summary of estimated Green Dot effects on CAHSEE pass rates, by attempt and test (Cohort 2 matched samples). Reported point estimates (diamonds) and approximate 95% confidence intervals (horizontal bars) are based on the adjusted regression probability estimates. Note: effect on passing math portion of CAHSEE by end of year 4 is not statistically significant at $p < 0.05$ level when tested with a logistic regression model.

End-of-High School Measures

In the previous CRESST report, we examined graduation rates and A-G completion for Cohort 1 students. Those results indicated that GDL students had much higher graduation and A-G completion rates than matched non-GDL students. For this report, we examined whether similar high school completion findings occurred with Cohort 2 students.

Cohort 2 graduation and A-G completion rates are reported in Table 7. We report outcomes for two different Cohort 2 matched samples: the 9th Grade Entry Sample that includes students who started 9th grade but may have left school prior to the end of 12th grade, and the Year 4 Sample that only includes students who stayed in the same school and had valid data for all four years of high school. Any student for whom we did not have graduation or A-G completion data was coded as a non-graduate and/or non-A-G completer.[10]

While only about half of the Cohort 2 students who entered GDL as a 9th grader graduated within four years, the findings indicate that GDL students were more likely to graduate than the matched non-GDL students. Among all matched students who started in GDL in 9th grade, 54% graduated within four years while only 40% of the matched students who started in a non-GDL school graduated. If we only look at students who remained in the same school for four years, 87% of GDL students and 70% of matched non-GDL students graduated. These graduation rate differences are sizable and statistically significant.

Similarly, GDL students were more likely to graduate with their A-G course requirements. Among all matched Cohort 2 students who entered GDL as a 9th grader, 26% graduated and completed their A-G requirements compared to only 16% of matched non-GDL students. Of students who stayed in the same school over the four year period (Year 4 sample), 44% of GDL students graduated and completed their A-G requirements compared to 27% of the matched non-GDL students. This indicates that about half of Cohort 2 GDL graduates met the A-G requirements while just over a third of matched non-GDL graduates met the A-G requirements. For both the 9th Grade Entry and Year 4 samples, differences in the graduation and graduation with A-G rates were statistically significant (see Figure 8).

[10] It is important to note that this coding approach may incorrectly classify some students as non-graduates if they moved to—and subsequently graduated from—a school for which we did not receive data. We only received data for students in Green Dot Public Schools and LAUSD local districts 5, 7, 8 and T.

Table 7

Estimated Effect of Green Dot Locke on Graduation Rates, by Cohort (Cohort 2 Matched Samples)

	Control group		Green Dot group		Raw difference		Adjusted difference*	
Year	*N*	Mean	*N*	Mean	Estimate	(*p*-value)	Estimate	(*p*-value)
9th Grade Entry Sample								
% Graduated	512	0.40	512	0.54	0.15	(0.000)	0.14	(0.000)
% Graduated w/ A-G	512	0.16	512	0.26	0.10	(0.000)	0.09	(0.000)
Year 4 Sample								
% Graduated	248	0.70	248	0.87	0.17	(0.000)	0.18	(0.000)
% Graduated w/ A-G	248	0.27	248	0.44	0.17	(0.000)	0.17	(0.000)

Note. Results are for students in the matched sample for a given year. *The adjusted difference controls for a student's 8th grade ELA CST scale score.

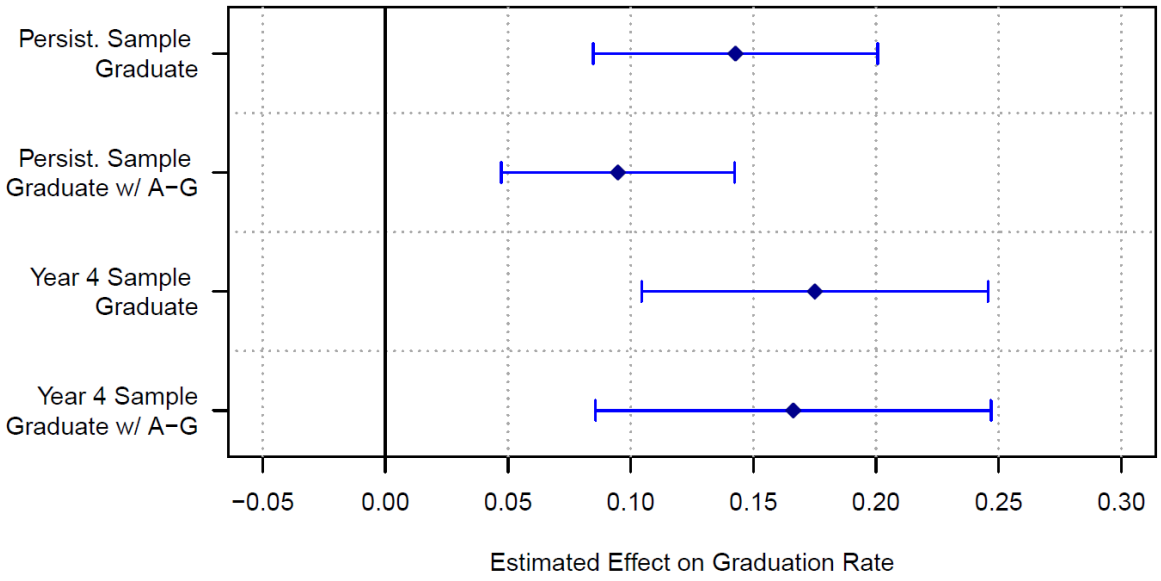

Figure 8. Summary of estimated Green Dot effects on graduation rates (Cohort 2 matched samples). Reported point estimates (diamonds) and approximate 95% confidence intervals (horizontal bars) are based on the adjusted regression probability estimates.

Conclusion

The results presented in this report, and in previous CRESST reports, document consistent and important evidence that students who attended Locke during the Green Dot transformation had a more stable and higher achieving high school experience than similar students who attended a neighboring high school. In particular, when comparing Cohort 2

GDL students to matched non-GDL students, the following positive, statistically significant, findings emerged:

- **School Persistence**: GDL students were more likely to stay in the same school over four years of high school (59% vs. 51%);
- **Course-taking and Course-completion**: GDL students were more likely to take key academic college-prep (A-G) courses during the first four years of high school (93% vs. 64%);
- **CAHSEE**: GDL students were more likely to pass CAHSEE on their first attempt (59% vs. 51% for ELA and Math); for students who remained in the same schools for four years. GDL students were more likely to pass CAHSEE math test;
- **CST**: GDL students scored better, on average, on high school CST mathematics tests;
- **Graduation**: GDL students were more likely to graduate from high school within four years (54% vs. 40%);
- **Graduation and A-G completion**: GDL fourth-year students were more likely to graduate with successful completion of the A-G college eligibility course requirements (44% vs. 27%).

While these findings indicate GDL students, on average, had a more positive academic high school experience than their non-GDL counterparts, one must be cautious inferring a causal connection between the GDL transformation and student outcomes given limitations in the data and research design (discussed above). Additionally, our analysis was not designed to determine *why* GDL students outperformed non-GDL students. To improve academic outcomes for both Green Dot and other public school students, it is important to identify the specific educational mechanisms responsible for the observed positive results. Doing so will require much more in-depth documentation and analysis of the people, programs, and policies that distinguish Green Dot Public Schools from more traditional public schools. These more intensive research efforts are necessary, however, to identify effective and actionable avenues for educational reform.

Nevertheless, the Green Dot Public School's transformation of Alain Leroy Locke High School has been a success for the majority of students in the transformation's first two cohorts. It is also encouraging that GDL accomplished positive effects on student achievement while maintaining a student population similar to its original population prior to transformation and to the control schools used in the study. Additionally, the increasingly positive results for Cohort 2 students, relative to Cohort 1 students, suggests positive benefits are likely to materialize for successive cohorts as well. As GDL's story progresses, future chapters on additional cohorts of students may further solidify the evidence base.

References

Herman, J. L., Wang, J., Rickles, J., Hsu, V., Monroe, S., Leon, S., Staubhaar, R. (2012). *Evaluation of Green Dot's Locke Transformation Project: Findings for Cohort 1 and 2 Students.* Los Angeles: University of California, National Center for Research on Evaluation, Standards, and Student Testing (CRESST).

Ho, D., Imai, K., King, G., & Stuart, E. (2009). *MatchIt: Nonparametric Preprocessing for Parametric Causal Inference*. Retrieved from: http://gking.harvard.edu/matchit/docs/matchit.pdf

Appendix

Classification of key college-prep courses based on Green Dot and LAUSD course titles

Subject Classification	LAUSD Course Titles	Green Dot Course Titles
Key English Courses: Year 1	ENGLISH 9A ENGLISH 9B ESL ADV 3 ESL ADV 4	English 9A English 9B English Honors 9A English Honors 9B ESL Adv. 3/4 A ESL Adv. 3/4 B
Key English Courses: Year 2	ENGLISH 10A ENGLISH 10B	English 10A English 10B English Honors 10A English Honors 10B
Key English Courses: Year 3	AM LIT COMP AP ENG LANG A AP ENG LANG B AUTH COMP A AUTH COMP B CONTEMP COMP	AP English Language A AP English Language B English 11A: American Literature English 11B: American Literature English Honors 11A: American L. English Honors 11B: American L.
Key English Courses: Year 4	AP ENG LIT A AP ENG LIT B ENGLISH LIT EXPOS COMP MODERN LIT WORLD LIT	AP English Literature A AP English Literature B English 12A English 12B English Honors 12A English Honors 12B
Key Math Courses: Year 1	ALG 1A – LAVA ALG 1B – LAVA ALGEBRA 1A ALGEBRA 1B	Algebra 1A Algebra 1B
Key Math Courses: Year 2	GEOM A – LAVA GEOM B – LAVA GEOMETRY A GEOMETRY B	Geometry A Geometry B Honors Geometry A Honors Geometry B

Subject Classification	LAUSD Course Titles	Green Dot Course Titles
Key Math Courses: Year 3	ALGEBRA 2A ALGEBRA 2B	Algebra 2 Honors A Algebra 2 Honors B Algebra 2A Algebra 2B
Key Math Courses: Year 4	AP CALC A UCCP AP CALC A-LAVA AP CALC B UCCP AP CALC B-LAVA AP CALCULUS A AP CALCULUS B AP CALCULUS C AP STAT A UCCP AP STAT B UCCP AP STATISTICS A AP STATISTICS B DISCR MATH A DISCR MATH B MATH ANALY A MATH ANALY B STAT & PROB A STAT & PROB B TRG/MATH AN A TRB/MATH AN B	AP Calculus A AP Calculus B Calculus A Calculus B Math Analysis A Math Analysis B Pre Calculus A Pre Calculus B Trigonometry A Trigonometry B Trigonometry Honors A Trigonometry Honors B
Key Science Courses: Year 1	BIOLOGY A BIOLOGY B ADV BIO A ADV BIO B AP BIO A AP BIO A-LAVA AP BIO B AP BIO B-LAVA	Biology A Biology B AP Biology A AP Biology B
Key Science Courses: Year 2	CHEMISTRY A CHEMISTRY B AP CHEMISTRY A AP CHEMISTRY B	Chemistry A Chemistry B Chemistry Honors A Chemistry Honors B

Subject Classification	LAUSD Course Titles	Green Dot Course Titles
Key Science Courses: Year 3	PHYSICS A PHYSICS B AP PHYSICS A AP PHYSICS B	Physics A Physics B Physics Honors A Physics Honors B
Key History/Social Science Courses: Year 1	WHG: MOD WLD A WHG: MOD WLD B AP WLD HIST A AP WLD HIST B AP EUR HIS A AP EUR HIS B	World History A World History B World History Honors A World History Honors B AP World History A AP World History B
Key History/Social Science Courses: Year 2	US HIST 20TH A US HIST 20TH B AP US HIST A AP US HIST B	U.S. History A U.S. History B U.S. History Honors 11 A U.S. History Honors 11 B AP US History A AP US History B