UCLA Los Angeles Education Research Institute

Twelfth Grade Math and College Access

Technical Appendices

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Disclaimers
This report reflects the analyses and interpretations of the authors. Readers should not attribute the report's findings or interpretations to the Los Angeles Unified School District, the funders of the work, or others who contributed to the project.

Appendix A: Data Sources, Measures, and Sample

Data Sources

This report uses five data sources: (1) the Los Angeles Unified School District's (L.A. Unified) administrative data files; (2) the National Student Clearinghouse's (NSC) Graduates files; (3) the California Partnership for Achieving Student Success' (Cal-PASS) transcript data; (4) students' responses to L.A. Unified's School Experience Survey (SES); and (5) students' responses to L.A. Unified's College and Career Readiness Survey (CCRS). We describe each below:

Los Angeles Unified School District's (L.A. Unified) Administrative Data: We use the Los Angeles Unified School District's (L.A. Unified) administrative data files from academic years 2004-05 to 2017-18 to describe students' demographic characteristics, academic achievement, school-related behavior, and course taking throughout high school. L.A. Unified's administrative data contain information about students in affiliated charter schools but lack information about students who attend independent charter schools.

National Student Clearinghouse's (NSC) Graduates Data: To examine students' college enrollment and persistence after high school graduation, we use the National Student Clearinghouse (NSC) Graduates files from 2018-2020, which describe college enrollment, persistence, and graduation for a large, national sample. In these years, the NSC data cover 97% of enrollments nationwide at Title IV-eligible,[1] degree-granting postsecondary institutions (National Student Clearinghouse, 2021).

California Partnership for Achieving Student Success' (Cal-PASS) Transcript Data: Some students in our data are missing college outcomes from the NSC. Therefore, we supplement the NSC data with data from the California Partnership for Achieving Student Success (Cal-PASS). These data describe college enrollment and persistence for California community college students. We also use these Cal-PASS transcript data to capture students' math course taking in and before 12th grade at community colleges while they were concurrently enrolled in L.A. Unified.

L.A. Unified's School Experience Survey (SES): We measure students' educational expectations and self-perceptions using survey data from L.A. Unified's 2015-16 and 2016-17 School Experience Survey (SES). We also use the 2016-17 SES to measure student's college application outcomes for the 2015-16 first-time 11th grade cohort.

L.A. Unified's College and Career Readiness Survey (CCRS): Because the 2016-17 SES only provides data on student's college application outcomes for the 2015-16 first-time 11th grade cohort, we also use responses to L.A. Unified's 2017-18 College and

[1] A Title IV institution is any college that is eligible to process U.S. federal student aid under Title IV of the Higher Education Act of 1965.

Career Readiness Survey (CCRS) to construct college application outcomes for the 2016-17 first-time 11th grade cohort.

Measures

Math Course Taking: We classify a course as a math course if it: 1) was offered by the L.A. Unified math department and was not a tutorial lab; 2) contained substantial math content (as determined by L.A. Unified staff) and was offered by the L.A. Unified special education, English as a second language, or adult education departments; 3) satisfied the A–G "C" requirement and was offered by the L.A. Unified computer science or science departments (e.g., AP Computer Science A); or 4) satisfied the A–G "C" requirement and was offered by a community college.

We define students as having taken a full year of math in 12th grade if they enrolled in the A (i.e., first) and B (i.e., second) terms of a math course, typically offered in the fall and spring, respectively. We exclude from this measure of "taking 12th grade math" students who took only one term of a math course and students who took a math course out of sequence (i.e., took the B term before the A term).[2] L.A. Unified students may also take 12th grade math at a community college. When students took the equivalent of two sequential terms at a community college, we counted that as a full year of 12th grade math.[3] If students took one term of a math course in L.A. Unified, and the second term of the same math course at a community college, we also counted that as a full year of 12th grade math.

For our analyses of specific types of math courses, we group similar math courses together. We count as "Precalculus" all of the following L.A. Unified courses: precalculus, honors advanced math, integrated math 4, math IB SL, math analysis, trigonometry, and trigonometry/math analysis. We count as "Calculus" all of the following L.A. Unified courses: calculus, AP calculus AB, AP calculus BC, and math studies IB SL. We count as "Statistics" all of the following L.A. Unified courses: statistics, AP statistics, and business statistics.[4] As with our measure of "taking 12th

[2] It is very rare for students to take the B term of a course before the A term. Nevertheless, we exclude those students because we suspect that students who take the terms out of sequence benefit less from the course than students who take the terms in the intended order.

[3] To determine whether students who took a community college math course while concurrently enrolled in L.A. Unified enrolled in the equivalent A and B terms of that course, we only count courses that students did not drop or withdraw from and courses with titles that implied that the course's material was self-contained (i.e., that it was not part of a sequence of courses). For example, we count taking and completing a community college course titled "Precalculus" as taking the A and B terms of a math course, while we count taking a course titled "Intermediate Algebra A" only as taking the A term of a math course (i.e., the A term of "Intermediate Algebra"). In this example, the student would also need to have taken "Intermediate Algebra B" for us to count that student as having taken the A and B terms of a math course. A complete description of how we classified community college courses is available upon request.

[4] We use L.A. Unified Policy Bulletin 1040.3 (L.A. Unified, 2016) course titles and course descriptions in online course catalogs to determine which community college courses teach material equivalent to L.A. Unified courses, and then categorize each course into a broader math course type accordingly. For example, "Calculus I" covers equivalent material to L.A. Unified's AP Calculus AB and thus we categorize it as "Calculus".

grade math," we count students as having taken a specific type of course if they took both the A and B term of that course, in sequence. In addition, if students took more than one type of math course during 12th grade (for example, both Precalculus and Statistics), we exclude those students from our analyses that compare the effects of taking different types of math courses.[5]

Predictors: Appendix Table A1 describes each of the predictors we include in our models. These predictors include a range of student-level demographic, academic, behavioral, and self-perception variables, measured prior to the beginning of 12th grade. These predictors also include potential predictors of a school's math course offerings, including school-level measures of the entering 12th grade cohort's demographic and academic composition as well as teachers' math credentials.

Outcomes: Appendix Table A2 describes each of the 12th grade and college outcomes we examine. Note that we include results for the "main" outcomes in both the report and in this appendix. We include results for "supplemental" outcomes only in this appendix.

Sample and Descriptive Statistics

We limit our sample to students who were first-time 11th graders during the 2015-16 and 2016-17 academic years, where we define a "first-time 11th grader" as a student who was an 11th grader in the fall semester at his/her home high school,[6] was in a grade lower than 11th grade in the spring semester of the prior academic year, and had not taken the 11th grade math SBAC by the spring semester of the prior academic year. We then define a first-time 11th grader's "12th grade year" as the academic year following the student's first-time 11th grade year, even if the student had not yet completed enough credits to count as a 12th grader in L.A. Unified's data. We focus on the 2015-16 and 2016-17 first-time 11th grade cohorts rather than earlier cohorts because these were the first cohorts to be required to complete the A-G requirements, with a D or better, to graduate from high school. In addition, both of these cohorts entered 11th grade at least a year after the implementation of the Common Core State Standards. We focus on these cohorts rather than more recent cohorts because we do not have sufficient data, or not enough time had passed, to examine later cohorts' college enrollment and persistence.

We then further restrict the sample in a number ways for our analytic purposes. First, because our research design involves matching similar students to one another (for details, see Appendix B), we exclude students who attended alternative schools

[5] Students rarely took more than one type of math course in a given year (no more than 2% of the sample for any of our comparisons did this). Also, note that while we exclude these students who took more than one type of math course in our comparisons between types of math courses, we *include* these students in our analyses that examine the effects of taking any type of 12th grade math course.

[6] We define students' "home high school" as the school at which students take most of their courses. When students take courses at multiple schools in a term, we sometimes see discrepancies between students' grade levels at each school. We thus use students' grade level at their home high school as the default.

(independent study, schools for expectant mothers, and home/hospital schools), continuation high schools,[7] community day schools,[8] and opportunity schools.[9] We exclude those students because they tend to differ from students in traditional or affiliated charter schools on many measured characteristics, and thus tend not to be an appropriate comparison group for most of the students in our sample. Moreover, these schools rarely offer advanced math courses, i.e., courses beyond the level of Algebra 2 (e.g., Precalculus).

Second, we exclude students with a documented disability as of the end of 11th grade because some of those students receive an alternate curriculum and/or have modified graduation requirements, and thus their 12th grade math course taking may differ from those of students without a documented disability.[10]

Third, so that we can accurately measure students' math course taking in 11th and 12th grade, we include only students who were enrolled in a course within L.A. Unified in both the fall and spring semesters of their 11th and 12th grade years.

Fourth, because our goal is to estimate the effect of taking a typical math course in 12th grade, compared to taking no math at all, we drop students who took less than a full year of math (i.e., those who enrolled in only the A or B terms of a given math course) and the few students who took the semesters of a given math course out of sequence (i.e., B in the fall and A in spring). We also exclude a small number of students who, in their 12th grade year, did not enroll in any math course that fulfills district or state high school graduation requirements (e.g., the student enrolled in the Geometry Tutorial Lab, but did not enroll in Geometry or any other course that fulfills district or state high school graduation requirements).

Fifth, because we examine the effects of math course taking on key high school and college outcomes, we restrict our sample to students who have data about those outcomes.[11] Because we require that students have non-missing data for college enrollment (so that we can tell whether or not they enrolled in college), and because the district data files only include college enrollment for students who graduated from high school, these sample restrictions mean that our analytical sample excludes students

[7] Continuation high schools serve students between the ages of 16 and 18 who are considered at-risk of not completing their education. This includes students who are regularly employed for at least 30 hours a week.
[8] Community day schools provide interim education for K-12 students who have been expelled, are at high risk, or have been referred by probation, or a School Attendance Review Board.
[9] Opportunity schools serve students in grades 7-12 who are truant, have irregular attendance, and exhibit other at-risk behaviors.
[10] Some students with a disability may qualify for an Algebra 2 waiver, i.e., they may be able to forego passing or validating Algebra 2 with a D or better, and instead fulfill their math graduation requirements with courses that cover separate material. We do not have sufficient data to determine which students with disabilities have waivers or are on an alternate curriculum.
[11] These outcomes include students' cumulative unweighted and weighted GPA at the end of their 12th grade year, their overall A-G completeness with a C or better at the end of their 12th grade year, and their enrollment and persistence in (any, two-year, and four-year) colleges.

who did not graduate from high school. However, very few students who did not graduate from high school were in the sample before this restriction (at most 2.8%) because of our (third) requirement that students have course-taking information for 12th grade.

Finally, because the validity of our statistical estimates depends on whether we have included the most important predictors of both math-taking and students' outcomes, we restrict our sample to students with non-missing data on a select set of key predictors.[12] For the other predictors, we include dummy variables for missing-ness.[13]

Appendix Tables A3 and A4 show how our analytic sample differs from 1) all students who were first-time 11th graders in the 2015-16 and 2016-17 cohorts; and from 2) 11th graders in those cohorts who attended traditional or affiliated charter schools, were not receiving special education services, and had transcript data from 11th and 12th grade. We use sample (2) for Figures 1 and 2 in the main report. The descriptive statistics in these appendix tables show that the analytic sample is, as expected, higher performing in 11th grade than the less-restricted samples and has more positive high school and college outcomes. These comparisons make it clear that readers should only generalize our results to students like those in our analytic sample.

[12] These key predictors include students' math and English language arts standardized test scores (i.e., SBAC scores) at the end of 11th grade, A-G completeness information by the end of 11th grade, cumulative GPA by the end of 11th grade, and math GPA in 11th grade. Note that for math GPA in 11th grade, we require that students have a math grade in the spring term of 11th grade and we do not count grades from L.A. Unified Tutorial Labs or from community college courses that cover material below the level of Algebra 1.

[13] We include dummy variables for missing-ness for the following predictors: race/ethnicity, subsidized meal eligibility, parents'/guardians' education, nonresident school enrollment, number of school moves, number of semesters of AP classes taken, PSAT scores, educational expectations, growth mindset, and academic self-efficacy. See Table A1 for the full set of predictors and information about how we measure them.

Appendix B: Analytic Approaches for Estimating Effects of 12th Grade Math Course Taking

From a causal inference perspective, we define taking math in 12th grade, or taking a specific type of 12th grade math course, as the "treatment" and not taking math in 12th grade, or taking a different type of math course, as the "control." We estimate the effect of taking 12th grade math by comparing the outcomes of students who were similar on our predictor variables as of the end of 11th grade but differed in whether or not they took math in 12th grade. Likewise, we estimate the effect of taking a particular type of 12th grade math course (e.g., taking Statistics instead of Precalculus) by comparing the outcomes of students who were similar on our predictor variables as of the end of 11th grade but differed in the type of math course they took.

As mentioned in the report, we first classify students from our analytic sample into six distinct groups that share similar math course-taking patterns and similar math course performance as of the end of 11th grade, so that we are comparing students within groups that have similar math backgrounds and so that we can examine whether the effects we find differ across groups (see Table 2 in the report). We then use quasi-experimental methods to estimate the effects of 12th grade math course taking separately for three of these groups – Groups 3, 4 and 5 – using a variety of approaches that control for the observed predictors of both 12th grade math course taking and our outcomes. These methods include our preferred estimation strategy, which we refer to as "Cluster Matching with OLS." It involves using "preferential within-cluster" propensity score matching (Arpino & Cannas, 2016) and then estimating effects for the matched sample by modeling the outcome with OLS, adjusting the standard errors for clustering within schools. In both the propensity score matching and in modeling the outcome, we control for the influence of schools on students' math course taking by including school fixed effects.

We also examine the extent to which the estimates vary across several alternative estimation strategies. These include OLS without Matching, Propensity Score Matching after Stratifying Key Predictors with OLS, Kernel Balancing with OLS, and Kernel Matching with OLS. Like our preferred estimation strategy, these alternative strategies include school fixed effects in the OLS model for the outcome, and in the propensity score model we use for matching (for those strategies that include propensity score matching). We produce a set of analogous estimates by repeating the preferred estimation strategy and the alternative strategies but replacing the school fixed effects with a set of school-level predictors, both in any propensity score matching and in the OLS model for the outcome. We also include estimates from a school random effects model that does not use matching and that that includes school-level predictors. We describe each of these strategies in detail below.

Preferred Estimation Strategy: Cluster Matching with OLS

Our preferred estimation strategy matches students on their estimated probability (i.e., propensity) of taking math or taking a particular math course of interest, given their measured characteristics as of the end of 11th grade, cohort, and school. We estimate the propensity score with logistic regression, according to:

$$(1) \qquad \text{Prob}(D_{ijt} = 1) = [1 + \exp(-\alpha_t - \mu_j - \beta^T X_{ijt})]^{-1}$$

where D_{ijt} indicates whether or not student *i* in school *j* and cohort *t* took 12th grade math (or a particular type of 12th grade math course), X_{ijt} is a vector of student-level predictors (described in Appendix Table A1),[14] α_t are cohort fixed effects, and μ_j are school fixed effects.[15] Note that our preferred models include school fixed effects (μ_j), per the recommendations of Arpino & Mealli (2011) and Li et al. (2013). Further, propensity score methods operate under the assumption that, conditional on the observed predictors, each student has a non-zero probability of taking or not taking 12th grade math, or of taking either of the two math courses that we compare (Rosenbaum & Rubin, 1983). Thus, because we control for schools with fixed effects, we drop students from our analyses who were in schools (and a given cohort) in which all or no students took 12th grade math, or all students took only one of the two 12th grade math courses that we compare.[16]

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[14] Note that X_{ijt} also contains squared terms of the continuous academic variables in Appendix Table A1: math 11th grade weighted GPA, cumulative overall weighted GPA at the end of 11th grade, ELA and math standardized SBAC scores in 11th grade, number of semesters of AP classes taken from 9th to 11th grade, all four variables pertaining to the number of semesters off-track in A-G courses at the end of 11th grade, and evidence-based reading and writing and math PSAT scores. Note that for Group 5 students, we also include dummy variables for the type of advanced math course students took prior to 12th grade. These include dummies for Precalculus, Statistics, and IDS, as well as an "other math course" dummy that includes all the less common advanced courses taken by these students by the end of 11th grade (i.e., AP computer science, calculus, discrete math, QRS, TCMS, and community college advanced math). We do not control for students' advanced math course taking in 11th grade for the other groups because students in Group 4 had not taken any advanced math courses before 12th grade, and few students in Group 3 had. Additionally, X_{ijt} includes dummy variables for missingness (1 if the variable had a missing value, and 0 otherwise) on various predictors: subsidized meal eligibility, nonresident school enrollment, number of school moves, number of semesters of AP classes taken, PSAT scores, educational expectations, growth mindset, and academic self-efficacy. Missing values were imputed at 0 (for binary/categorical variables) or at the mean (for continuous variables). Race/ethnicity and parents'/guardians' education also had missing values. For race/ethnicity, we group students who were Native American or Alaska Native, Native Hawaiian or Pacific Islander, or who had a missing race/ethnicity value into an "other race/ethnicity" category. We did this because the number of students of these races/ethnicities or who had missing values was very small, and thus keeping the groups separate added unstable parameters to our models. For parents'/guardians' education, we group together into one dummy variable students who were missing data or were recorded as "Declined to Answer."

[15] We also tried estimating the propensity score with "probit" and random forest regressions. Generally, our conclusions are robust to these alternative specifications of the propensity score.

[16] This is also numerically necessary for schools in which everyone in both cohorts took or did not take 12th grade math, or took the same course when comparing two courses, because it would be infeasible to estimate equation 1 while including those schools.

Our preferred matching specification matches each student to three other students who differ in their math course taking but are otherwise similar on their estimated propensity scores. The algorithm first tries to match students within the same school but if fewer than three matches are present in the school, or no matches at all are, the algorithm searches for the nearest student matches in other schools until the student has at most three matches. We prioritize matching students within schools because we hypothesize that certain school conditions, e.g., the number and types of 12th grade math courses available at a student's school, likely affect students' math course-taking decisions. Because our propensity score models include school fixed effects, however, our matching method still accounts for differences among schools even when students are matched to those from a different school.

To decide how similar students' propensity scores need to be to count as a "match," we use a maximum caliper (i.e., standardized difference on the propensity score) of 0.20, as recommend by Austin (2011). For most course comparisons, however, we reduce the caliper to 0.10 or 0.05 to obtain better covariate balance, following the advice of Lunt (2014).[17] Similarly, we increase the number of matches from three to five if five matches yield better covariate balance.[18]

Before matching, we also drop students from the treatment group whose propensity scores are very different from those in the control group and vice versa. Specifically, following the advice of Lechner & Strittmatter (2019), we discard treated students whose estimated propensity scores fall below the 1st percentile or above the 99th percentile of those for the control students, and we discard control students whose estimated propensity scores fall below the 1st percentile or above the 99th percentile of those for the treated students. When the overlap in the distributions of estimated propensity scores for the treatment and control groups after matching is poor, we increase the level of trimming and discard treated students whose estimated propensity scores fall below the 2.5th percentile or above the 97.5th percentile of those for the control students, and discard control students whose estimated propensity scores fall below the 2.5th percentile or above the 97.5th percentile of those for the treated students.[19] We allow these matching parameters (i.e., caliper, number of matches, and level of trimming) to vary by course comparison and student group to try to ensure as much balance as possible between the treatment and control groups. Appendix Table B1 shows our preferred matching parameters for each comparison.

For our main course comparisons, we aim to estimate the effect of taking math (or taking a specific math course) for the typical 12th grade student in our analytic sample (or, more formally, the average treatment effect, or ATE). To do that, we first create two matched datasets: one that includes the treated students (retained after trimming for

[17] Generally speaking, our conclusions are robust to calipers of 0.05, 0.10, 0.15, 0.20, and 0.25.
[18] We experiment with one, three, and five matches, with replacement, and generally find similar results.
[19] We also experiment with more extensive trimming of the tails of the distributions for the estimated propensity scores but generally find that additional trimming yields similar results.

common support) and their matched control students and another that includes the control students (retained after trimming for common support) and their matched treated students.[20] For our Math vs. No Math, and Statistics vs. Precalculus/Calculus comparisons, we combine these two datasets and estimate the effects using the combined dataset. This provides an estimate of the ATE.[21] For course comparisons that examine TCMS and IDS (i.e., TCMS vs. Precalculus, TCMS vs. Statistics, IDS vs. Precalculus, and IDS vs. Statistics), however, we only estimate the effects in the dataset that matched students to those taking TCMS or IDS (i.e., the treatment group) because this is the only comparison that did not result in poor balance (i.e., the algorithm found students taking Precalculus or Statistics who were sufficiently similar to all the students taking IDS or TCMS but the reverse was less true). Thus, for the comparisons involving TCMS and IDS, we estimate the average effect of TCMS or IDS for the students who took TCMS or IDS (i.e., the average treatment effect for the treated students, or ATT).[22]

After matching, we estimate linear models of the form:

$$Y_{ijt} = \alpha_t + \mu_j + \tau D_{ijt} + \beta^T X_{ijt} + \varepsilon_{ijt} \quad (2)$$

where Y_{ijt} is the outcome of interest, D_{ijt} is an indicator variable for taking 12th grade math (or a specific type of 12th grade math), X_{ijt} is the same vector of student-level predictors included in the propensity score model in equation 1, α_t are cohort fixed effects, μ_j are school fixed effects, and ε_{ijt} is an error term.[23] We cluster standard errors at the school-level (Cameron & Miller, 2015).[24]

The resulting τ from this model estimates the effect of taking 12th grade math or a specific 12th grade math course for our matched students, adjusting for *students'*

[20] In addition, to avoid artificially inflating the sample size of the final model, we calculate a "weight" in each of the two data sets for each student that is based on (i) whether the student was a "target" of the matching (e.g., when matching to the treatment group, the treated students are the "targets" of the match) and (ii) whether the student was a "matched" student (e.g., when matching to the treatment group, the control students are the "matched" students) and how many target students the student was matched to. To envision how these weights are calculated, consider three-to-one matching to the treatment group with replacement. Here, each treated student *i* would be given a weight of 1. Then, each control student would be given a weight equal to the sum, over the treated students that the control student was matched to, of 1/(# of control students matched to treated student *i*). For example, if a control student was matched to a treated student who had three matches, and another treated student who had two matches, the control student would be given a weight of 1/3 + 1/2 = 5/6.

[21] Technically, we are estimating the ATE only for those students remaining in the analytic sample and not removed by trimming. To combine the datasets, we combine the weights from each matched dataset. For more detail on how to create matching weights that estimate the ATE, see Abadie & Imbens (2016).

[22] Technically, we are estimating the ATT only for the TCMS or IDS students remaining in the analytic sample and not removed by trimming.

[23] We estimate linear models for ease of interpretation, but also run logistic models for our binary outcomes and find similar results (available from the authors).

[24] Following the advice of Ho et al. (2007), we continue to use standard errors clustered at the school-level after matching. Results from Abadie & Spiess (2021) imply that standard errors need to additionally account for the matching when it is done without replacement. However, all of our matching is done with replacement, and we are unaware of a proven standard error adjustment for this case.

measured characteristics (X_{ijt})*, cohort* (α_t)*, and school* (μ_j)*.* This "doubly robust" technique makes our estimates more robust to model misspecification in our estimation of the propensity score (Ho et al., 2007).

We report these estimated effects for each student group, along with estimated average outcomes, in Figures 3-10 in the report. In each figure, we display a pair of bars. The left bar shows the average predicted outcome from our preferred model after assigning all students to the control group (i.e., setting $D_{ijt}=0$). The right bar shows the average predicted outcome after assigning all students to the treatment group (i.e., setting $D_{ijt}=1$).[25]

Additional Estimation Strategies

In addition to our preferred estimation strategy, we also estimate the effects of taking math (or taking a specific math course) in a variety of other ways. These include:

- OLS without Matching
- Propensity Score Matching after Stratifying Key Predictors with OLS
- Kernel Balancing Weights with OLS
- Kernel Matching with OLS

As mentioned earlier, like our preferred estimation strategy, these alternative strategies use school fixed effects in the OLS model for the outcome, and in the propensity score model we use for matching (if any). We then repeat our preferred estimation strategy and these alternative strategies after replacing the school fixed effects with a set of school-level predictors, both in any propensity score matching and in the model for the outcome. We also include an estimate from a school random effects model without matching.

We use these methods to assess the extent to which the conclusions from our primary estimation approach are consistent with alternative approaches. As with our primary estimation method, we cluster the standard errors at the school level for each of these alternative approaches.

OLS without Matching

We estimate equation 2 for our full analytic sample, rather than for the matched and trimmed sample from our preferred estimation strategy. These OLS estimates are based on a larger and potentially more generalizable sample than that from our preferred estimation strategy. However, like our preferred estimation strategy, we drop students who were in schools (and a given cohort) in which all or no students took 12th grade math, or all took the same course among the two courses that we compare. This is because equation 2 controls for schools with fixed effects, and it is theoretically

[25] We calculate these averages only for the students retained in the model after matching. Further, we weight these averages with the same matching weights used when estimating equation 2. See footnotes 20 and 21 for more detail on how we calculate these weights.

impossible to estimate the effect of math course taking in schools (and a given cohort) in which there was no variation in math course taking.[26]

Propensity Score Matching after Stratifying Key Predictors with OLS

A chief concern with matching on an estimated propensity score – as we do with our preferred estimation strategy – is that students who have the same probability of being treated (i.e., of taking 12th grade math, or a particular type of math course) are not necessarily the same in terms of their measured characteristics (King & Nielson, 2019). As a result, the estimates based on propensity score matching may be biased. We thus estimate alternative models where we first stratify (i.e., group) students who differ in their 12th grade math course taking but are the same (or very similar) on a set of key predictors, and then we match those students based on their estimated propensity score. Although this approach ensures that the matched students are the same or very similar on key predictors, it excludes many students from the analysis because it is relatively rare for students to differ in their math course taking and share so many similarities in their key predictors. Moreover, we cannot match students within schools because very few students with different 12th grade math course taking share the same strata *and school*.

Ideally, we would stratify on the extensive set of predictors in our data but our sample is not large enough do this. We instead stratify using both a larger and smaller set of key predictors (Sets 1 and 2, respectively):

1. Set 1:
    - Gender *(Female or Not)*
    - English Learner Status in 11th Grade *(English Only or Not)*
    - Math 11th Grade Weighted GPA *(0-2, 2-3, 3-4, or 4+)*
    - Standardized Math SBAC Score in 11th Grade *(Quintiles)*
    - A-G Off-track with a C or better *(Off-track or On-track)*
        - Only for Groups 4 and 5
    - A-G Off-track with a D or better *(Off-track or On-track)*
        - Only for Group 3
    - Took the SAT or ACT before 12th Grade *(Yes or No)*
    - Took Precalculus by the end of 11th Grade *(Yes or No)*
        - Only for Group 5
    - Attendance Rate in 11th Grade *(<96% or >=96%)*
    - Education Expectations in 11th Grade *(4-year college or more, or Not)*

[26] This is also a conservative strategy, numerically. Within schools in which everyone in both cohorts took or didn't take 12th grade math, or took the same course among two that we compare, D_{ijt} and the school dummy variable are perfectly correlated. Thus, were these schools retained, τ would not be adjusted to better fit the outcome variable in these schools. However, α_t and β would be adjusted, which could affect τ in other schools. In other words, the schools without variation in math course taking could potentially distract the estimated coefficients from best modeling the outcome within the schools for which it is theoretically possible to estimate an effect.

2. Set 2:
    - Gender *(Female or Not)*
    - English Learner Status in 11th Grade *(English Only or Not)*
    - Math 11th Grade Weighted GPA *(0-2, 2-3, 3-4, or 4+)*
    - Standardized Math SBAC Score in 11th Grade *(Quintiles)*
    - Took Precalculus by the end of 11th Grade *(Yes or No)*
        - Only for Group 5

For most comparisons and student groups, using Set 1 yields poor balance on the predictors because doing so leaves too few remaining students, so we mostly stratify on Set 2 (see Appendix Table B1). After stratifying, we match on the estimated propensity score from equation 1 to reduce the dimensionality of the remaining predictors but still account for them (and school, through the school fixed effects) in the matching process.[27] As with the within-school propensity score matching, we perform three- (or five-) to-one nearest neighbor matching with a caliper of at most 0.20, and we trim for common support of the estimated propensity scores. We also allow each tuning parameter to vary depending on the course comparison and student group, prioritizing the parameters that yield better covariate balance and overlap in the estimated propensity scores (see Appendix Table B1). After this matching, we obtain estimates of the effect of taking 12th grade math by re-estimating equation 2.

Kernel Balancing Weights with OLS

The propensity matching methods described thus far attempt to make each student in the sample equivalent (in terms of their measured student characteristics, cohort, and school) to one or more matched students who have the opposite treatment status. However, because the predictors in our data are numerous, this is infeasible, and leads to inexact matches (i.e., students who are not the same in terms of their measured characteristics). This can yield poor balance in the student characteristics between the treatment and control groups, or can result in dropping students from the sample who do not have good matches. Poor balance leaves the resulting estimates susceptible to model misspecification (King & Nielson, 2019), and excluding students from analyses changes the sample for which we estimate the effect of taking 12th grade math or a specific 12th grade math course, making it difficult to generalize conclusions to the entire analytic sample.

An alternative approach is to use weighting, which attempts to make the *average* student in the treatment group equivalent to the *average* student in the control group. Specifically, we use "kernel balancing" weights (Hazlett, 2020), which side-step the risk of poor balance by requiring that the weighted means of the predictors, and their non-linear transformations, are equal in the treatment and control group. This method also

[27] We also try Mahalanobis distance matching on the predictors. But this yields poor balance in the predictors after matching due to the large number of predictors, and because many of them are categorical.

does not drop students (so it has the same sample size as the OLS models), unlike matching methods that drop students who are insufficiently similar.

For the Math vs. No Math and Statistics vs. Precalculus/Calculus comparisons, we find weights that equate the overall unweighted means of the predictors (and their non-linear transformations[28]) in the full sample to the weighted means of the predictors (and their non-linear transformations) among (i) the students who took 12th grade math, or a specific 12th grade math course, and (ii) the students who did not. These weights target the ATE, as does our matching for these course comparisons. For the comparisons involving TCMS or IDS, we find weights that equate the unweighted means of the predictors (and their non-linear transformations) among the students who took TCMS or IDS to the weighted means of the predictors (and their non-linear transformations) among the students who did not. These weights target the ATT, or the effect of TCMS or IDS on those who took TCMS and IDS, as does our matching for these course comparisons. We do not allow these kernel balancing weights to balance the dummy variables for 12th grade school, as they are numerous and would distract the weights from well-balancing the student-level predictors and their nonlinear transformations. However, the weights do balance the cohort-specific, school-level predictors shown in Table A1. And again, our estimates of the effect of math come from re-estimating equation 2 with these weights, and after dropping students who were in schools (and a given cohort) in which all or no students took 12th grade math, or all took the same course among the two courses we compare (the reasoning here is the same as for the OLS without Matching models).

Kernel Matching with OLS

Following the related work of Long et al. (2012) and Schudde & Keisler (2019), we also try "kernel matching." Kernel matching matches each treated student to the *weighted average of all* control students (potentially within some range of the estimated propensity score for the treated student), where students with estimated propensity scores that are closer to that of the target student are given more weight, and vice versa (i.e., each control student is matched to the weighted average of all treated students). For this approach, we do not by necessity upweight or prioritize comparing students from the same school, though we do include school fixed effects in the propensity score model.

In this matching, the "kernel" is a function of the difference in the estimated propensity scores of any one control student and any one treated student, and calculates how much weight is given to the control student when they are matched to each treated student, and vice versa.[29] Some kernels assign students weights of 0 (i.e., they are not

[28] These non-linear transformations are determined by the Gaussian kernel function. Per Hazlett (2020), we use the number of predictors as the bandwidth parameter for the Gaussian kernel.

[29] For example, if the estimated propensity score of a control student i_1 is 0.60, and the estimated propensity score of a treated student i_2 is 0.65, the kernel will input the difference of |0.65-0.60|=0.05 and calculate the weight for control student i_1 when matching to treated student i_2.

matched) when the difference in the propensity scores is larger than some value, which is equivalent to a caliper in traditional propensity score matching methods. We follow Schudde & Keisler (2019), who employ the Epanechnikov kernel with a bandwidth of 0.06, meaning that control students with estimated propensity scores at least 0.06 x $5^{1/2}$ = 0.134 away from that of a target treated student will not be matched to that treated student, and vice versa. Control students with propensity scores within 0.134 of that of the treated student will then be given more weight if their estimated propensity score is closer to that of the treated student, and vice versa. Further, we re-estimate the propensity scores according to a "probit" model to be consistent with Schudde & Keisler's (2019) methods:

$$(3) \qquad \text{Prob}(D_{ijt} = 1) = \Phi(\alpha_t + \mu_j + \beta^T X_{ijt})$$

where Φ is the cumulative distribution function of a standard normal random variable, and like our preferred estimation strategy, we drop students who were in schools (and a given cohort) in which all or no students took 12th grade math, or all took the same course among two that we compare, due to the inclusion of school fixed effects (μ_j). We also modify the way we trim students for common support of the estimated propensity scores accordingly -- we discard treated students whose estimated propensity scores fall below the minimum or above the maximum of those for the control students, and we discard control students whose estimated propensity scores fall below the minimum or above maximum of those for the treated students. We obtain our estimates of taking 12th grade math, or the 12th grade math course of interest, by re-estimating equation 2 with these kernel matching weights.

School-level Predictors Rather than School Fixed Effects

The alternative strategies described thus far, and our primary estimation approach, use school fixed effects in the OLS model for the outcome (i.e., equation 2) and, when matching, in the propensity score model (i.e., equations 1 and 3). As a result, we dropped students who were in schools (and a given cohort) in which all or no students took 12th grade math, or all took the same course among two that we compare. This limits the generalizability of these results. Thus, we also estimate a second version of each matching/weighting model that includes a set of measured school characteristics (see Appendix Table A1) instead of school fixed effects and thus retains a larger sample of students.

Specifically, for the methods that previously estimated the propensity score with equation 1 (i.e., Cluster Matching with OLS, and Propensity Score Matching after Stratifying Key Predictors with OLS), we instead estimate the propensity score using:

$$(4) \qquad \text{Prob}(D_{ijt} = 1) = [1 + \exp(-\alpha_t - \beta^T X_{ijt} - \theta^T U_{jt})]^{-1}$$

where U_{jt} is a vector of the cohort-specific, school-level predictors shown in Appendix Table A1.[30] For Kernel Matching with OLS, which previously estimated the propensity score with equation 3, we instead estimate the propensity score using:

$$\text{Prob}(D_{ijt} = 1) = \Phi(\alpha_t + \beta^T X_{ijt} + \theta^T U_{jt}) \quad (5)$$

After matching or weighting, or immediately in the case of OLS without Matching, we then estimate linear outcome models of the form:[31]

$$Y_{ijt} = \alpha_t + \tau D_{ijt} + \beta^T X_{ijt} + \theta^T U_{jt} + \varepsilon_{ijt} \quad (6)$$

This set of estimates has the advantage of improved generalizability for our conclusions, and, often, improved covariate balance and overlap in the estimated propensity scores after matching. However, unlike the models with school fixed effects, these models do not include all the school-level characteristics that may be correlated with whether or not students take math, or which math course they take, and their subsequent outcomes.

Random Effects

We also estimate equation 6 with random effects for schools. Random effects model any key school-level characteristics that are omitted by the (cohort-specific) school-level predictors in U_{jt}. In doing so, they have the potential to lessen the bias from omitting such predictors and have lower variance than fixed effects models. However, unlike fixed effects models, random effects cannot *entirely* adjust for such omitted school-level characteristics (Hazlett & Wainstein, 2022).

[30] Note that U_{jt} also includes the squared term of the size of the 12th grade class.
[31] As before, we also run logistic models for our binary outcomes and find similar results (available from the authors).

Appendix C: Results

Propensity Score Matching Results and Diagnostics

To assess how well our primary estimation approach matches treatment and control groups on their propensity scores and balances them on observed predictors, we show histograms of the estimated propensity scores and the means and variances of the predictors before and after matching.[32] We assess balance in the means of the predictors by calculating the standardized difference between the treatment and control group means, using a standardized difference of less than 0.10 in absolute value as a benchmark for determining whether the means of a specific predictor are sufficiently similar (Austin, 2009; Normand et al., 2001). To assess balance in the variance of the predictors, we calculate the "variance ratio," which is the ratio of the (weighted) variances in the treatment and control groups in the matched dataset.[33] Following Rubin (2001), we use 0.80 and 1.20 as benchmarks for assessing whether the variances are sufficiently similar (i.e., are within 20% of one another).

Math vs. No Math

Appendix Figures C1, C2, and C3 show that our preferred matching method is successful in equating the distributions of the estimated propensity scores for all the groups. These figures show that after matching, the distributions of the estimated propensity scores are largely the same in the treatment and control groups. Appendix Tables C1, C2, and C3 show that our preferred matching method also yields good balance on the predictors for all the groups, with the vast majority of standardized mean differences within the 0.10 benchmark and the vast majority of the variance ratios within the 0.80 to 1.20 range, though there are several variance ratios outside the desired range in Group 3.[34] Recall, too, that our effect estimates use all the same predictors in modeling the outcome, which provides an additional layer of robustness.

Statistics vs. Precalculus or Calculus

In contrast to the Math vs. No Math comparison, the matching of students who took Statistics instead of Precalculus or Calculus in 12th grade is less successful. This is particularly true for Group 3 -- the estimated propensity scores show noticeable misalignments (see Appendix Figure C4), and many variables remain unbalanced after matching (see Appendix Table C4). Therefore, we do not report effect estimates from our preferred matching method for Group 3 for this comparison. This lack of balance

[32] Regression tables for the propensity score models are available from the authors upon request.

[33] Ideally, propensity score matching would not only render the means of the predictors equal in the treatment and control groups, but also their multivariate distributions. Thus, some (e.g., Ho et al., 2007; Austin, 2009) recommend additionally comparing the variances of the treatment and control groups after matching.

[34] These figures and tables all show overlap and balance for our preferred model, using the caliper, number of matches, and levels of trimming shown in Appendix Table B1.

likely stems from the relatively small number of students who remain in the comparison after dropping the school-cohorts without treatment variation, which our fixed effects models do. Overlap and balance improve when we replace the school fixed effects in the propensity score and outcome models with cohort-specific, school-level controls (see Appendix Figure C5 and Appendix Table C5).

The overlap and balance results for Groups 4 and 5 are much better, especially for Group 5. For Group 4, the distributions of estimated propensity scores for those who took Statistics and those who took Precalculus largely align (see Appendix Figure C6) and the vast majority of the predictors are well-balanced in their means and variances (see Appendix Table C6). For Group 5, the distributions for those who took Statistics and those who took Calculus line up well (see Appendix Figure C7), all the predictors have standardized differences within the benchmark of 0.10 after matching, and the vast majority of predictors have variance ratios in the 0.80 to 1.20 range (see Appendix Table C7).

TCMS or IDS vs. Precalculus or Calculus

We do not find reasonable overlap and balance when comparing (i) TCMS or IDS to Precalculus for Group 3 or (ii) IDS to Calculus for Group 5, regardless of whether we include school fixed effects or school-level controls (results not shown).

For comparing TCMS or IDS to Precalculus in Group 4, the estimated propensity score distributions after matching correspond reasonably well, with some misalignments in parts of the distribution (see Appendix Figures C8 and C12). The standardized differences and variance ratios are less well balanced than in the prior comparisons, with considerably more imbalance in the means in the IDS-Precalculus comparison and considerably more imbalance in the variances in both the TCMS and IDS comparisons (see Appendix Tables C8 and C12). Matching students in Group 4 who took Precalculus to those who took TCMS or IDS is likely less successful because of the small number of students left in the comparison after dropping the school-cohorts without treatment variation. When we replace school fixed effects in the propensity score and outcome models with the cohort-specific, school-level controls, balance improves (see Appendix Figures and Tables C9 and C13).

As in Group 4, the distributions of the estimated propensity scores for comparing TCMS to Calculus in Group 5 are far closer after matching (see Appendix Figure C10) but still show misalignments. Moreover, the predictors are less well balanced in the TCMS/Calculus comparison than in prior comparisons (see Appendix Table C10). However, replacing school fixed effects in the propensity score and outcome models with the cohort-specific, school-level controls improves balance (see Appendix Figure and Table C11).

TCMS or IDS vs. Statistics

We do not find reasonable overlap and balance when comparing TCMS or IDS to Statistics for Group 3, regardless of whether we include school fixed effects or school-level controls (results not shown).

For our preferred matching strategy, we do not find sufficient overlap and balance when comparing TCMS or IDS to Statistics for Group 4. While the distributions of the estimated propensity scores are not terribly misaligned after matching (see Appendix Figures C14 and C18), they show noticeable discrepancies, particularly for the IDS-Statistics comparison. Several variables also show imbalance in their means and variances, with more for the TCMS-Statistics comparison (see Appendix Tables C14 and C18). However, when we use the models that include cohort-specific, school-level controls in lieu of school fixed effects, overlap and balance improve for these comparisons (see Appendix Figures and Tables C15 and C19).

In Group 5, our preferred matching strategy performs reasonably well when comparing TCMS to Statistics. The distributions of the estimated propensity scores are decently well-aligned after matching (see Appendix Figure C16), though some misalignments remain. Balance on the predictors is also decent for this TCMS-Statistics comparison (see Appendix Table C16), though a handful of standardized mean differences exceed the desired 0.10 benchmark and several variances are not well balanced. Replacing school fixed effects with cohort-specific, school-level controls improves overlap and balance for this TCMS-Statistics comparison (see Appendix Figure and Table C17). Our preferred matching strategy fails to run for the IDS-Statistics comparison in Group 5. But using school-level controls instead of fixed effects yields acceptable overlap and balance (see Appendix Figure and Table C20), though a handful of predictors have standardized mean differences greater than 0.10.

Estimated Effects of 12th Grade Math Courses

Math vs. No Math

As discussed in Appendix B, we estimate the effects of math course taking using a variety of methods to assess the robustness of the results to different approaches. Appendix Tables C21-C24 show the results from the various methods of estimating the effect of taking 12th grade math compared to not taking 12th grade math on each of the main outcomes. The first set of columns shows estimates from the models that include school fixed effects, which are the estimates we present in the main report. The second set of columns shows estimates from models that substitute school-level predictors for fixed effects in both the propensity score estimation (if any) and the modeling of the outcome. The first row of estimates for each group shows the association between taking math and the outcome, without adjusting for any predictors. The second row shows the estimated effect from our preferred model; these estimates are identical to those shown in the main report. Subsequent rows show the estimated effects from the other models, so that readers can compare those estimates to those discussed in the

main report. The tables show that the results for GPA and A-G completion are consistent in sign and statistical significance across the various models. The results for college enrollment and persistence overall, and for four-year college enrollment and persistence, are largely consistent in sign and statistical significance across all the models as well. The exception is the model that uses stratification to match students (see "Propensity Score Matching after Stratifying Key Predictors with OLS" in Appendix B), which reduces the sample size considerably, thus reducing statistical power.

Appendix Tables C25 and C26 show estimated effects of taking 12th grade math on two supplemental outcomes: SAT scores and students' college application behavior. We exclude these outcomes from the main report because they have considerably smaller samples; we can only estimate these models for students who, in 12th grade, took an SAT/ACT or who filled out the district's School Experience survey or the district's College and Career Readiness survey (which are the sources of data on students' college application behaviors; see Appendix A for more information on these data sources).

Appendix Table C25 suggests that, in Groups 4 and 5, taking math in 12th grade improves students' math SAT scores by around 10 to 15 points on average but does not improve students' verbal SAT scores. The Group 3 results imply a similar conclusion, but the estimates for this group are not consistently statistically significant across the models. These findings imply that taking math in 12th grade may help students learn or retain math skills, which they then demonstrate on the SAT. The contrasting results between math and verbal SAT provide suggestive evidence that our models have adjusted well for the selection of higher-achieving students into 12th grade math course taking. Nonetheless, it is also possible that students' perceptions of their math ability, their affinity for math, or other unmeasured variables are positively related to both math course taking in 12th grade and math SAT scores, and thus still confound our estimates of the effects of math course taking.

Appendix Table C26 suggests that students who took math in 12th grade were more likely to apply to four-year colleges, and to more selective colleges, even when compared to students who were otherwise similar on measured predictors in 11th grade but did not take math in 12th grade. It is likely that taking math in 12th grade exposes students to a peer group that is more likely to apply to a four-year college, which might lead students who take 12th grade math to be more likely to apply to college, and to more selective colleges. It is also possible that students who are enrolled in math during 12th grade, and thus perceived to be on a "college track," receive more support from school staff in applying to a four-year college. However, these results may instead indicate that our models do not sufficiently account for students' plans to attend college, or a selective college, as of the end of 11th grade, and thus what may seem like a causal effect is in fact the effect of college plans on both math course taking and students' college application patterns.

Statistics vs. Precalculus or Calculus

Appendix Tables C27-C30 show the results from all the methods of estimating the effects of taking Statistics compared to Precalculus (Groups 3 and 4) or Calculus (Group 5) on the main outcomes. The results are consistent in magnitude and statistical significance for GPA in Group 5 but are less consistent for the other outcomes.

Appendix Tables C31 and C32 report results for the supplemental outcomes for this comparison. The results suggest that otherwise similar students in Group 5 who took Statistics instead of Calculus scored around 7 to 11 points lower on the math SAT and were less likely to apply to a highly selective four-year college. As before, rather than indicating that taking Calculus improves Group 5 students' likelihood of applying to a highly selective college, these results may instead indicate that students who planned to attend a highly selective college as of the end of 11th grade, which we cannot directly measure with our data, were more likely to take Calculus than Statistics in 12th grade.

TCMS or IDS vs. Precalculus or Calculus

Appendix Tables C33-C36 show results for the main outcomes for taking TCMS compared to Precalculus (Group 4) or Calculus (Group 5). The signs and statistical significance are consistent for unweighted GPA in both groups, suggesting that otherwise similar students earned slightly higher grades in TCMS than in Precalculus or Calculus. The available estimates show similar results for weighted GPA in Group 5. The estimates are statistically insignificant for A-G completion in both groups, college enrollment in Group 4, and college persistence in Group 5. The estimates are inconsistent in terms of statistical significance for college enrollment in Group 5, and college persistence in Group 4.

Appendix Tables C37-C40 show the results comparing the effects of IDS to Precalculus in Group 4. Recall that we only estimate these models for Group 4 because overlap and balance were poor for other groups. The estimates are consistently positive and largely consistent in statistical significance for both weighted and unweighted GPA, suggesting that otherwise similar students earned slightly higher grades in IDS than in Precalculus. The estimates are consistently insignificant for A-G completion, and inconsistent for college enrollment and persistence.

TCMS or IDS vs. Statistics

Appendix Tables C41-48 show results comparing TCMS or IDS to Statistics for Groups 4 and 5. For Group 4, the models suggest that students earned slightly higher GPAs (weighted and unweighted) when they took IDS rather than Statistics; all the models except our preferred model indicate that these effects are statistically significant. For Group 5, the estimates also suggest that taking TCMS instead of Statistics may improve weighted GPAs. Results for all the other outcomes, however, are either inconsistent across the models or consistently statistically insignificant.

Appendix D: Sensitivity Analyses

Although Appendix C shows that our estimates of the effects of taking a 12th grade math course, compared to not taking one, are consistent across our various modeling approaches, all these models assume that we have perfectly accounted for all the possible confounders of the relationship between math course taking and our outcomes. Our models arguably account for the main reasons that students take math in 12th grade, including their math achievement (as measured by their prior grades and test scores), their prior math course taking, how much higher education they are planning in the future, and differences among their schools in their cultures, math offerings, and so forth (as measured by school fixed effects or school characteristics). But our models also lack some variables that may account for why academically-similar students differ in whether they take a 12th grade math course, including their perceptions of the extent to which math is important for their future, their plans to enroll in specific types of colleges, and their perceptions of the opportunity cost of taking math instead of a different course. To the extent these omitted variables also influence students' grades in 12th grade, A-G completion, or college outcomes, our estimated effects will be biased by the exclusion of these, or other, unmeasured variables. Although we cannot know the extent to which our estimates are confounded by omitted variables, we can assess how predictive all omitted variables, taken together, would need to be to: 1) reduce our estimates to zero, or 2) reduce our estimates to statistical insignificance (see Cinelli & Hazlett, 2020).[35]

Appendix Tables D1, D2, and D3 show these sensitivity results for Groups 3, 4, and 5, respectively. In these tables, we estimate how many times as predictive an omitted set of variables would need to be compared to a large set of academic-related predictors that are quite predictive of both math course taking and of our outcomes. This set includes:

- the following academic predictors from Appendix Table A1 (and their squared terms, when continuous): 11th grade weighted math GPA, cumulative overall weighted GPA at the end of 11th grade, standardized math and ELA SBAC scores in 11th grade, number of semesters of AP classes taken from 9th to 11th grade, number of A-G semesters off-track with a C or D in various subjects at the end of 11th grade, highest math and evidence-based reading and writing PSAT scores by the end of 11th grade, an indicator of taking the SAT or ACT before 12th grade, participation in the Advancement via Individual Determination program in

[35] Using this approach to sensitivity testing requires that we assess bias in our OLS without matching estimates rather than in the estimates from our matching or weighting approaches. Because our unmatched OLS estimates so closely resemble the estimates from these other approaches, however, this is not an important limitation. Note, too, that the adjusted standard error estimate that the procedure calculates is only assured to be valid under homoscedastic errors for the outcome after having accounted for omitted predictors (Cinelli & Hazlett, 2020).

11th grade, an indicator of taking a college or career seminar course in 11th grade, and math course taking prior to 12th grade, and

- the following additional covariates that correlate highly with the academic predictors and serve as imperfect proxies for some of them: Gifted and Talented program participation in 11th grade; overall work effort GPA in 11th grade; overall cooperation GPA in 11th grade; educational expectations in 11th grade

We refer to this set of predictors as the "Academics+" predictors. Taken together, these Academics+ predictors account for 24%, 29%, and 26% of the total explained variance in math course taking in our models for Groups 3, 4, and 5, respectively.[36] The set accounts for 16% to 75% of the total explained variance in our outcomes.[37]

Group 3

As readers may recall from the report (and Appendix C), our estimates for Group 3 imply that taking a 12th grade math course has (i) a small negative effect on weighted GPA; (ii) a large positive effect on A-G completion with a C; and (iii) a moderately positive effect on four-year enrollment and persistence. Appendix Table D1 shows these results from our OLS models in the first column. The columns labeled "X Times as Strong as Academics+" indicate how strong an unobserved confounder (or set of unobserved confounders) would need to be relative to the Academics+ predictors to reduce the estimate to zero or statistical insignificance at the 0.05 level. For GPA, the unobserved set of confounders would need be about a quarter (0.24) as strong as the Academics+ predictors. Note that this would involve the unobserved confounders explaining 100% of the remaining variation in GPA. This is because the Academics+ predictors include cumulative GPA through 11th grade, which is highly predictive of end-of-high school GPA. For A-G completeness, the unobserved confounders would need be about one and a half times as strong as the Academics+ predictors (1.65 for the sign of the estimate and 1.48 for the statistical significance), which seems quite unlikely.

The unobserved predictors would need to be 0.81 times as strong as the Academics+ predictors to yield a zero-effect estimate on four-year enrollment, and 0.64 times as strong as the Academics+ predictors to do so for four-year persistence. And the unobserved predictors would need to be 0.53 and 0.31 times as strong as the Academics+ predictors to render the estimates insignificant at the 0.05 level for four-year enrollment and persistence, respectively. The 0.31 number that would remove the statistical significance for four-year persistence approaches plausibility. Unobserved

[36] Per Appendix Tables D1-D3, including the Academics+ predictors in the linear model for math-taking increases the R^2 from 27.8% to 36.6% in Group 3 ($\frac{0.366-0.278}{0.366} * 100\% = 24\%$), 23.0% to 32.4% in Group 4 ($\frac{0.324-0.230}{0.324} * 100\% = 29\%$), and 20.1% to 27.3% in Group 5 ($\frac{0.273-0.201}{0.273} * 100\% = 26\%$).

[37] At their least predictive, the Academics+ predictors increase the R^2 for the linear model for two-year persistence in Group 3 from 9.1% to 10.9% ($\frac{0.109-0.091}{0.109} * 100\% = 16\%$). At their most predictive, this set of predictors increases the R^2 for the linear model for overall A-G completion with a C or better in Group 5 from 9.8% to 39.3% ($\frac{0.393-0.098}{0.393} * 100\% = 75\%$). See Appendix Tables D1-D3 for more detailed results.

predictors that strong would explain 4.3% and 3.0% of the remaining variation in math-taking and the outcome, respectively, which would increase the total R^2 of the linear model for the treatment from 36.6% to 39.3% and the total R^2 for the outcome from 17.7% to 20.2%.

Group 4

Our estimates for this group indicate that taking a 12th grade math course has a small negative effect on GPA, and moderately-sized, positive effects on enrollment and persistence in any college and in a four year college (see column 1 of Appendix Table D2 for OLS estimates of these effects). Our sensitivity results indicate that unobserved confounders would need to be 0.15 times as strong as the Academics+ predictors to reduce the weighted GPA estimate to 0 or render it insignificant at the 0.05 level. As with Group 3, note that this involves the unobserved confounders explaining 100% of the remaining variation in weighted GPA.

As for enrollment and persistence in any college, our sensitivity results imply that it would require unobserved predictors that are around 0.60 times as strong as the Academics+ predictors to yield a zero estimate, and around 0.40 times as strong to render the estimates statistically insignificant.

For the four-year outcomes, unobserved predictors would need to be over one fourth as strong as the Academics+ predictors to reduce the estimates to zero, and 0.15 times as strong to render the estimates insignificant at the 0.05 level. The 0.15 value that would render the estimate for four-year persistence insignificant is plausible given that it corresponds to unobserved predictors that would explain around 2.1% and 3.3% of the remaining variation in math-taking and the outcome, respectively. This would increase the total R^2 of the linear model for the treatment from 32.4% to 33.8%, and that for the outcome from 23.3% to 25.8%, which seems plausible.

Group 5

As in Group 4, our results for Group 5 suggest that taking math in 12th grade has a slightly negatively effect on GPA and slightly positive effects on college enrollment overall and on four-year college enrollment in particular (see the OLS estimates in Appendix Table D3). The sensitivity results indicate that unobserved confounders would need to be 0.18 times as strong as the Academics+ predictors to reduce the weighted GPA estimate to zero or render it insignificant at the 0.05 level. For enrollment and persistence at any college, unobserved predictors would need to be 0.56 and 0.46 times as strong as the Academics+ predictors to yield a zero estimate and about one fourth as strong to render the estimates statistically insignificant. Four-year enrollment and persistence outcomes show more sensitivity. Unobserved predictors would need to be about a fourth as strong as the Academics+ predictors to reduce the estimates to zero and 0.12 and 0.14 times as strong, for four-year enrollment and persistence respectively, to render the estimates insignificant at the 0.05 level. The existence of omitted predictors that explain an additional 1% of the variance in math course taking

and 3% of the variance in four-year college enrollment or persistence seems plausible. This would increase the total R^2 of the linear model for the treatment from 27.3% to about 28.2%, that for four-year enrollment from 26.7% to 28.8%, and that for four-year persistence from 26.4% to 28.7%.

Appendix E: Analytic Approach for Estimating Inequality in Math Course Taking & Results

In Table 5 of the main report, we show which students were less likely to enroll in 12th grade math after taking into account all the predictors that we used in our models for the effects of taking math, including school fixed effects. The models take the following form, estimated by logistic regression separately for Groups 3-5, and with standard errors clustered at the school level:

$$\text{Prob}(D_{ijt} = 1) = [1 + \exp(-\alpha_t - \mu_j - \beta^T X_{ijt})]^{-1}$$

where D_{ijt} is an indicator variable of taking 12th grade math (1 if the student took math, and 0 if not) for student *i* in school *j* and first-time 11th grade cohort *t*, X_{ijt} is the vector of student-level predictors described in Appendix Table A1,[38] μ_j are school fixed effects, α_t are cohort fixed effects, and we drop the school-cohorts in which everyone took math, or no one took math.[39] In Table 5, we present the differences in the predicted probabilities for the "average student" instead of model coefficients or odds ratios coefficients, for ease of interpretation.[40]

These models indicate which students were less likely than their peers to take 12th grade math, even when their math preparation, educational aspirations, and so forth, as of the end of 11th grade, were the same *and* they attended the same school. We present these results as "Disparities among Similar Students Attending the Same School." These estimates provide the clearest sense of whether students from particular demographic groups are less likely to take 12th grade math than their otherwise similar peers from the same school. However, because readers may be interested in additional disparity estimates, Appendix Tables E1-E3 show the results from the main report alongside results from three alternative sets of models. Appendix Tables E1-E3 also present disparity estimates for each set of models that come from OLS regression instead of logistic regression.

The first set of models simply compares the raw proportions of students who took math in each demographic group.[41] We cluster standard errors at the school level. These comparisons show which students were more likely to take 12th grade math, without

[38] As in our models that estimate the effects of taking math, X_{ijt} includes various squared terms and missing-data dummy variables. For more information, see Appendix B.

[39] We do this for the same reasons as in the models that estimate the effects of taking math. For more information, see Appendix B.

[40] First, we use the model to estimate the probability of taking math for a student of each demographic group (e.g., Latinx or Asian American), holding the rest of the variables in the model at their averages. Then, we calculate the difference in those predicted probabilities.

[41] This is equivalent to modeling the probability of taking math (logistically or linearly) using only the demographic indicators associated with each comparison. For example, when comparing females and males, this is equivalent to modeling the probability of taking math using only an indicator of being female as a regressor (and an intercept term).

accounting for any other characteristics of the students or the schools that they attended. We refer to these unadjusted differences as “Enrollment Disparities.”

The second set of models includes all student-level predictors as regressors but excludes school fixed effects. These results indicate which students were less likely than their peers to take 12th grade math even when they were similar in terms of their 11th grade achievement and the other student characteristics, but did not necessarily attend the same school. We refer to the results from these models as “Disparities Among Similar Students.” These logistic regression models take the following form:

$$Prob(D_{ijt} = 1) = [1 + \exp(-\alpha_t - \beta^T X_{ijt})]^{-1}$$

where estimates of the disparities in math-taking come from the differences in the predicted probabilities for the average student, and we cluster standard errors at the school level. Because school fixed effects are omitted, we retain school-cohorts in which either everyone took math, or no one took math.

The third set of models adds the school-level predictors listed in Appendix Table A1 as regressors. These models show differences among students who were not only similar in terms of their 11th grade achievement and the other predictors, but also attended similar, though not necessarily the same, schools. We call the estimates from these models “Disparities Among Similar Students Attending Similar Schools.” These logistic regression models take the following form:

$$Prob(D_{ijt} = 1) = [1 + \exp(-\alpha_t - \theta^T U_{jt} - \beta^T X_{ijt})]^{-1}$$

where U_{jt} is a vector of cohort-specific, school-level predictors,[42] disparity estimates come from the differences in the predicted probabilities for the average student, and standard errors are clustered at the school level. Because school fixed effects are omitted, we retain school-cohorts in which either everyone took math, or no one took math.

[42] As in the models that estimate the effects of taking math, U_{jt} also includes the squared 12th grade class size of the school the student attended in his/her 12th grade year.

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Table A1. Descriptions of Predictor Variables

Demographics	
Age (in Months)	We calculate students' age (in months) as of August 1st of their 11th grade year.
Gender	We code students' gender based on their classification in the spring of their 11th grade year. If students' gender was missing in spring, we use their gender classification from the fall of that year. The source data does not report non-binary gender, so students are classified as either female or male.
Race/Ethnicity	We code students' race/ethnicity based on their classification in the spring of their 11th grade year. If students' race/ethnicity was missing in the spring, we use their race/ethnicity from the fall of that year.
Ever Subsidized Meal Eligible from 9th to 11th Grade	We code students as eligible for subsidized meals if they were eligible in any term during their 9th through 11th grade years. If their subsidized meal eligibility was missing in every term from 9th through 11th grade, we give them a missing value for this variable.
Parents'/Guardians' Educational Attainment	We code students' parents'/guardians' educational attainment based on their parents'/guardians' education level classification in the spring of their 11th grade year. If students' parents'/guardians' educational attainment classification was missing or "Decline to Answer" in spring, we use the most recent education level classification, going back as far as students' kindergarten year.
Nonresident School Enrollment in 11th Grade	We code students as attending a school other than their resident school (i.e., a school that is not their neighborhood school) in 11th grade if their enrollment records indicate they were enrolled in a school other than their resident school in either term of their 11th grade year.

Note: We define students' 9th grade year as two years prior to their 11th grade year. A majority of students were enrolled in 9th grade two years prior to their 11th grade year. However, some students were not in 9th grade two years prior to their 11th grade year, either because they repeated a grade (e.g., repeated 10th grade, so they were in 10th grade two years prior to their 11th grade year), or because they accelerated (e.g., accelerated through 9th grade, so they were in 8th grade two years prior to their 11th grade year). Similarly, we define students' 10th grade year as one year prior to their 11th grade year, and we define students' kindergarten year as 11 years prior to their 11th grade year. Additionally, we define students' 12th grade year as the academic year following their 11th grade year, even if the student had not earned enough credits to be promoted to 12th grade.

Table A1 Continued. Descriptions of Predictor Variables

Demographics	
Number of School Moves from 9th to 11th Grade	We calculate the number of times students changed schools (i.e., changed from one preferred location school code to another) during their 9th through 11th grade years. If students' preferred school code was missing in any year from 9th to 11th grade, we give them a missing value for this variable.
English Learner Status in 11th Grade	We code students' English learner status based on their status in the spring of their 11th grade year. If their English learner status was missing in the spring, we use their status from fall of that year.
Gifted and Talented Program Participation in 11th Grade	We code students' gifted and talented program participation status based on their participation status in their 11th grade year.
Academic Variables	
Math 11th Grade Weighted GPA	We calculate students' weighted GPA for all the math courses they took during their 11th grade year. Our GPA calculation includes all math courses students took at an L.A. Unified school or through a concurrent enrollment program at a community college, except for math support tutorials and labs and community college courses that cover material below the level of Algebra 1. Specifically, we first compute the number of weighted grade points students were awarded for each math course by finding the product of their weighted marks for achievement and the number of course credits they attempted, and then finding the sum of all the weighted grade points they earned. We code this variable as missing if students did not receive a grade in a math course in the spring of their 11th grade year. We follow L.A. Unified's rules for weighting courses. Students who took an honors or AP course receive an additional grade point if they earned a C or better in the course (i.e., A=5, B=4, and C=3 GPA points, respectively). If students took a course at a community college above Algebra II (e.g., Statistics, Precalculus, Calculus), we apply L.A. Unified's GPA weighting rules.

See the note on the first page of the table.

Table A1 Continued. Descriptions of Predictor Variables

Academic Variables	
Cumulative Overall Weighted GPA at the End of 11th Grade	L.A. Unified provided students' annual cumulative overall weighted GPAs. Our measure reflects students' overall cumulative weighted GPAs in the end of spring of their 11th grade year.
Standardized ELA SBAC Score in 11th Grade	We calculate students' 11th grade Standardized ELA SBAC scores using their scaled score on the ELA SBAC in their 11th grade year. We standardize students' scores relative to all L.A. Unified students who took the 11th grade ELA SBAC in that year.
Standardized Math SBAC Score in 11th Grade	We calculate students' 11th grade Standardized Math SBAC scores using their scaled score on the Math SBAC in their 11th grade year. We standardize students' scores relative to all L.A. Unified students who took the 11th grade Math SBAC in that year.
Number of Semesters of AP Classes Taken from 9th to 11th Grade	We calculate the number of semesters of AP classes students took during their 9th through 11th grade years. If students were not continuously enrolled in L.A. Unified from 9th to 11th grade, we assign them a missing value for this variable.
A-G C or better Semesters Off-Track in English ("A" in A-G) and History ("B" in A-G) at the End of 11th Grade	We calculate the number of semesters of English and history A-G coursework in which students needed to receive a C or better in order for them to be on-track to meet in-state, public college eligibility requirements in those subjects by the end of their 11th grade year using L.A. Unified's subject-specific "A-G semesters off-track" measures. Specifically, we sum up students' English and History A-G semesters off-track measures from the spring of their 11th grade year.

See the note on the first page of the table.

Table A1 Continued. Descriptions of Predictor Variables

Academic Variables	
A-G C or better Semesters Off-Track in Science ("D" in A-G), Language other than English (LOTE; "E" in A-G), VPA ("F" in A-G), and Electives ("G" in A-G) at the End of 11th Grade	We calculate the number of semesters of Science, Language other than English (LOTE), Visual and Performing Arts (VPA), and Elective A-G coursework in which students needed to receive a C or better in order for them to be on-track to meet in-state, public college eligibility requirements in those subjects by the end of their 11th grade year using L.A. Unified's subject-specific "A-G semesters off-track" measures. Specifically, we sum up students' Science, Language other than English (LOTE), Visual and Performing Arts (VPA), and Elective A-G semesters off-track measures from the spring of their 11th grade year.
A-G D or better Semesters Off-Track in English ("A" in A-G) and History ("B" in A-G) at the End of 11th Grade	We calculate the number of semesters of English and history A-G coursework in which students needed to receive a D or better in order for them to be on-track to meet L.A. Unified's graduation requirements in those subjects by the end of their 11th grade year using L.A. Unified's subject-specific "A-G semesters off-track" measures. Specifically, we sum up students' English and History A-G semesters off-track measures from the spring of their 11th grade year.
A-G D or better Semesters Off-Track in Science ("D" in A-G), Language other than English (LOTE; "E" in A-G), VPA ("F" in A-G), and Electives ("G" in A-G) at the End of 11th Grade	We calculate the number of semesters of Science, Language other than English (LOTE), Visual and Performing Arts (VPA), and Elective A-G coursework in which students needed to receive a D or better in order for them to be on-track to L.A. Unified's graduation requirements in those subjects by the end of their 11th grade year using L.A. Unified's subject-specific "A-G semesters off-track" measures. Specifically, we sum up students' Science, Language other than English (LOTE), Visual and Performing Arts (VPA), and Elective A-G semesters off-track measures from the spring of their 11th grade year.

See the note on the first page of the table.

Table A1 Continued. Descriptions of Predictor Variables

Academic Variables	
Highest Evidence-Based Reading and Writing (ERW) PSAT Score by the End of 11th Grade	This measure reflects the highest PSAT Evidence-Based Reading and Writing (ERW) scores students received in their 10th and 11th grade years. The PSAT score range changed during the 2015-16 academic year, so we concord scores for exams students took prior to fall 2015 to the new scale per the PSAT concordance tables (The College Board & The National Merit Scholarship Corporation, 2016).
Highest Math PSAT Score by the End of 11th Grade	This measure reflects the highest PSAT Math scores students received in their 10th and 11th grade years. The PSAT score range changed during the 2015-16 academic year, so we concord scores for exams students took prior to fall 2015 to the new scale per the PSAT concordance tables (The College Board & The National Merit Scholarship Corporation, 2016).
Took the SAT or ACT before 12th Grade	This measure reflects whether students had taken the SAT or ACT prior to September 1st of their 12th grade year.
Participated in the Advancement via Individual Determination (AVID) Program in 11th Grade	We identify students as having participated in the Advancement via Individual Determination (AVID) program in 11th grade if they enrolled in an AVID course during their 11th grade year.
Took a College or Career Seminar Course in 11th Grade	We identify students as having taken a college, career, or senior seminar course in 11th grade if their transcript data indicated they enrolled in the course in either term of their 11th grade year.
Took an AP Computer Science Course by the End of 11th Grade	This measure reflects whether students enrolled in AP Computer Science A (which partially fulfills the “C”, or math, A-G requirement) during their 6th through 11th grade years. We include courses students completed at a community college.

See the note on the first page of the table.

Table A1 Continued. Descriptions of Predictor Variables

Academic Variables	
Took a Precalculus Course by the End of 11th Grade	This measure reflects whether students enrolled in a Precalculus course during their 6th through 11th grade years. We include courses students completed at a community college.
Took a Calculus Course by the End of 11th Grade	This measure reflects whether students enrolled in a Calculus course during their 6th through 11th grade years. We include courses students completed at a community college.
Took a Discrete Math Course by the End of 11th Grade	This measure reflects whether students enrolled in a Discrete Math course during their 6th through 11th grade years. We include courses students completed at a community college.
Took an Introduction to Data Science (IDS) Course by the End of 11th Grade	This measure reflects whether students enrolled in an Introduction to Data Science (IDS) course during their 6th through 11th grade years.
Took a Quantitative Reasoning with Statistics (QRS) Course by the End of 11th Grade	This measure reflects whether students enrolled in a Quantitative Reasoning with Statistics (QRS) course during their 6th through 11th grade years.
Took a Statistics Course by the End of 11th Grade	This measure reflects whether students enrolled in a Statistics course during their 6th through 11th grade years. We include courses students completed at a community college.
Took a Transition to College Math and Statistics (TCMS) Course by the End of 11th Grade	This measure reflects whether students enrolled in Transition to College Math and Statistics (TCMS) during their 6th through 11th grade years.
Took a Community College Advanced Math Course by the End of 11th Grade	This measure reflects whether students completed a course at a community college that we designate as "Other Community College Advanced Math" or "Community College Math Above AP Calculus BC" during their 6th through 11th grade years.

See the note on the first page of the table.

Table A1 Continued. Descriptions of Predictor Variables

Behavioral Variables	
Work Effort GPA in 11th Grade	We calculate students' 11th grade overall work effort GPAs by first computing the number of work effort grade points they were awarded for each course in their 11th grade year as the product of the work effort course mark and the number of course credits. We then find the sum of all the work effort grade points they earned and divide it by the total number of credits they attempted. Course marks for work effort range from 1-3, where "Excellent" is a 3, "Satisfactory" is a 2, and "Unsatisfactory" is a 1.
Cooperation GPA in 11th Grade	We calculate students' 11th grade cooperation GPAs by first computing the number of cooperation grade points they were awarded for each course in their 11th grade year as the product of the cooperation course mark and the number of course credits. We then find the sum of all the cooperation grade points they earned and divide it by the total number of credits they attempted. Course marks for cooperation range from 1-3, where "Excellent" is a 3, "Satisfactory" is a 2, and "Unsatisfactory" is a 1.
Attendance Rate in 11th Grade	We calculate students' attendance rates in 11th grade as the number of days they were marked as present divided by the number of days they were enrolled in their 11th grade year.
Ever Suspended from 9th to 11th Grade	We code students as having been suspended during their 9th through 11th grade years if they received any type of suspension during that time period.

See the note on the first page of the table.

Table A1 Continued. Descriptions of Predictor Variables

Self-Perception Variables	
Educational Expectations in 11th Grade	We measure students' educational expectations based on their responses to L.A. Unified's School Experience Survey during their 11th grade year. Because L.A. Unified changed the response set for the educational expectations question on the School Experience Survey in 2016-17, we recode the 2016-17 responses to align with the options from 2015-16, which were: "Unsure," "High School Diploma or less," "Two-Year Degree or Certificate," and "Four-Year Degree or higher." The 2016-17 survey asked students who indicated they were "Unsure" about the highest level of education they planned to complete to provide their best guess. To keep this variable consistent across the cohorts, we do not use the 2016-17 cohort's responses about their best guess if they are unsure.
Growth Mindset in 11th Grade	We construct a measure of students' beliefs about their ability to learn new or challenging material, i.e., "growth mindset," during their 11th grade year from their responses to three items on L.A. Unified's School Experience Survey: (i) "Challenging myself won't make me smarter"; (ii) "There are some things I am not capable of learning"; and (iii) "If I'm not naturally smart in a subject, I'll never do well in it." Students were asked to select if they felt the statement was "Not at all true," "A little true," "Somewhat true," "Mostly true," or "Completely true." We calculate standardized composite scores of students' responses to these items. To form the composite score, we assign a numeric value to how true students felt each statement was (i.e., "Not at all true" = 5, "A little true" = 4, "Somewhat true" = 3, "Mostly true" = 2, "Completely true" = 1), and average the scores from the three items (alpha=0.7907 for the 2015-16 cohort of first-time 11th graders, and alpha=0.8667 for the 2016-17 cohort). If students did not respond to all three items, we t**ake** the average of the items to which they responded. If students did not respond to any of the three items, we give them a missing value for this variable. We then standardize the composite scores for the cohorts relative to all 11th graders in L.A. Unified who had a non-missing composite score in the same year.

See the note on the first page of the table.

Table A1 Continued. Descriptions of Predictor Variables

Self-Perception Variables	
Academic Self-Efficacy in 11th Grade	We construct a measure of students' academic self-efficacy during their 11th grade year from their responses to four items on L.A. Unified's School Experience Survey: (i) "I can earn an A in all my classes"; (ii) "I can do well on all my tests, even when they're difficult"; (iii) "I can master the hardest topics in my class"; and (iv) "I can meet all the learning goals my teachers set." Students were asked to select if they felt "Not at all confident," "A little confident," "Somewhat confident," "Mostly confident," or "Completely confident" about the statement. We calculate standardized composite scores of students' responses to these items. To form the composite score, we assign a numeric value on an increasing scale of how confident the student felt about each statement (i.e., "Not at all confident" = 1, "A little confident" = 2, "Somewhat confident" = 3, "Mostly confident" = 4, "Completely confident" = 5), and average the scores from the four items (alpha=0.8992 for the 2015-16 cohort of first-time 11th graders, and alpha=0.9205 for the 2016-17 cohort). If students did not respond to all four items, we take the average of the items to which they responded. If they did not respond to any of the four items, we give them a missing value for this variable. We then standardize the composite scores for the cohorts relative to all 11th graders in L.A. Unified who had a non-missing composite score in the same year.
12th Grade School Variables	
School (in 12th Grade)	We define students' 12th grade school as the school in which they were enrolled in the fall of their 12th grade year. If they were missing a preferred school code in fall, we impute their school with their school code from the spring of that year.
12th Grade Enrollment	This measure reflects the total number of 12th graders enrolled at students' 12th grade school during the fall and spring terms.

See the note on the first page of the table.

Table A1 Continued. Descriptions of Predictor Variables

12th Grade School Variables	
Proportion of 12th Grade Class who Identify as African American or Latinx	We determine the proportion of the 12th grade class in students' 12th grade school who identified as African American or Latinx by dividing the number of African American or Latinx 12th graders by the total 12th grade enrollment.
Proportion of 12th Grade Class who were Subsidized Meal Eligible	We determine the proportion of the 12th grade class in students' 12th grade school who were subsidized meal eligible by dividing the number of subsidized meal eligible 12th graders by the total 12th grade enrollment.
Proportion of Teachers who were Full Math Credentialed in the Prior Year	We determine the proportion of teachers at students' school during their 12th grade year who held a full math credential in the *prior* year, i.e., the proportion of teachers in students' 11th grade year with a full math credential among all teachers who taught a course at that school in that same year.
Proportion of Students who Enrolled in a CTE Course in the Prior Year	We determine the proportion of students who enrolled in a Career Technical Education (CTE) course in students' 12th grade school in the *prior* year, i.e., the proportion of 11th graders who enrolled in a CTE course in students' 11th grade year among all 11th graders at that school in the same year.
Average 11th Grade Math SBAC Score in the 12th Grade Class	We calculate the average standardized 11th grade math SBAC score among 12th graders enrolled at students' 12th grade school.
Standard Deviation of the 11th Grade Math SBAC Scores in the 12th Grade Class	We calculate the standard deviation of the standardized 11th grade math SBAC scores among 12th graders enrolled at students' 12th grade school.
Average End-of-11th Grade Cumulative Weighted GPA in the 12th Grade Class	We calculate the average end-of-11th grade cumulative weighted GPA among 12th graders enrolled at students' 12th grade school.

See the note on the first page of the table.

Table A1 Continued. Descriptions of Predictor Variables

12th Grade School Variables	
Proportion of 12th Grade Class who were in Student Groups 5-6	We determine the proportion of the 12th grade class at students' 12th grade school who were in Student Groups 5-6 (see the main text for information about these student groups).
Proportion of 12th Grade Class who were in Student Group 4	We determine the proportion of the 12th grade class at students' 12th grade school who were in Student Group 4 (see the main text for information about this student group).

See the note on the first page of the table.

Table A2. Descriptions of Outcome Variables

Main	
Cumulative Overall Weighted GPA at the End of 12th Grade	This measure reflects students' overall cumulative weighted GPA at the end of spring of their 12th grade year, based on L.A. Unified's official GPA calculations.
Cumulative Overall Unweighted GPA at the End of 12th Grade	This measure reflects students' overall cumulative unweighted GPA at the end of spring of their 12th grade year, based on L.A. Unified's official GPA calculations.
Overall A-G Complete with a C or Better at the End of 12th Grade	This measure reflects whether students were A-G complete with a C or better at the end of spring of their 12th grade year, based on data from L.A. Unified's official calculations.
Enrollment in Any College within One Year of High School Graduation	We determine whether students enrolled in any college (two-year or four-year) within a year of high school graduation using National Student Clearinghouse (NSC) and CalPASS-Plus data. We define enrolling in college within one year of high school graduation as having enrolled between August 15 following high school graduation and August 14 of the subsequent year.
Enrollment in a Two-Year College within One Year of High School Graduation	We determine whether students enrolled in a two-year college within a year of high school graduation using NSC and CalPASS-Plus data. We define enrolling in a two-year college within one year of high school graduation as having enrolled between August 15 following high school graduation and August 14 of the subsequent year. If students enrolled in both a two-year college and a four-year college during the year after they graduated from high school, we categorize them as having enrolled in a four-year college.

Note: We define students' 12th grade year as the academic year following their 11th grade year, even if the student had not earned enough credits to be promoted to 12th grade. We use college enrollment data provided by the NSC, which includes approximately 97% of colleges in 2017 and 2018 (see NSC, 2021), and CalPASS-Plus, which includes all California Community colleges operating during the 2017 and 2018 academic years. In our analyses of college enrollment and persistence, we group two-year and less-than-two-year colleges together because very few students enrolled in less-than-two-year colleges. Furthermore, as of 2017, the first year our cohorts could have enrolled in college, 15 California community colleges offered bachelor's degrees. For the purposes of these analyses, we classify those community colleges as two-year colleges because bachelor's degree seeking students made up a very small proportion of their total enrollment (California Legislative Analyst's Office, 2017).

Table A2 Continued. Descriptions of Outcome Variables

Main	
Enrollment in a Four-Year College within One Year of High School Graduation	We determine whether students enrolled in a four-year college within a year of their high school graduation using NSC and CalPASS-Plus data. We define enrolling in a four-year college within one year of high school graduation as having enrolled between August 15 following high school graduation and August 14 of the subsequent year. If students enrolled in both a two-year college and a four-year college during the year after they graduated from high school, we categorize them as having enrolled in a four-year college.
Persistence in Any College after One Year	We determine whether students persisted in any college (two-year or four-year) using NSC and CalPASS-Plus data. We classify students as college persisters if they enrolled in any college within one year of high school graduation (see definition above) and enrolled again at any college in the subsequent year.
Persistence in a Two-Year College after One Year	We determine whether students persisted in a two-year college using NSC and CalPASS-Plus data. We classify students as two-year college persisters if they enrolled in a two-year college within one year of high school graduation (see definition above) and enrolled again at a two-year college in the subsequent year. If students persisted in both a two-year college and a four-year college in the same time frame, we categorize them as having persisted at a four-year college.
Persistence in a Four-Year College after One Year	We determine whether students persisted in a four-year college using NSC and CalPASS-Plus data. We classify students as four-year college persisters if they enrolled in a four-year college within one year of high school graduation (see definition above) and enrolled again at a four-year college in the subsequent year. If students persisted in both a two-year college and a four-year college in the same time frame, we categorize them as having persisted at a four-year college.

See the note on the first page of the table.

Table A2 Continued. Descriptions of Outcome Variables

Supplemental	
Highest Verbal SAT/ACT Score in 12th Grade	This measure reflects the highest verbal SAT or SAT-equivalent ACT score students received after August 31 of their 12th grade year. We concord pre-March 2016 SAT scores (2400 scale) to the current scale (1600) using The College Board's (2016) Concordance Tables. We concord English and Reading ACT scores with equivalent verbal SAT scores using the 2018 ACT/SAT Concordance Tables (The College Board & ACT, Inc., 2018).
Highest Math SAT/ACT Score in 12th Grade	This measure reflects the highest math SAT or SAT-equivalent ACT score students received after August 31 of their 12th grade year. We concord pre-March 2016 SAT scores (2400 scale) to the current scale (1600) using The College Board's (2016) Concordance Tables. We concord math ACT scores with equivalent math SAT scores using the 2018 ACT/SAT Concordance Tables (The College Board & ACT, Inc., 2018).
Highest Total SAT/ACT Score in 12th Grade	This measure reflects the highest total SAT or SAT-equivalent ACT score students received after August 31 of their 12th grade year. We concord pre-March 2016 SAT scores (2400 scale) to the current scale (1600) using The College Board's (2016) Concordance Tables. We concord ACT scores with equivalent SAT scores using the 2018 ACT/SAT Concordance Tables (The College Board & ACT, Inc., 2018).
Applied to a Four-Year College in 12th Grade	We code students as having applied to a four-year college if they reported submitting at least one four-year college application on a district-administered survey. We use data from surveys administered in students' 12th grade year -- L.A. Unified's 2017 School Experience Survey for the 2015-16 cohort and the 2018 College and Career Readiness Survey for the 2016-17 cohort.

See the note on the first page of the table.

Table A2 Continued. Descriptions of Outcome Variables

Supplemental	
Applied to a Selective Four-Year College in 12th Grade	We code students as having applied to a selective four-year college if they reported submitting at least one selective four-year college application on a district administered survey. We use data from surveys administered in students' 12th grade year -- L.A. Unified's 2017 School Experience Survey for the 2015-16 cohort and the 2018 College and Career Readiness Survey for the 2016-17 cohort. We define college selectivity based on colleges' ratings in the Barron's Profiles of American Colleges (2014). We code colleges in the "Most Competitive," "Highly Competitive Plus," "Highly Competitive," "Very Competitive Plus," "Very Competitive," or "Competitive Plus" categories as "selective."
Applied to a Very Selective Four-Year College in 12th Grade	We code students as having applied to a very selective four-year college if they reported submitting at least one very selective four-year college application on a district administered survey. We use data from surveys administered in students' 12th grade year -- L.A. Unified's 2017 School Experience Survey for the 2015-16 cohort and the 2018 College and Career Readiness Survey for the 2016-17 cohort. We define college selectivity based on colleges' ratings in the Barron's Profiles of American Colleges (2014). We code colleges in the "Most Competitive" or "Highly Competitive Plus" categories as "very selective."

See the note on the first page of the table.

Table A3. Descriptive Statistics for Predictors

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data[1] (N=45,392)			Analytic Sample (N=35,912)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Age (in Months)	61,319	196.55	6.86	45,339	195.44	5.62	35,912	195.28	5.40
Gender: Female	61,319	0.50	0.50	45,339	0.53	0.50	35,912	0.54	0.50
Race/Ethnicity: Native American or Alaskan Native	61,223	-	-	45,295	-	-	35,876	-	-
Race/Ethnicity: Asian	61,223	0.04	0.20	45,295	0.05	0.21	35,876	0.05	0.22
Race/Ethnicity: African American	61,223	0.09	0.29	45,295	0.08	0.27	35,876	0.08	0.27
Race/Ethnicity: Filipinx	61,223	0.03	0.17	45,295	0.04	0.19	35,876	0.04	0.19
Race/Ethnicity: Latinx	61,223	0.76	0.43	45,295	0.76	0.43	35,876	0.75	0.43
Race/Ethnicity: Pacific Islander	61,223	-	-	45,295	-	-	35,876	-	-
Race/Ethnicity: White	61,223	0.08	0.26	45,295	0.08	0.27	35,876	0.08	0.26
Ever Subsidized Meal Eligible from 9th-11th	60,548	0.93	0.26	44,539	0.92	0.27	35,294	0.92	0.27
Parents'/Guardians' Educational Attainment: Not HS Graduate	63,108	0.25	0.43	45,392	0.24	0.43	35,912	0.24	0.43
Parents'/Guardians' Educational Attainment: HS Graduate	63,108	0.20	0.40	45,392	0.21	0.40	35,912	0.20	0.40

Note: For information on how we define these variables, see Table A1. AVID = Advancement via Individual Determination. IDS = Introduction to Data Science. TCMS = Transition to College Math and Statistics. QRS = Quantitative Reasoning with Statistics. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

[1] We exclude students with a documented disability as of the end of 11th grade because some of those students receive an alternate curriculum and/or have modified graduation requirements, and thus their 12th grade math course taking may differ from those of students without a documented disability. Some students with a disability may qualify for an Algebra 2 waiver, i.e., they may be able to forego passing or validating Algebra 2 with a "D" or better, and instead fulfill their math graduation requirements with courses that cover separate material. We do not have sufficient data to determine which students with disabilities have waivers or are on an alternate curriculum.

Table A3 Continued. Descriptive Statistics for Predictors

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data[1] (N=45,392)			Analytic Sample (N=35,912)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Parents'/Guardians' Educational Attainment: Some College	63,108	0.12	0.32	45,392	0.12	0.33	35,912	0.12	0.33
Parents'/Guardians' Educational Attainment: College Graduate	63,108	0.08	0.28	45,392	0.09	0.29	35,912	0.09	0.29
Parents'/Guardians' Educational Attainment: Graduate School	63,108	0.04	0.19	45,392	0.04	0.20	35,912	0.04	0.20
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	63,108	0.31	0.46	45,392	0.30	0.46	35,912	0.30	0.46
Nonresident School Enrollment in 11th	62,568	0.34	0.47	44,931	0.33	0.47	35,542	0.34	0.47
Number of School Moves from 9th-11th	55,644	0.14	0.42	42,242	0.09	0.32	33,733	0.07	0.29
English Learner Status in 11th: English Only	63,108	0.29	0.46	45,392	0.29	0.45	35,912	0.29	0.45
English Learner Status in 11th: Initial Fluent English Proficient	63,108	0.15	0.35	45,392	0.17	0.38	35,912	0.18	0.38
English Learner Status in 11th: Limited English Proficient	63,108	0.10	0.30	45,392	0.06	0.23	35,912	0.04	0.21
English Learner Status in 11th: Reclassified to Fluent English Proficient	63,108	0.43	0.49	45,392	0.48	0.50	35,912	0.49	0.50
Gifted and Talented Program Participation in 11th	63,108	0.18	0.38	45,392	0.23	0.42	35,912	0.24	0.43
Math 11th Grade Weighted GPA	55,706	2.35	1.31	43,663	2.48	1.31	35,912	2.60	1.29
Cumulative Overall Weighted GPA at the End of 11th	61,801	2.69	0.86	45,391	2.91	0.76	35,912	2.99	0.73
Standardized ELA SBAC Score in 11th	53,914	0.03	0.99	44,399	0.22	0.90	35,912	0.28	0.88

See the note on the first page of the table.

Table A3 Continued. Descriptive Statistics for Predictors

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data[1] (N=45,392)			Analytic Sample (N=35,912)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Standardized Math SBAC Score in 11th	53,817	0.03	0.99	44,367	0.20	0.93	35,912	0.27	0.93
Number of Semesters of AP Classes Taken from 9th-11th	56,925	2.15	3.10	43,795	2.68	3.28	34,829	2.88	3.36
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	58,567	0.85	1.96	45,166	0.43	1.15	35,912	0.30	0.88
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	58,567	0.51	1.29	45,166	0.20	0.65	35,912	0.15	0.53
Highest Evidence-Based Reading and Writing PSAT Score by the End of 11th	51,617	435.32	89.62	41,522	448.95	87.87	33,256	453.00	88.27
Highest Math PSAT Score by the End of 11th	51,936	439.25	90.32	41,722	452.38	88.02	33,413	456.09	88.79
Took the SAT or ACT before 12th	63,108	0.28	0.45	45,392	0.36	0.48	35,912	0.40	0.49
Participation in the AVID Program in 11th	63,108	0.03	0.16	45,392	0.03	0.18	35,912	0.04	0.19
Took a College or Career Seminar Course in 11th	63,108	0.19	0.39	45,392	0.19	0.39	35,912	0.19	0.39
Took an AP Computer Science Course by the End of 11th	63,108	-	-	45,392	-	-	35,912	-	-
Took a Precalculus Course by the End of 11th	63,108	0.33	0.47	45,392	0.43	0.49	35,912	0.46	0.50
Took a Calculus Course by the End of 11th	63,108	0.07	0.25	45,392	0.09	0.29	35,912	0.10	0.30
Took a Discrete Math Course by the End of 11th	63,108	-	-	45,392	-	-	35,912	-	-
Took an IDS Course by the End of 11th	63,108	0.02	0.12	45,392	0.02	0.12	35,912	-	-

See the note on the first page of the table.

Table A3 Continued. Descriptive Statistics for Predictors

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data[1] (N=45,392)			Analytic Sample (N=35,912)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Took a Statistics Course by the End of 11th	63,108	0.04	0.20	45,392	0.05	0.22	35,912	0.06	0.23
Took a QRS Course by the End of 11th	63,108	-	-	45,392	-	-	35,912	-	-
Took a TCMS Course by the End of 11th	63,108	-	-	45,392	-	-	35,912	-	-
Took a Community College Advanced Math Course by the End of 11th	63,108	-	-	45,392	-	-	35,912	-	-
Work Effort GPA in 11th	61,551	2.32	0.48	45,352	2.41	0.42	35,912	2.46	0.39
Cooperation GPA in 11th	61,551	2.51	0.39	45,352	2.59	0.32	35,912	2.62	0.30
Attendance Rate in 11th	60,851	0.95	0.08	45,384	0.97	0.04	35,912	0.97	0.04
Ever Suspended from 9th-11th	63,108	0.02	0.12	45,392	-	-	35,912	-	-
Educational Expectations in 11th: Unsure	63,108	0.09	0.28	45,392	0.09	0.29	35,912	0.09	0.28
Educational Expectations in 11th: HS or Less	63,108	0.04	0.21	45,392	0.03	0.17	35,912	0.03	0.16
Educational Expectations in 11th: Associate Degree or Certificate	63,108	0.06	0.23	45,392	0.05	0.21	35,912	0.05	0.21
Educational Expectations in 11th: Bachelor's Degree or Higher	63,108	0.48	0.50	45,392	0.57	0.50	35,912	0.59	0.49
Educational Expectations in 11th: Missing	63,108	0.34	0.47	45,392	0.26	0.44	35,912	0.25	0.43
Growth Mindset in 11th	42,714	0.00	1.00	33,933	0.08	0.96	27,283	0.10	0.95
Academic Self-Efficacy in 11th	42,736	0.00	1.00	33,951	0.04	0.99	27,291	0.06	0.99

See the note on the first page of the table.

Table A4. Descriptive Statistics for Outcomes

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data[1] (N=45,392)			Analytic Sample (N=35,912)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Cumulative Overall Weighted GPA at the End of 12th Grade	56,371	2.87	0.78	45,392	2.99	0.73	35,912	3.07	0.69
Cumulative Overall Unweighted GPA at the End of 12th Grade	56,371	2.74	0.69	45,392	2.84	0.64	35,912	2.91	0.60
A-G Complete with a "C" or Better at the End of 12th Grade	54,020	0.58	0.49	45,158	0.65	0.48	35,912	0.69	0.46
Enrollment in Any College within One Year	51,097	0.75	0.44	43,093	0.78	0.41	35,912	0.79	0.40
Enrollment in a Two-Year College within One Year	51,097	0.42	0.49	43,093	0.41	0.49	35,912	0.40	0.49
Enrollment in a Four-Year College within One Year	51,097	0.32	0.47	43,093	0.37	0.48	35,912	0.40	0.49
Persistence in Any College after One Year	50,178	0.61	0.49	42,590	0.65	0.48	35,912	0.67	0.47
Persistence in a Two-Year College after One Year	50,178	0.32	0.47	42,590	0.32	0.46	35,912	0.31	0.46
Persistence in a Four-Year College after One Year	50,178	0.29	0.46	42,590	0.33	0.47	35,912	0.36	0.48
Highest Verbal SAT/ACT Score in 12th Grade	28,409	500.86	87.77	26,670	505.22	86.28	22,501	507.59	86.57
Highest Math SAT/ACT Score in 12th Grade	28,409	487.97	91.63	26,670	492.06	90.67	22,501	494.65	91.36

Note: For information on how we define these variables, see Table A2.

[1] We exclude students with a documented disability as of the end of 11th grade because some of those students receive an alternate curriculum and/or have modified graduation requirements, and thus their 12th grade math course taking may differ from those of students without a documented disability. Some students with a disability may qualify for an Algebra 2 waiver, i.e., they may be able to forego passing or validating Algebra 2 with a "D" or better, and instead fulfill their math graduation requirements with courses that cover separate material. We do not have sufficient data to determine which students with disabilities have waivers or are on an alternate curriculum.

Table A4 Continued. Descriptive Statistics for Outcomes

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data[1] (N=45,392)			Analytic Sample (N=35,912)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Highest Total SAT/ACT Score in 12th Grade	28,409	987.21	168.00	26,670	995.57	165.46	22,501	1000.41	166.53
Applied to a Four-Year College in 12th Grade	34,885	0.64	0.48	30,699	0.68	0.47	25,127	0.71	0.45
Applied to a Selective Four-Year College in 12th Grade	34,490	0.53	0.50	30,436	0.57	0.50	24,940	0.60	0.49
Applied to a Very Selective Four-Year College in 12th Grade	34,490	0.27	0.44	30,436	0.29	0.45	24,940	0.31	0.46

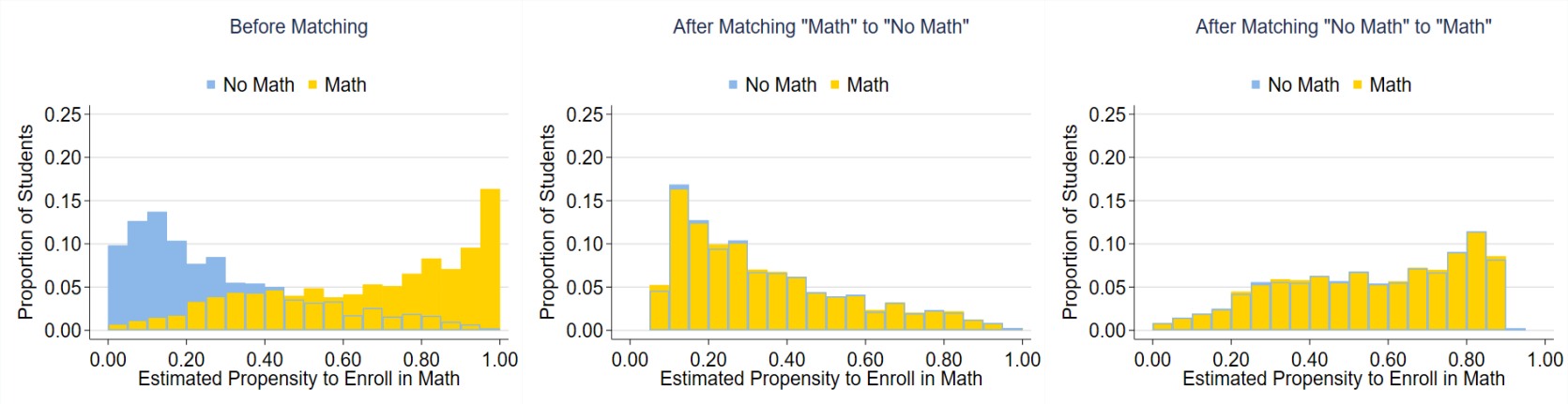
See the note on the first page of the table.

Table B1. Tuning Parameters for Matching Methods

		Cluster Matching			Propensity Score Matching after Stratifying Key Predictors			
		Caliper	Number of Matches	Level of Trimming	Stratifying Set	Caliper	Number of Matches	Level of Trimming
Group 3: Math A-G Complete with a "D"								
Math vs. None	Fixed Effects	0.10	5	0.010	Set 2	0.10	5	0.010
	School-level Controls	0.05	3	0.010	Set 2	0.10	3	0.010
Statistics vs. Precalculus	Fixed Effects	0.10	5	0.025	Set 2	0.10	5	0.025
	School-level Controls	0.10	5	0.010	Set 2	0.10	5	0.010
Group 4: Math A-G Complete with a "C"								
Math vs. None	Fixed Effects	0.05	3	0.010	Set 1	0.10	5	0.010
	School-level Controls	0.05	5	0.010	Set 1	0.05	3	0.010
Statistics vs. Precalculus	Fixed Effects	0.05	5	0.010	Set 2	0.10	5	0.010
	School-level Controls	0.05	3	0.010	Set 2	0.05	3	0.010
TCMS vs. Precalculus	Fixed Effects	0.10	5	0.025	Set 2	0.10	5	0.025
	School-level Controls	0.10	5	0.010	Set 2	0.10	5	0.010
IDS vs. Precalculus	Fixed Effects	0.10	5	0.025	Set 2	0.10	5	0.025
	School-level Controls	0.10	5	0.010	Set 2	0.10	5	0.010
TCMS vs. Statistics	Fixed Effects	0.05	5	0.025	Set 2	0.10	5	0.025
	School-level Controls	0.10	5	0.010	Set 2	0.10	3	0.010
IDS vs. Statistics	Fixed Effects	0.05	5	0.025	Set 2	0.20	5	0.025
	School-level Controls	0.10	5	0.010	Set 2	0.10	5	0.010
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Math vs. None	Fixed Effects	0.05	3	0.010	Set 1	0.10	5	0.010
	School-level Controls	0.10	3	0.010	Set 1	0.10	5	0.010
Statistics vs. Calculus	Fixed Effects	0.05	3	0.010	Set 2	0.10	5	0.010
	School-level Controls	0.05	5	0.010	Set 1	0.10	5	0.010
TCMS vs. Calculus	Fixed Effects	0.10	5	0.010	Set 2	0.10	5	0.010
	School-level Controls	0.10	5	0.010	Set 2	0.10	5	0.010
TCMS vs. Statistics	Fixed Effects	0.10	5	0.010	Set 2	0.10	5	0.010
	School-level Controls	0.10	5	0.010	Set 2	0.10	3	0.010
IDS vs. Statistics	Fixed Effects	-	-	-	-	-	-	-
	School-level Controls	0.10	5	0.010	Set 2	0.10	3	0.010

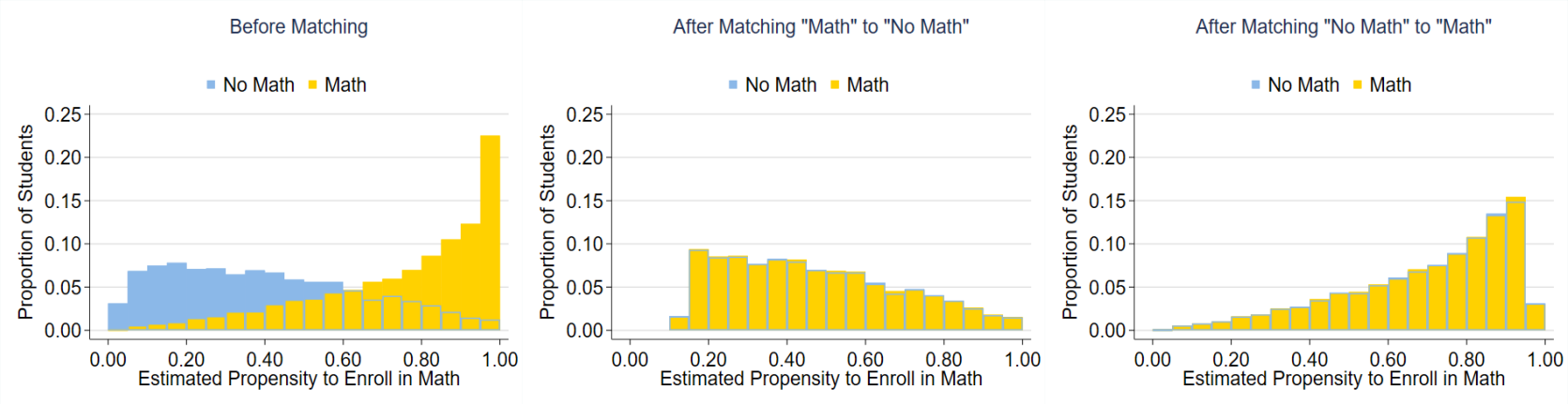
Note: The matching methods here fail to run for IDS vs. Statistics in Group 5 with school fixed effects.

Figure C1. Distributions of Estimated Propensities of Taking Math over No Math in Group 3 Before and After Matching, Using School Fixed Effects



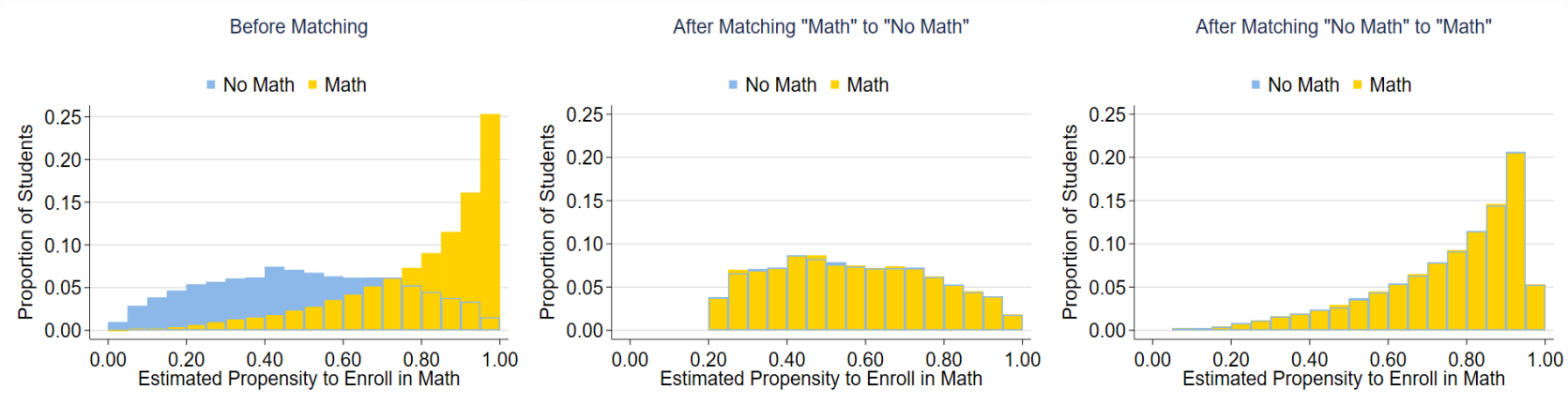
Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail.

Figure C2. Distributions of Estimated Propensities of Taking Math over No Math in Group 4 Before and After Matching, Using School Fixed Effects



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail.

Figure C3. Distributions of Estimated Propensities of Taking Math over No Math in Group 5 Before and After Matching, Using School Fixed Effects



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail.

Table C1. Matching Diagnostics for Math vs. No Math in Group 3, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,315)	Math (N=1,132)	SMD	VR	No Math (N=1,069)	Math (N=775)	SMD	VR	No Math (N=889)	Math (N=830)	SMD	VR
Age (in Months)	195.553	195.344	-0.039	0.851	195.297	195.311	0.003	0.926	195.546	195.398	-0.028	0.912
Gender: Female	0.440	0.488	0.097	1.014	0.456	0.436	-0.039	0.995	0.470	0.482	0.024	1.001
Race/Ethnicity: Asian	0.014	0.011	-0.026	0.797	0.015	0.028	0.088	1.832	-	-	-0.030	0.787
Race/Ethnicity: African American	0.116	0.093	-0.075	0.823	0.111	0.101	-0.033	0.921	0.090	0.101	0.037	1.105
Race/Ethnicity: Latinx	0.759	0.807	0.118	0.850	0.768	0.754	-0.033	1.045	0.790	0.777	-0.032	1.043
Race/Ethnicity: Filipinx	0.026	0.028	0.015	1.091	0.030	0.024	-0.035	0.820	0.033	0.035	0.012	1.062
Race/Ethnicity: White	0.072	0.057	-0.064	0.796	0.067	0.085	0.065	1.236	0.064	0.069	0.019	1.068
Race/Ethnicity: Other	-	-	-0.104	0.276	-	-	0.002	1.025	-	-	-0.016	0.800
Ever Subsidized Meal Eligible from 9th-11th	0.911	0.923	0.044	0.875	0.916	0.903	-0.046	1.143	0.919	0.908	-0.038	1.116
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.023	0.017	-0.043	0.740	0.019	0.022	0.026	1.199	0.013	0.019	0.054	1.526
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.245	0.270	0.058	1.067	0.245	0.236	-0.021	0.978	0.251	0.246	-0.011	0.986
Parents'/Guardians' Educational Attainment: HS Graduate	0.246	0.220	-0.061	0.926	0.249	0.211	-0.089	0.894	0.211	0.216	0.011	1.014
Parents'/Guardians' Educational Attainment: Some College	0.134	0.135	0.004	1.008	0.138	0.134	-0.014	0.975	0.146	0.146	-0.001	0.997
Parents'/Guardians' Educational Attainment: College Graduate	0.057	0.066	0.038	1.150	0.057	0.061	0.017	1.068	0.079	0.072	-0.024	0.925
Parents'/Guardians' Educational Attainment: Graduate School	0.023	0.030	0.045	1.307	0.024	0.022	-0.014	0.920	0.031	0.033	0.008	1.043

Note: These diagnostics correspond to the matching in our preferred estimation strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C1 Continued. Matching Diagnostics for Math vs. No Math in Group 3, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,315)	Math (N=1,132)	SMD	VR	No Math (N=1,069)	Math (N=775)	SMD	VR	No Math (N=889)	Math (N=830)	SMD	VR
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.296	0.278	-0.039	0.964	0.286	0.335	0.106	1.095	0.283	0.288	0.012	1.010
Nonresident School Enrollment in 11th	0.238	0.250	0.028	1.034	0.239	0.222	-0.040	0.953	0.259	0.253	-0.014	0.983
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.023	1.288	-	-	0.011	1.145	-	-	-0.016	0.866
Number of School Moves from 9th-11th	0.096	0.102	0.017	1.011	0.091	0.084	-0.021	0.847	0.101	0.103	0.004	0.979
Missing Dummy: Number of School Moves from 9th-11th	0.062	0.052	-0.044	0.845	0.059	0.084	0.097	1.389	0.061	0.053	-0.035	0.872
English Learner Status in 11th: English Only	0.320	0.279	-0.090	0.925	0.316	0.312	-0.009	0.996	0.306	0.312	0.013	1.009
English Learner Status in 11th: Initial Fluent English Proficient	0.128	0.156	0.082	1.184	0.134	0.140	0.019	1.044	0.184	0.157	-0.072	0.880
English Learner Status in 11th: Limited English Proficient	0.090	0.045	-0.179	0.527	0.056	0.083	0.105	1.439	0.057	0.049	-0.034	0.871
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.462	0.519	0.114	1.004	0.494	0.465	-0.058	0.998	0.453	0.482	0.058	1.006
Gifted and Talented Program Participation in 11th	0.078	0.087	0.036	1.116	0.085	0.097	0.042	1.131	0.097	0.095	-0.005	0.985
Math 11th Grade Weighted GPA	1.449	1.496	0.070	1.307	1.456	1.454	-0.003	1.177	1.466	1.495	0.040	0.917

See the note on the first page of the table.

Table C1 Continued. Matching Diagnostics for Math vs. No Math in Group 3, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,315)	Math (N=1,132)	SMD	VR	No Math (N=1,069)	Math (N=775)	SMD	VR	No Math (N=889)	Math (N=830)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th	2.202	2.390	0.416	1.048	2.263	2.280	0.040	0.998	2.401	2.367	-0.074	1.047
Standardized ELA SBAC Score in 11th	-0.413	-0.114	0.372	0.964	-0.283	-0.275	0.011	1.056	-0.126	-0.142	-0.021	1.078
Standardized Math SBAC Score in 11th	-0.489	-0.263	0.325	0.950	-0.386	-0.392	-0.010	1.009	-0.265	-0.271	-0.009	1.022
Number of Semesters of AP Classes Taken from 9th-11th	0.624	1.226	0.380	1.986	0.712	0.728	0.011	0.976	1.060	1.146	0.051	1.182
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	0.036	0.022	-0.082	0.627	0.032	0.059	0.132	1.818	0.030	0.027	-0.020	0.889
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	2.009	1.394	-0.359	0.788	1.804	1.797	-0.004	1.120	1.534	1.516	-0.011	0.966
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	1.053	0.677	-0.332	0.608	0.869	0.897	0.025	1.017	0.735	0.723	-0.012	0.988
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.609	0.397	-0.215	0.622	0.506	0.508	0.002	1.017	0.484	0.436	-0.049	0.787
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.324	0.175	-0.242	0.477	0.226	0.203	-0.040	1.119	0.180	0.194	0.028	1.052
Highest ERW PSAT Score by the End of 11th	403.790	416.369	0.198	1.112	408.271	411.334	0.048	1.051	416.068	415.901	-0.003	0.998
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.116	0.095	-0.071	0.833	0.106	0.135	0.089	1.237	0.100	0.106	0.021	1.054

See the note on the first page of the table.

Table C1 Continued. Matching Diagnostics for Math vs. No Math in Group 3, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,315)	Math (N=1,132)	SMD	VR	No Math (N=1,069)	Math (N=775)	SMD	VR	No Math (N=889)	Math (N=830)	SMD	VR
Highest Math PSAT Score by the End of 11th	405.217	416.084	0.166	0.998	409.028	412.161	0.050	0.849	413.164	414.290	0.017	1.049
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.110	0.086	-0.083	0.799	0.098	0.129	0.096	1.269	0.089	0.095	0.022	1.062
Took the SAT or ACT before 12th	0.078	0.214	0.391	2.329	0.095	0.094	-0.006	0.987	0.169	0.178	0.025	1.042
Participation in the AVID Program in 11th	0.013	0.024	0.081	1.825	-	-	-0.022	0.840	0.022	0.022	-0.003	0.977
Took a College or Career Seminar Course in 11th	0.163	0.185	0.058	1.105	0.167	0.138	-0.081	0.857	0.169	0.196	0.072	1.124
Math 11th Grade Weighted GPA (Squared)	2.491	2.748	0.105	1.469	2.538	2.605	0.026	1.357	2.682	2.724	0.016	0.907
Cumulative Overall Weighted GPA at the End of 11th (Squared)	5.050	5.923	0.411	1.197	5.312	5.391	0.039	0.963	5.961	5.811	-0.069	1.014
Standardized ELA SBAC Score in 11th (Squared)	0.826	0.645	-0.172	0.674	0.670	0.696	0.027	1.117	0.614	0.667	0.057	1.278
Standardized Math SBAC Score in 11th (Squared)	0.734	0.539	-0.219	0.591	0.607	0.615	0.009	0.961	0.543	0.557	0.018	0.887
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	2.070	4.840	0.304	2.894	2.422	2.393	-0.004	1.031	3.731	4.400	0.071	1.684
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	7.325	4.535	-0.288	0.611	6.213	6.534	0.031	1.261	5.274	5.123	-0.016	0.886

See the note on the first page of the table.

Table C1 Continued. Matching Diagnostics for Math vs. No Math in Group 3, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,315)	Math (N=1,132)	SMD	VR	No Math (N=1,069)	Math (N=775)	SMD	VR	No Math (N=889)	Math (N=830)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	2.706	1.429	-0.303	0.370	1.973	2.039	0.018	0.940	1.564	1.535	-0.009	1.023
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.576	0.907	-0.164	0.549	1.195	1.209	0.004	1.424	1.292	1.024	-0.067	0.831
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.619	0.276	-0.218	0.348	0.384	0.412	0.017	2.299	0.291	0.310	0.017	1.502
Highest ERW PSAT Score by the End of 11th (Squared)	166848.618	177588.553	0.199	1.168	170624.011	173323.382	0.050	1.052	177528.557	177386.101	-0.002	0.978
Highest Math PSAT Score by the End of 11th (Squared)	168469.009	177386.640	0.172	1.035	171615.409	173525.357	0.038	0.857	174902.893	176047.727	0.022	1.030
Work Effort GPA in 11th	2.083	2.169	0.261	0.940	2.124	2.143	0.057	1.054	2.176	2.171	-0.015	1.002
Cooperation GPA in 11th	2.359	2.426	0.238	0.920	2.390	2.408	0.061	1.027	2.442	2.431	-0.042	1.056
Attendance Rate in 11th	0.956	0.959	0.082	1.028	0.958	0.958	-0.010	1.293	0.961	0.959	-0.060	1.229
Ever Suspended from 9th-11th	-	-	-0.017	0.853	-	-	-0.007	0.928	-	-	0.015	1.197
Educational Expectations in 11th: Unsure	0.159	0.109	-0.148	0.725	0.147	0.117	-0.088	0.827	0.119	0.111	-0.025	0.940
Educational Expectations in 11th: HS or Less	0.062	0.033	-0.137	0.547	0.049	0.044	-0.020	0.919	0.048	0.037	-0.052	0.786
Educational Expectations in 11th: Associate Degree or Certificate	0.123	0.074	-0.165	0.636	0.109	0.149	0.120	1.312	0.092	0.082	-0.035	0.901

See the note on the first page of the table.

Table C1 Continued. Matching Diagnostics for Math vs. No Math in Group 3, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,315)	Math (N=1,132)	SMD	VR	No Math (N=1,069)	Math (N=775)	SMD	VR	No Math (N=889)	Math (N=830)	SMD	VR
Educational Expectations in 11th: Bachelor's Degree or Higher	0.413	0.509	0.193	1.031	0.446	0.439	-0.014	1.000	0.462	0.504	0.084	1.004
Educational Expectations in 11th: Missing	0.243	0.276	0.074	1.084	0.250	0.251	0.003	1.007	0.280	0.266	-0.030	0.968
Growth Mindset in 11th	-0.158	-0.058	0.113	0.941	-0.108	-0.029	0.093	0.933	0.007	-0.053	-0.072	1.141
Missing Dummy: Growth Mindset in 11th	0.237	0.255	0.044	1.053	0.241	0.243	0.003	1.007	0.267	0.255	-0.027	0.970
Academic Self-Efficacy in 11th	-0.191	-0.179	0.014	0.898	-0.200	-0.212	-0.014	0.925	-0.194	-0.188	0.007	0.986
Missing Dummy: Academic Self-Efficacy in 11th	0.237	0.256	0.044	1.053	0.240	0.243	0.005	1.010	0.269	0.257	-0.027	0.969
Indicator of 2016-17 Cohort	0.607	0.560	-0.095	1.033	0.601	0.613	0.025	0.992	0.581	0.564	-0.036	1.009

See the note on the first page of the table.

Table C2. Matching Diagnostics for Math vs. No Math in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=3,736)	Math (N=6,257)	SMD	VR	No Math (N=3,136)	Math (N=2,950)	SMD	VR	No Math (N=2,609)	Math (N=4,994)	SMD	VR
Age (in Months)	195.976	195.404	-0.093	0.755	195.612	195.697	0.014	1.035	195.236	195.408	0.031	1.123
Gender: Female	0.548	0.536	-0.024	1.004	0.546	0.546	0.001	1.000	0.537	0.537	0.001	0.999
Race/Ethnicity: Asian	0.019	0.025	0.043	1.328	0.019	0.019	0.005	1.034	0.025	0.025	-0.006	0.966
Race/Ethnicity: African American	0.097	0.082	-0.053	0.857	0.097	0.106	0.031	1.086	0.094	0.086	-0.030	0.918
Race/Ethnicity: Latinx	0.776	0.804	0.069	0.906	0.780	0.773	-0.019	1.025	0.785	0.792	0.016	0.976
Race/Ethnicity: Filipinx	0.025	0.029	0.029	1.188	0.027	0.024	-0.020	0.889	0.024	0.031	0.042	1.272
Race/Ethnicity: White	0.074	0.050	-0.099	0.695	0.068	0.070	0.006	1.021	0.061	0.057	-0.018	0.935
Race/Ethnicity: Other	-	-	-0.003	0.966	-	-	-0.007	0.930	-	-	0.001	1.006
Ever Subsidized Meal Eligible from 9th-11th	0.912	0.929	0.062	0.824	0.914	0.916	0.006	0.981	0.915	0.921	0.021	0.936
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.026	0.017	-0.063	0.658	0.024	0.026	0.013	1.084	0.018	0.019	0.007	1.053
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.249	0.245	-0.009	0.990	0.249	0.250	0.001	1.002	0.236	0.245	0.021	1.025
Parents'/Guardians' Educational Attainment: HS Graduate	0.210	0.210	0.001	1.001	0.210	0.206	-0.011	0.985	0.211	0.206	-0.012	0.982
Parents'/Guardians' Educational Attainment: Some College	0.134	0.116	-0.054	0.884	0.133	0.124	-0.027	0.941	0.119	0.121	0.006	1.013
Parents'/Guardians' Educational Attainment: College Graduate	0.080	0.073	-0.028	0.914	0.081	0.083	0.008	1.024	0.090	0.077	-0.046	0.869
Parents'/Guardians' Educational Attainment: Graduate School	0.021	0.033	0.071	1.524	0.024	0.025	0.007	1.044	0.033	0.032	-0.003	0.981

Note: These diagnostics correspond to the matching in our preferred estimation strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C2 Continued. Matching Diagnostics for Math vs. No Math in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=3,736)	Math (N=6,257)	SMD	VR	No Math (N=3,136)	Math (N=2,950)	SMD	VR	No Math (N=2,609)	Math (N=4,994)	SMD	VR
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.306	0.323	0.037	1.030	0.303	0.312	0.021	1.018	0.311	0.318	0.016	1.012
Nonresident School Enrollment in 11th	0.238	0.274	0.083	1.097	0.253	0.243	-0.021	0.976	0.283	0.273	-0.023	0.976
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.053	1.716	-	-	-0.031	0.694	0.011	0.011	-0.008	0.924
Number of School Moves from 9th-11th	0.096	0.082	-0.047	0.738	0.086	0.091	0.018	1.111	0.089	0.084	-0.018	0.893
Missing Dummy: Number of School Moves from 9th-11th	0.068	0.079	0.044	1.156	0.066	0.062	-0.018	0.937	0.083	0.079	-0.015	0.955
English Learner Status in 11th: English Only	0.308	0.266	-0.092	0.917	0.306	0.307	0.003	1.003	0.311	0.279	-0.071	0.937
English Learner Status in 11th: Initial Fluent English Proficient	0.140	0.154	0.040	1.082	0.147	0.136	-0.030	0.941	0.145	0.148	0.010	1.020
English Learner Status in 11th: Limited English Proficient	0.088	0.042	-0.187	0.504	0.062	0.060	-0.005	0.981	0.035	0.045	0.051	1.269
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.464	0.538	0.147	0.999	0.486	0.496	0.021	1.001	0.509	0.528	0.037	0.996
Gifted and Talented Program Participation in 11th	0.075	0.109	0.118	1.401	0.083	0.082	-0.002	0.996	0.115	0.104	-0.035	0.916
Math 11th Grade Weighted GPA	2.274	2.748	0.588	1.105	2.369	2.395	0.034	1.002	2.663	2.670	0.009	1.005
Cumulative Overall Weighted GPA at the End of 11th	2.687	2.979	0.533	1.032	2.758	2.806	0.093	0.963	2.937	2.939	0.004	1.100

See the note on the first page of the table.

Table C2 Continued. Matching Diagnostics for Math vs. No Math in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=3,736)	Math (N=6,257)	SMD	VR	No Math (N=3,136)	Math (N=2,950)	SMD	VR	No Math (N=2,609)	Math (N=4,994)	SMD	VR
Standardized ELA SBAC Score in 11th	-0.166	0.166	0.432	0.876	-0.071	-0.031	0.055	0.909	0.171	0.116	-0.075	1.051
Standardized Math SBAC Score in 11th	-0.253	0.086	0.502	1.016	-0.164	-0.130	0.054	0.926	0.086	0.039	-0.073	1.076
Number of Semesters of AP Classes Taken from 9th-11th	1.013	1.870	0.441	1.743	1.134	1.201	0.038	1.014	1.631	1.685	0.027	1.073
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	0.036	0.040	0.023	1.118	0.034	0.035	0.007	1.036	0.051	0.040	-0.050	0.804
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	1.036	0.531	-0.378	0.482	0.813	0.732	-0.064	0.870	0.570	0.582	0.011	1.060
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.487	0.235	-0.317	0.455	0.384	0.357	-0.034	0.894	0.238	0.263	0.038	1.081
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.427	0.183	-0.276	0.334	0.286	0.252	-0.045	0.775	0.201	0.204	0.005	1.051
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.193	0.094	-0.196	0.434	0.148	0.124	-0.051	0.806	0.082	0.100	0.047	1.223
Highest ERW PSAT Score by the End of 11th	411.701	430.149	0.283	1.075	416.271	418.698	0.039	0.912	431.005	427.460	-0.053	0.986
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.113	0.071	-0.149	0.652	0.096	0.092	-0.011	0.970	0.076	0.077	0.006	1.017

See the note on the first page of the table.

Table C2 Continued. Matching Diagnostics for Math vs. No Math in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=3,736)	Math (N=6,257)	SMD	VR	No Math (N=3,136)	Math (N=2,950)	SMD	VR	No Math (N=2,609)	Math (N=4,994)	SMD	VR
Highest Math PSAT Score by the End of 11th	413.102	428.925	0.253	0.993	416.033	417.036	0.016	0.935	424.209	425.961	0.027	0.887
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.107	0.066	-0.148	0.640	0.089	0.087	-0.008	0.979	0.068	0.071	0.012	1.039
Took the SAT or ACT before 12th	0.225	0.380	0.341	1.350	0.255	0.262	0.017	1.020	0.341	0.346	0.012	1.007
Participation in the AVID Program in 11th	0.031	0.049	0.089	1.528	0.036	0.040	0.020	1.104	0.047	0.051	0.019	1.080
Took a College or Career Seminar Course in 11th	0.193	0.196	0.008	1.013	0.192	0.187	-0.012	0.981	0.217	0.206	-0.026	0.963
Math 11th Grade Weighted GPA (Squared)	5.787	8.231	0.580	1.397	6.205	6.331	0.032	0.997	7.747	7.789	0.010	1.009
Cumulative Overall Weighted GPA at the End of 11th (Squared)	7.517	9.181	0.533	1.219	7.877	8.136	0.089	0.977	8.900	8.939	0.012	1.087
Standardized ELA SBAC Score in 11th (Squared)	0.655	0.578	-0.088	0.690	0.567	0.512	-0.069	0.888	0.552	0.564	0.015	1.031
Standardized Math SBAC Score in 11th (Squared)	0.517	0.468	-0.068	0.752	0.442	0.401	-0.064	0.862	0.419	0.444	0.041	1.061
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	3.771	8.281	0.357	2.521	4.313	4.511	0.019	1.054	6.696	7.174	0.035	1.121
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	3.470	1.438	-0.297	0.327	2.385	2.034	-0.062	0.720	1.524	1.611	0.018	1.261

See the note on the first page of the table.

Table C2 Continued. Matching Diagnostics for Math vs. No Math in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=3,736)	Math (N=6,257)	SMD	VR	No Math (N=3,136)	Math (N=2,950)	SMD	VR	No Math (N=2,609)	Math (N=4,994)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	1.105	0.450	-0.258	0.254	0.779	0.692	-0.042	0.703	0.462	0.508	0.027	1.071
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.353	0.425	-0.212	0.195	0.726	0.563	-0.056	0.526	0.453	0.476	0.009	1.420
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.398	0.165	-0.153	0.205	0.268	0.214	-0.053	0.583	0.142	0.176	0.040	1.150
Highest ERW PSAT Score by the End of 11th (Squared)	173589.174	189428.309	0.280	1.181	177360.759	179027.763	0.031	0.901	190204.752	187104.645	-0.053	0.960
Highest Math PSAT Score by the End of 11th (Squared)	174564.521	187859.808	0.262	1.105	176983.893	177565.532	0.012	0.953	184274.185	185278.948	0.019	0.922
Work Effort GPA in 11th	2.360	2.506	0.445	0.865	2.402	2.423	0.064	0.991	2.489	2.491	0.005	1.104
Cooperation GPA in 11th	2.546	2.641	0.353	0.844	2.574	2.590	0.061	0.958	2.635	2.630	-0.019	1.062
Attendance Rate in 11th	0.963	0.971	0.237	0.790	0.966	0.967	0.025	1.169	0.969	0.970	0.038	1.193
Ever Suspended from 9th-11th	-	-	-0.006	0.936	-	-	0.031	1.370	-	-	-0.007	0.928
Educational Expectations in 11th: Unsure	0.104	0.084	-0.068	0.828	0.098	0.098	-0.002	0.996	0.099	0.090	-0.032	0.915
Educational Expectations in 11th: HS or Less	0.041	0.028	-0.072	0.689	0.035	0.029	-0.032	0.843	0.026	0.028	0.009	1.053

See the note on the first page of the table.

Table C2 Continued. Matching Diagnostics for Math vs. No Math in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=3,736)	Math (N=6,257)	SMD	VR	No Math (N=3,136)	Math (N=2,950)	SMD	VR	No Math (N=2,609)	Math (N=4,994)	SMD	VR
Educational Expectations in 11th: Associate Degree or Certificate	0.068	0.043	-0.112	0.642	0.061	0.061	0.002	1.007	0.052	0.047	-0.021	0.917
Educational Expectations in 11th: Bachelor's Degree or Higher	0.517	0.579	0.126	0.976	0.537	0.544	0.014	0.998	0.575	0.582	0.015	0.994
Educational Expectations in 11th: Missing	0.271	0.267	-0.010	0.990	0.269	0.268	-0.002	0.998	0.249	0.254	0.011	1.012
Growth Mindset in 11th	-0.035	0.074	0.131	0.904	-0.012	0.027	0.046	0.953	0.059	0.057	-0.003	0.969
Missing Dummy: Growth Mindset in 11th	0.261	0.253	-0.018	0.980	0.259	0.259	0.001	1.002	0.236	0.241	0.011	1.013
Academic Self-Efficacy in 11th	-0.044	0.085	0.154	0.931	-0.033	0.011	0.052	0.972	0.074	0.060	-0.017	0.947
Missing Dummy: Academic Self-Efficacy in 11th	0.259	0.253	-0.013	0.985	0.257	0.258	0.003	1.004	0.237	0.241	0.009	1.010
Indicator of 2016-17 Cohort	0.530	0.532	0.005	0.999	0.533	0.573	0.082	0.983	0.552	0.539	-0.024	1.003

See the note on the first page of the table.

Table C3. Matching Diagnostics for Math vs. No Math in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=3,396)	Math (N=8,616)	SMD	VR	No Math (N=2,906)	Math (N=3,558)	SMD	VR	No Math (N=2,752)	Math (N=6,795)	SMD	VR
Age (in Months)	195.156	194.867	-0.059	0.916	195.060	194.878	-0.037	0.977	194.634	194.926	0.061	1.037
Gender: Female	0.591	0.568	-0.047	1.015	0.590	0.590	-0.001	1.001	0.578	0.570	-0.017	1.004
Race/Ethnicity: Asian	0.038	0.058	0.093	1.493	0.042	0.046	0.020	1.092	0.061	0.059	-0.009	0.967
Race/Ethnicity: African American	0.094	0.064	-0.111	0.703	0.087	0.083	-0.012	0.964	0.066	0.065	-0.003	0.989
Race/Ethnicity: Latinx	0.702	0.742	0.090	0.915	0.718	0.710	-0.018	1.017	0.727	0.724	-0.007	1.006
Race/Ethnicity: Filipinx	0.039	0.051	0.057	1.288	0.041	0.043	0.007	1.032	0.057	0.054	-0.015	0.942
Race/Ethnicity: White	0.117	0.078	-0.135	0.691	0.103	0.109	0.018	1.048	0.078	0.089	0.039	1.125
Race/Ethnicity: Other	-	-	-0.023	0.778	-	-	0.004	1.037	-	-	-0.016	0.854
Ever Subsidized Meal Eligible from 9th-11th	0.881	0.899	0.057	0.867	0.883	0.876	-0.019	1.046	0.904	0.889	-0.049	1.134
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.023	0.011	-0.095	0.472	0.019	0.019	0.002	1.012	0.011	0.013	0.015	1.147
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.217	0.242	0.060	1.080	0.218	0.219	0.001	1.002	0.214	0.226	0.029	1.039
Parents'/Guardians' Educational Attainment: HS Graduate	0.204	0.194	-0.024	0.964	0.208	0.203	-0.011	0.985	0.191	0.194	0.007	1.010
Parents'/Guardians' Educational Attainment: Some College	0.145	0.118	-0.082	0.837	0.138	0.135	-0.007	0.986	0.136	0.127	-0.027	0.943
Parents'/Guardians' Educational Attainment: College Graduate	0.113	0.107	-0.018	0.957	0.109	0.109	-0.001	0.997	0.105	0.116	0.036	1.092
Parents'/Guardians' Educational Attainment: Graduate School	0.044	0.046	0.007	1.031	0.046	0.046	0.002	1.010	0.048	0.048	-0.002	0.991

Note: These diagnostics correspond to the matching in our preferred estimation strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C3 Continued. Matching Diagnostics for Math vs. No Math in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=3,396)	Math (N=8,616)	SMD	VR	No Math (N=2,906)	Math (N=3,558)	SMD	VR	No Math (N=2,752)	Math (N=6,795)	SMD	VR
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.277	0.293	0.036	1.034	0.281	0.288	0.013	1.013	0.306	0.289	-0.036	0.967
Nonresident School Enrollment in 11th	0.344	0.389	0.093	1.053	0.350	0.356	0.013	1.008	0.393	0.380	-0.028	0.986
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.038	1.431	-	-	0.002	1.022	-	-	0.020	1.205
Number of School Moves from 9th-11th	0.071	0.061	-0.037	0.789	0.067	0.066	0.000	0.992	0.053	0.064	0.045	1.236
Missing Dummy: Number of School Moves from 9th-11th	0.039	0.040	0.005	1.025	0.037	0.035	-0.007	0.964	0.037	0.038	0.009	1.041
English Learner Status in 11th: English Only	0.342	0.281	-0.132	0.898	0.332	0.320	-0.026	0.981	0.302	0.298	-0.009	0.991
English Learner Status in 11th: Initial Fluent English Proficient	0.186	0.206	0.050	1.079	0.190	0.192	0.006	1.009	0.187	0.202	0.038	1.060
English Learner Status in 11th: Limited English Proficient	0.018	0.012	-0.048	0.684	0.018	0.015	-0.021	0.855	0.013	0.014	0.013	1.114
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.454	0.501	0.094	1.008	0.460	0.473	0.026	1.004	0.498	0.486	-0.025	0.998
Gifted and Talented Program Participation in 11th	0.255	0.326	0.157	1.157	0.272	0.283	0.026	1.026	0.347	0.322	-0.055	0.962
Math 11th Grade Weighted GPA	2.552	3.075	0.410	1.061	2.611	2.567	-0.035	1.018	2.911	2.945	0.027	0.948
Cumulative Overall Weighted GPA at the End of 11th	3.121	3.355	0.413	0.964	3.167	3.194	0.048	0.932	3.307	3.316	0.016	0.972

See the note on the first page of the table.

Table C3 Continued. Matching Diagnostics for Math vs. No Math in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=3,396)	Math (N=8,616)	SMD	VR	No Math (N=2,906)	Math (N=3,558)	SMD	VR	No Math (N=2,752)	Math (N=6,795)	SMD	VR
Standardized ELA SBAC Score in 11th	0.320	0.602	0.370	0.849	0.396	0.415	0.024	0.961	0.577	0.561	-0.022	1.034
Standardized Math SBAC Score in 11th	0.296	0.675	0.526	1.017	0.376	0.416	0.059	0.885	0.631	0.609	-0.032	1.167
Number of Semesters of AP Classes Taken from 9th-11th	2.626	3.823	0.420	1.301	2.833	2.816	-0.006	0.954	3.595	3.581	-0.005	1.018
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	0.014	0.014	-0.001	0.989	0.015	0.013	-0.016	0.878	0.016	0.013	-0.020	0.848
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.557	0.318	-0.241	0.566	0.487	0.443	-0.044	0.844	0.364	0.349	-0.017	0.875
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.218	0.115	-0.192	0.540	0.186	0.174	-0.020	0.983	0.126	0.128	0.003	1.038
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.196	0.111	-0.144	0.533	0.170	0.143	-0.046	0.663	0.140	0.126	-0.025	0.777
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.091	0.047	-0.125	0.515	0.073	0.067	-0.016	0.924	0.058	0.051	-0.024	0.888
Highest ERW PSAT Score by the End of 11th	450.819	476.334	0.333	1.114	456.218	459.087	0.039	0.976	475.278	472.197	-0.040	1.026
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.071	0.047	-0.100	0.686	0.065	0.066	0.005	1.017	0.057	0.052	-0.023	0.912
Highest Math PSAT Score by the End of 11th	452.839	480.675	0.393	1.131	457.543	458.817	0.019	0.968	474.960	475.559	0.009	1.052

See the note on the first page of the table.

Table C3 Continued. Matching Diagnostics for Math vs. No Math in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=3,396)	Math (N=8,616)	SMD	VR	No Math (N=2,906)	Math (N=3,558)	SMD	VR	No Math (N=2,752)	Math (N=6,795)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.065	0.044	-0.093	0.692	0.060	0.060	0.003	1.011	0.052	0.048	-0.021	0.917
Took the SAT or ACT before 12th	0.414	0.542	0.258	1.023	0.446	0.445	-0.002	1.000	0.524	0.518	-0.012	1.000
Participation in the AVID Program in 11th	0.032	0.046	0.075	1.437	0.034	0.033	-0.010	0.952	0.050	0.050	0.000	1.001
Took a College or Career Seminar Course in 11th	0.187	0.162	-0.065	0.894	0.193	0.171	-0.058	0.908	0.149	0.176	0.072	1.141
Took a Precalculus Course by the End of 11th	0.850	0.904	0.165	0.679	0.865	0.887	0.067	0.857	0.907	0.900	-0.021	1.059
Took an IDS Course by the End of 11th	0.040	0.022	-0.102	0.565	0.032	0.029	-0.018	0.906	0.021	0.023	0.015	1.105
Took a Statistics Course by the End of 11th	0.104	0.064	-0.146	0.639	0.096	0.077	-0.069	0.817	0.062	0.068	0.026	1.094
Took Other Advanced Math by the End of 11th	-	-	0.044	1.626	-	-	0.003	1.035	-	-	-0.023	0.792
Math 11th Grade Weighted GPA (Squared)	8.088	11.126	0.439	1.289	8.422	8.222	-0.031	0.916	10.202	10.318	0.016	0.906
Cumulative Overall Weighted GPA at the End of 11th (Squared)	10.069	11.572	0.420	1.073	10.347	10.493	0.042	0.938	11.254	11.304	0.014	0.971
Standardized ELA SBAC Score in 11th (Squared)	0.730	0.895	0.176	1.202	0.743	0.735	-0.009	1.053	0.856	0.856	0.000	1.066
Standardized Math SBAC Score in 11th (Squared)	0.603	0.980	0.382	2.006	0.621	0.597	-0.030	0.942	0.821	0.865	0.046	1.154

See the note on the first page of the table.

Table C3 Continued. Matching Diagnostics for Math vs. No Math in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=3,396)	Math (N=8,616)	SMD	VR	No Math (N=2,906)	Math (N=3,558)	SMD	VR	No Math (N=2,752)	Math (N=6,795)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	13.958	23.811	0.363	1.815	15.300	14.866	-0.019	0.834	21.383	21.438	0.002	0.911
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.563	0.811	-0.170	0.514	1.332	1.120	-0.048	0.804	1.010	0.890	-0.030	0.842
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.421	0.215	-0.147	0.497	0.344	0.335	-0.007	1.094	0.234	0.243	0.007	1.187
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.495	0.256	-0.091	0.476	0.437	0.291	-0.059	0.408	0.383	0.298	-0.033	0.711
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.171	0.086	-0.098	0.400	0.137	0.126	-0.013	0.732	0.107	0.094	-0.017	0.912
Highest ERW PSAT Score by the End of 11th (Squared)	208781.036	233070.995	0.331	1.230	213710.832	216204.574	0.036	0.982	231782.855	229020.802	-0.037	1.027
Highest Math PSAT Score by the End of 11th (Squared)	209772.640	236377.037	0.403	1.300	214053.331	215069.862	0.016	0.987	230378.398	231200.743	0.012	1.069
Work Effort GPA in 11th	2.496	2.605	0.326	0.846	2.522	2.525	0.010	1.019	2.590	2.588	-0.006	1.031
Cooperation GPA in 11th	2.657	2.733	0.297	0.793	2.678	2.682	0.014	0.973	2.725	2.722	-0.014	1.033
Attendance Rate in 11th	0.969	0.976	0.222	0.773	0.971	0.972	0.026	1.172	0.975	0.975	-0.009	1.166
Ever Suspended from 9th-11th	-	-	-0.070	0.420	-	-	-0.007	0.925	-	-	0.021	1.375

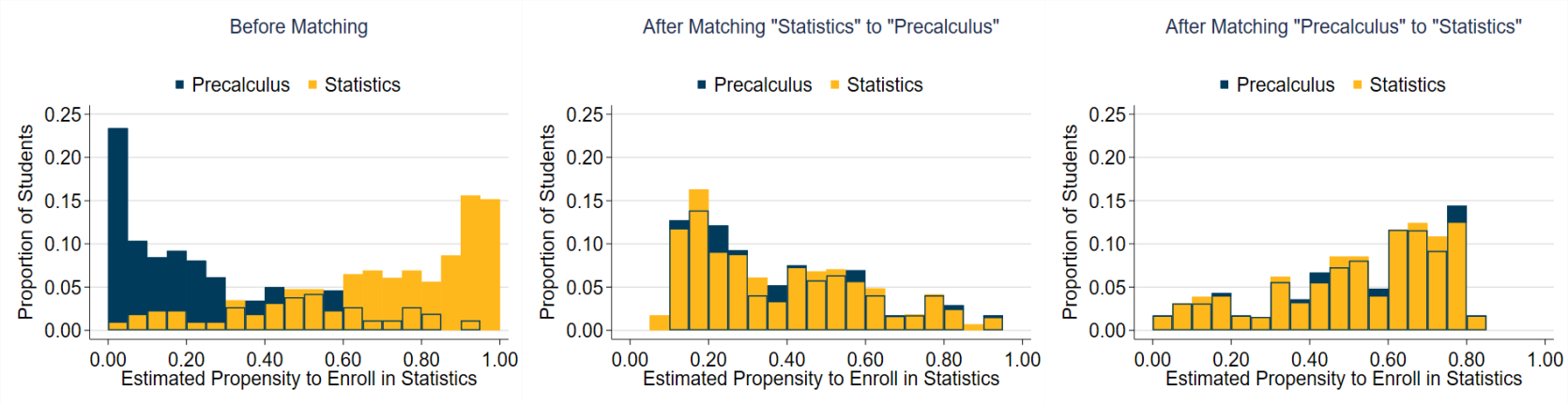
See the note on the first page of the table.

Table C3 Continued. Matching Diagnostics for Math vs. No Math in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=3,396)	Math (N=8,616)	SMD	VR	No Math (N=2,906)	Math (N=3,558)	SMD	VR	No Math (N=2,752)	Math (N=6,795)	SMD	VR
Educational Expectations in 11th: Unsure	0.082	0.065	-0.065	0.808	0.076	0.082	0.025	1.082	0.075	0.068	-0.024	0.921
Educational Expectations in 11th: HS or Less	-	-	-0.083	0.476	0.014	0.011	-0.034	0.741	-	-	0.030	1.381
Educational Expectations in 11th: Associate Degree or Certificate	0.040	0.019	-0.120	0.498	0.032	0.033	0.003	1.014	0.019	0.021	0.016	1.111
Educational Expectations in 11th: Bachelor's Degree or Higher	0.603	0.674	0.149	0.917	0.623	0.632	0.018	0.991	0.662	0.667	0.010	0.992
Educational Expectations in 11th: Missing	0.257	0.233	-0.057	0.934	0.255	0.242	-0.028	0.968	0.237	0.234	-0.008	0.989
Growth Mindset in 11th	0.101	0.198	0.123	0.943	0.121	0.126	0.007	0.994	0.168	0.178	0.013	1.049
Missing Dummy: Growth Mindset in 11th	0.249	0.224	-0.058	0.930	0.245	0.238	-0.018	0.979	0.230	0.225	-0.011	0.984
Academic Self-Efficacy in 11th	-0.025	0.140	0.196	1.054	0.005	0.010	0.006	1.097	0.046	0.105	0.069	0.998
Missing Dummy: Academic Self-Efficacy in 11th	0.248	0.225	-0.055	0.934	0.245	0.237	-0.020	0.976	0.229	0.226	-0.009	0.987
Indicator of 2016-17 Cohort	0.460	0.458	-0.002	0.999	0.465	0.471	0.011	1.002	0.480	0.461	-0.037	0.995

See the note on the first page of the table.

Figure C4. Distributions of Estimated Propensities of Taking Statistics over Precalculus in Group 3 Before and After Matching, Using School Fixed Effects



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail.

Table C4. Matching Diagnostics for Statistics vs. Precalculus in Group 3, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=261)	Statistics (N=231)	SMD	VR	Precalculus (N=173)	Statistics (N=135)	SMD	VR	Precalculus (N=161)	Statistics (N=129)	SMD	VR
Age (in Months)	195.001	195.079	0.016	1.048	194.792	194.927	0.030	0.949	195.283	194.892	-0.083	1.405
Gender: Female	0.483	0.446	-0.074	0.990	0.474	0.424	-0.099	0.994	0.455	0.450	-0.010	0.990
Race/Ethnicity: Asian	-	-	0.008	1.130	-	-	-0.078	0.204	-	-	N/A	N/A
Race/Ethnicity: African American	0.157	0.095	-0.187	0.651	0.139	0.173	0.094	1.214	0.153	0.132	-0.061	0.874
Race/Ethnicity: Latinx	0.774	0.823	0.121	0.835	0.780	0.749	-0.073	1.113	0.786	0.767	-0.045	1.053
Race/Ethnicity: Filipinx	-	-	0.070	1.489	-	-	-0.036	0.817	-	-	0.023	1.096
Race/Ethnicity: White	-	-	0.003	1.017	-	-	0.047	1.250	-	-	0.157	2.409
Race/Ethnicity: Other	-	-	0.008	1.130	-	-	-0.034	0.610	-	-	0.125	Inf
Ever Subsidized Meal Eligible from 9th-11th	0.923	0.939	0.063	0.805	0.931	0.917	-0.052	1.199	-	-	0.113	0.705
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.034	0.812	-	-	0.187	2.334	-	-	-0.094	0.633
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.218	0.264	0.107	1.139	0.225	0.314	0.199	1.252	0.308	0.256	-0.115	0.886
Parents'/Guardians' Educational Attainment: HS Graduate	0.238	0.203	-0.082	0.895	0.202	0.163	-0.100	0.859	0.179	0.217	0.096	1.148
Parents'/Guardians' Educational Attainment: Some College	0.123	0.121	-0.004	0.991	0.110	0.149	0.117	1.319	0.144	0.116	-0.083	0.825
Parents'/Guardians' Educational Attainment: College Graduate	0.054	0.069	0.065	1.271	0.064	0.061	-0.011	0.973	0.096	0.085	-0.038	0.890
Parents'/Guardians' Educational Attainment: Graduate School	0.015	0.052	0.204	3.265	0.023	0.018	-0.032	0.816	0.008	0.031	0.168	3.874

Note: These diagnostics correspond to the matching in our preferred estimation strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C4 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 3, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=261)	Statistics (N=231)	SMD	VR	Precalculus (N=173)	Statistics (N=135)	SMD	VR	Precalculus (N=161)	Statistics (N=129)	SMD	VR
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.352	0.290	-0.134	0.903	0.376	0.294	-0.173	0.898	0.265	0.295	0.066	1.058
Nonresident School Enrollment in 11th	0.314	0.260	-0.120	0.893	0.393	0.420	0.055	1.036	0.322	0.364	0.088	1.051
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.152	0.000	-	-	N/A	N/A	-	-	N/A	N/A
Number of School Moves from 9th-11th	0.096	0.064	-0.113	0.602	0.065	0.082	0.065	1.053	0.077	0.061	-0.061	1.019
Missing Dummy: Number of School Moves from 9th-11th	0.057	0.052	-0.024	0.910	-	-	0.219	2.050	-	-	-0.103	0.668
English Learner Status in 11th: English Only	0.310	0.247	-0.142	0.869	0.283	0.296	0.027	1.041	0.295	0.264	-0.069	0.926
English Learner Status in 11th: Initial Fluent English Proficient	0.138	0.147	0.026	1.056	0.156	0.185	0.077	1.163	0.174	0.163	-0.029	0.942
English Learner Status in 11th: Limited English Proficient	-	-	-0.039	0.829	-	-	-0.026	0.884	-	-	0.126	1.936
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.510	0.571	0.124	0.980	0.526	0.489	-0.074	1.017	0.509	0.527	0.037	0.989
Gifted and Talented Program Participation in 11th	0.134	0.104	-0.093	0.802	0.156	0.130	-0.074	0.871	0.118	0.132	0.042	1.092
Math 11th Grade Weighted GPA	1.659	1.415	-0.361	0.769	1.570	1.688	0.185	0.999	1.719	1.579	-0.194	0.737
Cumulative Overall Weighted GPA at the End of 11th	2.354	2.269	-0.189	1.061	2.372	2.351	-0.045	0.995	2.366	2.329	-0.080	0.891

See the note on the first page of the table.

Table C4 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 3, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=261)	Statistics (N=231)	SMD	VR	Precalculus (N=173)	Statistics (N=135)	SMD	VR	Precalculus (N=161)	Statistics (N=129)	SMD	VR
Standardized ELA SBAC Score in 11th	-0.106	-0.108	-0.002	1.007	-0.086	-0.146	-0.076	0.950	-0.126	-0.104	0.028	1.199
Standardized Math SBAC Score in 11th	-0.233	-0.307	-0.103	0.869	-0.217	-0.177	0.054	0.898	-0.262	-0.226	0.052	1.218
Number of Semesters of AP Classes Taken from 9th-11th	1.288	1.020	-0.152	0.922	1.327	1.240	-0.050	0.782	1.276	1.322	0.026	1.352
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	-	-	-0.087	0.573	-	-	0.236	3.078	-	-	-0.112	0.586
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	1.521	1.494	-0.018	1.139	1.387	1.460	0.050	1.029	1.478	1.388	-0.061	0.969
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.667	0.818	0.147	1.241	0.653	0.434	-0.238	0.707	0.862	0.690	-0.161	0.877
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.387	0.303	-0.103	0.520	0.329	0.287	-0.060	1.001	0.342	0.357	0.020	1.143
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.203	0.195	-0.016	1.098	0.179	0.097	-0.187	0.606	0.240	0.186	-0.098	0.617
Highest ERW PSAT Score by the End of 11th	418.037	418.219	0.003	0.936	422.242	421.994	-0.004	0.922	413.880	420.056	0.104	1.168
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.092	0.048	-0.174	0.543	-	-	0.124	1.570	-	-	-0.013	0.941

See the note on the first page of the table.

Table C4 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 3, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=261)	Statistics (N=231)	SMD	VR	Precalculus (N=173)	Statistics (N=135)	SMD	VR	Precalculus (N=161)	Statistics (N=129)	SMD	VR
Highest Math PSAT Score by the End of 11th	418.522	420.014	0.025	1.037	419.627	422.602	0.049	0.754	423.865	423.614	-0.004	1.358
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.175	0.506	-	-	0.164	2.017	-	-	-0.023	0.890
Took the SAT or ACT before 12th	0.169	0.160	-0.023	0.960	0.162	0.203	0.106	1.210	0.157	0.171	0.038	1.062
Participation in the AVID Program in 11th	-	-	-0.075	0.571	-	-	-0.158	0.207	-	-	0.069	1.637
Took a College or Career Seminar Course in 11th	0.203	0.078	-0.365	0.444	0.156	0.093	-0.192	0.648	0.110	0.109	-0.005	0.979
Math 11th Grade Weighted GPA (Squared)	3.264	2.397	-0.354	0.582	2.872	3.250	0.165	1.217	3.552	2.936	-0.228	0.623
Cumulative Overall Weighted GPA at the End of 11th (Squared)	5.736	5.354	-0.177	0.963	5.834	5.732	-0.046	0.933	5.821	5.625	-0.087	0.853
Standardized ELA SBAC Score in 11th (Squared)	0.612	0.617	0.005	1.080	0.638	0.611	-0.028	0.829	0.563	0.672	0.113	1.041
Standardized Math SBAC Score in 11th (Squared)	0.608	0.575	-0.041	0.731	0.629	0.546	-0.100	0.658	0.500	0.581	0.110	1.045
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	4.896	4.024	-0.081	1.165	5.211	4.194	-0.098	0.685	4.237	5.306	0.095	2.177
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	4.602	4.835	0.030	1.209	4.012	4.248	0.036	1.129	4.362	4.054	-0.048	1.087

See the note on the first page of the table.

Table C4 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 3, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=261)	Statistics (N=231)	SMD	VR	Precalculus (N=173)	Statistics (N=135)	SMD	VR	Precalculus (N=161)	Statistics (N=129)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	1.395	1.848	0.134	1.571	1.416	0.878	-0.189	0.619	1.949	1.543	-0.108	0.676
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.023	0.545	-0.130	0.127	0.618	0.585	-0.017	1.099	0.612	0.698	0.043	1.318
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.310	0.333	0.019	2.259	0.272	0.153	-0.132	1.147	0.426	0.264	-0.160	0.481
Highest ERW PSAT Score by the End of 11th (Squared)	178885.438	178769.461	-0.002	1.019	182615.244	182009.997	-0.011	0.954	174524.333	180249.062	0.110	1.262
Highest Math PSAT Score by the End of 11th (Squared)	178770.783	180152.086	0.028	1.016	180279.892	181709.030	0.029	0.769	182602.053	183474.297	0.018	1.296
Work Effort GPA in 11th	2.135	2.117	-0.054	1.020	2.151	2.137	-0.038	1.310	2.160	2.130	-0.089	1.086
Cooperation GPA in 11th	2.387	2.363	-0.083	1.143	2.416	2.387	-0.094	1.614	2.407	2.392	-0.053	1.293
Attendance Rate in 11th	0.956	0.963	0.166	0.671	0.962	0.957	-0.101	0.930	0.965	0.962	-0.076	0.719
Ever Suspended from 9th-11th	-	-	-0.138	0.230	-	-	-0.108	0.000	-	-	0.091	4.927
Educational Expectations in 11th: Unsure	0.100	0.113	0.042	1.114	-	-	-0.136	0.670	0.101	0.109	0.025	1.059
Educational Expectations in 11th: HS or Less	-	-	0.001	1.005	-	-	0.075	1.556	-	-	-0.046	0.713

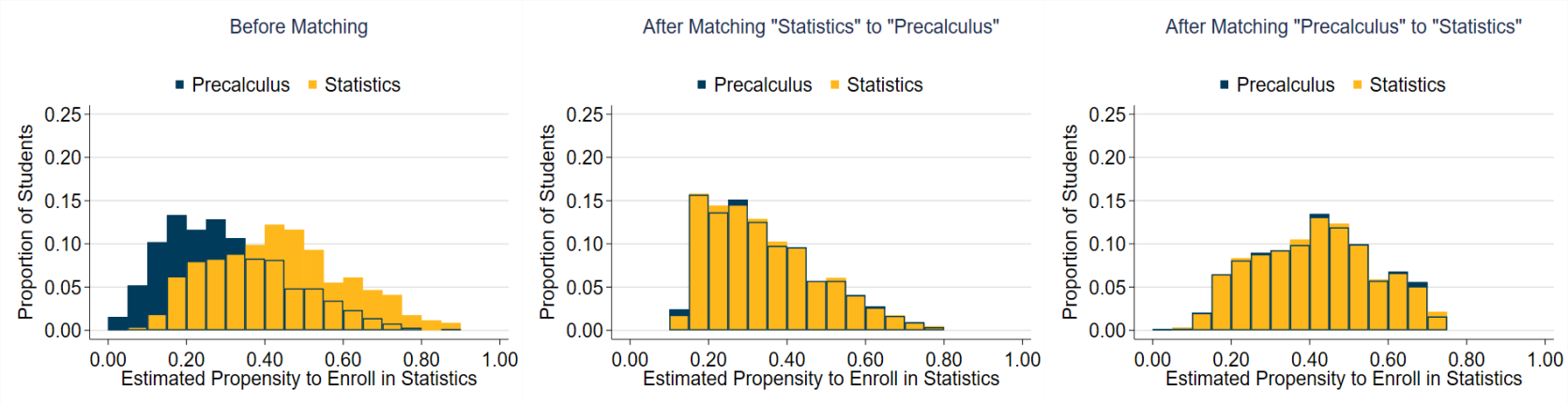
See the note on the first page of the table.

Table C4 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 3, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=261)	Statistics (N=231)	SMD	VR	Precalculus (N=173)	Statistics (N=135)	SMD	VR	Precalculus (N=161)	Statistics (N=129)	SMD	VR
Educational Expectations in 11th: Associate Degree or Certificate	0.077	0.104	0.095	1.316	-	-	-0.058	0.836	-	-	-0.037	0.871
Educational Expectations in 11th: Bachelor's Degree or Higher	0.494	0.459	-0.071	0.994	0.503	0.467	-0.071	1.010	0.434	0.504	0.139	1.009
Educational Expectations in 11th: Missing	0.295	0.290	-0.011	0.991	0.289	0.365	0.162	1.145	0.372	0.310	-0.130	0.908
Growth Mindset in 11th	-0.088	-0.154	-0.079	1.015	-0.087	0.063	0.184	0.785	-0.111	-0.099	0.015	1.178
Missing Dummy: Growth Mindset in 11th	0.272	0.260	-0.028	0.971	0.260	0.332	0.156	1.169	0.322	0.264	-0.128	0.881
Academic Self-Efficacy in 11th	-0.162	-0.246	-0.098	0.894	-0.217	-0.023	0.238	0.842	-0.028	-0.261	-0.280	1.262
Missing Dummy: Academic Self-Efficacy in 11th	0.276	0.264	-0.027	0.973	0.266	0.332	0.143	1.153	0.325	0.264	-0.135	0.877
Indicator of 2016-17 Cohort	0.659	0.654	-0.011	1.008	0.624	0.639	0.031	0.997	0.628	0.612	-0.032	1.007

See the note on the first page of the table.

Figure C5. Distributions of Estimated Propensities of Taking Statistics over Precalculus in Group 3 Before and After Matching, Using School-Cohort Controls



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school-cohort controls. See Appendix B for more detail.

Table C5. Matching Diagnostics for Statistics vs. Precalculus in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=638)	Statistics (N=344)	SMD	VR	Precalculus (N=542)	Statistics (N=330)	SMD	VR	Precalculus (N=508)	Statistics (N=324)	SMD	VR
Age (in Months)	195.393	195.018	-0.074	0.825	195.139	195.202	0.012	0.884	195.120	195.002	-0.024	0.947
Gender: Female	0.483	0.465	-0.035	0.998	0.478	0.456	-0.044	0.997	0.448	0.475	0.054	1.008
Race/Ethnicity: Asian	-	-	0.047	1.540	-	-	-0.020	0.804	-	-	0.009	1.080
Race/Ethnicity: African American	0.110	0.073	-0.129	0.691	0.087	0.082	-0.019	0.948	0.076	0.077	0.005	1.015
Race/Ethnicity: Latinx	0.823	0.811	-0.031	1.053	0.838	0.839	0.004	0.996	0.830	0.815	-0.039	1.067
Race/Ethnicity: Filipinx	0.019	0.032	0.084	1.680	-	-	0.033	1.238	-	-	0.030	1.184
Race/Ethnicity: White	0.038	0.067	0.132	1.726	0.044	0.045	0.002	1.013	0.050	0.062	0.050	1.212
Race/Ethnicity: Other	-	-	0.028	1.855	-	-	0.008	1.203	-	-	-0.053	0.456
Ever Subsidized Meal Eligible from 9th-11th	0.929	0.924	-0.019	1.067	0.924	0.948	0.096	0.710	0.949	0.926	-0.094	1.411
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.010	0.930	-	-	-0.033	0.788	-	-	0.061	1.654
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.262	0.259	-0.007	0.994	0.273	0.269	-0.009	0.993	0.285	0.265	-0.043	0.958
Parents'/Guardians' Educational Attainment: HS Graduate	0.235	0.206	-0.069	0.912	0.218	0.205	-0.031	0.959	0.211	0.210	-0.004	0.994
Parents'/Guardians' Educational Attainment: Some College	0.102	0.142	0.124	1.337	0.107	0.111	0.012	1.035	0.120	0.136	0.048	1.113
Parents'/Guardians' Educational Attainment: College Graduate	0.044	0.076	0.134	1.667	0.050	0.043	-0.034	0.864	0.056	0.065	0.038	1.149

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after substituting school-level controls for school fixed effects in the propensity score model. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C5 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=638)	Statistics (N=344)	SMD	VR	Precalculus (N=542)	Statistics (N=330)	SMD	VR	Precalculus (N=508)	Statistics (N=324)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.022	0.041	0.108	1.822	0.026	0.033	0.044	1.279	0.036	0.034	-0.012	0.942
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.335	0.276	-0.129	0.898	0.327	0.339	0.027	1.022	0.292	0.290	-0.005	0.995
Nonresident School Enrollment in 11th	0.262	0.291	0.065	1.068	0.260	0.300	0.088	1.093	0.327	0.290	-0.080	0.935
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.025	0.744	-	-	-0.027	0.670	-	-	0.026	1.426
Number of School Moves from 9th-11th	0.101	0.074	-0.086	0.736	0.082	0.099	0.052	1.401	0.067	0.076	0.032	1.211
Missing Dummy: Number of School Moves from 9th-11th	0.058	0.052	-0.025	0.909	0.055	0.062	0.027	1.109	0.051	0.056	0.022	1.092
English Learner Status in 11th: English Only	0.263	0.267	0.009	1.011	0.244	0.230	-0.031	0.965	0.241	0.265	0.055	1.065
English Learner Status in 11th: Initial Fluent English Proficient	0.147	0.160	0.035	1.071	0.153	0.167	0.037	1.075	0.148	0.154	0.017	1.034
English Learner Status in 11th: Limited English Proficient	0.052	0.041	-0.052	0.797	0.042	0.045	0.011	1.053	0.051	0.043	-0.038	0.850
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.538	0.532	-0.011	1.003	0.561	0.558	-0.006	1.004	0.559	0.537	-0.045	1.008
Gifted and Talented Program Participation in 11th	0.110	0.105	-0.016	0.961	0.103	0.109	0.017	1.048	0.119	0.105	-0.043	0.899

See the note on the first page of the table.

Table C5 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=638)	Statistics (N=344)	SMD	VR	Precalculus (N=542)	Statistics (N=330)	SMD	VR	Precalculus (N=508)	Statistics (N=324)	SMD	VR
Math 11th Grade Weighted GPA	1.663	1.455	-0.299	0.891	1.617	1.597	-0.030	0.954	1.450	1.484	0.051	1.067
Cumulative Overall Weighted GPA at the End of 11th	2.370	2.349	-0.046	1.288	2.361	2.366	0.012	1.022	2.368	2.358	-0.021	1.006
Standardized ELA SBAC Score in 11th	-0.118	-0.062	0.070	0.976	-0.122	-0.129	-0.008	1.108	-0.091	-0.066	0.030	1.010
Standardized Math SBAC Score in 11th	-0.258	-0.281	-0.030	0.962	-0.279	-0.268	0.016	0.981	-0.273	-0.280	-0.010	0.961
Number of Semesters of AP Classes Taken from 9th-11th	1.240	1.212	-0.015	1.043	1.230	1.196	-0.019	0.948	1.266	1.206	-0.033	1.022
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	-	-	-0.043	0.747	-	-	0.013	1.092	-	-	-0.022	0.860
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	1.433	1.398	-0.022	1.024	1.362	1.379	0.012	1.062	1.332	1.395	0.041	1.069
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.660	0.715	0.056	1.120	0.672	0.632	-0.042	0.934	0.594	0.688	0.098	1.096
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.378	0.302	-0.098	0.611	0.297	0.320	0.034	1.167	0.297	0.302	0.008	1.080
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.187	0.172	-0.030	1.053	0.170	0.178	0.018	1.038	0.133	0.160	0.061	1.249
Highest ERW PSAT Score by the End of 11th	413.393	422.245	0.139	0.997	415.404	415.756	0.006	1.010	421.481	421.797	0.005	0.991

See the note on the first page of the table.

Table C5 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=638)	Statistics (N=344)	SMD	VR	Precalculus (N=542)	Statistics (N=330)	SMD	VR	Precalculus (N=508)	Statistics (N=324)	SMD	VR
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.096	0.067	-0.105	0.722	0.079	0.088	0.031	1.100	0.065	0.071	0.022	1.078
Highest Math PSAT Score by the End of 11th	416.314	422.599	0.098	0.866	418.196	415.149	-0.047	1.122	421.420	421.278	-0.002	0.973
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.086	0.061	-0.096	0.729	0.068	0.077	0.033	1.117	0.060	0.065	0.018	1.066
Took the SAT or ACT before 12th	0.232	0.206	-0.062	0.921	0.238	0.227	-0.025	0.971	0.249	0.207	-0.101	0.876
Participation in the AVID Program in 11th	-	-	-0.146	0.423	-	-	0.044	1.279	-	-	-0.013	0.911
Took a College or Career Seminar Course in 11th	0.221	0.160	-0.156	0.781	0.207	0.213	0.016	1.026	0.142	0.170	0.076	1.155
Math 11th Grade Weighted GPA (Squared)	3.276	2.571	-0.264	0.774	3.088	3.000	-0.033	0.938	2.534	2.664	0.054	1.299
Cumulative Overall Weighted GPA at the End of 11th (Squared)	5.800	5.753	-0.021	1.262	5.768	5.798	0.014	0.993	5.828	5.782	-0.020	0.974
Standardized ELA SBAC Score in 11th (Squared)	0.659	0.633	-0.028	1.019	0.651	0.719	0.067	1.487	0.654	0.657	0.003	1.149
Standardized Math SBAC Score in 11th (Squared)	0.614	0.604	-0.011	0.892	0.614	0.596	-0.022	0.853	0.624	0.607	-0.021	0.810

See the note on the first page of the table.

Table C5 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=638)	Statistics (N=344)	SMD	VR	Precalculus (N=542)	Statistics (N=330)	SMD	VR	Precalculus (N=508)	Statistics (N=324)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	4.859	4.929	0.006	1.240	4.841	4.576	-0.024	1.087	4.787	4.709	-0.007	1.266
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	4.448	4.404	-0.006	1.019	4.015	4.190	0.026	1.076	4.036	4.364	0.045	1.194
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	1.356	1.541	0.060	1.273	1.402	1.285	-0.041	0.812	1.230	1.435	0.069	0.976
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.879	0.541	-0.118	0.197	0.507	0.590	0.049	1.566	0.501	0.537	0.023	1.145
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.281	0.288	0.007	1.821	0.255	0.265	0.012	1.010	0.195	0.247	0.063	1.484
Highest ERW PSAT Score by the End of 11th (Squared)	174947.104	182326.149	0.132	1.071	176636.121	176957.476	0.006	1.034	181733.943	181965.726	0.004	1.021
Highest Math PSAT Score by the End of 11th (Squared)	177696.282	182376.088	0.090	0.913	178813.587	176740.801	-0.040	1.054	181444.854	181222.760	-0.004	0.936
Work Effort GPA in 11th	2.168	2.166	-0.005	1.126	2.171	2.164	-0.021	1.047	2.159	2.173	0.044	1.088
Cooperation GPA in 11th	2.414	2.410	-0.014	1.257	2.412	2.395	-0.060	1.175	2.399	2.412	0.046	1.180
Attendance Rate in 11th	0.958	0.960	0.057	0.899	0.959	0.960	0.039	0.803	0.962	0.960	-0.037	1.062
Ever Suspended from 9th-11th	-	-	-0.110	0.234	-	-	0.017	1.302	-	-	0.025	1.664

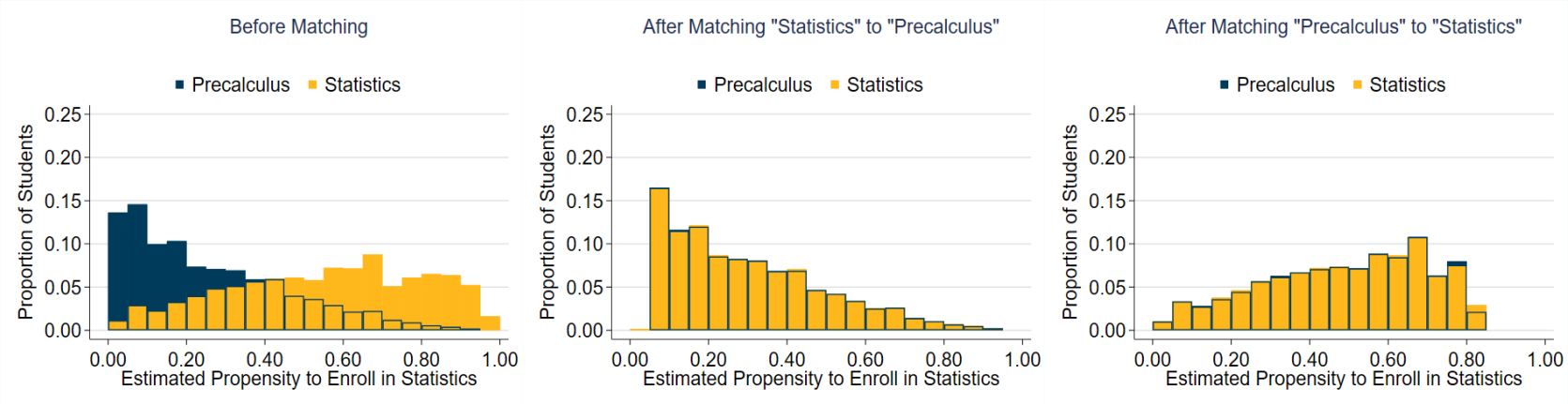
See the note on the first page of the table.

Table C5 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=638)	Statistics (N=344)	SMD	VR	Precalculus (N=542)	Statistics (N=330)	SMD	VR	Precalculus (N=508)	Statistics (N=324)	SMD	VR
Educational Expectations in 11th: Unsure	0.100	0.119	0.060	1.165	0.105	0.107	0.006	1.018	0.130	0.123	-0.020	0.955
Educational Expectations in 11th: HS or Less	0.036	0.032	-0.022	0.892	-	-	-0.044	0.770	0.027	0.034	0.039	1.241
Educational Expectations in 11th: Associate Degree or Certificate	0.071	0.084	0.051	1.179	0.072	0.073	0.006	1.022	0.066	0.077	0.043	1.154
Educational Expectations in 11th: Bachelor's Degree or Higher	0.528	0.488	-0.080	1.004	0.526	0.541	0.030	0.999	0.495	0.491	-0.009	1.000
Educational Expectations in 11th: Missing	0.265	0.276	0.025	1.028	0.268	0.256	-0.026	0.975	0.281	0.275	-0.015	0.985
Growth Mindset in 11th	-0.036	-0.076	-0.047	0.962	-0.044	-0.074	-0.035	0.914	-0.125	-0.086	0.046	0.950
Missing Dummy: Growth Mindset in 11th	0.252	0.250	-0.005	0.995	0.251	0.238	-0.030	0.968	0.257	0.247	-0.024	0.973
Academic Self-Efficacy in 11th	-0.121	-0.250	-0.153	0.879	-0.124	-0.179	-0.065	0.888	-0.268	-0.225	0.050	0.824
Missing Dummy: Academic Self-Efficacy in 11th	0.254	0.253	-0.002	0.999	0.253	0.241	-0.026	0.972	0.258	0.250	-0.018	0.979
Indicator of 2016-17 Cohort	0.547	0.602	0.111	0.968	0.559	0.547	-0.024	1.008	0.577	0.580	0.007	0.998

See the note on the first page of the table.

Figure C6. Distributions of Estimated Propensities of Taking Statistics over Precalculus in Group 4 Before and After Matching, Using School Fixed Effects



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail.

Table C6. Matching Diagnostics for Statistics vs. Precalculus in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=2,396)	Statistics (N=1,411)	SMD	VR	Precalculus (N=2,060)	Statistics (N=1,165)	SMD	VR	Precalculus (N=1,517)	Statistics (N=1,164)	SMD	VR
Age (in Months)	195.458	195.061	-0.071	0.883	195.328	195.190	-0.024	1.162	195.296	195.246	-0.009	1.106
Gender: Female	0.534	0.541	0.015	0.998	0.539	0.524	-0.031	1.006	0.530	0.529	-0.001	1.000
Race/Ethnicity: Asian	0.038	0.024	-0.082	0.637	0.031	0.023	-0.048	0.753	0.020	0.027	0.043	1.315
Race/Ethnicity: African American	0.107	0.106	-0.003	0.992	0.118	0.118	-0.001	1.000	0.118	0.119	0.003	1.007
Race/Ethnicity: Latinx	0.757	0.765	0.018	0.979	0.756	0.763	0.016	0.982	0.772	0.760	-0.027	1.034
Race/Ethnicity: Filipinx	0.035	0.032	-0.020	0.903	0.033	0.034	0.004	1.025	0.025	0.029	0.023	1.144
Race/Ethnicity: White	0.054	0.061	0.029	1.116	0.054	0.054	-0.003	0.988	0.058	0.054	-0.015	0.943
Race/Ethnicity: Other	-	-	0.046	1.597	-	-	0.011	1.126	-	-	0.037	1.494
Ever Subsidized Meal Eligible from 9th-11th	0.919	0.911	-0.029	1.090	0.923	0.930	0.027	0.917	0.923	0.918	-0.018	1.056
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.017	0.013	-0.036	0.749	0.015	0.011	-0.032	0.759	0.013	0.013	0.003	1.026
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.232	0.222	-0.024	0.969	0.234	0.221	-0.033	0.960	0.216	0.229	0.031	1.042
Parents'/Guardians' Educational Attainment: HS Graduate	0.186	0.221	0.087	1.137	0.185	0.180	-0.012	0.983	0.225	0.204	-0.051	0.931
Parents'/Guardians' Educational Attainment: Some College	0.126	0.138	0.037	1.085	0.130	0.130	0.002	1.007	0.141	0.137	-0.013	0.973
Parents'/Guardians' Educational Attainment: College Graduate	0.073	0.097	0.085	1.288	0.077	0.074	-0.011	0.966	0.082	0.088	0.025	1.075
Parents'/Guardians' Educational Attainment: Graduate School	0.041	0.033	-0.044	0.804	0.037	0.031	-0.032	0.849	0.030	0.034	0.022	1.122

Note: These diagnostics correspond to the matching in our preferred estimation strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C6 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=2,396)	Statistics (N=1,411)	SMD	VR	Precalculus (N=2,060)	Statistics (N=1,165)	SMD	VR	Precalculus (N=1,517)	Statistics (N=1,164)	SMD	VR
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.342	0.289	-0.113	0.914	0.337	0.364	0.055	1.037	0.307	0.308	0.004	1.003
Nonresident School Enrollment in 11th	0.325	0.397	0.151	1.092	0.350	0.370	0.041	1.026	0.386	0.363	-0.047	0.975
Missing Dummy: Nonresident School Enrollment in 11th	0.015	0.014	-0.007	0.944	0.016	0.026	0.075	1.678	0.013	0.013	-0.003	0.974
Number of School Moves from 9th-11th	0.072	0.077	0.018	1.054	0.074	0.073	-0.003	0.951	0.084	0.077	-0.023	0.874
Missing Dummy: Number of School Moves from 9th-11th	0.087	0.057	-0.114	0.683	0.074	0.073	-0.004	0.989	0.057	0.060	0.012	1.044
English Learner Status in 11th: English Only	0.285	0.325	0.087	1.076	0.292	0.285	-0.016	0.987	0.302	0.324	0.047	1.038
English Learner Status in 11th: Initial Fluent English Proficient	0.149	0.157	0.022	1.044	0.149	0.160	0.030	1.062	0.169	0.151	-0.047	0.915
English Learner Status in 11th: Limited English Proficient	0.042	0.028	-0.075	0.682	0.037	0.048	0.051	1.266	0.032	0.032	-0.004	0.979
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.524	0.490	-0.068	1.002	0.521	0.507	-0.028	1.003	0.497	0.493	-0.007	0.999
Gifted and Talented Program Participation in 11th	0.113	0.131	0.056	1.140	0.119	0.150	0.091	1.219	0.159	0.133	-0.073	0.863
Math 11th Grade Weighted GPA	2.881	2.587	-0.363	1.041	2.833	2.907	0.096	0.923	2.702	2.656	-0.059	1.059

See the note on the first page of the table.

Table C6 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=2,396)	Statistics (N=1,411)	SMD	VR	Precalculus (N=2,060)	Statistics (N=1,165)	SMD	VR	Precalculus (N=1,517)	Statistics (N=1,164)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th	3.014	2.891	-0.225	0.985	3.007	3.043	0.067	0.974	2.941	2.910	-0.056	0.954
Standardized ELA SBAC Score in 11th	0.178	0.196	0.023	0.983	0.187	0.232	0.058	1.050	0.237	0.185	-0.069	1.007
Standardized Math SBAC Score in 11th	0.132	0.034	-0.140	0.973	0.123	0.168	0.065	1.032	0.100	0.057	-0.061	0.983
Number of Semesters of AP Classes Taken from 9th-11th	1.940	1.936	-0.002	1.085	1.966	2.339	0.160	1.153	2.192	1.904	-0.122	0.854
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	0.035	0.030	-0.023	0.884	0.033	0.041	0.043	1.242	0.034	0.031	-0.019	0.903
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.535	0.552	0.016	1.076	0.521	0.512	-0.009	0.926	0.511	0.521	0.010	1.036
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.218	0.243	0.040	1.055	0.206	0.152	-0.098	0.668	0.207	0.231	0.039	1.176
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.190	0.163	-0.045	0.742	0.180	0.173	-0.011	0.881	0.155	0.156	0.002	0.921
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.086	0.099	0.034	1.072	0.085	0.053	-0.097	0.569	0.078	0.093	0.039	1.213
Highest ERW PSAT Score by the End of 11th	436.093	437.739	0.024	1.007	437.585	442.355	0.071	1.037	441.575	438.044	-0.052	0.941

See the note on the first page of the table.

Table C6 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=2,396)	Statistics (N=1,411)	SMD	VR	Precalculus (N=2,060)	Statistics (N=1,165)	SMD	VR	Precalculus (N=1,517)	Statistics (N=1,164)	SMD	VR
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.071	0.044	-0.115	0.641	0.061	0.069	0.034	1.128	0.036	0.047	0.056	1.294
Highest Math PSAT Score by the End of 11th	434.890	432.527	-0.038	0.865	434.856	439.798	0.078	0.963	435.868	434.357	-0.025	1.022
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.062	0.041	-0.095	0.676	0.056	0.062	0.028	1.111	0.032	0.044	0.061	1.346
Took the SAT or ACT before 12th	0.403	0.381	-0.045	0.981	0.398	0.426	0.056	1.022	0.391	0.376	-0.030	0.985
Participation in the AVID Program in 11th	0.057	0.052	-0.024	0.910	0.055	0.047	-0.036	0.864	0.043	0.052	0.045	1.212
Took a College or Career Seminar Course in 11th	0.181	0.143	-0.102	0.829	0.163	0.141	-0.059	0.893	0.111	0.121	0.031	1.077
Math 11th Grade Weighted GPA (Squared)	8.943	7.361	-0.353	0.925	8.658	9.037	0.084	0.989	7.913	7.699	-0.049	1.040
Cumulative Overall Weighted GPA at the End of 11th (Squared)	9.391	8.657	-0.226	0.922	9.336	9.547	0.065	0.989	8.955	8.763	-0.060	0.930
Standardized ELA SBAC Score in 11th (Squared)	0.610	0.606	-0.004	1.018	0.603	0.649	0.054	1.156	0.631	0.614	-0.022	1.068
Standardized Math SBAC Score in 11th (Squared)	0.512	0.482	-0.043	0.947	0.495	0.523	0.041	0.939	0.501	0.486	-0.021	1.018

See the note on the first page of the table.

Table C6 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=2,396)	Statistics (N=1,411)	SMD	VR	Precalculus (N=2,060)	Statistics (N=1,165)	SMD	VR	Precalculus (N=1,517)	Statistics (N=1,164)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	8.640	9.038	0.025	1.285	8.890	11.249	0.141	1.288	10.801	8.747	-0.118	0.821
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.422	1.526	0.021	1.295	1.359	1.267	-0.022	0.729	1.284	1.332	0.011	1.137
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.421	0.453	0.020	0.950	0.400	0.262	-0.098	0.506	0.376	0.446	0.045	1.288
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.449	0.333	-0.053	0.461	0.401	0.354	-0.023	0.467	0.331	0.308	-0.014	0.833
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.150	0.163	0.016	1.100	0.150	0.084	-0.096	0.530	0.128	0.156	0.038	1.345
Highest ERW PSAT Score by the End of 11th (Squared)	194706.552	196175.660	0.024	1.016	195908.698	200261.838	0.071	1.036	199811.747	196424.164	-0.054	0.918
Highest Math PSAT Score by the End of 11th (Squared)	193321.408	190706.122	-0.050	0.871	193192.059	197356.065	0.078	0.966	193468.573	192233.574	-0.024	1.000
Work Effort GPA in 11th	2.519	2.470	-0.152	1.049	2.516	2.527	0.035	1.023	2.476	2.474	-0.008	1.054
Cooperation GPA in 11th	2.655	2.626	-0.110	1.077	2.649	2.651	0.009	1.049	2.619	2.620	0.004	1.006
Attendance Rate in 11th	0.969	0.970	0.018	0.942	0.969	0.969	-0.011	0.993	0.970	0.970	0.006	0.997

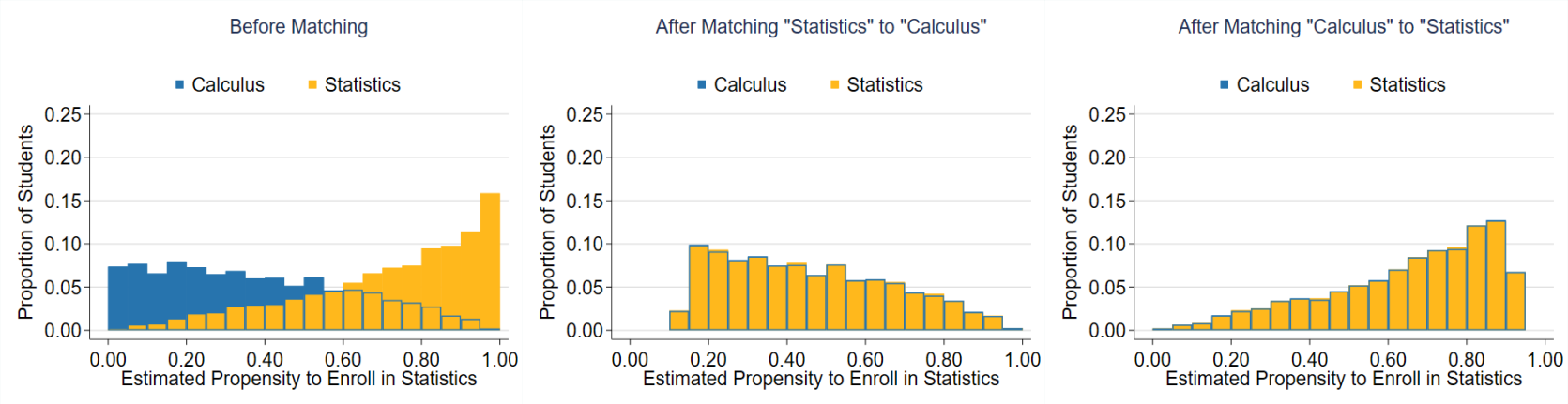
See the note on the first page of the table.

Table C6 Continued. Matching Diagnostics for Statistics vs. Precalculus in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=2,396)	Statistics (N=1,411)	SMD	VR	Precalculus (N=2,060)	Statistics (N=1,165)	SMD	VR	Precalculus (N=1,517)	Statistics (N=1,164)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.033	1.540	-	-	-0.034	0.584	-	-	0.030	1.447
Educational Expectations in 11th: Unsure	0.070	0.083	0.048	1.167	0.071	0.079	0.031	1.106	0.073	0.078	0.019	1.064
Educational Expectations in 11th: HS or Less	0.026	0.027	0.004	1.024	0.023	0.022	-0.007	0.957	0.018	0.025	0.051	1.410
Educational Expectations in 11th: Associate Degree or Certificate	0.046	0.033	-0.069	0.720	0.041	0.034	-0.039	0.827	0.031	0.037	0.030	1.168
Educational Expectations in 11th: Bachelor's Degree or Higher	0.574	0.602	0.058	0.980	0.574	0.586	0.024	0.994	0.594	0.582	-0.023	1.008
Educational Expectations in 11th: Missing	0.284	0.255	-0.065	0.935	0.291	0.279	-0.025	0.978	0.284	0.277	-0.015	0.985
Growth Mindset in 11th	0.079	0.069	-0.012	0.970	0.078	0.150	0.092	0.859	0.131	0.095	-0.046	0.991
Missing Dummy: Growth Mindset in 11th	0.272	0.242	-0.070	0.926	0.276	0.263	-0.030	0.971	0.263	0.262	-0.002	0.998
Academic Self-Efficacy in 11th	0.111	-0.017	-0.156	1.064	0.089	0.148	0.074	0.946	0.084	0.018	-0.080	0.978
Missing Dummy: Academic Self-Efficacy in 11th	0.272	0.239	-0.075	0.919	0.277	0.263	-0.030	0.971	0.261	0.261	0.000	1.000
Indicator of 2016-17 Cohort	0.510	0.551	0.083	0.990	0.522	0.521	-0.003	1.002	0.574	0.552	-0.046	1.011

See the note on the first page of the table.

Figure C7. Distributions of Estimated Propensities of Taking Statistics over Calculus in Group 5 Before and After Matching, Using School Fixed Effects



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail.

Table C7. Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=2,394)	Statistics (N=3,262)	SMD	VR	Calculus (N=1,920)	Statistics (N=1,732)	SMD	VR	Calculus (N=1,628)	Statistics (N=2,544)	SMD	VR
Age (in Months)	194.645	194.823	0.039	0.980	194.703	194.561	-0.030	1.266	194.716	194.699	-0.004	1.123
Gender: Female	0.538	0.612	0.148	0.956	0.555	0.551	-0.008	1.002	0.585	0.607	0.046	0.981
Race/Ethnicity: Asian	0.089	0.058	-0.116	0.680	0.085	0.077	-0.027	0.920	0.071	0.066	-0.019	0.937
Race/Ethnicity: African American	0.068	0.084	0.060	1.212	0.072	0.071	-0.006	0.981	0.088	0.087	-0.001	0.995
Race/Ethnicity: Latinx	0.667	0.706	0.083	0.935	0.667	0.663	-0.008	1.006	0.666	0.684	0.038	0.971
Race/Ethnicity: Filipinx	0.062	0.058	-0.019	0.930	0.065	0.081	0.063	1.232	0.072	0.060	-0.046	0.850
Race/Ethnicity: White	0.104	0.089	-0.051	0.869	0.103	0.098	-0.017	0.956	0.096	0.095	-0.005	0.985
Race/Ethnicity: Other	-	-	-0.051	0.560	-	-	0.019	1.221	-	-	0.000	0.999
Ever Subsidized Meal Eligible from 9th-11th	0.878	0.880	0.003	0.992	0.883	0.874	-0.029	1.070	0.884	0.879	-0.017	1.040
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.006	0.940	-	-	-0.036	0.648	-	-	0.004	1.044
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.215	0.231	0.038	1.052	0.222	0.216	-0.016	0.979	0.212	0.220	0.021	1.028
Parents'/Guardians' Educational Attainment: HS Graduate	0.188	0.192	0.010	1.016	0.187	0.171	-0.041	0.934	0.174	0.189	0.038	1.064
Parents'/Guardians' Educational Attainment: Some College	0.112	0.128	0.051	1.126	0.115	0.124	0.028	1.068	0.126	0.127	0.002	1.004
Parents'/Guardians' Educational Attainment: College Graduate	0.127	0.115	-0.037	0.917	0.125	0.139	0.041	1.094	0.116	0.119	0.009	1.021
Parents'/Guardians' Educational Attainment: Graduate School	0.060	0.049	-0.046	0.835	0.060	0.069	0.036	1.138	0.068	0.052	-0.066	0.782

Note: These diagnostics correspond to the matching in our preferred estimation strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C7 Continued. Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=2,394)	Statistics (N=3,262)	SMD	VR	Calculus (N=1,920)	Statistics (N=1,732)	SMD	VR	Calculus (N=1,628)	Statistics (N=2,544)	SMD	VR
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.298	0.284	-0.030	0.972	0.291	0.281	-0.021	0.981	0.304	0.292	-0.025	0.977
Nonresident School Enrollment in 11th	0.450	0.436	-0.029	0.993	0.443	0.435	-0.016	0.997	0.443	0.446	0.006	1.000
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.083	2.048	-	-	-0.024	0.790	-	-	0.063	1.722
Number of School Moves from 9th-11th	0.050	0.058	0.035	1.159	0.053	0.053	-0.003	0.908	0.058	0.058	0.003	0.828
Missing Dummy: Number of School Moves from 9th-11th	0.046	0.031	-0.082	0.672	0.038	0.043	0.023	1.114	0.035	0.033	-0.014	0.927
English Learner Status in 11th: English Only	0.299	0.323	0.053	1.044	0.308	0.312	0.008	1.007	0.317	0.324	0.014	1.010
English Learner Status in 11th: Initial Fluent English Proficient	0.204	0.205	0.002	1.003	0.203	0.218	0.037	1.054	0.203	0.203	0.001	1.001
English Learner Status in 11th: Limited English Proficient	-	-	-0.001	0.991	-	-	-0.018	0.814	-	-	-0.053	0.597
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.488	0.463	-0.050	0.995	0.481	0.464	-0.034	0.997	0.467	0.465	-0.003	0.998
Gifted and Talented Program Participation in 11th	0.404	0.327	-0.162	0.913	0.383	0.393	0.021	1.011	0.352	0.349	-0.007	0.994
Math 11th Grade Weighted GPA	3.729	2.883	-0.773	1.641	3.611	3.646	0.036	0.985	3.202	3.185	-0.017	1.047
Cumulative Overall Weighted GPA at the End of 11th	3.574	3.298	-0.526	1.134	3.518	3.521	0.007	1.046	3.376	3.383	0.013	1.032

See the note on the first page of the table.

Table C7 Continued. Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=2,394)	Statistics (N=3,262)	SMD	VR	Calculus (N=1,920)	Statistics (N=1,732)	SMD	VR	Calculus (N=1,628)	Statistics (N=2,544)	SMD	VR
Standardized ELA SBAC Score in 11th	0.812	0.612	-0.285	1.133	0.774	0.810	0.054	0.928	0.694	0.677	-0.025	1.044
Standardized Math SBAC Score in 11th	1.027	0.583	-0.658	1.087	0.927	0.932	0.008	0.912	0.685	0.702	0.026	1.010
Number of Semesters of AP Classes Taken from 9th-11th	4.754	3.875	-0.288	0.961	4.585	4.584	0.000	0.978	4.103	4.148	0.015	0.954
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	-	-	-0.066	0.555	0.012	0.016	0.033	1.315	-	-	0.014	1.151
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.221	0.331	0.140	1.567	0.224	0.246	0.030	1.195	0.296	0.284	-0.015	0.903
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.076	0.115	0.096	1.491	0.073	0.098	0.063	1.488	0.101	0.093	-0.021	0.825
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.079	0.118	0.087	1.374	0.076	0.087	0.025	1.291	0.105	0.100	-0.011	0.812
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.041	0.041	-0.001	0.881	0.032	0.055	0.076	1.946	0.050	0.036	-0.048	0.703
Highest ERW PSAT Score by the End of 11th	499.517	481.911	-0.225	0.839	495.180	497.355	0.027	1.026	486.502	487.025	0.007	0.984
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.038	0.033	-0.026	0.875	0.033	0.037	0.025	1.133	0.035	0.033	-0.009	0.952

See the note on the first page of the table.

Table C7 Continued. Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=2,394)	Statistics (N=3,262)	SMD	VR	Calculus (N=1,920)	Statistics (N=1,732)	SMD	VR	Calculus (N=1,628)	Statistics (N=2,544)	SMD	VR
Highest Math PSAT Score by the End of 11th	509.035	479.792	-0.415	0.801	501.327	498.191	-0.045	0.998	484.323	486.454	0.032	1.011
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.033	0.032	-0.005	0.976	0.030	0.032	0.016	1.091	0.033	0.032	-0.003	0.983
Took the SAT or ACT before 12th	0.639	0.550	-0.181	1.072	0.628	0.607	-0.043	1.022	0.561	0.570	0.019	0.994
Participation in the AVID Program in 11th	0.039	0.044	0.028	1.137	0.036	0.030	-0.037	0.825	0.038	0.039	0.009	1.042
Took a College or Career Seminar Course in 11th	0.151	0.108	-0.128	0.752	0.147	0.138	-0.027	0.947	0.099	0.111	0.040	1.108
Took a Precalculus Course by the End of 11th	0.988	0.915	-0.347	6.744	0.986	0.981	-0.039	1.352	0.970	0.974	0.026	0.862
Took an IDS Course by the End of 11th	-	-	0.240	67.711	-	-	0.000	1.001	-	-	N/A	N/A
Took a Statistics Course by the End of 11th	-	-	0.260	7.736	-	-	0.014	1.166	0.020	0.018	-0.018	0.878
Took Other Advanced Math by the End of 11th	-	-	0.041	1.631	-	-	0.042	1.606	-	-	-0.018	0.822
Math 11th Grade Weighted GPA (Squared)	14.812	9.800	-0.752	1.006	13.964	14.201	0.036	0.990	11.272	11.213	-0.009	0.993
Cumulative Overall Weighted GPA at the End of 11th (Squared)	13.033	11.168	-0.539	1.001	12.633	12.669	0.010	1.033	11.659	11.714	0.016	1.020
Standardized ELA SBAC Score in 11th (Squared)	1.123	0.900	-0.218	0.771	1.067	1.090	0.023	0.923	0.939	0.936	-0.003	0.975

See the note on the first page of the table.

Table C7 Continued. Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=2,394)	Statistics (N=3,262)	SMD	VR	Calculus (N=1,920)	Statistics (N=1,732)	SMD	VR	Calculus (N=1,628)	Statistics (N=2,544)	SMD	VR
Standardized Math SBAC Score in 11th (Squared)	1.491	0.815	-0.574	0.463	1.263	1.236	-0.023	0.961	0.878	0.906	0.029	1.110
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	32.136	24.172	-0.239	0.875	30.558	30.332	-0.006	1.259	26.362	26.313	-0.001	1.061
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.527	0.859	0.102	1.910	0.546	0.653	0.035	1.284	0.800	0.725	-0.020	0.802
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.141	0.215	0.074	1.730	0.130	0.195	0.064	2.151	0.201	0.166	-0.035	0.802
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.174	0.245	0.043	1.038	0.167	0.215	0.029	1.094	0.269	0.220	-0.025	0.563
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.080	0.071	-0.016	0.782	0.062	0.122	0.073	3.095	0.094	0.066	-0.047	0.805
Highest ERW PSAT Score by the End of 11th (Squared)	256194.643	237841.400	-0.233	0.780	251459.459	253776.578	0.029	1.054	242394.170	242820.107	0.006	0.985
Highest Math PSAT Score by the End of 11th (Squared)	264636.221	234619.243	-0.431	0.719	256243.178	253095.416	-0.045	1.015	238874.609	240996.157	0.033	1.016
Work Effort GPA in 11th	2.715	2.576	-0.462	1.345	2.695	2.702	0.024	0.953	2.634	2.626	-0.025	1.000
Cooperation GPA in 11th	2.814	2.714	-0.448	1.422	2.798	2.806	0.038	0.838	2.757	2.747	-0.043	0.929
Attendance Rate in 11th	0.979	0.975	-0.160	1.205	0.978	0.978	-0.016	0.854	0.976	0.976	0.002	0.801

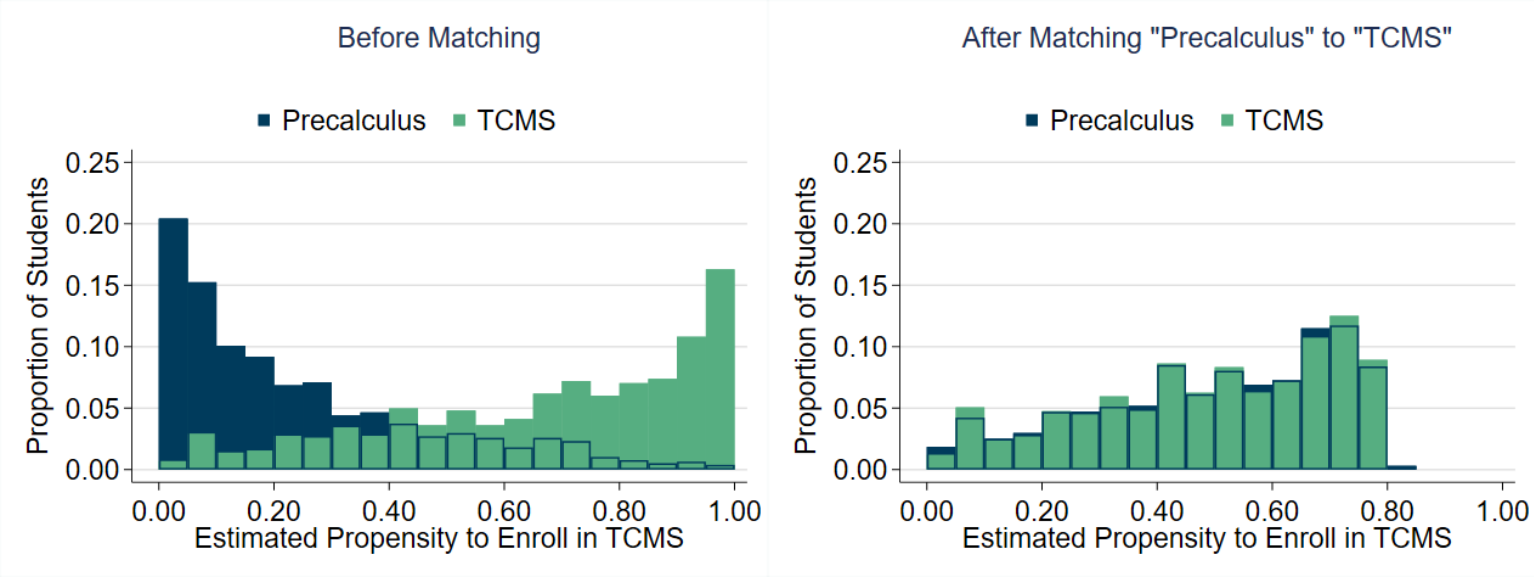
See the note on the first page of the table.

Table C7 Continued. Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=2,394)	Statistics (N=3,262)	SMD	VR	Calculus (N=1,920)	Statistics (N=1,732)	SMD	VR	Calculus (N=1,628)	Statistics (N=2,544)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.023	1.649	-	-	0.032	1.831	-	-	0.006	1.152
Educational Expectations in 11th: Unsure	0.046	0.069	0.098	1.459	0.047	0.045	-0.011	0.955	0.058	0.058	0.002	1.005
Educational Expectations in 11th: HS or Less	-	-	0.027	1.317	-	-	0.000	1.001	-	-	0.017	1.221
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.092	2.212	0.011	0.013	0.021	1.204	0.015	0.015	0.000	0.999
Educational Expectations in 11th: Bachelor's Degree or Higher	0.703	0.654	-0.106	1.084	0.695	0.700	0.011	0.991	0.663	0.668	0.011	0.991
Educational Expectations in 11th: Missing	0.234	0.247	0.031	1.038	0.238	0.233	-0.012	0.986	0.258	0.251	-0.016	0.981
Growth Mindset in 11th	0.269	0.144	-0.165	1.098	0.253	0.280	0.036	0.912	0.175	0.189	0.018	0.961
Missing Dummy: Growth Mindset in 11th	0.225	0.239	0.032	1.042	0.227	0.221	-0.013	0.984	0.251	0.243	-0.019	0.977
Academic Self-Efficacy in 11th	0.301	-0.003	-0.369	1.115	0.244	0.258	0.017	1.018	0.063	0.082	0.022	0.908
Missing Dummy: Academic Self-Efficacy in 11th	0.226	0.240	0.033	1.042	0.227	0.222	-0.013	0.984	0.252	0.244	-0.018	0.977
Indicator of 2016-17 Cohort	0.437	0.455	0.037	1.008	0.439	0.448	0.017	1.005	0.486	0.458	-0.057	0.992

See the note on the first page of the table.

Figure C8. Distributions of Estimated Propensities of Taking TCMS over Precalculus in Group 4 Before and After Matching, Using School Fixed Effects



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail.

Table C8. Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=774)	TCMS (N=583)	SMD	VR	Precalculus (N=454)	TCMS (N=336)	SMD	VR
Age (in Months)	195.334	194.934	-0.077	0.848	195.000	194.861	-0.027	1.162
Gender: Female	0.525	0.602	0.157	0.961	0.562	0.586	0.049	0.984
Race/Ethnicity: Asian	-	-	-0.172	0.292	-	-	0.039	1.355
Race/Ethnicity: African American	0.056	0.099	0.165	1.708	0.114	0.101	-0.040	0.901
Race/Ethnicity: Latinx	0.800	0.835	0.092	0.859	0.812	0.818	0.017	0.971
Race/Ethnicity: Filipinx	-	-	-0.214	0.276	-	-	0.028	1.243
Race/Ethnicity: White	0.047	0.031	-0.081	0.675	0.036	0.039	0.016	1.078
Race/Ethnicity: Other	-	-	0.000	0.996	-	-	-0.058	0.528
Ever Subsidized Meal Eligible from 9th-11th	0.920	0.950	0.123	0.642	0.933	0.935	0.007	0.974
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.077	0.552	-	-	0.055	1.566
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.248	0.298	0.113	1.123	0.292	0.256	-0.080	0.920
Parents'/Guardians' Educational Attainment: HS Graduate	0.230	0.230	0.000	1.000	0.205	0.214	0.023	1.032
Parents'/Guardians' Educational Attainment: Some College	0.116	0.130	0.043	1.104	0.122	0.143	0.061	1.141
Parents'/Guardians' Educational Attainment: College Graduate	0.094	0.060	-0.129	0.661	0.068	0.065	-0.012	0.958
Parents'/Guardians' Educational Attainment: Graduate School	0.043	0.024	-0.104	0.574	0.018	0.039	0.126	2.117
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.269	0.257	-0.026	0.973	0.295	0.283	-0.028	0.973
Nonresident School Enrollment in 11th	0.288	0.288	0.000	1.001	0.310	0.298	-0.027	0.976
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.125	0.224	-	-	-0.010	0.833
Number of School Moves from 9th-11th	0.068	0.087	0.072	1.157	0.097	0.092	-0.015	0.561
Missing Dummy: Number of School Moves from 9th-11th	0.083	0.053	-0.117	0.664	0.048	0.063	0.065	1.290
English Learner Status in 11th: English Only	0.265	0.293	0.063	1.065	0.298	0.301	0.005	1.003
English Learner Status in 11th: Initial Fluent English Proficient	0.165	0.137	-0.079	0.858	0.129	0.152	0.065	1.143

Note: These diagnostics correspond to the matching in our preferred estimation strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C8 Continued. Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=774)	TCMS (N=583)	SMD	VR	Precalculus (N=454)	TCMS (N=336)	SMD	VR
English Learner Status in 11th: Limited English Proficient	0.052	0.036	-0.076	0.709	0.037	0.042	0.024	1.122
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.518	0.533	0.031	0.997	0.536	0.506	-0.059	1.003
Gifted and Talented Program Participation in 11th	0.150	0.094	-0.170	0.671	0.149	0.122	-0.078	0.844
Math 11th Grade Weighted GPA	2.942	2.376	-0.731	0.959	2.598	2.613	0.021	1.003
Cumulative Overall Weighted GPA at the End of 11th	3.149	2.742	-0.758	0.857	2.905	2.920	0.031	0.940
Standardized ELA SBAC Score in 11th	0.336	0.068	-0.383	0.940	0.220	0.149	-0.105	0.974
Standardized Math SBAC Score in 11th	0.323	-0.068	-0.591	0.774	0.097	0.054	-0.070	1.179
Number of Semesters of AP Classes Taken from 9th-11th	1.756	0.923	-0.462	0.512	1.123	1.176	0.032	1.081
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	0.041	0.036	-0.028	0.876	0.029	0.042	0.068	1.408
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.468	0.588	0.112	1.389	0.536	0.524	-0.011	0.993
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.169	0.266	0.160	1.461	0.172	0.205	0.062	1.376
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.147	0.196	0.078	1.154	0.151	0.146	-0.009	1.127
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.063	0.101	0.098	1.686	0.029	0.065	0.133	1.992
Highest ERW PSAT Score by the End of 11th	441.946	417.076	-0.389	0.987	429.143	428.069	-0.017	1.000
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.087	0.057	-0.116	0.676	0.065	0.057	-0.035	0.878
Highest Math PSAT Score by the End of 11th	439.419	415.242	-0.409	0.913	426.392	426.743	0.006	0.939
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.085	0.055	-0.119	0.665	0.064	0.057	-0.032	0.885
Took the SAT or ACT before 12th	0.267	0.235	-0.075	0.918	0.243	0.238	-0.011	0.985
Participation in the AVID Program in 11th	0.066	0.029	-0.173	0.460	0.052	0.045	-0.033	0.867
Took a College or Career Seminar Course in 11th	0.124	0.165	0.116	1.267	0.051	0.110	0.217	2.014

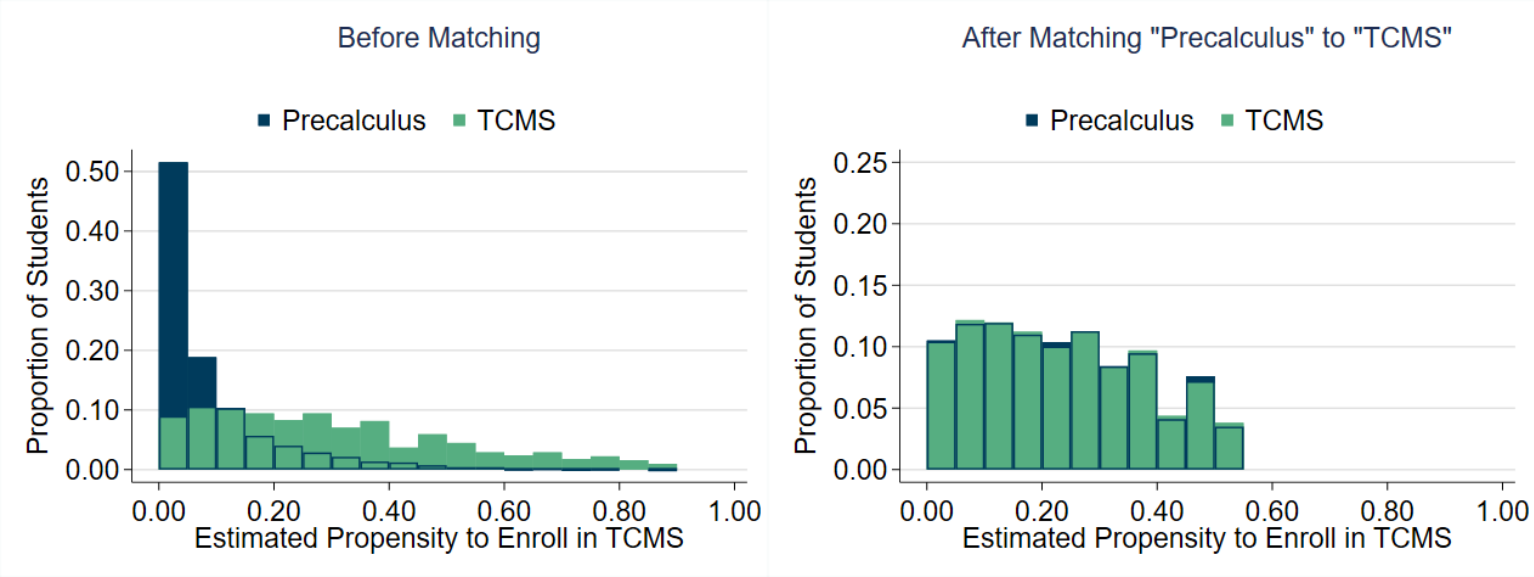
See the note on the first page of the table.

Table C8 Continued. Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=774)	TCMS (N=583)	SMD	VR	Precalculus (N=454)	TCMS (N=336)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	9.270	6.233	-0.718	0.733	7.300	7.382	0.020	1.038
Cumulative Overall Weighted GPA at the End of 11th (Squared)	10.228	7.782	-0.770	0.690	8.683	8.755	0.026	0.959
Standardized ELA SBAC Score in 11th (Squared)	0.616	0.477	-0.194	0.868	0.520	0.482	-0.057	0.961
Standardized Math SBAC Score in 11th (Squared)	0.596	0.385	-0.300	0.434	0.349	0.404	0.099	1.323
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	7.367	3.043	-0.399	0.240	3.800	4.130	0.040	0.944
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.194	1.700	0.102	2.203	1.430	1.411	-0.004	1.060
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.324	0.503	0.102	1.122	0.273	0.378	0.077	2.403
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.372	0.443	0.028	1.005	0.302	0.336	0.016	1.447
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.115	0.197	0.086	2.996	0.052	0.107	0.095	2.113
Highest ERW PSAT Score by the End of 11th (Squared)	199423.226	178002.635	-0.382	0.819	187953.364	187038.031	-0.017	0.986
Highest Math PSAT Score by the End of 11th (Squared)	196746.038	175763.431	-0.420	0.813	184864.632	184982.145	0.003	1.014
Work Effort GPA in 11th	2.582	2.415	-0.540	1.013	2.475	2.493	0.061	0.942
Cooperation GPA in 11th	2.710	2.559	-0.622	1.254	2.620	2.625	0.023	1.055
Attendance Rate in 11th	0.976	0.968	-0.229	1.475	0.971	0.969	-0.075	0.785
Ever Suspended from 9th-11th	-	-	0.088	2.634	-	-	0.006	1.050
Educational Expectations in 11th: Unsure	0.074	0.115	0.142	1.492	0.088	0.077	-0.037	0.893
Educational Expectations in 11th: HS or Less	-	-	0.200	3.709	-	-	0.031	1.243
Educational Expectations in 11th: Associate Degree or Certificate	0.039	0.062	0.105	1.556	0.062	0.063	0.002	1.007
Educational Expectations in 11th: Bachelor's Degree or Higher	0.645	0.592	-0.109	1.055	0.628	0.634	0.012	0.992
Educational Expectations in 11th: Missing	0.231	0.187	-0.109	0.855	0.206	0.205	-0.001	0.996
Growth Mindset in 11th	0.166	0.015	-0.180	1.322	0.085	0.112	0.033	0.898
Missing Dummy: Growth Mindset in 11th	0.231	0.175	-0.140	0.812	0.212	0.208	-0.009	0.986
Academic Self-Efficacy in 11th	0.153	-0.055	-0.244	1.114	-0.022	0.030	0.061	0.893
Missing Dummy: Academic Self-Efficacy in 11th	0.231	0.175	-0.140	0.812	0.212	0.208	-0.010	0.984
Indicator of 2016-17 Cohort	0.862	0.746	-0.294	1.591	0.815	0.830	0.039	0.935

See the note on the first page of the table.

Figure C9. Distributions of Estimated Propensities of Taking TCMS over Precalculus in Group 4 Before and After Matching, Using School-Cohort Controls



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school-cohort controls. See Appendix B for more detail.

Table C9. Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=4,728)	TCMS (N=626)	SMD	VR	Precalculus (N=1,238)	TCMS (N=526)	SMD	VR
Age (in Months)	195.521	195.006	-0.094	0.727	194.852	194.942	0.018	1.018
Gender: Female	0.526	0.602	0.154	0.962	0.573	0.578	0.010	0.998
Race/Ethnicity: Asian	-	-	-0.118	0.391	-	-	-0.017	0.859
Race/Ethnicity: African American	0.082	0.096	0.049	1.155	0.076	0.084	0.028	1.092
Race/Ethnicity: Latinx	0.815	0.840	0.067	0.892	0.854	0.842	-0.034	1.069
Race/Ethnicity: Filipinx	-	-	-0.109	0.462	-	-	-0.007	0.947
Race/Ethnicity: White	0.042	0.032	-0.055	0.764	0.027	0.038	0.060	1.374
Race/Ethnicity: Other	-	-	0.021	1.258	-	-	-0.030	0.772
Ever Subsidized Meal Eligible from 9th-11th	0.938	0.949	0.045	0.841	0.951	0.945	-0.026	1.109
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.042	0.700	-	-	-0.014	0.884
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.253	0.292	0.088	1.096	0.286	0.281	-0.011	0.990
Parents'/Guardians' Educational Attainment: HS Graduate	0.203	0.244	0.100	1.145	0.252	0.245	-0.015	0.983
Parents'/Guardians' Educational Attainment: Some College	0.108	0.131	0.071	1.182	0.124	0.129	0.016	1.037
Parents'/Guardians' Educational Attainment: College Graduate	0.064	0.061	-0.012	0.958	0.054	0.057	0.015	1.061
Parents'/Guardians' Educational Attainment: Graduate School	0.032	0.024	-0.047	0.762	0.019	0.027	0.048	1.363
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.341	0.248	-0.205	0.830	0.265	0.260	-0.010	0.989
Nonresident School Enrollment in 11th	0.262	0.283	0.047	1.051	0.260	0.262	0.004	1.005
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.097	0.282	-	-	0.000	1.001
Number of School Moves from 9th-11th	0.078	0.088	0.037	1.016	0.092	0.095	0.008	0.751

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after substituting school-level controls for school fixed effects in the propensity score model. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C9 Continued. Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=4,728)	TCMS (N=626)	SMD	VR	Precalculus (N=1,238)	TCMS (N=526)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	0.081	0.058	-0.094	0.726	0.048	0.063	0.065	1.290
English Learner Status in 11th: English Only	0.240	0.289	0.111	1.128	0.271	0.270	-0.003	0.998
English Learner Status in 11th: Initial Fluent English Proficient	0.148	0.137	-0.029	0.943	0.151	0.143	-0.023	0.956
English Learner Status in 11th: Limited English Proficient	0.049	0.038	-0.051	0.798	0.043	0.040	-0.015	0.933
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.563	0.535	-0.057	1.013	0.535	0.548	0.024	0.997
Gifted and Talented Program Participation in 11th	0.102	0.089	-0.042	0.893	0.091	0.091	0.000	1.001
Math 11th Grade Weighted GPA	2.851	2.387	-0.595	0.925	2.486	2.463	-0.031	1.038
Cumulative Overall Weighted GPA at the End of 11th	3.022	2.734	-0.541	0.889	2.830	2.795	-0.068	1.011
Standardized ELA SBAC Score in 11th	0.170	0.051	-0.166	0.882	0.098	0.057	-0.059	1.033
Standardized Math SBAC Score in 11th	0.098	-0.089	-0.287	0.814	-0.047	-0.069	-0.035	0.971
Number of Semesters of AP Classes Taken from 9th-11th	1.910	0.942	-0.520	0.490	1.025	1.060	0.022	1.056
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	0.037	0.038	0.005	1.025	0.031	0.044	0.066	1.385
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.528	0.593	0.058	1.257	0.519	0.551	0.032	1.152
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.210	0.267	0.091	1.214	0.187	0.249	0.106	1.335
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.201	0.196	-0.006	0.937	0.143	0.192	0.086	1.553
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.085	0.109	0.057	1.383	0.056	0.080	0.072	1.286

See the note on the first page of the table.

Table C9 Continued. Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=4,728)	TCMS (N=626)	SMD	VR	Precalculus (N=1,238)	TCMS (N=526)	SMD	VR
Highest ERW PSAT Score by the End of 11th	429.064	415.443	-0.211	0.960	421.669	418.548	-0.050	1.044
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.073	0.062	-0.042	0.865	0.059	0.067	0.033	1.127
Highest Math PSAT Score by the End of 11th	429.034	414.747	-0.237	0.853	418.595	416.586	-0.035	1.130
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.067	0.061	-0.024	0.918	0.058	0.065	0.027	1.104
Took the SAT or ACT before 12th	0.410	0.230	-0.394	0.733	0.254	0.232	-0.051	0.942
Participation in the AVID Program in 11th	0.054	0.035	-0.093	0.661	0.049	0.042	-0.033	0.866
Took a College or Career Seminar Course in 11th	0.212	0.206	-0.015	0.980	0.163	0.215	0.131	1.234
Math 11th Grade Weighted GPA (Squared)	8.761	6.281	-0.589	0.746	6.730	6.636	-0.024	1.049
Cumulative Overall Weighted GPA at the End of 11th (Squared)	9.430	7.742	-0.548	0.754	8.264	8.072	-0.067	0.980
Standardized ELA SBAC Score in 11th (Squared)	0.577	0.486	-0.123	0.803	0.493	0.502	0.013	1.043
Standardized Math SBAC Score in 11th (Squared)	0.475	0.386	-0.142	0.681	0.403	0.393	-0.017	1.004
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	8.307	3.164	-0.451	0.246	3.438	3.643	0.026	0.895
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.375	1.727	0.069	1.763	1.260	1.445	0.046	1.192
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.398	0.500	0.062	1.337	0.324	0.447	0.088	1.723
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.465	0.436	-0.012	0.896	0.272	0.428	0.077	2.401
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.149	0.208	0.059	2.161	0.096	0.125	0.050	1.185

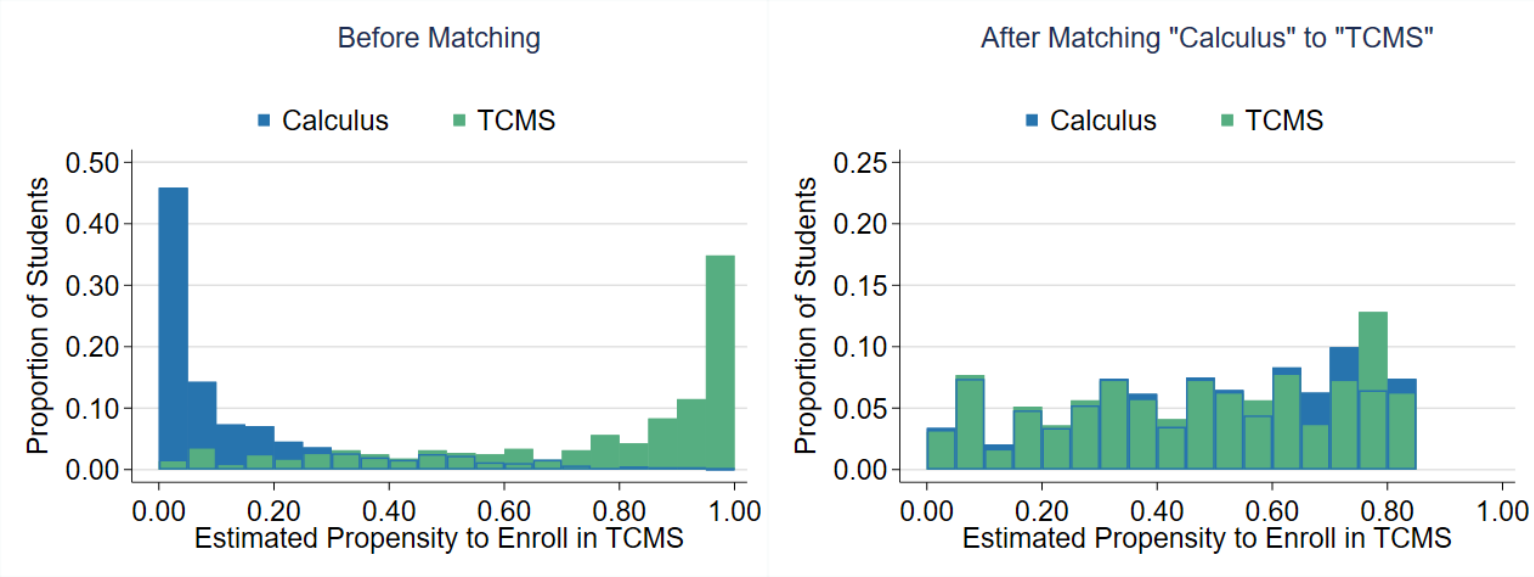
See the note on the first page of the table.

Table C9 Continued. Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=4,728)	TCMS (N=626)	SMD	VR	Precalculus (N=1,238)	TCMS (N=526)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	188345.226	176667.350	-0.210	0.847	181637.390	179179.553	-0.046	0.982
Highest Math PSAT Score by the End of 11th (Squared)	188005.333	175368.692	-0.255	0.812	178387.202	177118.543	-0.027	1.167
Work Effort GPA in 11th	2.519	2.406	-0.364	0.954	2.433	2.428	-0.018	0.952
Cooperation GPA in 11th	2.647	2.553	-0.371	0.983	2.579	2.572	-0.026	0.931
Attendance Rate in 11th	0.970	0.968	-0.084	1.054	0.970	0.967	-0.082	1.104
Ever Suspended from 9th-11th	-	-	0.071	2.146	-	-	0.077	2.484
Educational Expectations in 11th: Unsure	0.075	0.115	0.137	1.472	0.119	0.103	-0.053	0.877
Educational Expectations in 11th: HS or Less	0.026	0.045	0.103	1.702	0.045	0.049	0.020	1.088
Educational Expectations in 11th: Associate Degree or Certificate	0.045	0.065	0.092	1.438	0.053	0.061	0.034	1.142
Educational Expectations in 11th: Bachelor's Degree or Higher	0.599	0.581	-0.035	1.014	0.574	0.582	0.015	0.996
Educational Expectations in 11th: Missing	0.256	0.193	-0.150	0.820	0.208	0.205	-0.008	0.990
Growth Mindset in 11th	0.093	0.007	-0.099	1.195	0.030	0.019	-0.014	1.122
Missing Dummy: Growth Mindset in 11th	0.245	0.182	-0.153	0.807	0.203	0.198	-0.012	0.982
Academic Self-Efficacy in 11th	0.147	-0.047	-0.230	1.151	-0.013	-0.015	-0.002	0.995
Missing Dummy: Academic Self-Efficacy in 11th	0.245	0.182	-0.154	0.806	0.203	0.198	-0.012	0.982
Indicator of 2016-17 Cohort	0.503	0.764	0.562	0.723	0.714	0.726	0.026	0.975

See the note on the first page of the table.

Figure C10. Distributions of Estimated Propensities of Taking TCMS over Calculus in Group 5 Before and After Matching, Using School Fixed Effects



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail.

Table C10. Matching Diagnostics for TCMS vs. Calculus in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Calculus" to "TCMS"			
	Calculus (N=750)	TCMS (N=445)	SMD	VR	Calculus (N=294)	TCMS (N=195)	SMD	VR
Age (in Months)	194.905	194.898	-0.001	1.040	194.641	194.626	-0.003	1.278
Gender: Female	0.515	0.607	0.186	0.956	0.566	0.564	-0.004	0.997
Race/Ethnicity: Asian	-	-	-0.141	0.458	-	-	0.138	2.435
Race/Ethnicity: Black	0.047	0.070	0.098	1.458	0.065	0.077	0.048	1.170
Race/Ethnicity: Latinx	0.789	0.856	0.176	0.741	0.870	0.831	-0.109	1.236
Race/Ethnicity: Filipinx	-	-	-0.167	0.368	-	-	-0.019	0.832
Race/Ethnicity: White	0.068	0.027	-0.194	0.414	-	-	0.059	1.380
Race/Ethnicity: Other	-	-	0.048	1.679	-	-	-0.028	0.768
Ever Subsidized Meal Eligible from 9th-11th	0.919	0.933	0.053	0.842	0.926	0.923	-0.012	1.034
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.071	0.424	-	-	0.101	Inf
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.265	0.292	0.060	1.062	0.292	0.267	-0.056	0.942
Parents'/Guardians' Educational Attainment: HS Graduate	0.213	0.216	0.006	1.009	0.226	0.205	-0.050	0.929
Parents'/Guardians' Educational Attainment: Some College	0.111	0.133	0.067	1.170	0.132	0.118	-0.042	0.905
Parents'/Guardians' Educational Attainment: College Graduate	0.105	0.079	-0.092	0.770	0.087	0.103	0.052	1.152
Parents'/Guardians' Educational Attainment: Graduate School	0.039	0.040	0.009	1.045	0.014	0.041	0.163	2.768
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.267	0.240	-0.060	0.935	0.249	0.267	0.040	1.041
Nonresident School Enrollment in 11th	0.420	0.400	-0.041	0.986	0.320	0.364	0.093	1.060
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.062	2.238	-	-	0.088	3.296
Number of School Moves from 9th-11th	0.057	0.051	-0.024	0.733	0.039	0.050	0.053	1.232

Note: These diagnostics correspond to the matching in our preferred estimation strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C10 Continued. Matching Diagnostics for TCMS vs. Calculus in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Calculus" to "TCMS"			
	Calculus (N=750)	TCMS (N=445)	SMD	VR	Calculus (N=294)	TCMS (N=195)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	0.044	0.029	-0.079	0.675	-	-	0.064	1.541
English Learner Status in 11th: English Only	0.245	0.279	0.076	1.087	0.227	0.262	0.081	1.097
English Learner Status in 11th: Initial Fluent English Proficient	0.212	0.200	-0.030	0.959	0.173	0.215	0.106	1.175
English Learner Status in 11th: Limited English Proficient	-	-	0.033	1.401	-	-	-0.010	0.906
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.535	0.510	-0.049	1.005	0.589	0.513	-0.152	1.028
Gifted and Talented Program Participation in 11th	0.360	0.209	-0.339	0.718	0.262	0.277	0.033	1.031
Math 11th Grade Weighted GPA	3.578	2.434	-1.145	1.578	2.988	2.997	0.009	1.027
Cumulative Overall Weighted GPA at the End of 11th	3.591	3.075	-1.029	1.178	3.276	3.300	0.048	0.922
Standardized ELA SBAC Score in 11th	0.769	0.331	-0.685	1.056	0.427	0.495	0.108	1.007
Standardized Math SBAC Score in 11th	0.980	0.343	-1.090	0.898	0.525	0.573	0.089	1.016
Number of Semesters of AP Classes Taken from 9th-11th	3.773	2.074	-0.634	0.794	2.624	2.776	0.057	1.048
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	-	-	-0.010	0.921	-	-	0.000	0.996
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.208	0.330	0.165	1.659	0.341	0.297	-0.054	0.748
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.043	0.153	0.277	4.574	0.055	0.072	0.056	1.332
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.060	0.108	0.110	2.646	0.112	0.077	-0.082	0.578
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.015	0.079	0.206	6.649	0.012	0.015	0.025	1.062

See the note on the first page of the table.

Table C10 Continued. Matching Diagnostics for TCMS vs. Calculus in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Calculus" to "TCMS"			
	Calculus (N=750)	TCMS (N=445)	SMD	VR	Calculus (N=294)	TCMS (N=195)	SMD	VR
Highest ERW PSAT Score by the End of 11th	480.551	449.179	-0.425	0.696	454.228	461.244	0.104	1.045
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.033	0.031	-0.011	0.947	-	-	-0.067	0.749
Highest Math PSAT Score by the End of 11th	490.258	449.235	-0.632	0.831	453.035	458.687	0.091	1.230
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.029	0.031	0.012	1.071	-	-	-0.067	0.749
Took the SAT or ACT before 12th	0.463	0.290	-0.362	0.829	0.386	0.364	-0.045	0.973
Participation in the AVID Program in 11th	0.040	0.040	0.002	1.012	-	-	0.058	1.409
Took a College or Career Seminar Course in 11th	0.112	0.160	0.139	1.350	0.161	0.179	0.049	1.086
Took a Precalculus Course by the End of 11th	-	-	-0.797	16.627	-	-	0.098	0.597
Took an IDS Course by the End of 11th	-	-	0.235	Inf	-	-	N/A	N/A
Took a Statistics Course by the End of 11th	-	-	0.746	33.563	-	-	-0.116	0.468
Took Other Advanced Math by the End of 11th	-	-	0.048	1.679	-	-	0.000	0.996
Math 11th Grade Weighted GPA (Squared)	13.578	7.143	-1.093	0.892	9.911	9.994	0.013	1.005
Cumulative Overall Weighted GPA at the End of 11th (Squared)	13.130	9.728	-1.041	0.916	10.980	11.115	0.042	0.938
Standardized ELA SBAC Score in 11th (Squared)	0.991	0.531	-0.531	0.479	0.573	0.641	0.090	1.054
Standardized Math SBAC Score in 11th (Squared)	1.319	0.440	-0.866	0.233	0.561	0.620	0.075	1.034
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	22.222	10.638	-0.462	0.586	13.666	14.842	0.055	0.953
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.456	0.793	0.118	2.305	0.831	0.626	-0.068	0.379

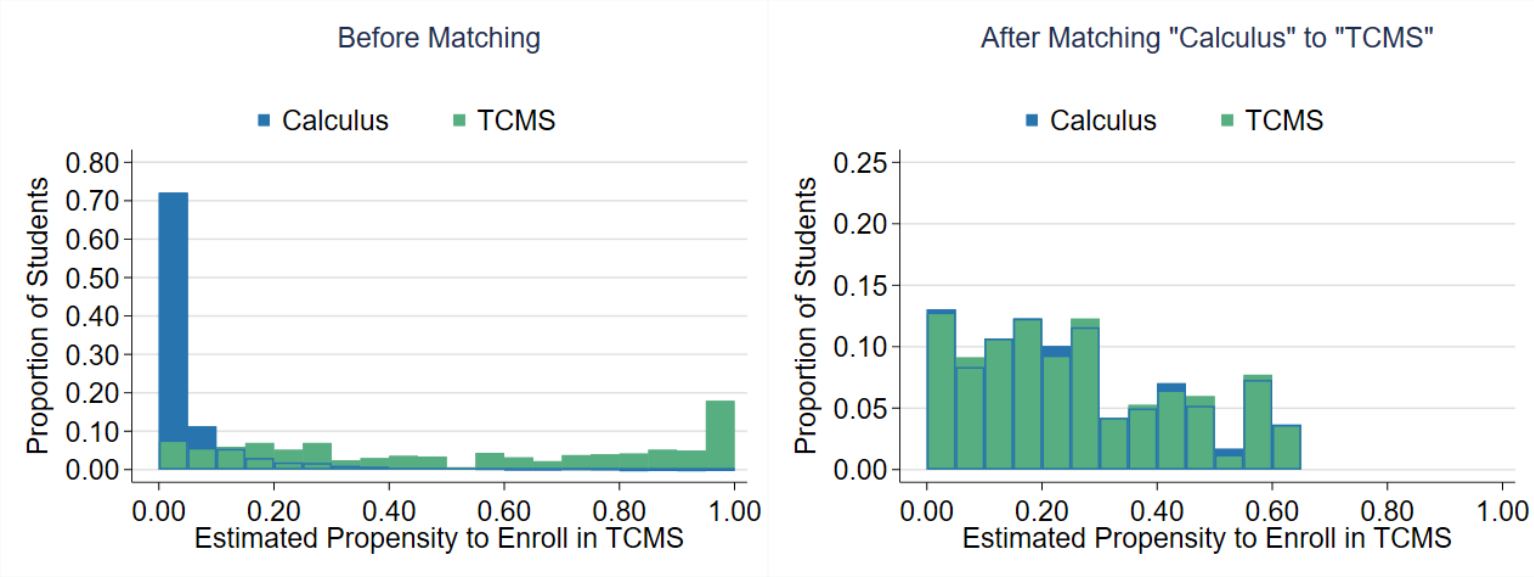
See the note on the first page of the table.

Table C10 Continued. Matching Diagnostics for TCMS vs. Calculus in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Calculus" to "TCMS"			
	Calculus (N=750)	TCMS (N=445)	SMD	VR	Calculus (N=294)	TCMS (N=195)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.059	0.283	0.226	12.052	0.076	0.103	0.046	2.378
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.108	0.288	0.093	5.905	0.241	0.138	-0.074	0.213
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.025	0.173	0.167	16.527	0.014	0.015	0.007	0.570
Highest ERW PSAT Score by the End of 11th (Squared)	237347.071	206225.074	-0.440	0.616	210759.665	217403.247	0.104	1.039
Highest Math PSAT Score by the End of 11th (Squared)	244948.415	205626.778	-0.636	0.678	208683.376	214645.103	0.103	1.239
Work Effort GPA in 11th	2.723	2.502	-0.765	1.404	2.611	2.590	-0.071	1.100
Cooperation GPA in 11th	2.810	2.655	-0.678	1.591	2.741	2.707	-0.145	0.914
Attendance Rate in 11th	0.982	0.970	-0.397	2.944	0.977	0.975	-0.096	1.146
Ever Suspended from 9th-11th	-	-	0.059	3.363	-	-	0.032	1.656
Educational Expectations in 11th: Unsure	0.069	0.088	0.068	1.240	0.044	0.072	0.118	1.574
Educational Expectations in 11th: HS or Less	-	-	0.121	5.006	-	-	0.144	Inf
Educational Expectations in 11th: Associate Degree or Certificate	0.017	0.045	0.159	2.522	-	-	0.043	1.234
Educational Expectations in 11th: Bachelor's Degree or Higher	0.783	0.665	-0.265	1.311	0.770	0.733	-0.084	1.099
Educational Expectations in 11th: Missing	0.128	0.189	0.167	1.373	0.153	0.144	-0.027	0.943
Growth Mindset in 11th	0.362	0.137	-0.270	1.295	0.256	0.325	0.090	1.030
Missing Dummy: Growth Mindset in 11th	0.121	0.184	0.175	1.411	0.145	0.133	-0.034	0.928
Academic Self-Efficacy in 11th	0.378	0.052	-0.382	1.097	0.139	0.143	0.005	0.938
Missing Dummy: Academic Self-Efficacy in 11th	0.125	0.182	0.158	1.359	0.145	0.133	-0.034	0.928
Indicator of 2016-17 Cohort	0.725	0.789	0.148	0.837	0.765	0.800	0.084	0.887

See the note on the first page of the table.

Figure C11. Distributions of Estimated Propensities of Taking TCMS over Calculus in Group 5 Before and After Matching, Using School-Cohort Controls



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school-cohort controls. See Appendix B for more detail.

Table C11. Matching Diagnostics for TCMS vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Calculus" to "TCMS"			
	Calculus (N=3,850)	TCMS (N=503)	SMD	VR	Calculus (N=620)	TCMS (N=285)	SMD	VR
Age (in Months)	194.803	194.915	0.023	1.043	194.557	194.855	0.063	1.129
Gender: Female	0.532	0.606	0.151	0.960	0.571	0.586	0.031	0.991
Race/Ethnicity: Asian	-	-	-0.228	0.318	-	-	0.004	1.023
Race/Ethnicity: Black	0.054	0.066	0.050	1.207	0.036	0.046	0.050	1.262
Race/Ethnicity: Latinx	0.737	0.861	0.313	0.619	0.863	0.860	-0.010	1.022
Race/Ethnicity: Filipinx	-	-	-0.195	0.344	-	-	-0.032	0.816
Race/Ethnicity: White	0.082	0.026	-0.249	0.337	-	-	-0.026	0.882
Race/Ethnicity: Other	-	-	0.017	1.196	-	-	0.038	1.663
Ever Subsidized Meal Eligible from 9th-11th	0.905	0.940	0.133	0.653	0.959	0.940	-0.087	1.438
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.061	0.453	-	-	0.061	4.990
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.241	0.296	0.125	1.142	0.285	0.291	0.014	1.014
Parents'/Guardians' Educational Attainment: HS Graduate	0.191	0.215	0.058	1.091	0.221	0.196	-0.060	0.918
Parents'/Guardians' Educational Attainment: Some College	0.108	0.129	0.066	1.172	0.139	0.112	-0.080	0.834
Parents'/Guardians' Educational Attainment: College Graduate	0.110	0.080	-0.103	0.751	0.075	0.098	0.082	1.277
Parents'/Guardians' Educational Attainment: Graduate School	0.046	0.040	-0.032	0.867	0.039	0.039	0.000	1.001
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.304	0.241	-0.143	0.865	0.241	0.263	0.050	1.060
Nonresident School Enrollment in 11th	0.379	0.368	-0.024	0.989	0.347	0.330	-0.037	0.976
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.015	0.853	-	-	0.146	Inf
Number of School Moves from 9th-11th	0.057	0.047	-0.044	0.711	0.050	0.052	0.008	0.806
Missing Dummy: Number of School Moves from 9th-11th	0.044	0.026	-0.097	0.604	-	-	0.028	1.247
English Learner Status in 11th: English Only	0.257	0.266	0.021	1.025	0.236	0.239	0.007	1.009

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after substituting school-level controls for school fixed effects in the propensity score model. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C11 Continued. Matching Diagnostics for TCMS vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Calculus" to "TCMS"			
	Calculus (N=3,850)	TCMS (N=503)	SMD	VR	Calculus (N=620)	TCMS (N=285)	SMD	VR
English Learner Status in 11th: Initial Fluent English Proficient	0.208	0.195	-0.034	0.953	0.213	0.207	-0.015	0.979
English Learner Status in 11th: Limited English Proficient	-	-	0.045	1.526	-	-	-0.017	0.872
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.525	0.525	-0.001	1.002	0.535	0.540	0.011	0.999
Gifted and Talented Program Participation in 11th	0.377	0.219	-0.352	0.728	0.288	0.267	-0.047	0.955
Math 11th Grade Weighted GPA	3.725	2.441	-1.250	1.395	2.947	2.868	-0.078	1.047
Cumulative Overall Weighted GPA at the End of 11th	3.556	3.093	-0.897	1.088	3.279	3.243	-0.070	1.209
Standardized ELA SBAC Score in 11th	0.756	0.338	-0.620	0.930	0.450	0.435	-0.022	1.093
Standardized Math SBAC Score in 11th	0.948	0.351	-0.946	0.796	0.502	0.510	0.014	1.212
Number of Semesters of AP Classes Taken from 9th-11th	4.404	2.129	-0.828	0.699	2.719	2.857	0.051	1.020
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	-	-	-0.038	0.734	-	-	-0.023	0.771
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.219	0.314	0.127	1.446	0.277	0.330	0.066	1.252
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.072	0.163	0.202	2.184	0.112	0.102	-0.023	0.926
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.082	0.103	0.047	1.552	0.079	0.130	0.104	2.822
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.036	0.082	0.133	2.457	0.044	0.049	0.015	1.072
Highest ERW PSAT Score by the End of 11th	486.243	448.876	-0.498	0.686	456.081	455.660	-0.006	1.060
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.044	0.028	-0.085	0.650	-	-	0.080	1.592
Highest Math PSAT Score by the End of 11th	496.937	447.037	-0.724	0.717	451.661	452.324	0.010	1.024
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.039	0.028	-0.061	0.729	-	-	0.080	1.592
Took the SAT or ACT before 12th	0.617	0.296	-0.681	0.884	0.410	0.361	-0.099	0.955
Participation in the AVID Program in 11th	0.050	0.050	-0.003	0.989	0.045	0.049	0.020	1.090
Took a College or Career Seminar Course in 11th	0.186	0.173	-0.035	0.946	0.175	0.221	0.114	1.191
Took a Precalculus Course by the End of 11th	0.989	0.746	-0.767	17.208	-	-	0.019	0.913
Took an IDS Course by the End of 11th	-	-	0.241	55.819	-	-	-0.038	0.670
Took a Statistics Course by the End of 11th	-	-	0.714	38.421	-	-	-0.039	0.745
Took Other Advanced Math by the End of 11th	-	-	0.041	1.591	-	-	0.046	1.532

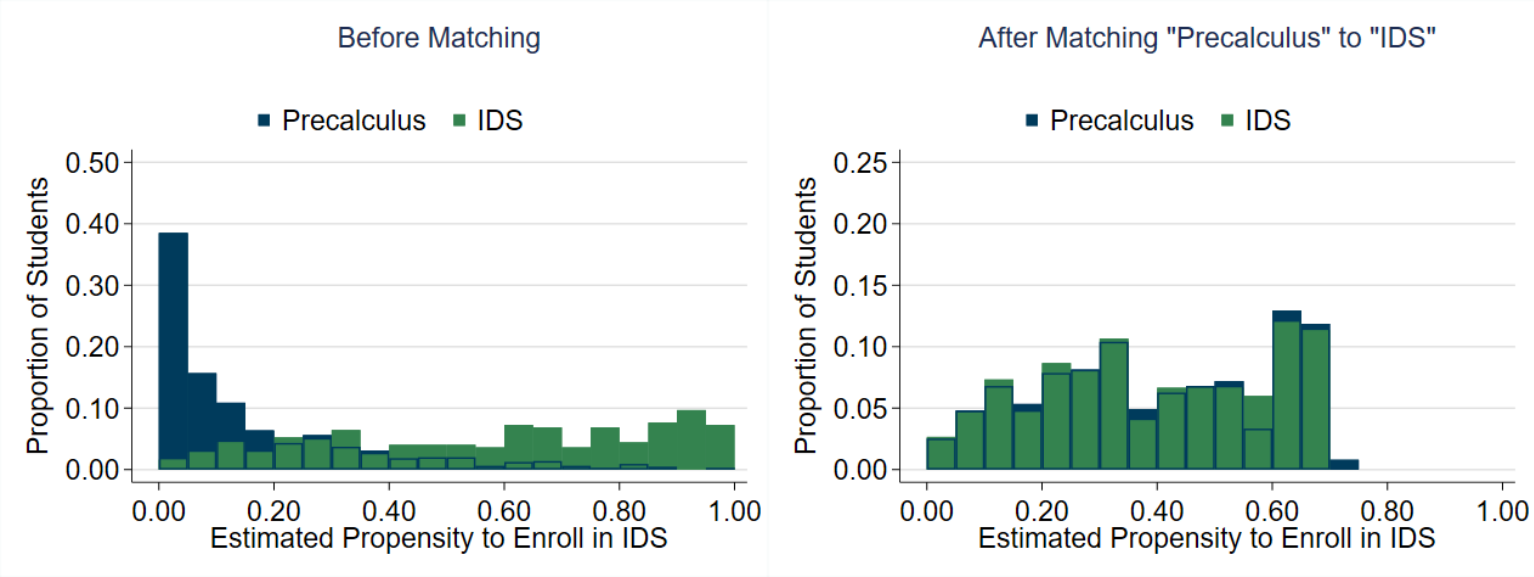
See the note on the first page of the table.

Table C11 Continued. Matching Diagnostics for TCMS vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Calculus" to "TCMS"			
	Calculus (N=3,850)	TCMS (N=503)	SMD	VR	Calculus (N=620)	TCMS (N=285)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	14.753	7.186	-1.225	0.756	9.676	9.263	-0.069	1.059
Cumulative Overall Weighted GPA at the End of 11th (Squared)	12.899	9.841	-0.917	0.885	10.991	10.806	-0.057	1.146
Standardized ELA SBAC Score in 11th (Squared)	1.040	0.550	-0.548	0.439	0.648	0.675	0.035	0.886
Standardized Math SBAC Score in 11th (Squared)	1.340	0.475	-0.820	0.258	0.559	0.632	0.095	1.246
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	28.280	10.731	-0.655	0.440	14.700	15.611	0.037	1.222
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.506	0.759	0.084	1.367	0.646	0.821	0.053	1.576
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.132	0.302	0.151	2.729	0.210	0.193	-0.014	0.949
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.174	0.270	0.046	1.909	0.133	0.375	0.106	9.881
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.069	0.173	0.112	3.779	0.105	0.112	0.007	1.023
Highest ERW PSAT Score by the End of 11th (Squared)	243121.427	206068.704	-0.510	0.584	212856.862	212762.601	-0.001	1.031
Highest Math PSAT Score by the End of 11th (Squared)	252479.999	203803.213	-0.743	0.566	208729.293	209439.890	0.012	1.044
Work Effort GPA in 11th	2.704	2.505	-0.680	1.241	2.587	2.570	-0.057	1.053
Cooperation GPA in 11th	2.797	2.651	-0.630	1.414	2.700	2.695	-0.024	0.922
Attendance Rate in 11th	0.979	0.971	-0.267	1.669	0.976	0.974	-0.064	0.732
Ever Suspended from 9th-11th	-	-	0.029	1.701	-	-	-0.092	0.000
Educational Expectations in 11th: Unsure	0.049	0.087	0.151	1.704	0.063	0.063	0.000	1.001
Educational Expectations in 11th: HS or Less	-	-	0.060	1.906	-	-	0.029	1.361
Educational Expectations in 11th: Associate Degree or Certificate	0.011	0.044	0.200	3.794	-	-	0.013	1.080
Educational Expectations in 11th: Bachelor's Degree or Higher	0.716	0.670	-0.099	1.089	0.745	0.733	-0.026	1.029
Educational Expectations in 11th: Missing	0.217	0.187	-0.076	0.895	0.159	0.165	0.017	1.033
Growth Mindset in 11th	0.294	0.158	-0.168	1.329	0.304	0.285	-0.023	1.029
Missing Dummy: Growth Mindset in 11th	0.210	0.183	-0.067	0.904	0.155	0.158	0.008	1.015
Academic Self-Efficacy in 11th	0.337	0.061	-0.328	1.163	0.222	0.140	-0.092	1.001
Missing Dummy: Academic Self-Efficacy in 11th	0.211	0.181	-0.075	0.893	0.155	0.158	0.008	1.015
Indicator of 2016-17 Cohort	0.438	0.813	0.839	0.618	0.759	0.775	0.038	0.954

See the note on the first page of the table.

Figure C12. Distributions of Estimated Propensities of Taking IDS over Precalculus in Group 4 Before and After Matching, Using School Fixed Effects



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail.

Table C12. Matching Diagnostics for IDS vs. Precalculus in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Precalculus" to "IDS"			
	Precalculus (N=644)	IDS (N=248)	SMD	VR	Precalculus (N=269)	IDS (N=150)	SMD	VR
Age (in Months)	195.697	195.697	0.000	0.748	195.074	195.672	0.115	0.886
Gender: Female	0.517	0.593	0.152	0.969	0.564	0.547	-0.035	1.007
Race/Ethnicity: Asian	-	-	-0.011	0.931	-	-	0.020	1.150
Race/Ethnicity: African American	-	-	-0.005	0.977	-	-	-0.086	0.695
Race/Ethnicity: Latinx	0.852	0.891	0.116	0.773	0.853	0.887	0.099	0.802
Race/Ethnicity: Filipinx	-	-	-0.090	0.556	-	-	-0.060	0.688
Race/Ethnicity: White	-	-	-0.073	0.721	-	-	-0.042	0.813
Race/Ethnicity: Other	-	-	-0.125	0.000	-	-	N/A	N/A
Ever Subsidized Meal Eligible from 9th-11th	0.950	0.952	0.006	0.978	-	-	0.078	0.766
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	0.046	1.480	-	-	-0.011	0.910
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.280	0.266	-0.030	0.972	0.247	0.247	0.000	0.999
Parents'/Guardians' Educational Attainment: HS Graduate	0.199	0.234	0.085	1.128	0.207	0.267	0.141	1.192
Parents'/Guardians' Educational Attainment: Some College	0.116	0.077	-0.135	0.689	0.108	0.100	-0.026	0.934
Parents'/Guardians' Educational Attainment: College Graduate	0.043	0.052	0.042	1.197	0.048	0.040	-0.039	0.840
Parents'/Guardians' Educational Attainment: Graduate School	0.034	0.020	-0.086	0.600	0.037	0.033	-0.022	0.896
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.328	0.351	0.049	1.036	0.353	0.313	-0.085	0.941
Nonresident School Enrollment in 11th	0.196	0.218	0.054	1.085	0.239	0.227	-0.028	0.964
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.032	0.817	-	-	0.008	1.050
Number of School Moves from 9th-11th	0.080	0.102	0.072	1.398	0.108	0.107	-0.005	0.787
Missing Dummy: Number of School Moves from 9th-11th	0.071	0.065	-0.027	0.912	0.085	0.093	0.028	1.083
English Learner Status in 11th: English Only	0.199	0.222	0.056	1.086	0.309	0.260	-0.109	0.900

Note: These diagnostics correspond to the matching in our preferred estimation strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C12 Continued. Matching Diagnostics for IDS vs. Precalculus in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Precalculus" to "IDS"			
	Precalculus (N=644)	IDS (N=248)	SMD	VR	Precalculus (N=269)	IDS (N=150)	SMD	VR
English Learner Status in 11th: Initial Fluent English Proficient	0.154	0.153	-0.001	1.000	0.176	0.160	-0.043	0.926
English Learner Status in 11th: Limited English Proficient	-	-	-0.094	0.664	-	-	0.035	1.242
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.592	0.589	-0.006	1.005	0.493	0.553	0.120	0.988
Gifted and Talented Program Participation in 11th	0.106	0.056	-0.181	0.565	-	-	-0.120	0.691
Math 11th Grade Weighted GPA	2.855	2.124	-0.941	0.922	2.435	2.404	-0.044	1.004
Cumulative Overall Weighted GPA at the End of 11th	3.061	2.758	-0.579	1.061	2.930	2.867	-0.124	1.088
Standardized ELA SBAC Score in 11th	0.247	-0.043	-0.385	1.159	0.144	0.069	-0.100	1.168
Standardized Math SBAC Score in 11th	0.218	-0.095	-0.495	0.906	0.076	0.049	-0.048	1.015
Number of Semesters of AP Classes Taken from 9th-11th	2.025	1.759	-0.122	0.988	2.222	1.872	-0.150	0.874
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	-	-	-0.059	0.753	-	-	0.007	1.039
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.514	0.601	0.079	1.306	0.432	0.540	0.104	1.403
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.217	0.383	0.227	1.802	0.323	0.260	-0.086	0.663
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.216	0.161	-0.084	0.745	0.119	0.160	0.080	1.519
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.095	0.105	0.026	0.978	0.140	0.107	-0.077	0.777
Highest ERW PSAT Score by the End of 11th	437.572	425.378	-0.188	1.136	434.002	435.755	0.028	1.154
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.104	0.048	-0.211	0.495	-	-	0.080	1.361
Highest Math PSAT Score by the End of 11th	430.980	418.230	-0.191	0.903	432.924	427.683	-0.090	1.473
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.101	0.048	-0.201	0.509	-	-	0.080	1.361
Took the SAT or ACT before 12th	0.391	0.351	-0.084	0.959	0.384	0.413	0.060	1.024

See the note on the first page of the table.

Table C12 Continued. Matching Diagnostics for IDS vs. Precalculus in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Precalculus" to "IDS"			
	Precalculus (N=644)	IDS (N=248)	SMD	VR	Precalculus (N=269)	IDS (N=150)	SMD	VR
Participation in the AVID Program in 11th	-	-	-0.291	0.083	-	-	0.017	1.247
Took a College or Career Seminar Course in 11th	0.068	0.149	0.262	1.999	0.139	0.113	-0.076	0.841
Math 11th Grade Weighted GPA (Squared)	8.777	5.087	-0.917	0.605	6.406	6.259	-0.041	1.009
Cumulative Overall Weighted GPA at the End of 11th (Squared)	9.633	7.889	-0.578	0.878	8.828	8.484	-0.119	1.136
Standardized ELA SBAC Score in 11th (Squared)	0.585	0.608	0.028	1.260	0.535	0.606	0.086	1.322
Standardized Math SBAC Score in 11th (Squared)	0.466	0.388	-0.119	0.775	0.321	0.323	0.003	0.495
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	8.915	7.838	-0.072	1.138	10.696	8.541	-0.130	0.787
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.321	1.738	0.089	1.500	1.085	1.553	0.111	1.876
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.425	0.827	0.193	2.445	0.736	0.487	-0.119	0.511
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.533	0.387	-0.058	0.561	0.225	0.347	0.072	0.934
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.163	0.161	-0.002	1.136	0.228	0.173	-0.063	1.112
Highest ERW PSAT Score by the End of 11th (Squared)	195397.946	185398.990	-0.173	1.062	191983.265	194068.942	0.037	1.126
Highest Math PSAT Score by the End of 11th (Squared)	190437.107	179145.736	-0.210	0.940	190133.503	186907.792	-0.067	1.478
Work Effort GPA in 11th	2.527	2.407	-0.376	1.140	2.486	2.456	-0.103	1.335
Cooperation GPA in 11th	2.675	2.575	-0.387	1.359	2.645	2.633	-0.054	1.309
Attendance Rate in 11th	0.969	0.972	0.102	0.955	0.970	0.970	-0.001	1.263
Ever Suspended from 9th-11th	-	-	0.090	Inf	-	-	N/A	N/A
Educational Expectations in 11th: Unsure	0.056	0.113	0.206	1.902	-	-	0.112	1.569
Educational Expectations in 11th: HS or Less	-	-	-0.080	0.586	-	-	-0.070	0.593
Educational Expectations in 11th: Associate Degree or Certificate	0.047	0.077	0.125	1.597	-	-	-0.026	0.887

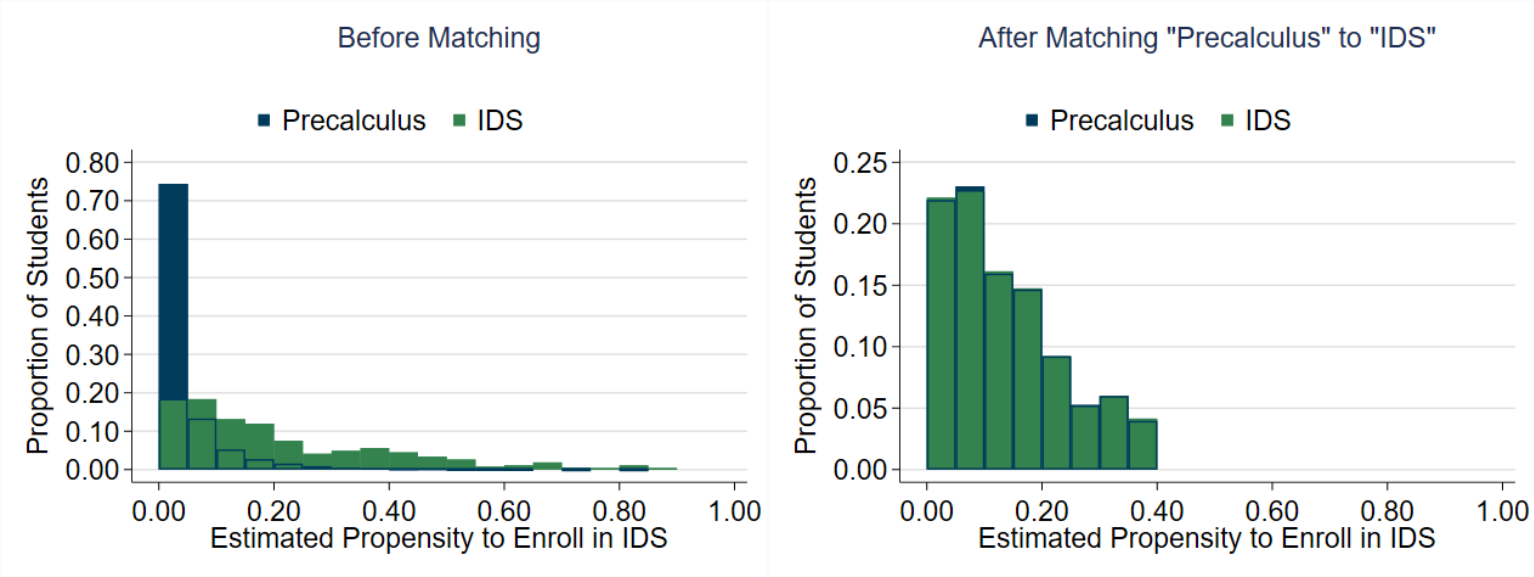
See the note on the first page of the table.

Table C12 Continued. Matching Diagnostics for IDS vs. Precalculus in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Precalculus" to "IDS"			
	Precalculus (N=644)	IDS (N=248)	SMD	VR	Precalculus (N=269)	IDS (N=150)	SMD	VR
Educational Expectations in 11th: Bachelor's Degree or Higher	0.568	0.508	-0.121	1.021	0.579	0.527	-0.104	1.022
Educational Expectations in 11th: Missing	0.301	0.286	-0.033	0.973	0.312	0.353	0.088	1.064
Growth Mindset in 11th	0.125	-0.052	-0.218	1.304	0.042	0.091	0.066	1.223
Missing Dummy: Growth Mindset in 11th	0.295	0.266	-0.064	0.941	0.297	0.340	0.091	1.073
Academic Self-Efficacy in 11th	0.128	-0.075	-0.253	1.205	-0.008	-0.009	-0.002	1.148
Missing Dummy: Academic Self-Efficacy in 11th	0.295	0.266	-0.064	0.941	0.297	0.340	0.091	1.073
Indicator of 2016-17 Cohort	0.629	0.492	-0.278	1.074	0.553	0.553	0.000	0.999

See the note on the first page of the table.

Figure C13. Distributions of Estimated Propensities of Taking IDS over Precalculus in Group 4 Before and After Matching, Using School-Cohort Controls



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school-cohort controls. See Appendix B for more detail.

Table C13. Matching Diagnostics for IDS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "IDS"			
	Precalculus (N=4,732)	IDS (N=267)	SMD	VR	Precalculus (N=648)	IDS (N=217)	SMD	VR
Age (in Months)	195.523	195.678	0.028	0.843	195.485	195.778	0.052	0.851
Gender: Female	0.526	0.584	0.117	0.978	0.549	0.553	0.009	1.001
Race/Ethnicity: Asian	-	-	-0.016	0.907	-	-	-0.032	0.840
Race/Ethnicity: African American	-	-	-0.207	0.435	-	-	0.065	1.392
Race/Ethnicity: Latinx	0.816	0.895	0.228	0.626	0.882	0.885	0.009	0.982
Race/Ethnicity: Filipinx	-	-	-0.089	0.546	-	-	-0.020	0.874
Race/Ethnicity: White	-	-	-0.045	0.808	-	-	-0.037	0.818
Race/Ethnicity: Other	-	-	-0.124	0.000	-	-	N/A	N/A
Ever Subsidized Meal Eligible from 9th-11th	0.939	0.951	0.056	0.805	0.937	0.940	0.012	0.961
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.009	0.937	-	-	-0.007	0.956
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.254	0.262	0.020	1.026	0.210	0.249	0.093	1.131
Parents'/Guardians' Educational Attainment: HS Graduate	0.202	0.255	0.124	1.180	0.234	0.244	0.024	1.032
Parents'/Guardians' Educational Attainment: Some College	0.108	0.075	-0.115	0.722	0.088	0.088	-0.003	0.993
Parents'/Guardians' Educational Attainment: College Graduate	0.063	0.049	-0.064	0.783	0.046	0.055	0.042	1.191
Parents'/Guardians' Educational Attainment: Graduate School	0.032	0.019	-0.083	0.601	0.018	0.023	0.032	1.247
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.341	0.341	0.000	1.003	0.403	0.341	-0.129	0.936
Nonresident School Enrollment in 11th	0.262	0.213	-0.114	0.872	0.209	0.217	0.020	1.031
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.060	1.635	-	-	0.046	1.383
Number of School Moves from 9th-11th	0.078	0.095	0.057	1.344	0.085	0.088	0.010	1.063
Missing Dummy: Number of School Moves from 9th-11th	0.081	0.060	-0.084	0.756	0.062	0.069	0.028	1.106
English Learner Status in 11th: English Only	0.240	0.213	-0.064	0.923	0.197	0.240	0.103	1.154
English Learner Status in 11th: Initial Fluent English Proficient	0.148	0.157	0.027	1.058	0.165	0.161	-0.009	0.987

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after substituting school-level controls for school fixed effects in the propensity score model. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C13 Continued. Matching Diagnostics for IDS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "IDS"			
	Precalculus (N=4,732)	IDS (N=267)	SMD	VR	Precalculus (N=648)	IDS (N=217)	SMD	VR
English Learner Status in 11th: Limited English Proficient	-	-	-0.036	0.857	0.039	0.051	0.057	1.289
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.563	0.588	0.050	0.988	0.599	0.548	-0.103	1.034
Gifted and Talented Program Participation in 11th	0.101	0.052	-0.185	0.547	0.070	0.060	-0.041	0.867
Math 11th Grade Weighted GPA	2.852	2.164	-0.879	0.937	2.375	2.311	-0.088	0.992
Cumulative Overall Weighted GPA at the End of 11th	3.022	2.768	-0.470	0.944	2.858	2.832	-0.053	1.105
Standardized ELA SBAC Score in 11th	0.170	-0.041	-0.278	1.096	0.001	0.015	0.017	1.061
Standardized Math SBAC Score in 11th	0.098	-0.106	-0.314	0.811	0.014	-0.042	-0.090	0.982
Number of Semesters of AP Classes Taken from 9th-11th	1.911	1.731	-0.084	0.965	1.894	1.719	-0.079	0.955
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	-	-	-0.041	0.810	-	-	0.015	1.085
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.528	0.584	0.051	1.231	0.531	0.558	0.025	1.166
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.210	0.356	0.207	1.821	0.278	0.304	0.037	1.104
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.200	0.172	-0.044	0.886	0.146	0.157	0.022	1.403
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.085	0.097	0.032	0.994	0.112	0.101	-0.028	0.924
Highest ERW PSAT Score by the End of 11th	429.081	422.094	-0.105	1.065	428.288	425.640	-0.040	1.111
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.073	0.049	-0.102	0.686	0.064	0.055	-0.035	0.879
Highest Math PSAT Score by the End of 11th	429.064	415.881	-0.206	1.073	424.513	417.700	-0.103	1.054
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.067	0.049	-0.078	0.746	0.065	0.055	-0.043	0.856
Took the SAT or ACT before 12th	0.410	0.375	-0.073	0.972	0.399	0.387	-0.024	0.992
Participation in the AVID Program in 11th	-	-	-0.305	0.073	-	-	0.049	2.499
Took a College or Career Seminar Course in 11th	0.213	0.142	-0.185	0.732	0.129	0.171	0.116	1.260
Math 11th Grade Weighted GPA (Squared)	8.764	5.272	-0.857	0.632	6.177	5.870	-0.085	0.959
Cumulative Overall Weighted GPA at the End of 11th (Squared)	9.431	7.945	-0.476	0.802	8.419	8.291	-0.044	1.087
Standardized ELA SBAC Score in 11th (Squared)	0.577	0.600	0.028	1.201	0.599	0.634	0.037	0.825

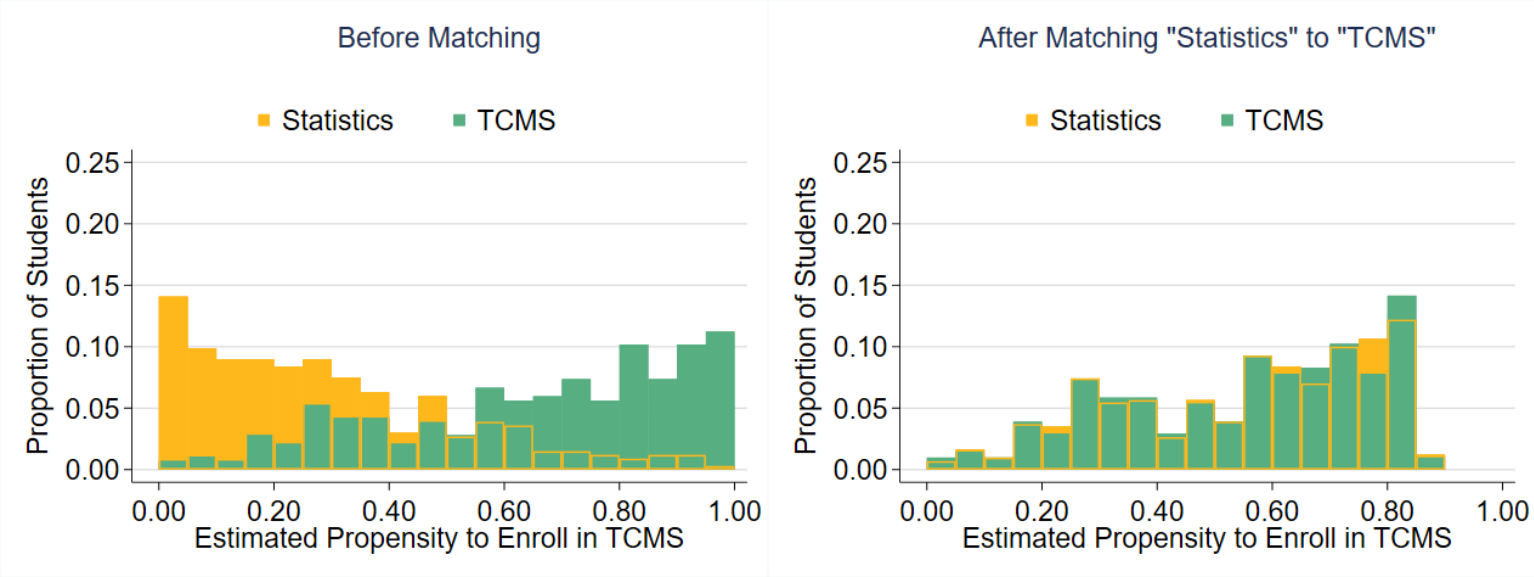
See the note on the first page of the table.

Table C13 Continued. Matching Diagnostics for IDS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "IDS"			
	Precalculus (N=4,732)	IDS (N=267)	SMD	VR	Precalculus (N=648)	IDS (N=217)	SMD	VR
Standardized Math SBAC Score in 11th (Squared)	0.475	0.387	-0.136	0.795	0.385	0.379	-0.011	0.997
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	8.308	7.475	-0.057	1.053	8.585	7.716	-0.057	1.109
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.374	1.685	0.066	1.325	1.334	1.535	0.047	1.467
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.397	0.768	0.184	2.448	0.571	0.636	0.031	1.259
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.464	0.404	-0.026	0.685	0.234	0.323	0.069	2.331
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.149	0.150	0.001	0.924	0.171	0.157	-0.020	1.273
Highest ERW PSAT Score by the End of 11th (Squared)	188361.439	182676.231	-0.098	1.012	187631.553	185826.957	-0.031	1.096
Highest Math PSAT Score by the End of 11th (Squared)	188030.801	177165.840	-0.207	1.027	184429.464	178909.412	-0.104	1.076
Work Effort GPA in 11th	2.519	2.426	-0.290	1.102	2.483	2.456	-0.084	1.094
Cooperation GPA in 11th	2.647	2.583	-0.240	1.169	2.636	2.611	-0.095	1.060
Attendance Rate in 11th	0.970	0.972	0.057	0.889	0.973	0.971	-0.055	1.450
Ever Suspended from 9th-11th	-	-	-0.031	0.637	-	-	0.096	Inf
Educational Expectations in 11th: Unsure	0.075	0.116	0.140	1.484	0.069	0.115	0.160	1.588
Educational Expectations in 11th: HS or Less	-	-	-0.076	0.590	-	-	-0.037	0.755
Educational Expectations in 11th: Associate Degree or Certificate	0.045	0.071	0.113	1.550	0.060	0.065	0.019	1.074
Educational Expectations in 11th: Bachelor's Degree or Higher	0.598	0.528	-0.142	1.041	0.568	0.525	-0.085	1.018
Educational Expectations in 11th: Missing	0.256	0.270	0.031	1.037	0.285	0.281	-0.009	0.994
Growth Mindset in 11th	0.092	-0.051	-0.169	1.113	0.020	0.029	0.011	1.031
Missing Dummy: Growth Mindset in 11th	0.245	0.251	0.014	1.021	0.277	0.258	-0.044	0.957
Academic Self-Efficacy in 11th	0.147	-0.051	-0.239	1.073	0.011	0.019	0.010	1.035
Missing Dummy: Academic Self-Efficacy in 11th	0.245	0.251	0.013	1.019	0.276	0.258	-0.040	0.961
Indicator of 2016-17 Cohort	0.503	0.461	-0.085	0.997	0.479	0.456	-0.045	0.997

See the note on the first page of the table.

Figure C14. Distributions of Estimated Propensities of Taking TCMS over Statistics in Group 4 Before and After Matching, Using School Fixed Effects



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail.

Table C14. Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=334)	TCMS (N=285)	SMD	VR	Statistics (N=217)	TCMS (N=205)	SMD	VR
Age (in Months)	194.855	194.973	0.024	1.270	194.922	194.647	-0.062	0.970
Gender: Female	0.584	0.618	0.069	0.973	0.625	0.590	-0.072	1.022
Race/Ethnicity: Asian	-	-	-0.137	0.298	-	-	0.021	1.235
Race/Ethnicity: African American	0.051	0.168	0.382	2.901	0.072	0.083	0.042	1.134
Race/Ethnicity: Latinx	0.787	0.733	-0.127	1.169	0.796	0.805	0.023	0.956
Race/Ethnicity: Filipinx	-	-	-0.111	0.559	-	-	0.063	1.470
Race/Ethnicity: White	0.075	0.056	-0.076	0.766	0.098	0.063	-0.126	0.666
Race/Ethnicity: Other	-	-	-0.063	0.591	-	-	0.021	1.235
Ever Subsidized Meal Eligible from 9th-11th	0.934	0.923	-0.044	1.158	-	-	-0.113	1.632
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	0.144	5.777	-	-	0.082	3.026
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.216	0.263	0.112	1.147	0.256	0.283	0.061	1.056
Parents'/Guardians' Educational Attainment: HS Graduate	0.284	0.235	-0.113	0.884	0.294	0.254	-0.090	0.903
Parents'/Guardians' Educational Attainment: Some College	0.132	0.151	0.055	1.121	0.133	0.141	0.025	1.043
Parents'/Guardians' Educational Attainment: College Graduate	0.108	0.063	-0.160	0.616	0.040	0.054	0.064	1.309
Parents'/Guardians' Educational Attainment: Graduate School	0.024	0.032	0.046	1.309	0.007	0.020	0.111	2.793
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.237	0.256	0.045	1.056	0.271	0.249	-0.050	0.937
Nonresident School Enrollment in 11th	0.467	0.467	-0.001	1.000	0.434	0.424	-0.019	0.985
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.119	0.340	-	-	0.000	0.990
Number of School Moves from 9th-11th	0.079	0.072	-0.026	0.805	0.104	0.078	-0.078	0.484
Missing Dummy: Number of School Moves from 9th-11th	0.051	0.088	0.145	1.657	0.056	0.068	0.052	1.200
English Learner Status in 11th: English Only	0.290	0.326	0.078	1.067	0.255	0.273	0.041	1.034
English Learner Status in 11th: Initial Fluent English Proficient	0.183	0.119	-0.177	0.704	0.111	0.127	0.048	1.110
English Learner Status in 11th: Limited English Proficient	-	-	0.146	2.022	-	-	-0.026	0.886

Note: These diagnostics correspond to the matching in our preferred estimation strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C14 Continued. Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=334)	TCMS (N=285)	SMD	VR	Statistics (N=217)	TCMS (N=205)	SMD	VR
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.500	0.498	-0.004	1.001	0.584	0.556	-0.057	1.006
Gifted and Talented Program Participation in 11th	0.153	0.098	-0.165	0.685	0.107	0.102	-0.015	0.953
Math 11th Grade Weighted GPA	2.558	2.350	-0.260	0.878	2.411	2.413	0.003	1.181
Cumulative Overall Weighted GPA at the End of 11th	2.913	2.717	-0.365	0.869	2.747	2.779	0.063	0.955
Standardized ELA SBAC Score in 11th	0.319	0.159	-0.222	0.860	0.296	0.214	-0.116	0.913
Standardized Math SBAC Score in 11th	0.128	-0.052	-0.264	0.608	0.053	-0.005	-0.091	0.948
Number of Semesters of AP Classes Taken from 9th-11th	1.655	1.085	-0.304	0.593	1.421	1.168	-0.143	0.858
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	0.033	0.053	0.097	1.566	-	-	0.024	1.100
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.443	0.544	0.096	1.187	0.515	0.400	-0.126	0.895
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.210	0.288	0.126	1.266	0.248	0.254	0.009	0.984
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.069	0.186	0.233	4.040	0.220	0.117	-0.192	0.502
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.078	0.123	0.111	1.874	0.104	0.117	0.029	0.950
Highest ERW PSAT Score by the End of 11th	450.349	430.009	-0.310	0.871	442.263	431.421	-0.160	0.941
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	0.090	1.851	-	-	-0.098	0.552
Highest Math PSAT Score by the End of 11th	437.534	426.575	-0.191	0.834	433.243	429.400	-0.071	1.104
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	0.090	1.851	-	-	-0.098	0.552
Took the SAT or ACT before 12th	0.234	0.228	-0.013	0.984	0.161	0.234	0.185	1.317
Participation in the AVID Program in 11th	-	-	-0.140	0.400	-	-	-0.037	0.746
Took a College or Career Seminar Course in 11th	0.207	0.186	-0.052	0.924	0.113	0.137	0.070	1.161
Math 11th Grade Weighted GPA (Squared)	7.218	6.117	-0.264	0.769	6.313	6.422	0.028	1.179
Cumulative Overall Weighted GPA at the End of 11th (Squared)	8.799	7.649	-0.374	0.759	7.815	7.986	0.059	0.978
Standardized ELA SBAC Score in 11th (Squared)	0.660	0.505	-0.199	0.726	0.603	0.521	-0.111	0.920

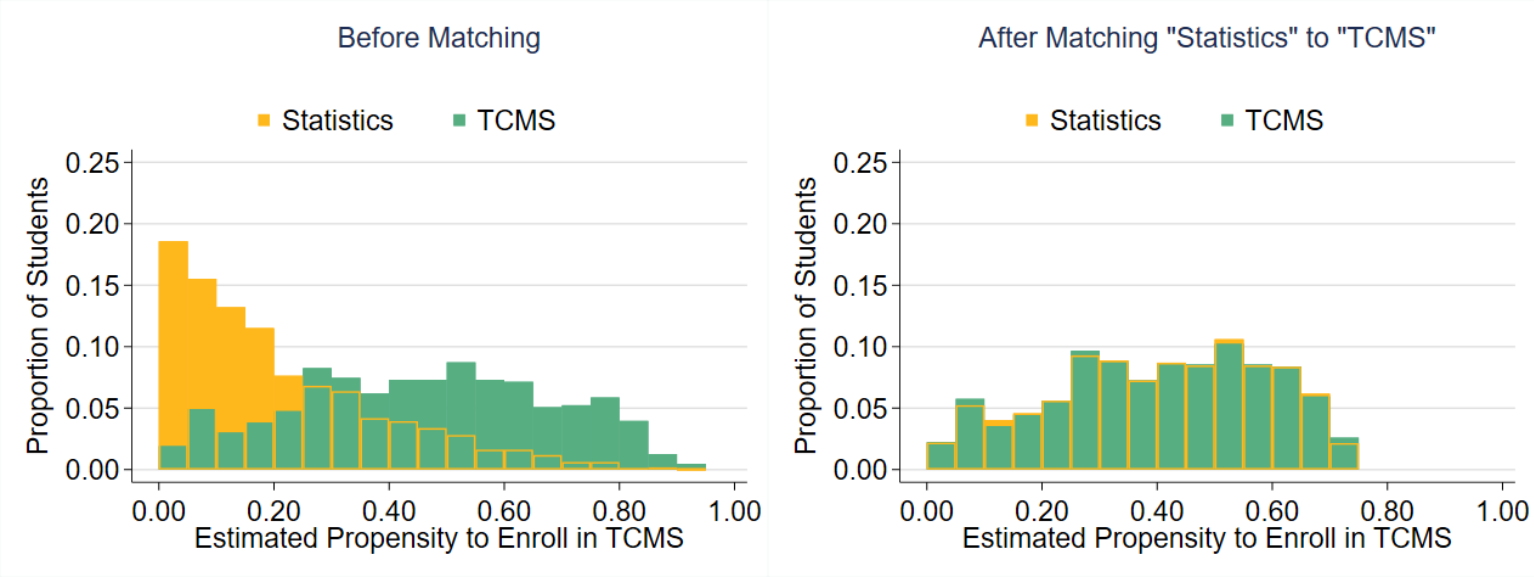
See the note on the first page of the table.

Table C14 Continued. Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=334)	TCMS (N=285)	SMD	VR	Statistics (N=217)	TCMS (N=205)	SMD	VR
Standardized Math SBAC Score in 11th (Squared)	0.593	0.353	-0.346	0.422	0.414	0.394	-0.036	1.069
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	7.125	3.776	-0.302	0.351	5.356	4.255	-0.116	0.730
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.210	1.498	0.061	1.043	1.135	0.946	-0.055	0.989
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.383	0.512	0.080	1.440	0.409	0.410	0.001	0.951
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.105	0.439	0.175	16.445	0.425	0.205	-0.172	0.868
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.120	0.228	0.112	3.008	0.200	0.195	-0.005	0.632
Highest ERW PSAT Score by the End of 11th (Squared)	207391.379	188893.099	-0.314	0.762	200240.294	190538.617	-0.162	0.864
Highest Math PSAT Score by the End of 11th (Squared)	195011.031	184947.702	-0.202	0.796	190438.207	187439.256	-0.064	1.058
Work Effort GPA in 11th	2.493	2.384	-0.349	1.025	2.402	2.412	0.033	1.016
Cooperation GPA in 11th	2.645	2.568	-0.306	1.030	2.596	2.595	-0.005	1.154
Attendance Rate in 11th	0.970	0.965	-0.146	1.257	0.970	0.969	-0.051	1.140
Ever Suspended from 9th-11th	-	-	0.189	Inf	-	-	N/A	N/A
Educational Expectations in 11th: Unsure	0.063	0.091	0.106	1.408	0.099	0.083	-0.055	0.845
Educational Expectations in 11th: HS or Less	0.036	0.046	0.049	1.257	0.058	0.059	0.002	0.998
Educational Expectations in 11th: Associate Degree or Certificate	0.048	0.063	0.067	1.298	-	-	0.021	1.078
Educational Expectations in 11th: Bachelor's Degree or Higher	0.635	0.554	-0.164	1.066	0.534	0.605	0.142	0.951
Educational Expectations in 11th: Missing	0.219	0.246	0.064	1.085	0.260	0.200	-0.141	0.824
Growth Mindset in 11th	0.053	-0.085	-0.152	1.110	-0.111	-0.087	0.025	1.054
Missing Dummy: Growth Mindset in 11th	0.225	0.232	0.017	1.022	0.255	0.190	-0.155	0.803
Academic Self-Efficacy in 11th	0.021	-0.056	-0.094	0.978	-0.172	-0.038	0.162	0.964
Missing Dummy: Academic Self-Efficacy in 11th	0.216	0.232	0.038	1.053	0.255	0.190	-0.155	0.803
Indicator of 2016-17 Cohort	0.925	0.902	-0.083	1.280	0.911	0.888	-0.077	1.218

See the note on the first page of the table.

Figure C15. Distributions of Estimated Propensities of Taking TCMS over Statistics in Group 4 Before and After Matching, Using School-Cohort Controls



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school-cohort controls. See Appendix B for more detail.

Table C15. Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,599)	TCMS (N=630)	SMD	VR	Statistics (N=827)	TCMS (N=538)	SMD	VR
Age (in Months)	195.151	195.029	-0.023	0.825	195.075	195.083	0.002	0.828
Gender: Female	0.537	0.598	0.125	0.967	0.596	0.565	-0.063	1.021
Race/Ethnicity: Asian	-	-	-0.108	0.418	-	-	0.007	1.070
Race/Ethnicity: African American	0.109	0.095	-0.045	0.889	0.069	0.091	0.082	1.292
Race/Ethnicity: Latinx	0.772	0.841	0.175	0.760	0.866	0.836	-0.084	1.180
Race/Ethnicity: Filipinx	-	-	-0.113	0.449	-	-	0.024	1.246
Race/Ethnicity: White	0.056	0.032	-0.117	0.585	0.034	0.037	0.016	1.083
Race/Ethnicity: Other	-	-	-0.017	0.848	-	-	0.011	1.110
Ever Subsidized Meal Eligible from 9th-11th	0.916	0.948	0.127	0.643	0.956	0.941	-0.069	1.323
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.034	0.744	-	-	0.043	1.514
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.227	0.292	0.149	1.179	0.282	0.275	-0.015	0.985
Parents'/Guardians' Educational Attainment: HS Graduate	0.216	0.241	0.061	1.083	0.286	0.249	-0.084	0.915
Parents'/Guardians' Educational Attainment: Some College	0.131	0.132	0.003	1.008	0.120	0.128	0.024	1.055
Parents'/Guardians' Educational Attainment: College Graduate	0.092	0.060	-0.119	0.680	0.053	0.059	0.027	1.111
Parents'/Guardians' Educational Attainment: Graduate School	0.030	0.024	-0.038	0.799	0.026	0.022	-0.022	0.872
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.305	0.251	-0.120	0.888	0.233	0.266	0.076	1.093
Nonresident School Enrollment in 11th	0.383	0.284	-0.212	0.861	0.304	0.286	-0.040	0.965
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.111	0.244	-	-	0.035	1.996
Number of School Moves from 9th-11th	0.079	0.088	0.031	1.021	0.094	0.096	0.008	0.937
Missing Dummy: Number of School Moves from 9th-11th	0.066	0.057	-0.038	0.871	0.056	0.061	0.024	1.093
English Learner Status in 11th: English Only	0.309	0.290	-0.040	0.966	0.256	0.283	0.059	1.064
English Learner Status in 11th: Initial Fluent English Proficient	0.158	0.138	-0.057	0.895	0.157	0.151	-0.016	0.968
English Learner Status in 11th: Limited English Proficient	0.031	0.038	0.041	1.235	0.031	0.035	0.023	1.126
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.502	0.533	0.062	0.997	0.556	0.532	-0.049	1.008
Gifted and Talented Program Participation in 11th	0.128	0.089	-0.125	0.728	0.085	0.091	0.022	1.067
Math 11th Grade Weighted GPA	2.636	2.395	-0.302	0.871	2.376	2.432	0.073	1.041
Cumulative Overall Weighted GPA at the End of 11th	2.899	2.739	-0.299	0.868	2.745	2.758	0.025	1.050

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after substituting school-level controls for school fixed effects in the propensity score model. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C15 Continued. Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,599)	TCMS (N=630)	SMD	VR	Statistics (N=827)	TCMS (N=538)	SMD	VR
Standardized ELA SBAC Score in 11th	0.180	0.058	-0.166	0.816	0.117	0.074	-0.062	0.991
Standardized Math SBAC Score in 11th	0.023	-0.082	-0.158	0.775	-0.038	-0.075	-0.059	1.032
Number of Semesters of AP Classes Taken from 9th-11th	1.955	0.952	-0.518	0.441	1.037	1.050	0.008	1.061
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	0.038	0.038	0.003	1.016	0.039	0.039	0.000	1.000
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.540	0.592	0.046	1.168	0.517	0.589	0.066	1.152
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.249	0.267	0.027	1.047	0.251	0.262	0.017	1.024
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.158	0.195	0.064	1.345	0.146	0.188	0.071	1.287
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.104	0.108	0.008	1.173	0.108	0.097	-0.029	0.913
Highest ERW PSAT Score by the End of 11th	435.781	416.091	-0.299	0.893	422.576	418.931	-0.057	1.042
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.046	0.062	0.069	1.317	0.045	0.058	0.055	1.254
Highest Math PSAT Score by the End of 11th	431.562	415.288	-0.274	0.909	419.780	417.820	-0.034	0.949
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.043	0.060	0.078	1.374	0.045	0.056	0.051	1.235
Took the SAT or ACT before 12th	0.377	0.230	-0.324	0.755	0.215	0.240	0.059	1.080
Participation in the AVID Program in 11th	0.049	0.037	-0.061	0.759	0.055	0.043	-0.055	0.792
Took a College or Career Seminar Course in 11th	0.173	0.206	0.086	1.148	0.177	0.206	0.075	1.124
Math 11th Grade Weighted GPA (Squared)	7.626	6.326	-0.309	0.773	6.220	6.512	0.074	1.043
Cumulative Overall Weighted GPA at the End of 11th (Squared)	8.711	7.766	-0.309	0.783	7.791	7.873	0.029	1.031
Standardized ELA SBAC Score in 11th (Squared)	0.628	0.489	-0.177	0.672	0.513	0.500	-0.018	0.895
Standardized Math SBAC Score in 11th (Squared)	0.494	0.389	-0.163	0.626	0.390	0.407	0.029	1.057
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	9.033	3.201	-0.450	0.182	3.432	3.604	0.022	0.936
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.465	1.719	0.047	1.326	1.384	1.634	0.049	0.898
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.470	0.498	0.016	1.154	0.459	0.474	0.010	1.168

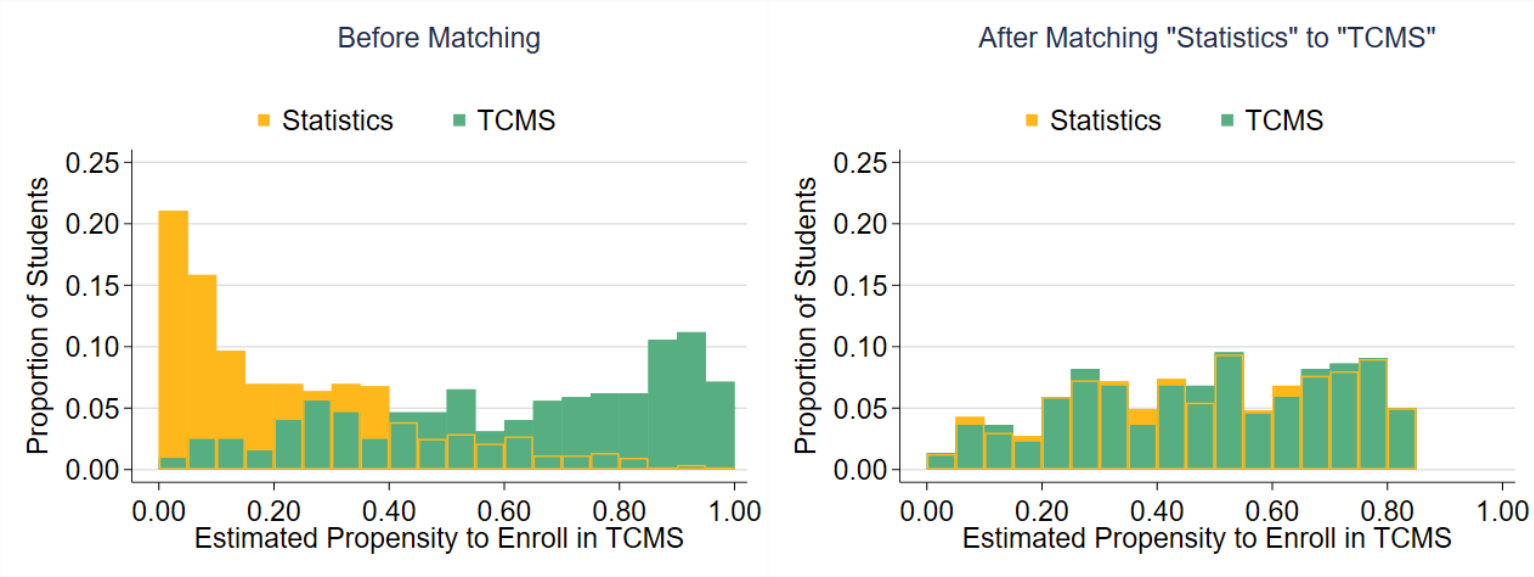
See the note on the first page of the table.

Table C15 Continued. Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,599)	TCMS (N=630)	SMD	VR	Statistics (N=827)	TCMS (N=538)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.319	0.433	0.055	2.062	0.319	0.418	0.043	1.165
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.177	0.206	0.028	1.610	0.177	0.160	-0.021	0.881
Highest ERW PSAT Score by the End of 11th (Squared)	194486.120	177217.875	-0.301	0.761	182510.522	179611.019	-0.053	0.983
Highest Math PSAT Score by the End of 11th (Squared)	189948.621	175827.938	-0.286	0.841	179619.861	177803.729	-0.038	0.994
Work Effort GPA in 11th	2.477	2.407	-0.221	0.893	2.408	2.413	0.013	0.962
Cooperation GPA in 11th	2.625	2.556	-0.265	0.871	2.563	2.565	0.010	0.890
Attendance Rate in 11th	0.970	0.968	-0.073	1.129	0.967	0.967	0.024	0.944
Ever Suspended from 9th-11th	-	-	0.052	1.685	-	-	-0.004	0.968
Educational Expectations in 11th: Unsure	0.083	0.117	0.116	1.370	0.104	0.112	0.025	1.066
Educational Expectations in 11th: HS or Less	0.027	0.044	0.095	1.624	0.042	0.043	0.004	1.017
Educational Expectations in 11th: Associate Degree or Certificate	0.033	0.067	0.158	1.980	0.058	0.056	-0.010	0.964
Educational Expectations in 11th: Bachelor's Degree or Higher	0.587	0.578	-0.018	1.007	0.582	0.571	-0.023	1.007
Educational Expectations in 11th: Missing	0.271	0.194	-0.185	0.790	0.214	0.219	0.012	1.016
Growth Mindset in 11th	0.070	0.004	-0.077	1.269	-0.049	-0.002	0.052	0.989
Missing Dummy: Growth Mindset in 11th	0.256	0.184	-0.174	0.790	0.209	0.210	0.004	1.005
Academic Self-Efficacy in 11th	0.000	-0.045	-0.053	1.124	-0.038	-0.044	-0.007	0.999
Missing Dummy: Academic Self-Efficacy in 11th	0.253	0.184	-0.168	0.795	0.207	0.210	0.006	1.009
Indicator of 2016-17 Cohort	0.570	0.767	0.427	0.730	0.779	0.738	-0.096	1.124

See the note on the first page of the table.

Figure C16. Distributions of Estimated Propensities of Taking TCMS over Statistics in Group 5 Before and After Matching, Using School Fixed Effects



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail.

Table C16. Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=518)	TCMS (N=322)	SMD	VR	Statistics (N=316)	TCMS (N=220)	SMD	VR
Age (in Months)	194.646	194.893	0.053	1.299	194.621	194.804	0.038	1.146
Gender: Female	0.625	0.621	-0.009	1.006	0.620	0.645	0.053	0.969
Race/Ethnicity: Asian	-	-	-0.233	0.348	-	-	0.074	1.568
Race/Ethnicity: African American	0.054	0.084	0.118	1.504	0.049	0.059	0.044	1.189
Race/Ethnicity: Latinx	0.736	0.820	0.204	0.760	0.846	0.827	-0.052	1.097
Race/Ethnicity: Filipinx	-	-	-0.208	0.357	-	-	0.075	1.645
Race/Ethnicity: White	-	-	-0.152	0.524	0.054	0.050	-0.016	0.934
Race/Ethnicity: Other	-	-	0.119	3.979	-	-	-0.103	0.315
Ever Subsidized Meal Eligible from 9th-11th	0.927	0.953	0.113	0.654	-	-	-0.009	1.037
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.082	0.324	-	-	N/A	N/A
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.222	0.286	0.147	1.183	0.268	0.245	-0.052	0.942
Parents'/Guardians' Educational Attainment: HS Graduate	0.214	0.217	0.008	1.012	0.219	0.223	0.009	1.010
Parents'/Guardians' Educational Attainment: Some College	0.125	0.140	0.042	1.097	0.140	0.150	0.028	1.057
Parents'/Guardians' Educational Attainment: College Graduate	0.116	0.099	-0.053	0.875	0.107	0.114	0.020	1.050
Parents'/Guardians' Educational Attainment: Graduate School	0.035	0.037	0.013	1.071	0.028	0.027	-0.006	0.967
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.288	0.220	-0.155	0.840	0.237	0.241	0.009	1.008
Nonresident School Enrollment in 11th	0.502	0.484	-0.035	1.000	0.482	0.491	0.018	0.999
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.157	0.348	-	-	-0.032	0.802
Number of School Moves from 9th-11th	0.063	0.047	-0.066	0.565	0.060	0.047	-0.054	0.766
Missing Dummy: Number of School Moves from 9th-11th	-	-	-0.058	0.723	-	-	0.034	1.356
English Learner Status in 11th: English Only	0.276	0.283	0.015	1.016	0.262	0.268	0.014	1.013
English Learner Status in 11th: Initial Fluent English Proficient	0.224	0.180	-0.109	0.851	0.163	0.186	0.062	1.111
English Learner Status in 11th: Limited English Proficient	-	-	0.073	1.997	-	-	-0.072	0.530
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.492	0.522	0.059	1.000	0.558	0.536	-0.044	1.006
Gifted and Talented Program Participation in 11th	0.359	0.220	-0.309	0.748	0.256	0.264	0.017	1.016
Math 11th Grade Weighted GPA	2.980	2.401	-0.513	0.780	2.580	2.562	-0.016	0.974

Note: These diagnostics correspond to the matching in our preferred estimation strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C16 Continued. Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=518)	TCMS (N=322)	SMD	VR	Statistics (N=316)	TCMS (N=220)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th	3.313	3.044	-0.528	1.010	3.075	3.152	0.151	0.941
Standardized ELA SBAC Score in 11th	0.708	0.363	-0.514	0.872	0.456	0.510	0.088	1.054
Standardized Math SBAC Score in 11th	0.683	0.354	-0.493	0.665	0.474	0.486	0.020	1.095
Number of Semesters of AP Classes Taken from 9th-11th	3.429	2.148	-0.472	0.729	2.474	2.542	0.028	1.094
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	-	-	0.017	1.148	-	-	0.043	1.657
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.263	0.298	0.046	1.382	0.362	0.291	-0.086	0.801
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.097	0.193	0.195	2.015	0.149	0.136	-0.027	0.825
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.064	0.096	0.076	2.558	0.089	0.068	-0.058	0.532
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.041	0.112	0.181	3.208	0.075	0.064	-0.031	0.730
Highest ERW PSAT Score by the End of 11th	491.396	457.861	-0.473	0.861	467.106	470.457	0.048	0.961
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	-0.055	0.649	-	-	0.055	1.987
Highest Math PSAT Score by the End of 11th	481.742	458.314	-0.338	0.677	467.060	464.857	-0.032	0.946
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.055	0.649	-	-	0.055	1.987
Took the SAT or ACT before 12th	0.353	0.295	-0.125	0.911	0.290	0.314	0.051	1.043
Participation in the AVID Program in 11th	-	-	-0.024	0.890	-	-	-0.063	0.749
Took a College or Career Seminar Course in 11th	0.156	0.155	-0.003	0.995	0.150	0.164	0.037	1.071
Took a Precalculus Course by the End of 11th	0.857	0.646	-0.503	1.870	0.785	0.759	-0.061	1.080
Took an IDS Course by the End of 11th	-	-	0.053	1.350	-	-	-0.013	0.944
Took a Statistics Course by the End of 11th	0.097	0.311	0.551	2.458	0.143	0.182	0.106	1.213
Took Other Advanced Math by the End of 11th	-	-	-0.097	0.445	-	-	-0.080	0.561
Math 11th Grade Weighted GPA (Squared)	10.309	6.877	-0.565	0.631	7.906	7.784	-0.021	0.964
Cumulative Overall Weighted GPA at the End of 11th (Squared)	11.234	9.526	-0.538	0.895	9.723	10.192	0.150	1.032
Standardized ELA SBAC Score in 11th (Squared)	0.981	0.550	-0.520	0.535	0.577	0.651	0.108	1.190
Standardized Math SBAC Score in 11th (Squared)	1.002	0.481	-0.537	0.367	0.577	0.623	0.062	1.474
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	20.254	10.802	-0.351	0.504	11.760	12.647	0.044	1.194

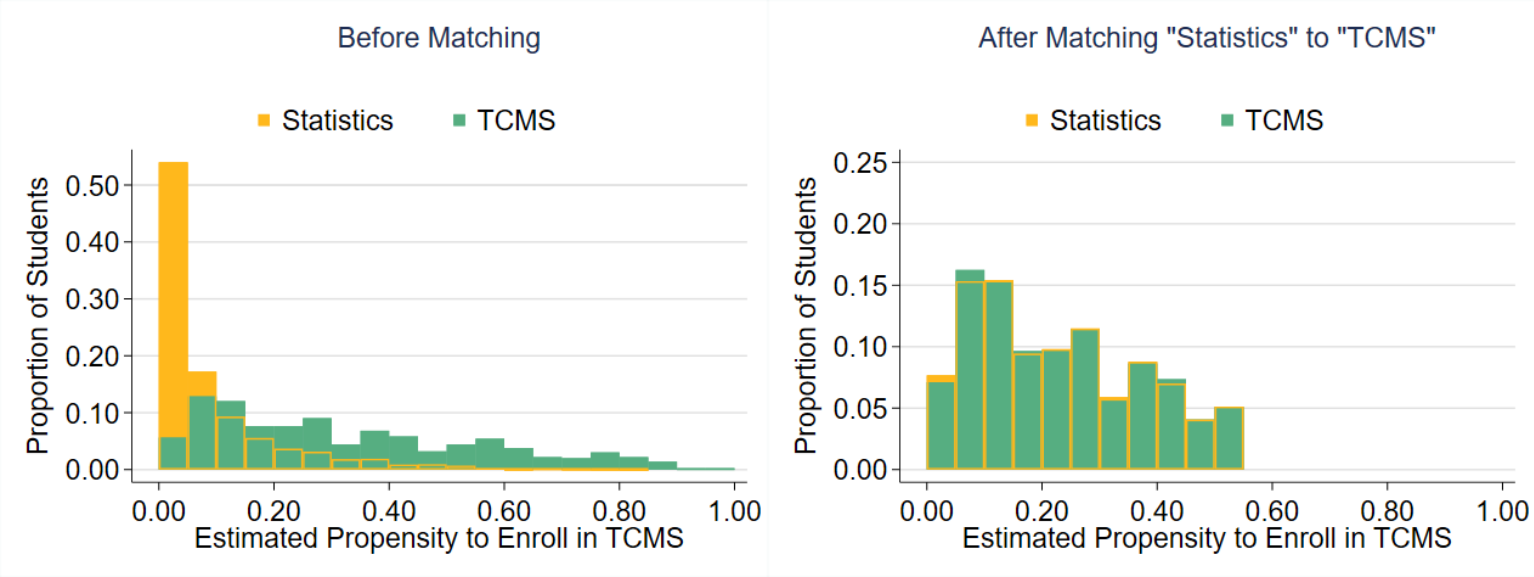
See the note on the first page of the table.

Table C16 Continued. Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=518)	TCMS (N=322)	SMD	VR	Statistics (N=316)	TCMS (N=220)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.571	0.783	0.067	2.101	0.875	0.682	-0.064	0.679
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.170	0.360	0.157	3.508	0.264	0.218	-0.052	0.749
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.106	0.270	0.081	15.902	0.178	0.095	-0.105	0.256
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.075	0.248	0.160	7.380	0.149	0.109	-0.058	0.643
Highest ERW PSAT Score by the End of 11th (Squared)	246852.396	214263.095	-0.479	0.774	223085.928	226046.856	0.045	0.989
Highest Math PSAT Score by the End of 11th (Squared)	237781.214	213909.154	-0.374	0.655	222999.622	220693.517	-0.037	1.006
Work Effort GPA in 11th	2.606	2.496	-0.360	1.038	2.532	2.542	0.032	0.952
Cooperation GPA in 11th	2.743	2.644	-0.411	1.430	2.692	2.688	-0.014	0.912
Attendance Rate in 11th	0.975	0.971	-0.147	1.359	0.971	0.973	0.063	1.424
Ever Suspended from 9th-11th	-	-	0.112	Inf	-	-	N/A	N/A
Educational Expectations in 11th: Unsure	0.095	0.096	0.006	1.017	0.110	0.114	0.012	1.027
Educational Expectations in 11th: HS or Less	-	-	-0.089	0.406	-	-	0.010	1.108
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.111	1.866	-	-	0.010	1.056
Educational Expectations in 11th: Bachelor's Degree or Higher	0.668	0.646	-0.046	1.032	0.659	0.655	-0.010	1.004
Educational Expectations in 11th: Missing	0.201	0.211	0.026	1.039	0.193	0.191	-0.005	0.991
Growth Mindset in 11th	0.277	0.124	-0.190	1.446	0.181	0.216	0.043	1.120
Missing Dummy: Growth Mindset in 11th	0.203	0.211	0.021	1.032	0.192	0.191	-0.002	0.994
Academic Self-Efficacy in 11th	0.028	0.050	0.026	1.115	-0.018	0.026	0.047	0.923
Missing Dummy: Academic Self-Efficacy in 11th	0.203	0.208	0.013	1.021	0.189	0.191	0.005	1.005
Indicator of 2016-17 Cohort	0.921	0.882	-0.130	1.430	0.909	0.923	0.049	0.861

See the note on the first page of the table.

Figure C17. Distributions of Estimated Propensities of Taking TCMS over Statistics in Group 5 Before and After Matching, Using School-Cohort Controls



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school-cohort controls. See Appendix B for more detail.

Table C17. Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=3,687)	TCMS (N=498)	SMD	VR	Statistics (N=1,017)	TCMS (N=394)	SMD	VR
Age (in Months)	194.849	194.941	0.019	1.039	194.659	194.907	0.052	1.006
Gender: Female	0.605	0.604	-0.001	1.002	0.613	0.635	0.044	0.979
Race/Ethnicity: Asian	-	-	-0.192	0.367	-	-	0.003	1.021
Race/Ethnicity: African American	0.080	0.064	-0.060	0.821	0.063	0.061	-0.008	0.971
Race/Ethnicity: Latinx	0.718	0.861	0.358	0.590	0.842	0.850	0.022	0.959
Race/Ethnicity: Filipinx	-	-	-0.206	0.331	-	-	-0.013	0.921
Race/Ethnicity: White	0.083	0.026	-0.253	0.334	0.034	0.030	-0.020	0.900
Race/Ethnicity: Other	-	-	0.053	1.846	-	-	-0.010	0.911
Ever Subsidized Meal Eligible from 9th-11th	0.883	0.940	0.201	0.548	0.937	0.934	-0.010	1.038
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.077	0.383	-	-	-0.048	0.558
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.234	0.293	0.134	1.157	0.287	0.287	0.000	1.001
Parents'/Guardians' Educational Attainment: HS Graduate	0.190	0.215	0.061	1.096	0.221	0.213	-0.018	0.976
Parents'/Guardians' Educational Attainment: Some College	0.126	0.131	0.015	1.035	0.111	0.124	0.043	1.108
Parents'/Guardians' Educational Attainment: College Graduate	0.112	0.080	-0.108	0.742	0.091	0.086	-0.018	0.951
Parents'/Guardians' Educational Attainment: Graduate School	0.047	0.038	-0.042	0.827	0.025	0.030	0.031	1.195
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.291	0.243	-0.108	0.894	0.265	0.259	-0.014	0.986
Nonresident School Enrollment in 11th	0.423	0.367	-0.113	0.954	0.417	0.371	-0.095	0.961
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.087	0.454	-	-	-0.015	0.872
Number of School Moves from 9th-11th	0.059	0.046	-0.061	0.667	0.049	0.047	-0.009	0.907
Missing Dummy: Number of School Moves from 9th-11th	0.034	0.024	-0.058	0.719	-	-	0.034	1.245
English Learner Status in 11th: English Only	0.314	0.267	-0.102	0.911	0.262	0.251	-0.026	0.973
English Learner Status in 11th: Initial Fluent English Proficient	0.200	0.195	-0.012	0.983	0.181	0.203	0.057	1.094
English Learner Status in 11th: Limited English Proficient	-	-	0.016	1.152	-	-	-0.005	0.954

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after substituting school-level controls for school fixed effects in the propensity score model. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C17 Continued. Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=3,687)	TCMS (N=498)	SMD	VR	Statistics (N=1,017)	TCMS (N=394)	SMD	VR
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.475	0.524	0.099	1.002	0.546	0.536	-0.021	1.005
Gifted and Talented Program Participation in 11th	0.322	0.221	-0.230	0.789	0.244	0.244	-0.001	1.000
Math 11th Grade Weighted GPA	2.954	2.448	-0.435	0.829	2.517	2.530	0.012	0.969
Cumulative Overall Weighted GPA at the End of 11th	3.304	3.092	-0.393	0.931	3.142	3.150	0.016	1.016
Standardized ELA SBAC Score in 11th	0.594	0.335	-0.366	0.772	0.387	0.382	-0.007	1.009
Standardized Math SBAC Score in 11th	0.574	0.353	-0.335	0.684	0.419	0.381	-0.061	1.016
Number of Semesters of AP Classes Taken from 9th-11th	3.761	2.136	-0.587	0.689	2.458	2.549	0.035	0.934
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	-	-	0.006	1.059	-	-	-0.022	0.792
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.338	0.317	-0.024	0.873	0.327	0.350	0.027	1.212
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.120	0.163	0.088	1.348	0.164	0.137	-0.055	0.839
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.124	0.104	-0.039	1.026	0.103	0.112	0.018	1.270
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.046	0.080	0.099	2.256	0.076	0.053	-0.064	0.707
Highest ERW PSAT Score by the End of 11th	478.852	448.784	-0.417	0.800	456.737	453.221	-0.051	1.013
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.047	0.028	-0.100	0.609	0.026	0.033	0.042	1.267
Highest Math PSAT Score by the End of 11th	477.730	446.907	-0.461	0.811	450.823	449.594	-0.019	0.987
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.046	0.028	-0.095	0.622	0.026	0.033	0.042	1.267
Took the SAT or ACT before 12th	0.548	0.295	-0.528	0.841	0.306	0.343	0.078	1.062
Participation in the AVID Program in 11th	0.044	0.050	0.030	1.137	0.051	0.056	0.020	1.085
Took a College or Career Seminar Course in 11th	0.156	0.175	0.049	1.094	0.167	0.198	0.080	1.143
Took a Precalculus Course by the End of 11th	0.911	0.747	-0.446	2.336	0.855	0.848	-0.021	1.044
Took an IDS Course by the End of 11th	0.029	0.030	0.005	1.029	0.033	0.033	0.000	1.001
Took a Statistics Course by the End of 11th	0.049	0.213	0.500	3.595	0.105	0.107	0.005	1.014
Took Other Advanced Math by the End of 11th	-	-	-0.005	0.951	-	-	0.062	1.913

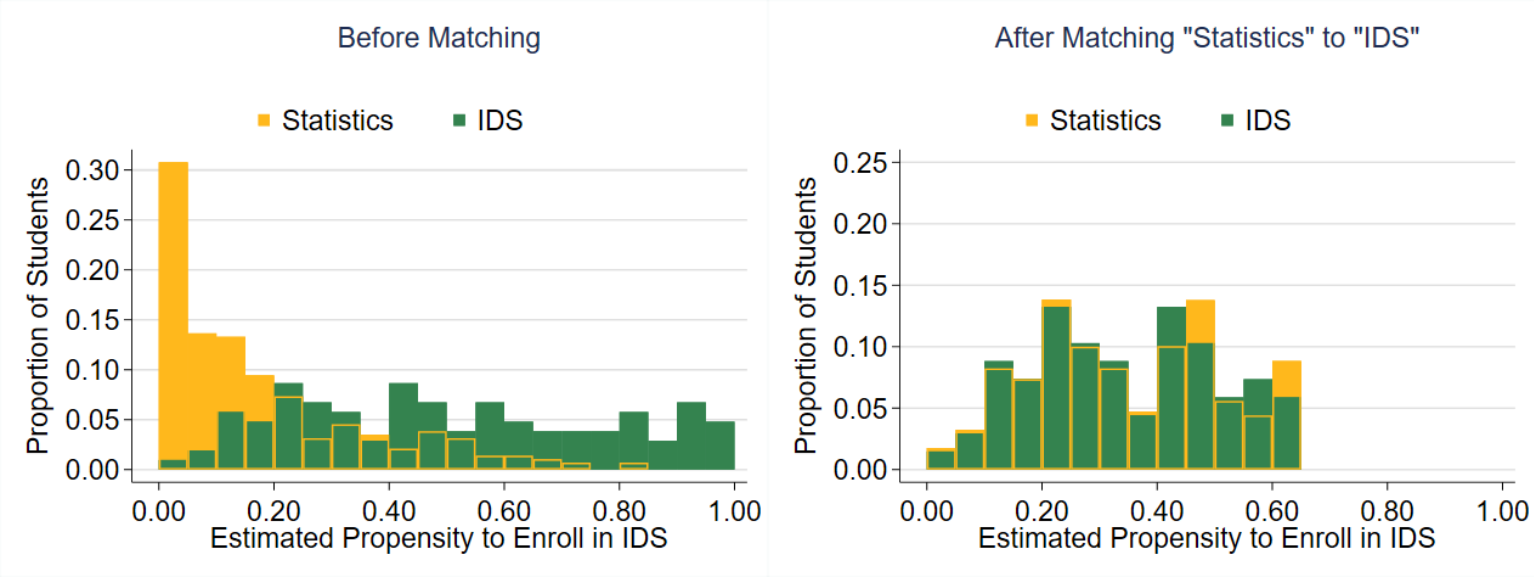
See the note on the first page of the table.

Table C17 Continued. Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=3,687)	TCMS (N=498)	SMD	VR	Statistics (N=1,017)	TCMS (N=394)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	10.203	7.215	-0.476	0.718	7.699	7.723	0.004	1.112
Cumulative Overall Weighted GPA at the End of 11th (Squared)	11.216	9.841	-0.408	0.855	10.142	10.198	0.017	1.024
Standardized ELA SBAC Score in 11th (Squared)	0.915	0.546	-0.434	0.501	0.601	0.601	0.000	0.999
Standardized Math SBAC Score in 11th (Squared)	0.849	0.479	-0.430	0.455	0.560	0.536	-0.035	1.222
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	23.210	10.797	-0.464	0.448	13.233	13.213	-0.001	0.747
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.878	0.767	-0.032	0.788	0.740	0.888	0.046	1.688
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.220	0.303	0.067	1.499	0.302	0.249	-0.043	0.935
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.271	0.273	0.001	1.805	0.245	0.310	0.029	2.212
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.076	0.173	0.106	4.513	0.156	0.109	-0.049	0.884
Highest ERW PSAT Score by the End of 11th (Squared)	235067.784	206015.779	-0.423	0.708	213302.645	210161.558	-0.049	1.029
Highest Math PSAT Score by the End of 11th (Squared)	233169.913	203728.145	-0.477	0.703	207636.843	206469.745	-0.020	1.056
Work Effort GPA in 11th	2.582	2.504	-0.246	0.919	2.518	2.525	0.020	0.964
Cooperation GPA in 11th	2.714	2.650	-0.258	1.059	2.668	2.669	0.005	0.977
Attendance Rate in 11th	0.974	0.971	-0.112	1.339	0.970	0.970	-0.007	1.084
Ever Suspended from 9th-11th	-	-	-0.001	0.989	-	-	0.041	1.997
Educational Expectations in 11th: Unsure	0.070	0.088	0.067	1.235	0.082	0.081	-0.004	0.990
Educational Expectations in 11th: HS or Less	-	-	0.009	1.084	-	-	-0.026	0.810
Educational Expectations in 11th: Associate Degree or Certificate	0.020	0.044	0.141	2.209	0.048	0.038	-0.048	0.807
Educational Expectations in 11th: Bachelor's Degree or Higher	0.655	0.669	0.029	0.982	0.642	0.665	0.048	0.970
Educational Expectations in 11th: Missing	0.244	0.187	-0.140	0.824	0.212	0.203	-0.023	0.969
Growth Mindset in 11th	0.151	0.156	0.005	1.242	0.206	0.194	-0.015	1.223
Missing Dummy: Growth Mindset in 11th	0.235	0.183	-0.128	0.832	0.215	0.198	-0.041	0.943
Academic Self-Efficacy in 11th	0.032	0.063	0.036	1.054	0.041	0.036	-0.007	1.106
Missing Dummy: Academic Self-Efficacy in 11th	0.236	0.181	-0.136	0.823	0.212	0.198	-0.035	0.951
Indicator of 2016-17 Cohort	0.466	0.811	0.770	0.616	0.801	0.782	-0.046	1.070

See the note on the first page of the table.

Figure C18. Distributions of Estimated Propensities of Taking IDS over Statistics in Group 4 Before and After Matching, Using School Fixed Effects



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail.

Table C18. Matching Diagnostics for IDS vs. Statistics in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "IDS"			
	Statistics (N=286)	IDS (N=104)	SMD	VR	Statistics (N=140)	IDS (N=68)	SMD	VR
Age (in Months)	194.740	196.025	0.252	1.255	195.803	195.471	-0.066	0.789
Gender: Female	0.476	0.529	0.106	1.005	0.470	0.485	0.031	1.005
Race/Ethnicity: Asian	-	-	-0.012	0.924	-	-	0.077	1.650
Race/Ethnicity: African American	-	-	0.000	1.006	-	-	0.024	1.079
Race/Ethnicity: Latinx	0.787	0.808	0.052	0.931	0.804	0.779	-0.061	1.095
Race/Ethnicity: Filipinx	-	-	0.103	1.812	-	-	0.018	1.110
Race/Ethnicity: White	-	-	-0.102	0.712	-	-	0.013	1.047
Race/Ethnicity: Other	-	-	-0.145	0.000	-	-	N/A	N/A
Ever Subsidized Meal Eligible from 9th-11th	-	-	0.102	0.712	-	-	-0.027	1.097
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.168	0.000	-	-	N/A	N/A
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.269	0.212	-0.135	0.853	0.285	0.235	-0.113	0.884
Parents'/Guardians' Educational Attainment: HS Graduate	0.248	0.298	0.112	1.128	0.279	0.279	0.002	1.004
Parents'/Guardians' Educational Attainment: Some College	0.126	0.096	-0.094	0.795	0.125	0.132	0.021	1.050
Parents'/Guardians' Educational Attainment: College Graduate	0.084	0.077	-0.026	0.929	0.040	0.074	0.146	1.791
Parents'/Guardians' Educational Attainment: Graduate School	0.024	0.019	-0.036	0.795	0.019	0.029	0.068	1.545
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.248	0.298	0.112	1.128	0.252	0.250	-0.005	0.996
Nonresident School Enrollment in 11th	0.294	0.221	-0.166	0.835	0.230	0.309	0.178	1.209
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.118	0.000	-	-	N/A	N/A
Number of School Moves from 9th-11th	0.086	0.091	0.018	1.162	0.135	0.116	-0.055	1.021
Missing Dummy: Number of School Moves from 9th-11th	-	-	0.137	1.564	-	-	0.030	1.097
English Learner Status in 11th: English Only	0.318	0.298	-0.043	0.970	0.347	0.324	-0.048	0.969
English Learner Status in 11th: Initial Fluent English Proficient	0.147	0.135	-0.035	0.936	-	-	-0.056	0.901
English Learner Status in 11th: Limited English Proficient	-	-	0.153	2.698	-	-	0.171	Inf

Note: These diagnostics correspond to the matching in our preferred estimation strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school fixed effects. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C18 Continued. Matching Diagnostics for IDS vs. Statistics in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "IDS"			
	Statistics (N=286)	IDS (N=104)	SMD	VR	Statistics (N=140)	IDS (N=68)	SMD	VR
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.521	0.529	0.016	1.005	0.486	0.515	0.057	1.002
Gifted and Talented Program Participation in 11th	-	-	-0.229	0.536	-	-	0.102	1.354
Math 11th Grade Weighted GPA	2.526	2.198	-0.403	0.952	2.313	2.319	0.007	1.154
Cumulative Overall Weighted GPA at the End of 11th	2.895	2.732	-0.307	1.010	2.779	2.778	-0.002	0.976
Standardized ELA SBAC Score in 11th	0.152	-0.014	-0.218	1.224	0.033	0.086	0.064	0.892
Standardized Math SBAC Score in 11th	0.114	-0.012	-0.206	0.954	0.074	0.090	0.025	1.110
Number of Semesters of AP Classes Taken from 9th-11th	1.766	1.399	-0.161	0.822	1.545	1.651	0.048	1.246
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	-	-	0.005	1.037	-	-	-0.043	0.798
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.416	0.606	0.176	1.638	0.567	0.485	-0.078	0.901
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.308	0.317	0.013	0.937	0.266	0.294	0.039	1.267
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.094	0.135	0.086	1.675	0.090	0.074	-0.048	0.759
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.119	0.058	-0.157	0.446	0.035	0.088	0.170	2.700
Highest ERW PSAT Score by the End of 11th	442.738	434.820	-0.113	1.170	442.559	443.764	0.017	1.220
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	0.019	1.103	-	-	0.091	1.597
Highest Math PSAT Score by the End of 11th	437.461	424.586	-0.188	1.354	437.511	439.820	0.036	1.096
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	0.058	1.369	-	-	0.091	1.597
Took the SAT or ACT before 12th	0.311	0.260	-0.114	0.902	0.333	0.250	-0.182	0.846
Participation in the AVID Program in 11th	-	-	-0.320	0.000	-	-	N/A	N/A
Took a College or Career Seminar Course in 11th	-	-	0.041	1.376	-	-	0.078	2.209
Math 11th Grade Weighted GPA (Squared)	7.059	5.472	-0.386	0.747	5.969	6.087	0.029	1.117
Cumulative Overall Weighted GPA at the End of 11th (Squared)	8.658	7.743	-0.302	0.930	8.014	8.000	-0.005	0.977
Standardized ELA SBAC Score in 11th (Squared)	0.543	0.633	0.102	1.394	0.716	0.644	-0.071	0.713
Standardized Math SBAC Score in 11th (Squared)	0.398	0.365	-0.067	0.770	0.376	0.419	0.081	0.957

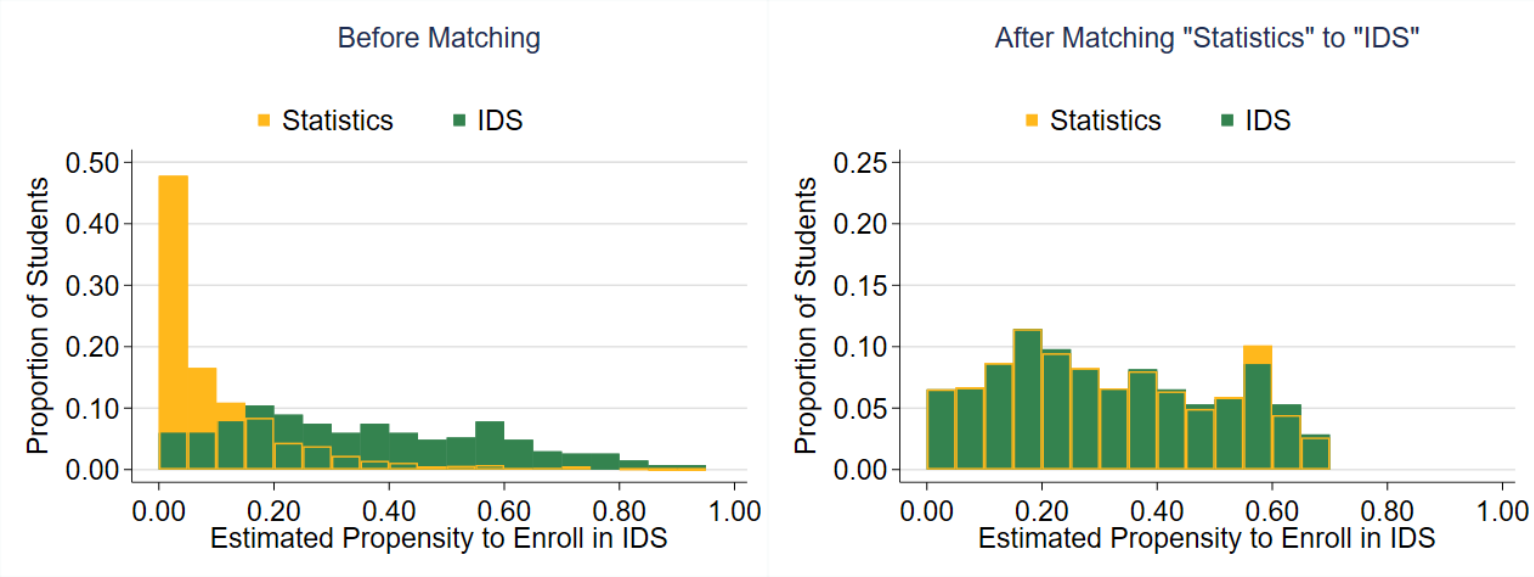
See the note on the first page of the table.

Table C18 Continued. Matching Diagnostics for IDS vs. Statistics in Group 4, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "IDS"			
	Statistics (N=286)	IDS (N=104)	SMD	VR	Statistics (N=140)	IDS (N=68)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	8.835	6.624	-0.127	0.730	6.712	8.106	0.084	1.283
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.052	1.798	0.175	1.798	1.484	1.279	-0.054	0.848
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.699	0.663	-0.016	0.774	0.538	0.676	0.064	1.502
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.171	0.288	0.082	2.096	0.137	0.103	-0.051	0.440
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.224	0.096	-0.138	0.230	0.053	0.147	0.166	3.073
Highest ERW PSAT Score by the End of 11th (Squared)	200513.082	194298.236	-0.099	1.056	200430.921	202491.359	0.032	1.109
Highest Math PSAT Score by the End of 11th (Squared)	195351.381	185626.418	-0.170	1.300	195309.631	197698.686	0.043	1.162
Work Effort GPA in 11th	2.447	2.415	-0.092	1.163	2.403	2.407	0.011	0.925
Cooperation GPA in 11th	2.630	2.588	-0.159	1.194	2.571	2.605	0.115	0.809
Attendance Rate in 11th	0.974	0.972	-0.094	0.991	0.975	0.974	-0.080	0.945
Ever Suspended from 9th-11th	-	-	-0.118	0.000	-	-	N/A	N/A
Educational Expectations in 11th: Unsure	0.094	0.144	0.154	1.453	-	-	-0.070	0.828
Educational Expectations in 11th: HS or Less	-	-	0.072	1.828	-	-	0.087	2.483
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.260	3.479	-	-	-0.131	0.607
Educational Expectations in 11th: Bachelor's Degree or Higher	0.650	0.510	-0.287	1.106	0.553	0.574	0.041	0.992
Educational Expectations in 11th: Missing	0.224	0.250	0.062	1.086	0.256	0.279	0.052	1.058
Growth Mindset in 11th	0.177	-0.028	-0.256	1.096	0.088	0.025	-0.086	1.028
Missing Dummy: Growth Mindset in 11th	0.224	0.240	0.039	1.058	0.259	0.279	0.046	1.051
Academic Self-Efficacy in 11th	-0.069	-0.120	-0.064	0.894	-0.067	-0.079	-0.015	0.897
Missing Dummy: Academic Self-Efficacy in 11th	0.224	0.250	0.062	1.086	0.259	0.279	0.046	1.051
Indicator of 2016-17 Cohort	0.594	0.548	-0.093	1.034	0.580	0.559	-0.042	1.014

See the note on the first page of the table.

Figure C19. Distributions of Estimated Propensities of Taking IDS over Statistics in Group 4 Before and After Matching, Using School-Cohort Controls



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school-cohort controls. See Appendix B for more detail.

Table C19. Matching Diagnostics for IDS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "IDS"			
	Statistics (N=1,599)	IDS (N=268)	SMD	VR	Statistics (N=484)	IDS (N=245)	SMD	VR
Age (in Months)	195.153	195.661	0.093	0.952	195.101	195.795	0.128	1.006
Gender: Female	0.537	0.582	0.090	0.982	0.543	0.555	0.023	0.995
Race/Ethnicity: Asian	-	-	-0.005	0.971	-	-	-0.048	0.741
Race/Ethnicity: African American	-	-	-0.296	0.336	-	-	0.036	1.208
Race/Ethnicity: Latinx	0.772	0.892	0.323	0.551	0.866	0.890	0.072	0.846
Race/Ethnicity: Filipinx	-	-	-0.066	0.657	-	-	-0.027	0.837
Race/Ethnicity: White	-	-	-0.107	0.619	-	-	-0.093	0.647
Race/Ethnicity: Other	-	-	-0.151	0.000	-	-	N/A	N/A
Ever Subsidized Meal Eligible from 9th-11th	0.916	0.948	0.128	0.642	0.929	0.947	0.074	0.762
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.001	0.998	-	-	-0.021	0.835
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.228	0.261	0.078	1.101	0.228	0.261	0.078	1.097
Parents'/Guardians' Educational Attainment: HS Graduate	0.216	0.254	0.090	1.123	0.278	0.257	-0.046	0.952
Parents'/Guardians' Educational Attainment: Some College	0.131	0.075	-0.185	0.610	0.092	0.082	-0.036	0.899
Parents'/Guardians' Educational Attainment: College Graduate	0.092	0.052	-0.154	0.595	0.065	0.057	-0.034	0.883
Parents'/Guardians' Educational Attainment: Graduate School	0.030	0.019	-0.074	0.631	0.019	0.020	0.012	1.085
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.304	0.340	0.076	1.063	0.319	0.322	0.008	1.006
Nonresident School Enrollment in 11th	0.383	0.213	-0.379	0.711	0.233	0.212	-0.049	0.936
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.044	1.417	-	-	-0.050	0.732
Number of School Moves from 9th-11th	0.079	0.094	0.052	1.352	0.107	0.103	-0.013	1.131
Missing Dummy: Number of School Moves from 9th-11th	0.066	0.060	-0.027	0.910	0.075	0.065	-0.036	0.884
English Learner Status in 11th: English Only	0.309	0.213	-0.220	0.787	0.249	0.229	-0.049	0.942
English Learner Status in 11th: Initial Fluent English Proficient	0.158	0.160	0.006	1.015	0.150	0.151	0.004	1.008
English Learner Status in 11th: Limited English Proficient	-	-	0.056	1.329	0.037	0.045	0.041	1.212
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.502	0.586	0.168	0.974	0.564	0.576	0.022	0.994
Gifted and Talented Program Participation in 11th	0.128	0.056	-0.250	0.476	0.076	0.061	-0.058	0.819
Math 11th Grade Weighted GPA	2.634	2.167	-0.587	0.874	2.251	2.226	-0.032	0.922

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after substituting school-level controls for school fixed effects in the propensity score model. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C19 Continued. Matching Diagnostics for IDS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "IDS"			
	Statistics (N=1,599)	IDS (N=268)	SMD	VR	Statistics (N=484)	IDS (N=245)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th	2.898	2.768	-0.239	0.914	2.782	2.799	0.032	0.946
Standardized ELA SBAC Score in 11th	0.180	-0.038	-0.282	1.010	0.042	-0.016	-0.076	1.128
Standardized Math SBAC Score in 11th	0.023	-0.100	-0.185	0.779	-0.041	-0.066	-0.040	0.983
Number of Semesters of AP Classes Taken from 9th-11th	1.952	1.725	-0.103	0.861	1.824	1.764	-0.027	0.899
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	-	-	-0.042	0.804	-	-	-0.014	0.933
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.540	0.582	0.037	1.146	0.582	0.571	-0.009	0.929
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.248	0.354	0.147	1.572	0.287	0.335	0.066	1.426
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.158	0.172	0.024	1.274	0.165	0.151	-0.026	0.860
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.104	0.097	-0.019	0.845	0.079	0.094	0.041	1.233
Highest ERW PSAT Score by the End of 11th	435.706	422.422	-0.197	0.990	431.696	425.118	-0.095	0.979
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.046	0.049	0.010	1.049	0.037	0.049	0.058	1.302
Highest Math PSAT Score by the End of 11th	431.487	416.232	-0.242	1.143	421.804	419.065	-0.041	0.953
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.043	0.049	0.026	1.121	0.037	0.049	0.058	1.302
Took the SAT or ACT before 12th	0.377	0.377	-0.001	1.003	0.337	0.388	0.106	1.063
Participation in the AVID Program in 11th	-	-	-0.284	0.080	-	-	0.013	1.249
Took a College or Career Seminar Course in 11th	0.172	0.142	-0.083	0.857	0.134	0.151	0.049	1.107
Math 11th Grade Weighted GPA (Squared)	7.618	5.286	-0.576	0.646	5.681	5.522	-0.043	0.876
Cumulative Overall Weighted GPA at the End of 11th (Squared)	8.708	7.944	-0.247	0.825	8.030	8.110	0.027	0.936
Standardized ELA SBAC Score in 11th (Squared)	0.628	0.601	-0.031	1.006	0.560	0.630	0.082	1.168
Standardized Math SBAC Score in 11th (Squared)	0.494	0.393	-0.151	0.735	0.392	0.388	-0.006	0.841
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	9.023	7.448	-0.099	0.771	8.545	7.804	-0.047	0.884
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.465	1.679	0.043	0.998	1.700	1.592	-0.021	0.713
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.470	0.765	0.144	2.116	0.502	0.710	0.107	2.597
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.319	0.403	0.044	1.578	0.347	0.298	-0.029	0.565
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.177	0.149	-0.033	0.690	0.122	0.151	0.042	1.709

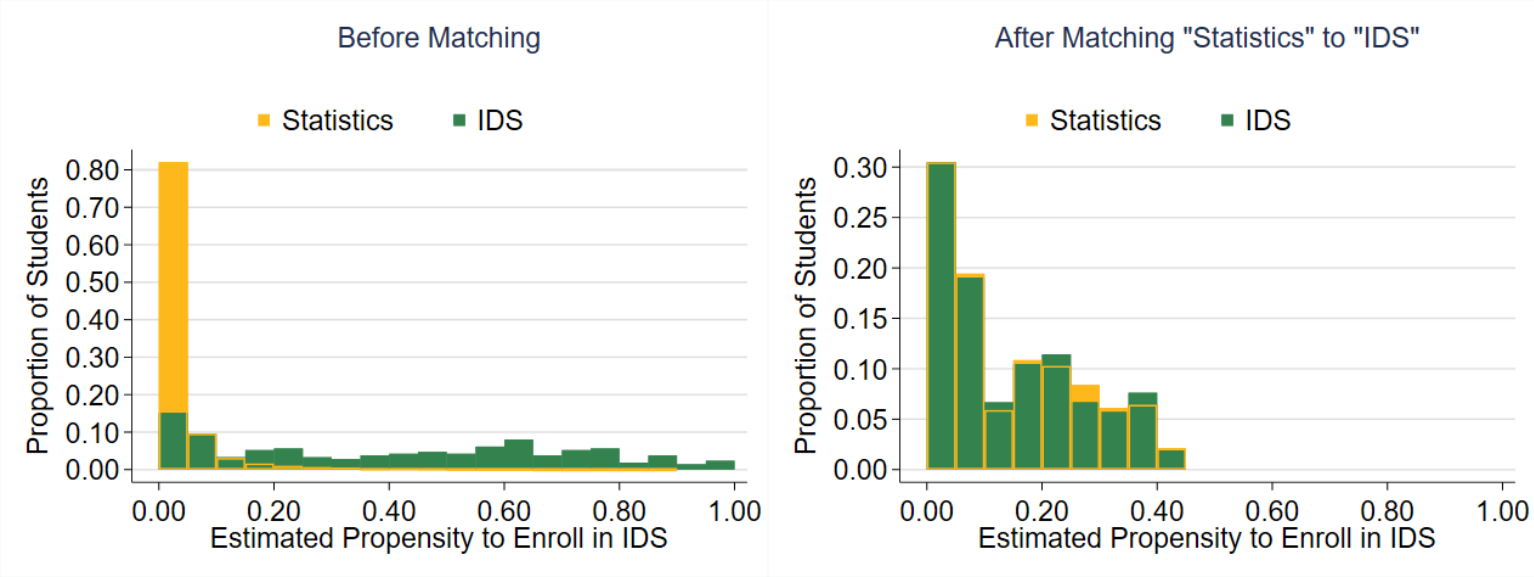
See the note on the first page of the table.

Table C19 Continued. Matching Diagnostics for IDS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "IDS"			
	Statistics (N=1,599)	IDS (N=268)	SMD	VR	Statistics (N=484)	IDS (N=245)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	194423.081	182965.126	-0.192	0.906	191190.351	185450.407	-0.094	0.897
Highest Math PSAT Score by the End of 11th (Squared)	189890.084	177475.296	-0.238	1.062	182460.315	179943.031	-0.046	0.945
Work Effort GPA in 11th	2.477	2.425	-0.159	1.022	2.431	2.437	0.017	0.998
Cooperation GPA in 11th	2.625	2.584	-0.149	1.031	2.611	2.598	-0.051	1.114
Attendance Rate in 11th	0.970	0.972	0.070	0.951	0.972	0.972	-0.020	1.256
Ever Suspended from 9th-11th	-	-	-0.050	0.501	-	-	-0.012	0.834
Educational Expectations in 11th: Unsure	0.083	0.116	0.111	1.355	0.151	0.118	-0.096	0.814
Educational Expectations in 11th: HS or Less	-	-	-0.084	0.564	-	-	0.000	1.000
Educational Expectations in 11th: Associate Degree or Certificate	0.033	0.071	0.174	2.100	0.066	0.053	-0.056	0.811
Educational Expectations in 11th: Bachelor's Degree or Higher	0.586	0.526	-0.121	1.031	0.513	0.543	0.059	0.993
Educational Expectations in 11th: Missing	0.272	0.272	0.001	1.004	0.253	0.269	0.037	1.041
Growth Mindset in 11th	0.069	-0.050	-0.143	1.182	-0.028	0.014	0.050	0.911
Missing Dummy: Growth Mindset in 11th	0.256	0.254	-0.006	0.996	0.238	0.249	0.027	1.032
Academic Self-Efficacy in 11th	-0.001	-0.051	-0.060	1.047	-0.069	-0.034	0.042	0.942
Missing Dummy: Academic Self-Efficacy in 11th	0.254	0.254	0.000	1.003	0.238	0.249	0.027	1.032
Indicator of 2016-17 Cohort	0.569	0.463	-0.214	1.017	0.495	0.457	-0.075	0.993

See the note on the first page of the table.

Figure C20. Distributions of Estimated Propensities of Taking IDS over Statistics in Group 5 Before and After Matching, Using School-Cohort Controls



Note: These figures correspond our preferred matching strategy, i.e., "Cluster Matching" on the estimated propensity score that includes school-cohort controls. See Appendix B for more detail.

Table C20. Matching Diagnostics for IDS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "IDS"			
	Statistics (N=3,690)	IDS (N=212)	SMD	VR	Statistics (N=328)	IDS (N=105)	SMD	VR
Age (in Months)	194.847	195.240	0.080	1.189	195.231	195.288	0.011	1.159
Gender: Female	0.605	0.580	-0.051	1.024	0.545	0.533	-0.023	1.009
Race/Ethnicity: Asian	-	-	-0.200	0.346	-	-	-0.027	0.870
Race/Ethnicity: African American	-	-	-0.285	0.253	-	-	-0.029	0.880
Race/Ethnicity: Latinx	0.718	0.849	0.323	0.635	0.792	0.771	-0.050	1.077
Race/Ethnicity: Filipinx	-	-	-0.115	0.598	-	-	-0.009	0.969
Race/Ethnicity: White	0.083	0.061	-0.084	0.758	0.070	0.105	0.121	1.440
Race/Ethnicity: Other	-	-	0.123	3.449	-	-	-0.014	0.876
Ever Subsidized Meal Eligible from 9th-11th	0.883	0.920	0.124	0.717	0.908	0.895	-0.044	1.132
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.067	0.451	-	-	0.101	4.989
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.235	0.335	0.223	1.246	0.293	0.276	-0.037	0.971
Parents'/Guardians' Educational Attainment: HS Graduate	0.190	0.236	0.111	1.175	0.227	0.210	-0.042	0.950
Parents'/Guardians' Educational Attainment: Some College	0.126	0.085	-0.133	0.710	0.114	0.105	-0.029	0.935
Parents'/Guardians' Educational Attainment: College Graduate	0.112	0.080	-0.109	0.744	0.099	0.124	0.078	1.222
Parents'/Guardians' Educational Attainment: Graduate School	0.047	0.019	-0.156	0.418	0.021	0.029	0.049	1.361
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.291	0.245	-0.102	0.902	0.247	0.257	0.024	1.034
Nonresident School Enrollment in 11th	0.422	0.288	-0.284	0.844	0.366	0.324	-0.089	0.949
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.040	1.317	-	-	0.000	1.006
Number of School Moves from 9th-11th	0.059	0.071	0.049	1.018	0.072	0.080	0.032	1.018
Missing Dummy: Number of School Moves from 9th-11th	-	-	0.019	1.106	-	-	-0.060	0.735
English Learner Status in 11th: English Only	0.314	0.307	-0.015	0.992	0.280	0.267	-0.031	0.975
English Learner Status in 11th: Initial Fluent English Proficient	0.200	0.132	-0.182	0.720	0.145	0.124	-0.061	0.881

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after substituting school-level controls for school fixed effects in the propensity score model. See Appendix B for more detail. The N after matching is the number of unique students who are retained after matching, and are subsequently reweighted when calculating adjusted means and balance statistics. SMD = Standardized Mean Difference. VR = Variance Ratio. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample.

Table C20 Continued. Matching Diagnostics for IDS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "IDS"			
	Statistics (N=3,690)	IDS (N=212)	SMD	VR	Statistics (N=328)	IDS (N=105)	SMD	VR
English Learner Status in 11th: Limited English Proficient	-	-	-0.027	0.779	-	-	0.080	1.992
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.475	0.552	0.155	0.996	0.565	0.590	0.051	0.990
Gifted and Talented Program Participation in 11th	0.322	0.236	-0.193	0.829	0.244	0.324	0.178	1.194
Math 11th Grade Weighted GPA	2.954	2.253	-0.563	1.098	2.413	2.436	0.018	1.149
Cumulative Overall Weighted GPA at the End of 11th	3.304	3.278	-0.049	0.948	3.261	3.233	-0.050	1.244
Standardized ELA SBAC Score in 11th	0.594	0.418	-0.251	0.760	0.430	0.388	-0.061	1.123
Standardized Math SBAC Score in 11th	0.574	0.508	-0.102	0.590	0.541	0.594	0.086	1.055
Number of Semesters of AP Classes Taken from 9th-11th	3.761	2.742	-0.376	0.620	3.036	3.135	0.038	1.068
Missing Dummy: Number of Semesters of AP Classes Taken from 9th-11th	-	-	-0.019	0.834	-	-	-0.036	0.721
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.337	0.311	-0.030	0.939	0.312	0.429	0.112	1.180
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.120	0.123	0.006	1.170	0.149	0.124	-0.042	0.765
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.124	0.090	-0.070	0.913	0.125	0.143	0.028	1.019
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.046	0.028	-0.073	0.629	0.029	0.029	0.000	1.095
Highest ERW PSAT Score by the End of 11th	478.877	454.377	-0.351	0.687	460.618	458.152	-0.036	1.089
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	-0.023	0.909	-	-	-0.022	0.891
Highest Math PSAT Score by the End of 11th	477.716	458.647	-0.306	0.568	466.804	471.217	0.070	0.883
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.018	0.929	-	-	-0.022	0.891
Took the SAT or ACT before 12th	0.548	0.458	-0.181	1.006	0.433	0.448	0.029	1.013
Participation in the AVID Program in 11th	-	-	-0.215	0.224	-	-	0.014	1.115
Took a College or Career Seminar Course in 11th	0.156	0.108	-0.141	0.736	0.118	0.171	0.151	1.371
Took a Precalculus Course by the End of 11th	0.911	0.943	0.126	0.659	-	-	0.068	0.844
Took an IDS Course by the End of 11th	-	-	-0.191	0.166	-	-	-0.139	0.342
Took a Statistics Course by the End of 11th	0.050	0.052	0.010	1.048	-	-	-0.007	0.986

See the note on the first page of the table.

Table C20 Continued. Matching Diagnostics for IDS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "IDS"			
	Statistics (N=3,690)	IDS (N=212)	SMD	VR	Statistics (N=328)	IDS (N=105)	SMD	VR
Took Other Advanced Math by the End of 11th	-	-	-0.146	0.000	-	-	N/A	N/A
Math 11th Grade Weighted GPA (Squared)	10.200	6.691	-0.552	0.760	7.213	7.520	0.053	1.153
Cumulative Overall Weighted GPA at the End of 11th (Squared)	11.216	11.026	-0.055	0.926	10.901	10.787	-0.033	1.217
Standardized ELA SBAC Score in 11th (Squared)	0.915	0.600	-0.361	0.580	0.629	0.646	0.022	1.231
Standardized Math SBAC Score in 11th (Squared)	0.849	0.563	-0.332	0.454	0.661	0.739	0.099	1.038
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	23.205	13.114	-0.398	0.302	15.567	16.568	0.049	1.019
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.878	0.811	-0.019	0.831	1.085	1.343	0.048	0.595
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.220	0.255	0.027	1.561	0.415	0.314	-0.047	0.582
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.271	0.241	-0.017	1.116	0.419	0.429	0.003	0.611
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.076	0.047	-0.060	0.522	0.044	0.048	0.010	1.204
Highest ERW PSAT Score by the End of 11th (Squared)	235087.702	210401.119	-0.370	0.607	216652.975	214759.166	-0.030	1.020
Highest Math PSAT Score by the End of 11th (Squared)	233152.702	213151.094	-0.343	0.520	222121.638	225746.768	0.063	0.868
Work Effort GPA in 11th	2.582	2.600	0.058	0.899	2.585	2.572	-0.040	1.190
Cooperation GPA in 11th	2.714	2.740	0.107	0.872	2.728	2.714	-0.056	1.260
Attendance Rate in 11th	0.974	0.976	0.061	0.855	0.974	0.974	0.006	0.734
Ever Suspended from 9th-11th	-	-	0.010	1.165	-	-	N/A	N/A
Educational Expectations in 11th: Unsure	0.070	0.075	0.020	1.074	-	-	-0.049	0.856
Educational Expectations in 11th: HS or Less	-	-	-0.017	0.854	-	-	0.044	1.670
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.057	1.444	-	-	0.049	1.361
Educational Expectations in 11th: Bachelor's Degree or Higher	0.655	0.618	-0.076	1.049	0.684	0.695	0.024	0.986
Educational Expectations in 11th: Missing	0.244	0.269	0.056	1.069	0.210	0.200	-0.024	0.970
Growth Mindset in 11th	0.151	0.148	-0.005	0.827	0.119	0.079	-0.052	0.979
Missing Dummy: Growth Mindset in 11th	0.235	0.264	0.067	1.086	0.219	0.190	-0.071	0.905

See the note on the first page of the table.

Table C20 Continued. Matching Diagnostics for IDS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "IDS"			
	Statistics (N=3,690)	IDS (N=212)	SMD	VR	Statistics (N=328)	IDS (N=105)	SMD	VR
Academic Self-Efficacy in 11th	0.032	-0.008	-0.048	0.856	-0.069	0.012	0.097	0.767
Missing Dummy: Academic Self-Efficacy in 11th	0.236	0.264	0.065	1.083	0.219	0.190	-0.071	0.905
Indicator of 2016-17 Cohort	0.466	0.453	-0.027	1.000	0.434	0.410	-0.050	0.990

See the note on the first page of the table.

Table C21. Estimated Effects of Taking Math (Compared to No Math) on Cumulative Overall GPA

	School Fixed Effects						School-Cohort Controls					
	N		Weighted GPA		Unweighted GPA		N		Weighted GPA		Unweighted GPA	
	No Math	Math	b	se	b	se	No Math	Math	b	se	b	se
Group 3: Math A-G Complete with a "D"												
Unadjust	1,315	1,132	0.129***	(0.026)	0.098***	(0.023)	1,361	1,494	0.100***	(0.025)	0.075***	(0.023)
CM+OLS	1,129	886	-0.057***	(0.007)	-0.064***	(0.008)	1,244	1,365	-0.056***	(0.007)	-0.062***	(0.007)
OLS	1,315	1,132	-0.057***	(0.007)	-0.061***	(0.007)	1,361	1,494	-0.058***	(0.007)	-0.066***	(0.008)
SM+OLS	803	637	-0.060***	(0.008)	-0.063***	(0.008)	944	1,033	-0.056***	(0.007)	-0.067***	(0.008)
KBAL+OLS	1,315	1,132	-0.056***	(0.008)	-0.064***	(0.008)	1,361	1,494	-0.055***	(0.007)	-0.063***	(0.008)
KM+OLS	1,315	1,132	-0.058***	(0.008)	-0.065***	(0.008)	1,361	1,494	-0.057***	(0.007)	-0.064***	(0.008)
RE	-	-	-	-	-	-	1,361	1,494	-0.057***	(0.006)	-0.062***	(0.007)
Group 4: Math A-G Complete with a "C"												
Unadjust	3,736	6,257	0.232***	(0.022)	0.190***	(0.019)	3,767	7,488	0.207***	(0.023)	0.174***	(0.020)
CM+OLS	3,285	5,093	-0.039***	(0.004)	-0.055***	(0.006)	3,497	7,100	-0.045***	(0.004)	-0.056***	(0.006)
OLS	3,736	6,257	-0.042***	(0.004)	-0.058***	(0.005)	3,767	7,488	-0.045***	(0.004)	-0.059***	(0.006)
SM+OLS	1,106	1,391	-0.038***	(0.005)	-0.050***	(0.007)	868	1,216	-0.035***	(0.007)	-0.054***	(0.008)
KBAL+OLS	3,736	6,257	-0.044***	(0.004)	-0.059***	(0.006)	3,767	7,488	-0.045***	(0.004)	-0.054***	(0.006)
KM+OLS	3,736	6,257	-0.036***	(0.004)	-0.051***	(0.006)	3,767	7,488	-0.043***	(0.004)	-0.052***	(0.006)
RE	-	-	-	-	-	-	3,767	7,488	-0.042***	(0.004)	-0.059***	(0.005)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math												
Unadjust	3,396	8,616	0.180***	(0.021)	0.144***	(0.017)	3,419	9,406	0.173***	(0.022)	0.140***	(0.018)
CM+OLS	3,079	6,897	-0.033***	(0.004)	-0.043***	(0.005)	3,265	8,585	-0.033***	(0.004)	-0.046***	(0.006)
OLS	3,396	8,616	-0.037***	(0.004)	-0.046***	(0.005)	3,419	9,406	-0.036***	(0.004)	-0.050***	(0.006)
SM+OLS	981	1,924	-0.038***	(0.005)	-0.042***	(0.007)	1,330	2,931	-0.035***	(0.005)	-0.046***	(0.007)
KBAL+OLS	3,396	8,616	-0.031***	(0.004)	-0.042***	(0.005)	3,419	9,406	-0.033***	(0.005)	-0.047***	(0.006)
KM+OLS	3,396	8,616	-0.031***	(0.004)	-0.042***	(0.005)	3,419	9,406	-0.033***	(0.004)	-0.044***	(0.006)
RE	-	-	-	-	-	-	3,419	9,406	-0.038***	(0.004)	-0.047***	(0.005)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C22. Estimated Effects of Taking Math (Compared to No Math) on Completion of Overall A-G Requirements with a "C" or Better

	School Fixed Effects				School-Cohort Controls			
	N		Overall A-G Complete with a "C"		N		Overall A-G Complete with a "C"	
	No Math	Math	b	se	No Math	Math	b	se
Group 3: Math A-G Complete with a "D"								
Unadjust	1,315	1,132	0.306***	(0.017)	1,361	1,494	0.318***	(0.015)
CM+OLS	1,129	886	0.219***	(0.016)	1,244	1,365	0.239***	(0.014)
OLS	1,315	1,132	0.229***	(0.016)	1,361	1,494	0.227***	(0.014)
SM+OLS	803	637	0.216***	(0.021)	944	1,033	0.227***	(0.013)
KBAL+OLS	1,315	1,132	0.224***	(0.015)	1,361	1,494	0.242***	(0.013)
KM+OLS	1,315	1,132	0.222***	(0.014)	1,361	1,494	0.246***	(0.012)
RE	-	-	-	-	1,361	1,494	0.230***	(0.014)
Group 4: Math A-G Complete with a "C"								
Unadjust	3,736	6,257	0.158***	(0.015)	3,767	7,488	0.161***	(0.015)
CM+OLS	3,285	5,093	0.009	(0.011)	3,497	7,100	0.003	(0.010)
OLS	3,736	6,257	0.008	(0.010)	3,767	7,488	0.015	(0.010)
SM+OLS	1,106	1,391	0.006	(0.014)	868	1,216	0.008	(0.017)
KBAL+OLS	3,736	6,257	0.002	(0.011)	3,767	7,488	0.013	(0.011)
KM+OLS	3,736	6,257	0.008	(0.011)	3,767	7,488	0.004	(0.010)
RE	-	-	-	-	3,767	7,488	0.013	(0.009)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	3,396	8,616	0.090***	(0.011)	3,419	9,406	0.091***	(0.011)
CM+OLS	3,079	6,897	-0.002	(0.008)	3,265	8,585	0.006	(0.008)
OLS	3,396	8,616	0.003	(0.009)	3,419	9,406	0.010	(0.008)
SM+OLS	981	1,924	0.012	(0.010)	1,330	2,931	0.008	(0.008)
KBAL+OLS	3,396	8,616	0.001	(0.009)	3,419	9,406	0.009	(0.009)
KM+OLS	3,396	8,616	0.003	(0.009)	3,419	9,406	0.006	(0.007)
RE	-	-	-	-	3,419	9,406	0.007	(0.008)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C23. Estimated Effects of Taking Math (Compared to No Math) on College Enrollment

	School Fixed Effects								School-Cohort Controls							
	N		Any Enrollment		Two-Year Enrollment		Four-Year Enrollment		N		Any Enrollment		Two-Year Enrollment		Four-Year Enrollment	
	No Math	Math	b	se	b	se	b	se	No Math	Math	b	se	b	se	b	se
Group 3: Math A-G Complete with a "D"																
Unadjust	1,315	1,132	0.062*	(0.026)	-0.040	(0.024)	0.102***	(0.012)	1,361	1,494	0.077**	(0.024)	-0.026	(0.023)	0.103***	(0.010)
CM+OLS	1,129	886	0.023	(0.029)	-0.047	(0.030)	0.070***	(0.014)	1,244	1,365	0.008	(0.022)	-0.053*	(0.023)	0.061***	(0.011)
OLS	1,315	1,132	0.011	(0.029)	-0.055	(0.029)	0.066***	(0.013)	1,361	1,494	0.017	(0.023)	-0.037	(0.023)	0.054***	(0.011)
SM+OLS	803	637	0.022	(0.031)	-0.034	(0.029)	0.056***	(0.014)	944	1,033	0.019	(0.026)	-0.036	(0.024)	0.055***	(0.011)
KBAL+OLS	1,315	1,132	0.021	(0.028)	-0.047	(0.030)	0.068***	(0.013)	1,361	1,494	0.018	(0.023)	-0.049*	(0.023)	0.066***	(0.010)
KM+OLS	1,315	1,132	0.015	(0.028)	-0.052	(0.030)	0.066***	(0.014)	1,361	1,494	0.012	(0.022)	-0.055*	(0.022)	0.067***	(0.010)
RE	-	-	-	-	-	-	-	-	1,361	1,494	0.017	(0.023)	-0.041	(0.023)	0.055***	(0.011)
Group 4: Math A-G Complete with a "C"																
Unadjust	3,736	6,257	0.098***	(0.010)	-0.093***	(0.011)	0.191***	(0.013)	3,767	7,488	0.093***	(0.011)	-0.089***	(0.011)	0.182***	(0.014)
CM+OLS	3,285	5,093	0.049***	(0.012)	-0.000	(0.013)	0.049***	(0.014)	3,497	7,100	0.034***	(0.010)	-0.008	(0.012)	0.042***	(0.012)
OLS	3,736	6,257	0.053***	(0.010)	0.003	(0.011)	0.050***	(0.011)	3,767	7,488	0.036***	(0.010)	-0.001	(0.012)	0.038***	(0.011)
SM+OLS	1,106	1,391	0.031	(0.020)	-0.020	(0.022)	0.051**	(0.020)	868	1,216	-0.001	(0.016)	-0.021	(0.021)	0.020	(0.022)
KBAL+OLS	3,736	6,257	0.057***	(0.013)	0.006	(0.014)	0.051***	(0.014)	3,767	7,488	0.040***	(0.012)	-0.008	(0.014)	0.047***	(0.013)
KM+OLS	3,736	6,257	0.044***	(0.011)	-0.005	(0.013)	0.049***	(0.014)	3,767	7,488	0.034***	(0.010)	-0.011	(0.012)	0.045***	(0.012)
RE	-	-	-	-	-	-	-	-	3,767	7,488	0.045***	(0.010)	0.000	(0.011)	0.047***	(0.011)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	3,396	8,616	0.058***	(0.010)	-0.107***	(0.016)	0.165***	(0.016)	3,419	9,406	0.057***	(0.010)	-0.107***	(0.016)	0.165***	(0.016)
CM+OLS	3,079	6,897	0.032**	(0.011)	-0.025*	(0.012)	0.057***	(0.014)	3,265	8,585	0.033***	(0.010)	-0.005	(0.012)	0.038**	(0.012)
OLS	3,396	8,616	0.033***	(0.009)	-0.009	(0.011)	0.042***	(0.011)	3,419	9,406	0.025**	(0.008)	-0.008	(0.012)	0.033**	(0.011)
SM+OLS	981	1,924	0.038*	(0.016)	-0.008	(0.017)	0.046*	(0.022)	1,330	2,931	0.028*	(0.012)	0.016	(0.016)	0.012	(0.018)
KBAL+OLS	3,396	8,616	0.044***	(0.011)	-0.010	(0.012)	0.054***	(0.014)	3,419	9,406	0.036**	(0.011)	-0.003	(0.013)	0.039**	(0.015)
KM+OLS	3,396	8,616	0.039***	(0.011)	-0.012	(0.011)	0.051***	(0.013)	3,419	9,406	0.028**	(0.009)	-0.001	(0.011)	0.029*	(0.011)
RE	-	-	-	-	-	-	-	-	3,419	9,406	0.028***	(0.008)	-0.011	(0.011)	0.041***	(0.010)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C24. Estimated Effects of Taking Math (Compared to No Math) on College Persistence

	School Fixed Effects								School-Cohort Controls							
	N		Any Persistence		Two-Year Persistence		Four-Year Persistence		N		Any Persistence		Two-Year Persistence		Four-Year Persistence	
	No Math	Math	b	se	b	se	b	se	No Math	Math	b	se	b	se	b	se
Group 3: Math A-G Complete with a "D"																
Unadjust	1,315	1,132	0.073**	(0.026)	0.001	(0.025)	0.073***	(0.009)	1,361	1,494	0.085***	(0.023)	0.008	(0.023)	0.077***	(0.009)
CM+OLS	1,129	886	0.032	(0.026)	-0.012	(0.028)	0.043***	(0.010)	1,244	1,365	0.012	(0.021)	-0.030	(0.023)	0.041***	(0.009)
OLS	1,315	1,132	0.025	(0.026)	-0.015	(0.028)	0.040***	(0.011)	1,361	1,494	0.032	(0.020)	-0.004	(0.021)	0.036***	(0.009)
SM+OLS	803	637	0.019	(0.032)	-0.011	(0.032)	0.030**	(0.011)	944	1,033	0.018	(0.024)	-0.018	(0.024)	0.036***	(0.009)
KBAL+OLS	1,315	1,132	0.043	(0.025)	-0.005	(0.028)	0.047***	(0.012)	1,361	1,494	0.035	(0.021)	-0.014	(0.023)	0.048***	(0.009)
KM+OLS	1,315	1,132	0.019	(0.024)	-0.022	(0.027)	0.041***	(0.010)	1,361	1,494	0.027	(0.020)	-0.020	(0.021)	0.047***	(0.009)
RE	-	-	-	-	-	-	-	-	1,361	1,494	0.032	(0.020)	-0.006	(0.021)	0.036***	(0.009)
Group 4: Math A-G Complete with a "C"																
Unadjust	3,736	6,257	0.129***	(0.013)	-0.042***	(0.011)	0.171***	(0.011)	3,767	7,488	0.120***	(0.014)	-0.042***	(0.012)	0.163***	(0.013)
CM+OLS	3,285	5,093	0.064***	(0.014)	0.019	(0.013)	0.045***	(0.013)	3,497	7,100	0.048***	(0.013)	0.007	(0.012)	0.041***	(0.012)
OLS	3,736	6,257	0.071***	(0.012)	0.024*	(0.012)	0.047***	(0.011)	3,767	7,488	0.047***	(0.012)	0.013	(0.013)	0.034***	(0.010)
SM+OLS	1,106	1,391	0.042	(0.024)	-0.001	(0.023)	0.043*	(0.020)	868	1,216	0.025	(0.020)	0.003	(0.020)	0.023	(0.021)
KBAL+OLS	3,736	6,257	0.063***	(0.014)	0.020	(0.014)	0.043**	(0.014)	3,767	7,488	0.047***	(0.014)	0.004	(0.013)	0.043***	(0.013)
KM+OLS	3,736	6,257	0.066***	(0.014)	0.016	(0.013)	0.050***	(0.013)	3,767	7,488	0.051***	(0.012)	0.005	(0.012)	0.046***	(0.011)
RE	-	-	-	-	-	-	-	-	3,767	7,488	0.061***	(0.012)	0.019	(0.011)	0.043***	(0.010)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	3,396	8,616	0.080***	(0.013)	-0.085***	(0.015)	0.165***	(0.014)	3,419	9,406	0.078***	(0.013)	-0.085***	(0.015)	0.163***	(0.015)
CM+OLS	3,079	6,897	0.049***	(0.013)	-0.008	(0.010)	0.058***	(0.013)	3,265	8,585	0.039***	(0.011)	0.002	(0.011)	0.036***	(0.011)
OLS	3,396	8,616	0.040***	(0.011)	-0.005	(0.010)	0.044***	(0.010)	3,419	9,406	0.023*	(0.011)	-0.008	(0.011)	0.031**	(0.010)
SM+OLS	981	1,924	0.052**	(0.020)	-0.005	(0.018)	0.057*	(0.024)	1,330	2,931	0.035*	(0.015)	0.017	(0.015)	0.018	(0.019)
KBAL+OLS	3,396	8,616	0.057***	(0.014)	0.005	(0.012)	0.052***	(0.013)	3,419	9,406	0.042**	(0.013)	0.006	(0.013)	0.036**	(0.013)
KM+OLS	3,396	8,616	0.057***	(0.013)	0.000	(0.011)	0.057***	(0.012)	3,419	9,406	0.032**	(0.011)	0.003	(0.011)	0.029**	(0.011)
RE	-	-	-	-	-	-	-	-	3,419	9,406	0.032**	(0.010)	-0.008	(0.010)	0.041***	(0.009)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C25. Estimated Effects of Taking Math (Compared to No Math) on SAT/ACT Scores

	School Fixed Effects								School-Cohort Controls							
	N		Math SAT/ACT		Verbal SAT/ACT		Overall SAT/ACT		N		Math SAT/ACT		Verbal SAT/ACT		Overall SAT/ACT	
	No Math	Math	b	se	b	se	b	se	No Math	Math	b	se	b	se	b	se
Group 3: Math A-G Complete with a "D"																
Unadjust	247	384	21.677***	(6.198)	17.377**	(6.105)	37.168**	(11.472)	276	722	13.596*	(5.335)	3.609	(5.502)	16.069	(10.174)
CM+OLS	-	-	-	-	-	-	-	-	244	616	5.944	(3.719)	-4.465	(3.556)	0.239	(6.323)
OLS	247	384	11.976**	(4.237)	-0.582	(5.012)	10.219	(8.348)	276	722	5.275	(3.542)	-4.615	(3.449)	-0.410	(6.161)
SM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KBAL+OLS	247	384	10.430*	(4.816)	-0.661	(4.697)	8.353	(8.683)	276	722	7.446	(3.869)	-5.776	(3.620)	-0.140	(6.654)
KM+OLS	247	384	11.366**	(4.201)	-0.787	(4.077)	9.696	(7.327)	276	722	4.770	(3.430)	-5.560	(3.232)	-2.169	(5.856)
RE	-	-	-	-	-	-	-	-	276	722	5.452	(3.533)	-4.016	(3.508)	0.838	(6.160)
Group 4: Math A-G Complete with a "C"																
Unadjust	1,757	3,951	32.310***	(2.609)	20.045***	(3.046)	50.442***	(5.368)	1,772	5,195	27.587***	(2.744)	16.899***	(3.095)	42.633***	(5.480)
CM+OLS	1,599	3,391	14.789***	(1.716)	-0.080	(1.459)	12.453***	(2.541)	1,698	4,860	11.482***	(1.658)	-1.547	(1.433)	8.132**	(2.524)
OLS	1,757	3,951	13.188***	(1.696)	0.669	(1.418)	12.310***	(2.614)	1,772	5,195	9.691***	(1.702)	-2.220	(1.264)	6.090*	(2.445)
SM+OLS	411	595	14.708***	(3.473)	-0.860	(3.127)	12.519*	(5.434)	375	550	14.661***	(3.165)	1.382	(2.705)	14.423**	(4.500)
KBAL+OLS	1,757	3,951	13.512***	(1.806)	0.776	(1.499)	12.750***	(2.649)	1,772	5,195	11.416***	(1.829)	-1.725	(1.467)	8.379**	(2.713)
KM+OLS	1,757	3,951	14.015***	(1.689)	0.371	(1.484)	12.254***	(2.548)	1,772	5,195	11.266***	(1.703)	-2.015	(1.415)	7.704**	(2.602)
RE	-	-	-	-	-	-	-	-	1,772	5,195	11.276***	(1.650)	-0.618	(1.279)	9.489***	(2.453)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	2,050	6,389	39.310***	(3.364)	22.826***	(3.946)	60.030***	(7.208)	2,080	7,378	37.783***	(3.382)	21.369***	(3.892)	57.021***	(7.135)
CM+OLS	1,892	5,268	13.309***	(1.676)	0.491	(1.442)	12.406***	(2.514)	2,024	6,755	11.567***	(1.578)	-0.975	(1.594)	8.928**	(2.780)
OLS	2,050	6,389	12.375***	(1.281)	1.508	(1.365)	12.177***	(2.271)	2,080	7,378	9.065***	(1.405)	-1.718	(1.501)	5.913*	(2.606)
SM+OLS	575	1,227	15.710***	(3.019)	1.871	(2.696)	15.421***	(4.587)	786	1,905	12.943***	(2.507)	0.830	(2.421)	12.223**	(4.288)
KBAL+OLS	2,050	6,389	13.286***	(1.575)	1.582	(1.703)	13.360***	(2.669)	2,080	7,378	9.814***	(1.673)	-2.217	(2.055)	6.303	(3.255)
KM+OLS	2,050	6,389	13.260***	(1.600)	1.661	(1.454)	13.406***	(2.398)	2,080	7,378	10.604***	(1.510)	-1.359	(1.522)	7.805**	(2.644)
RE	-	-	-	-	-	-	-	-	2,080	7,378	11.466***	(1.206)	0.804	(1.330)	10.957***	(2.174)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C26. Estimated Effects of Taking Math (Compared to No Math) on Applying to Four-Year Colleges

	School Fixed Effects								School-Cohort Controls							
	N		Applying to Any College		Applying to a Selective College		Applying to a Highly Selective College		N		Applying to Any College		Applying to a Selective College		Applying to a Highly Selective College	
	No Math	Math	b	se	b	se	b	se	No Math	Math	b	se	b	se	b	se
Group 3: Math A-G Complete with a "D"																
Unadjust	845	720	0.246***	(0.027)	0.187***	(0.025)	0.044***	(0.012)	899	1,023	0.244***	(0.025)	0.182***	(0.022)	0.030**	(0.010)
CM+OLS	730	584	0.192***	(0.031)	0.136***	(0.028)	0.050**	(0.017)	817	917	0.158***	(0.024)	0.105***	(0.023)	0.012	(0.012)
OLS	845	720	0.189***	(0.027)	0.127***	(0.024)	0.042**	(0.015)	899	1,023	0.141***	(0.025)	0.099***	(0.024)	0.019	(0.012)
SM+OLS	439	350	0.172***	(0.034)	0.102***	(0.029)	0.038*	(0.017)	535	610	0.154***	(0.027)	0.105***	(0.022)	0.021	(0.014)
KBAL+OLS	845	720	0.191***	(0.027)	0.126***	(0.024)	0.039**	(0.014)	899	1,023	0.143***	(0.024)	0.095***	(0.023)	0.013	(0.012)
KM+OLS	845	720	0.198***	(0.026)	0.128***	(0.023)	0.037*	(0.016)	899	1,023	0.146***	(0.024)	0.099***	(0.023)	0.014	(0.012)
RE	-	-	-	-	-	-	-	-	899	1,023	0.160***	(0.024)	0.109***	(0.023)	0.023	(0.012)
Group 4: Math A-G Complete with a "C"																
Unadjust	2,510	4,354	0.225***	(0.019)	0.228***	(0.018)	0.125***	(0.012)	2,540	5,353	0.229***	(0.019)	0.234***	(0.019)	0.126***	(0.012)
CM+OLS	2,220	3,499	0.079***	(0.016)	0.066***	(0.017)	0.019	(0.013)	2,348	5,130	0.057***	(0.016)	0.041**	(0.014)	0.014	(0.011)
OLS	2,510	4,354	0.083***	(0.014)	0.065***	(0.013)	0.017	(0.012)	2,540	5,353	0.068***	(0.015)	0.052***	(0.013)	0.013	(0.010)
SM+OLS	614	750	0.073**	(0.028)	0.047	(0.030)	0.021	(0.020)	519	709	0.084***	(0.025)	0.078**	(0.030)	0.025	(0.023)
KBAL+OLS	2,510	4,354	0.074***	(0.018)	0.068***	(0.016)	0.026*	(0.012)	2,540	5,353	0.060***	(0.016)	0.052***	(0.015)	0.029**	(0.011)
KM+OLS	2,510	4,354	0.085***	(0.017)	0.077***	(0.016)	0.029*	(0.013)	2,540	5,353	0.064***	(0.015)	0.054***	(0.014)	0.023*	(0.010)
RE	-	-	-	-	-	-	-	-	2,540	5,353	0.080***	(0.014)	0.063***	(0.012)	0.014	(0.011)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	2,335	5,623	0.171***	(0.021)	0.212***	(0.025)	0.178***	(0.017)	2,348	6,631	0.176***	(0.021)	0.217***	(0.025)	0.186***	(0.017)
CM+OLS	2,121	4,580	0.081***	(0.013)	0.085***	(0.015)	0.031	(0.017)	2,228	6,045	0.067***	(0.011)	0.083***	(0.012)	0.034*	(0.015)
OLS	2,335	5,623	0.086***	(0.013)	0.087***	(0.014)	0.032*	(0.014)	2,348	6,631	0.079***	(0.013)	0.086***	(0.015)	0.038**	(0.013)
SM+OLS	555	1,049	0.044*	(0.019)	0.055*	(0.023)	0.019	(0.029)	815	1,686	0.041**	(0.013)	0.055***	(0.016)	0.044	(0.024)
KBAL+OLS	2,335	5,623	0.067***	(0.011)	0.084***	(0.014)	0.037*	(0.018)	2,348	6,631	0.052***	(0.011)	0.076***	(0.014)	0.039*	(0.017)
KM+OLS	2,335	5,623	0.081***	(0.013)	0.080***	(0.014)	0.027	(0.015)	2,348	6,631	0.064***	(0.011)	0.076***	(0.014)	0.037**	(0.014)
RE	-	-	-	-	-	-	-	-	2,348	6,631	0.085***	(0.012)	0.087***	(0.014)	0.037**	(0.013)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C27. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on Cumulative Overall GPA

	School Fixed Effects						School-Cohort Controls					
	N		Weighted GPA		Unweighted GPA		N		Weighted GPA		Unweighted GPA	
	Precalc or Calc	Stat	b	se	b	se	Precalc or Calc	Stat	b	se	b	se
Group 3: Math A-G Complete with a "D"												
Unadjust	261	231	-0.053	(0.056)	-0.048	(0.048)	638	344	0.003	(0.062)	0.012	(0.055)
CM+OLS	-	-	-	-	-	-	562	337	0.022*	(0.010)	0.041**	(0.012)
OLS	261	231	0.016	(0.014)	0.024	(0.017)	638	344	0.022*	(0.010)	0.044***	(0.012)
SM+OLS	-	-	-	-	-	-	292	214	0.033**	(0.012)	0.051***	(0.013)
KBAL+OLS	261	231	0.015	(0.013)	0.025	(0.015)	638	344	0.022*	(0.011)	0.038**	(0.012)
KM+OLS	261	231	0.011	(0.011)	0.011	(0.015)	638	344	0.023*	(0.010)	0.043***	(0.012)
RE	-	-	-	-	-	-	638	344	0.021*	(0.010)	0.031*	(0.013)
Group 4: Math A-G Complete with a "C"												
Unadjust	2,396	1,411	-0.100*	(0.044)	-0.090*	(0.040)	4,678	1,547	-0.108**	(0.042)	-0.098**	(0.038)
CM+OLS	2,120	1,263	0.009	(0.005)	0.015*	(0.007)	4,436	1,519	0.011	(0.006)	0.023**	(0.007)
OLS	2,396	1,411	0.010*	(0.005)	0.020**	(0.007)	4,678	1,547	0.009	(0.007)	0.025***	(0.007)
SM+OLS	1,368	886	0.009	(0.006)	0.014	(0.008)	2,565	1,123	0.014*	(0.007)	0.029***	(0.007)
KBAL+OLS	2,396	1,411	0.009	(0.005)	0.017*	(0.007)	4,678	1,547	0.006	(0.007)	0.019*	(0.008)
KM+OLS	2,396	1,411	0.010*	(0.005)	0.016*	(0.006)	4,678	1,547	0.009	(0.007)	0.025***	(0.007)
RE	-	-	-	-	-	-	4,678	1,547	0.010*	(0.004)	0.021***	(0.006)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math												
Unadjust	2,394	3,262	-0.225***	(0.025)	-0.223***	(0.021)	3,708	3,543	-0.211***	(0.027)	-0.207***	(0.022)
CM+OLS	2,011	2,600	0.038***	(0.004)	0.035***	(0.007)	3,495	3,003	0.034***	(0.005)	0.040***	(0.007)
OLS	2,394	3,262	0.038***	(0.004)	0.037***	(0.006)	3,708	3,543	0.036***	(0.006)	0.038***	(0.008)
SM+OLS	1,761	1,913	0.040***	(0.004)	0.038***	(0.006)	1,760	1,152	0.031***	(0.005)	0.037***	(0.010)
KBAL+OLS	2,394	3,262	0.036***	(0.004)	0.038***	(0.006)	3,708	3,543	0.034***	(0.006)	0.041***	(0.008)
KM+OLS	2,394	3,262	0.037***	(0.004)	0.037***	(0.006)	3,708	3,543	0.033***	(0.006)	0.041***	(0.008)
RE	-	-	-	-	-	-	3,708	3,543	0.039***	(0.004)	0.037***	(0.006)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C28. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on Completion of Overall A-G Requirements with a "C" or Better

	School Fixed Effects				School-Cohort Controls			
	N		Overall A-G Complete with a "C"		N		Overall A-G Complete with a "C"	
	Precalc or Calc	Stat	b	se	Precalc or Calc	Stat	b	se
Group 3: Math A-G Complete with a "D"								
Unadjust	261	231	-0.018	(0.050)	638	344	-0.016	(0.040)
CM+OLS	-	-	-	-	562	337	-0.012	(0.037)
OLS	261	231	0.042	(0.061)	638	344	-0.013	(0.034)
SM+OLS	-	-	-	-	292	214	0.018	(0.041)
KBAL+OLS	261	231	0.040	(0.064)	638	344	-0.022	(0.034)
KM+OLS	261	231	0.032	(0.053)	638	344	-0.021	(0.033)
RE	-	-	-	-	638	344	-0.008	(0.035)
Group 4: Math A-G Complete with a "C"								
Unadjust	2,396	1,411	-0.005	(0.024)	4,678	1,547	-0.020	(0.022)
CM+OLS	2,120	1,263	0.004	(0.017)	4,436	1,519	0.011	(0.013)
OLS	2,396	1,411	0.008	(0.016)	4,678	1,547	0.016	(0.014)
SM+OLS	1,368	886	0.018	(0.018)	2,565	1,123	0.013	(0.015)
KBAL+OLS	2,396	1,411	0.007	(0.017)	4,678	1,547	0.018	(0.014)
KM+OLS	2,396	1,411	0.008	(0.017)	4,678	1,547	0.016	(0.013)
RE	-	-	-	-	4,678	1,547	0.012	(0.014)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	2,394	3,262	-0.038***	(0.011)	3,708	3,543	-0.038***	(0.010)
CM+OLS	2,011	2,600	0.014	(0.011)	3,495	3,003	0.019*	(0.009)
OLS	2,394	3,262	0.014	(0.010)	3,708	3,543	0.020*	(0.008)
SM+OLS	1,761	1,913	0.023*	(0.010)	1,760	1,152	0.005	(0.006)
KBAL+OLS	2,394	3,262	0.009	(0.012)	3,708	3,543	0.014	(0.010)
KM+OLS	2,394	3,262	0.009	(0.011)	3,708	3,543	0.018	(0.010)
RE	-	-	-	-	3,708	3,543	0.022**	(0.008)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C29. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on College Enrollment

	School Fixed Effects								School-Cohort Controls							
	N		Any Enrollment		Two-Year Enrollment		Four-Year Enrollment		N		Any Enrollment		Two-Year Enrollment		Four-Year Enrollment	
	Precalc or Calc	Stat	b	se	b	se	b	se	Precalc or Calc	Stat	b	se	b	se	b	se
Group 3: Math A-G Complete with a "D"																
Unadjust	261	231	-0.077	(0.044)	-0.050	(0.046)	-0.027	(0.024)	638	344	-0.023	(0.035)	0.006	(0.033)	-0.029	(0.021)
CM+OLS	-	-	-	-	-	-	-	-	562	337	-0.039	(0.029)	-0.016	(0.032)	-0.023	(0.019)
OLS	261	231	-0.097	(0.061)	-0.057	(0.070)	-0.040	(0.032)	638	344	-0.041	(0.029)	-0.020	(0.031)	-0.021	(0.018)
SM+OLS	-	-	-	-	-	-	-	-	292	214	-0.047	(0.045)	0.003	(0.047)	-0.050**	(0.017)
KBAL+OLS	261	231	-0.089	(0.062)	-0.054	(0.072)	-0.035	(0.031)	638	344	-0.052	(0.031)	-0.024	(0.033)	-0.029	(0.018)
KM+OLS	261	231	-0.094	(0.058)	-0.046	(0.063)	-0.048*	(0.024)	638	344	-0.042	(0.029)	-0.019	(0.031)	-0.024	(0.018)
RE	-	-	-	-	-	-	-	-	638	344	-0.046	(0.031)	-0.024	(0.032)	-0.021	(0.018)
Group 4: Math A-G Complete with a "C"																
Unadjust	2,396	1,411	0.001	(0.017)	-0.006	(0.018)	0.007	(0.024)	4,678	1,547	0.004	(0.017)	0.014	(0.017)	-0.010	(0.024)
CM+OLS	2,120	1,263	-0.019	(0.020)	-0.063**	(0.021)	0.044**	(0.016)	4,436	1,519	-0.007	(0.013)	-0.036*	(0.016)	0.029	(0.015)
OLS	2,396	1,411	-0.006	(0.016)	-0.054**	(0.021)	0.048**	(0.016)	4,678	1,547	-0.003	(0.013)	-0.026	(0.017)	0.023	(0.015)
SM+OLS	1,368	886	-0.024	(0.018)	-0.097***	(0.023)	0.073**	(0.026)	2,565	1,123	-0.028	(0.017)	-0.049*	(0.021)	0.021	(0.019)
KBAL+OLS	2,396	1,411	-0.003	(0.018)	-0.055*	(0.023)	0.052**	(0.018)	4,678	1,547	0.016	(0.015)	-0.011	(0.018)	0.026	(0.018)
KM+OLS	2,396	1,411	-0.009	(0.021)	-0.062**	(0.022)	0.052**	(0.018)	4,678	1,547	-0.004	(0.013)	-0.032*	(0.016)	0.028	(0.016)
RE	-	-	-	-	-	-	-	-	4,678	1,547	-0.004	(0.013)	-0.035*	(0.017)	0.033*	(0.014)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	2,394	3,262	-0.025**	(0.009)	0.077***	(0.017)	-0.103***	(0.019)	3,708	3,543	-0.022*	(0.009)	0.080***	(0.015)	-0.102***	(0.017)
CM+OLS	2,011	2,600	-0.000	(0.010)	-0.018	(0.020)	0.018	(0.020)	3,495	3,003	-0.014	(0.009)	-0.011	(0.017)	-0.003	(0.016)
OLS	2,394	3,262	-0.005	(0.010)	-0.019	(0.017)	0.014	(0.017)	3,708	3,543	-0.006	(0.009)	-0.011	(0.016)	0.005	(0.015)
SM+OLS	1,761	1,913	-0.011	(0.013)	-0.037	(0.019)	0.026	(0.020)	1,760	1,152	-0.003	(0.013)	0.019	(0.022)	-0.022	(0.022)
KBAL+OLS	2,394	3,262	0.010	(0.013)	-0.008	(0.020)	0.018	(0.019)	3,708	3,543	0.002	(0.011)	0.004	(0.019)	-0.002	(0.018)
KM+OLS	2,394	3,262	-0.008	(0.011)	-0.013	(0.021)	0.005	(0.020)	3,708	3,543	-0.003	(0.010)	-0.009	(0.017)	0.006	(0.016)
RE	-	-	-	-	-	-	-	-	3,708	3,543	-0.007	(0.009)	-0.019	(0.015)	0.011	(0.015)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C30. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on College Persistence

	School Fixed Effects								School-Cohort Controls							
	N		Any Persistence		Two-Year Persistence		Four-Year Persistence		N		Any Persistence		Two-Year Persistence		Four-Year Persistence	
	Precalc or Calc	Stat	b	se	b	se	b	se	Precalc or Calc	Stat	b	se	b	se	b	se
Group 3: Math A-G Complete with a "D"																
Unadjust	261	231	-0.063	(0.045)	-0.062	(0.043)	-0.001	(0.021)	638	344	-0.038	(0.037)	-0.024	(0.035)	-0.014	(0.018)
CM+OLS	-	-	-	-	-	-	-	-	562	337	-0.058	(0.032)	-0.044	(0.034)	-0.014	(0.019)
OLS	261	231	-0.077	(0.069)	-0.057	(0.071)	-0.020	(0.030)	638	344	-0.063*	(0.031)	-0.054	(0.032)	-0.010	(0.019)
SM+OLS	-	-	-	-	-	-	-	-	292	214	-0.105*	(0.042)	-0.062	(0.044)	-0.044*	(0.017)
KBAL+OLS	261	231	-0.060	(0.068)	-0.044	(0.072)	-0.016	(0.029)	638	344	-0.067*	(0.031)	-0.049	(0.033)	-0.018	(0.019)
KM+OLS	261	231	-0.057	(0.067)	-0.036	(0.065)	-0.021	(0.024)	638	344	-0.055	(0.031)	-0.043	(0.031)	-0.011	(0.018)
RE	-	-	-	-	-	-	-	-	638	344	-0.068*	(0.032)	-0.059	(0.034)	-0.010	(0.019)
Group 4: Math A-G Complete with a "C"																
Unadjust	2,396	1,411	-0.013	(0.020)	-0.018	(0.019)	0.005	(0.023)	4,678	1,547	-0.007	(0.021)	-0.001	(0.018)	-0.006	(0.022)
CM+OLS	2,120	1,263	-0.025	(0.022)	-0.062**	(0.023)	0.037*	(0.017)	4,436	1,519	-0.025	(0.013)	-0.045**	(0.016)	0.020	(0.014)
OLS	2,396	1,411	-0.010	(0.020)	-0.055*	(0.023)	0.045**	(0.015)	4,678	1,547	-0.026	(0.015)	-0.041*	(0.018)	0.014	(0.013)
SM+OLS	1,368	886	-0.022	(0.023)	-0.093***	(0.024)	0.070**	(0.022)	2,565	1,123	-0.049**	(0.018)	-0.063**	(0.022)	0.014	(0.017)
KBAL+OLS	2,396	1,411	-0.014	(0.022)	-0.058*	(0.024)	0.043*	(0.019)	4,678	1,547	-0.016	(0.018)	-0.027	(0.019)	0.011	(0.016)
KM+OLS	2,396	1,411	-0.013	(0.023)	-0.060*	(0.024)	0.047**	(0.018)	4,678	1,547	-0.024	(0.014)	-0.043*	(0.017)	0.019	(0.014)
RE	-	-	-	-	-	-	-	-	4,678	1,547	-0.021	(0.015)	-0.044*	(0.018)	0.026*	(0.013)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	2,394	3,262	-0.054***	(0.011)	0.062***	(0.015)	-0.116***	(0.019)	3,708	3,543	-0.045**	(0.014)	0.068***	(0.013)	-0.112***	(0.018)
CM+OLS	2,011	2,600	-0.009	(0.010)	-0.021	(0.018)	0.012	(0.020)	3,495	3,003	-0.019	(0.010)	-0.005	(0.015)	-0.014	(0.017)
OLS	2,394	3,262	-0.007	(0.011)	-0.013	(0.016)	0.007	(0.016)	3,708	3,543	-0.011	(0.011)	-0.005	(0.014)	-0.007	(0.016)
SM+OLS	1,761	1,913	-0.004	(0.015)	-0.024	(0.019)	0.020	(0.020)	1,760	1,152	0.006	(0.015)	0.022	(0.021)	-0.016	(0.022)
KBAL+OLS	2,394	3,262	0.003	(0.013)	-0.008	(0.018)	0.011	(0.019)	3,708	3,543	-0.009	(0.013)	0.006	(0.018)	-0.015	(0.019)
KM+OLS	2,394	3,262	-0.007	(0.012)	-0.011	(0.020)	0.004	(0.020)	3,708	3,543	-0.007	(0.011)	-0.001	(0.016)	-0.006	(0.017)
RE	-	-	-	-	-	-	-	-	3,708	3,543	-0.011	(0.011)	-0.012	(0.014)	-0.000	(0.015)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C31. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on SAT/ACT Scores

	School Fixed Effects								School-Cohort Controls							
	N		Math SAT/ACT		Verbal SAT/ACT		Overall SAT/ACT		N		Math SAT/ACT		Verbal SAT/ACT		Overall SAT/ACT	
	Precalc or Calc	Stat	b	se	b	se	b	se	Precalc or Calc	Stat	b	se	b	se	b	se
Group 3: Math A-G Complete with a "D"																
Unadjust	90	83	-8.719	(8.110)	0.365	(9.790)	-2.268	(16.075)	310	157	2.122	(7.449)	8.533	(8.355)	13.899	(14.166)
CM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OLS	-	-	-	-	-	-	-	-	310	157	-2.581	(3.278)	2.305	(4.279)	3.617	(6.336)
SM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KBAL+OLS	-	-	-	-	-	-	-	-	310	157	-0.942	(3.554)	5.934	(4.184)	7.552	(6.748)
KM+OLS	-	-	-	-	-	-	-	-	310	157	-1.533	(3.320)	4.949	(3.716)	6.303	(5.725)
RE	-	-	-	-	-	-	-	-	310	157	-2.581	(3.278)	1.666	(4.146)	2.817	(6.347)
Group 4: Math A-G Complete with a "C"																
Unadjust	1,642	958	-6.874	(4.592)	-1.904	(4.529)	-7.719	(8.741)	3,344	1,048	-1.665	(4.410)	3.613	(4.588)	3.314	(8.606)
CM+OLS	1,548	879	0.535	(2.142)	3.784	(2.552)	4.822	(3.887)	3,223	1,017	-1.045	(1.737)	-0.097	(1.969)	-0.328	(3.066)
OLS	1,642	958	-0.594	(2.155)	3.863	(2.060)	3.663	(3.435)	3,344	1,048	-2.225	(1.772)	0.053	(1.688)	-1.294	(2.816)
SM+OLS	879	528	-2.191	(2.617)	0.983	(2.951)	-0.018	(5.081)	1,428	691	1.670	(2.194)	2.684	(2.225)	5.604	(3.613)
KBAL+OLS	1,642	958	0.158	(2.247)	4.476*	(2.261)	5.037	(3.649)	3,344	1,048	-0.432	(2.170)	0.883	(1.922)	0.819	(3.044)
KM+OLS	-	-	-	-	-	-	-	-	3,344	1,048	-1.832	(1.742)	0.340	(1.833)	-0.195	(2.864)
RE	-	-	-	-	-	-	-	-	3,344	1,048	-1.583	(1.751)	1.214	(1.670)	0.656	(2.787)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	1,945	2,503	-46.483***	(4.304)	-23.841***	(4.216)	-68.374***	(8.315)	3,090	2,703	-34.307***	(4.632)	-14.329**	(4.776)	-46.389***	(9.200)
CM+OLS	1,662	1,990	-8.271***	(2.221)	1.957	(1.858)	-5.828	(3.672)	2,890	2,312	-8.870***	(1.979)	-0.505	(1.937)	-8.339*	(3.534)
OLS	1,945	2,503	-9.324***	(2.162)	1.298	(1.901)	-7.081	(3.734)	3,090	2,703	-8.428***	(1.938)	-0.470	(1.980)	-7.743*	(3.444)
SM+OLS	1,375	1,403	-7.063**	(2.313)	2.470	(2.044)	-3.203	(3.840)	1,274	843	-8.434***	(2.406)	1.778	(2.564)	-4.475	(4.719)
KBAL+OLS	1,945	2,503	-10.513***	(2.662)	0.608	(2.106)	-9.192*	(4.376)	3,090	2,703	-8.786***	(2.069)	0.348	(2.118)	-6.800	(3.694)
KM+OLS	1,945	2,503	-9.170***	(2.186)	1.428	(1.900)	-6.486	(3.570)	3,090	2,703	-8.797***	(1.924)	-0.157	(1.897)	-7.640*	(3.339)
RE	-	-	-	-	-	-	-	-	3,090	2,703	-8.528***	(1.929)	0.636	(1.695)	-6.858*	(3.265)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C32. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on Applying to Four-Year Colleges

	School Fixed Effects								School-Cohort Controls							
	N		Applying to Any College		Applying to a Selective College		Applying to a Highly Selective College		N		Applying to Any College		Applying to a Selective College		Applying to a Highly Selective College	
	Precalc or Calc	Stat	b	se	b	se	b	se	Precalc or Calc	Stat	b	se	b	se	b	se
Group 3: Math A-G Complete with a "D"																
Unadjust	150	156	0.004	(0.084)	0.015	(0.064)	0.023	(0.027)	433	240	-0.003	(0.059)	-0.008	(0.044)	0.016	(0.020)
CM+OLS	-	-	-	-	-	-	-	-	389	227	0.013	(0.040)	-0.016	(0.040)	0.002	(0.017)
OLS	150	156	-0.046	(0.068)	-0.015	(0.074)	0.003	(0.033)	433	240	0.025	(0.043)	-0.008	(0.041)	0.004	(0.020)
SM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KBAL+OLS	150	156	-0.011	(0.060)	0.012	(0.061)	0.012	(0.026)	433	240	0.052	(0.048)	-0.002	(0.044)	-0.001	(0.019)
KM+OLS	-	-	-	-	-	-	-	-	433	240	0.020	(0.041)	-0.010	(0.040)	-0.003	(0.018)
RE	-	-	-	-	-	-	-	-	433	240	0.024	(0.045)	-0.010	(0.042)	0.004	(0.020)
Group 4: Math A-G Complete with a "C"																
Unadjust	1,602	1,009	-0.006	(0.030)	-0.045	(0.033)	-0.047	(0.024)	3,348	1,116	-0.029	(0.024)	-0.068*	(0.027)	-0.054*	(0.021)
CM+OLS	1,462	891	0.004	(0.020)	-0.028	(0.021)	0.031	(0.020)	3,151	1,092	0.002	(0.017)	-0.021	(0.018)	0.004	(0.015)
OLS	1,602	1,009	-6.379	(0.020)	-0.014	(0.020)	0.019	(0.015)	3,348	1,116	-0.002	(0.016)	-0.025	(0.016)	-0.006	(0.014)
SM+OLS	797	559	-0.003	(0.023)	-0.043	(0.032)	0.027	(0.025)	1,483	720	0.009	(0.019)	-0.018	(0.024)	-0.002	(0.017)
KBAL+OLS	1,602	1,009	0.020	(0.021)	-0.012	(0.024)	0.030	(0.016)	3,348	1,116	0.003	(0.016)	-0.030	(0.018)	0.007	(0.017)
KM+OLS	1,602	1,009	0.007	(0.020)	-0.016	(0.022)	0.026	(0.019)	3,348	1,116	0.001	(0.016)	-0.026	(0.017)	0.001	(0.015)
RE	-	-	-	-	-	-	-	-	3,348	1,116	0.001	(0.016)	-0.019	(0.016)	0.004	(0.013)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	1,650	2,241	-0.072***	(0.013)	-0.108***	(0.016)	-0.254***	(0.025)	2,716	2,425	-0.072***	(0.012)	-0.098***	(0.015)	-0.217***	(0.022)
CM+OLS	1,332	1,646	-0.014	(0.014)	-0.022	(0.015)	-0.074***	(0.020)	2,527	2,034	-0.024*	(0.010)	-0.020	(0.014)	-0.076***	(0.018)
OLS	1,650	2,241	-0.019	(0.010)	-0.015	(0.012)	-0.065***	(0.017)	2,716	2,425	-0.024**	(0.009)	-0.017	(0.013)	-0.065***	(0.016)
SM+OLS	1,098	1,112	-0.010	(0.013)	-0.018	(0.015)	-0.080***	(0.022)	1,108	673	-0.027*	(0.012)	-0.004	(0.015)	-0.100***	(0.022)
KBAL+OLS	1,650	2,241	0.005	(0.013)	-0.003	(0.015)	-0.061**	(0.021)	2,716	2,425	-0.010	(0.011)	-0.000	(0.014)	-0.059***	(0.018)
KM+OLS	1,650	2,241	-0.013	(0.011)	-0.013	(0.014)	-0.074***	(0.020)	2,716	2,425	-0.015	(0.012)	-0.009	(0.015)	-0.066***	(0.016)
RE	-	-	-	-	-	-	-	-	2,716	2,425	-0.022*	(0.009)	-0.014	(0.011)	-0.055***	(0.015)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C33. Estimated Effects of Taking TCMS (Compared to Precalculus/Calculus) on Cumulative Overall GPA

	School Fixed Effects						School-Cohort Controls					
	N		Weighted GPA		Unweighted GPA		N		Weighted GPA		Unweighted GPA	
	Precalc or Calc	TCMS	b	se	b	se	Precalc or Calc	TCMS	b	se	b	se
Group 4: Math A-G Complete with a "C"												
Unadjust	774	583	-0.390***	(0.048)	-0.294***	(0.042)	4,728	626	-0.260***	(0.044)	-0.238***	(0.041)
CM+OLS	454	336	-0.001	(0.015)	0.040***	(0.011)	1,238	526	0.016	(0.011)	0.043***	(0.012)
OLS	774	583	0.003	(0.015)	0.053***	(0.013)	4,728	626	0.018*	(0.008)	0.021*	(0.010)
SM+OLS	-	-	-	-	-	-	1,059	413	0.026**	(0.009)	0.035***	(0.010)
KBAL+OLS	774	583	0.021	(0.014)	0.062***	(0.014)	4,728	626	0.019*	(0.008)	0.024*	(0.011)
KM+OLS	774	525	0.010	(0.016)	0.056***	(0.010)	4,728	622	0.021**	(0.007)	0.024**	(0.008)
RE	-	-	-	-	-	-	4,728	626	-0.006	(0.012)	0.051***	(0.015)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math												
Unadjust	750	445	-0.477***	(0.058)	-0.355***	(0.045)	3,850	503	-0.398***	(0.051)	-0.351***	(0.032)
CM+OLS	294	195	0.016	(0.011)	0.029**	(0.011)	620	285	0.048***	(0.012)	0.034**	(0.013)
OLS	750	445	0.027**	(0.010)	0.034**	(0.012)	3,850	503	0.058***	(0.012)	0.045**	(0.014)
SM+OLS	-	-	-	-	-	-	494	184	0.043**	(0.014)	0.021	(0.015)
KBAL+OLS	-	-	-	-	-	-	-	-	-	-	-	-
KM+OLS	-	-	-	-	-	-	-	-	-	-	-	-
RE	-	-	-	-	-	-	3,850	503	0.039***	(0.009)	0.057***	(0.009)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C34. Estimated Effects of Taking TCMS (Compared to Precalculus/Calculus) on Completion of Overall A-G Requirements with a "C" or Better

	School Fixed Effects				School-Cohort Controls			
	N		Overall A-G Complete with a "C"		N		Overall A-G Complete with a "C"	
	Precalc or Calc	TCMS	b	se	Precalc or Calc	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	774	583	-0.047	(0.036)	4,728	626	-0.063	(0.033)
CM+OLS	454	336	0.015	(0.030)	1,238	526	0.014	(0.024)
OLS	774	583	-0.002	(0.026)	4,728	626	0.015	(0.024)
SM+OLS	-	-	-	-	1,059	413	0.015	(0.021)
KBAL+OLS	774	583	0.018	(0.031)	4,728	626	0.012	(0.025)
KM+OLS	774	525	0.002	(0.026)	4,728	622	0.011	(0.020)
RE	-	-	-	-	4,728	626	0.005	(0.020)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	750	445	-0.063*	(0.032)	3,850	503	-0.082**	(0.026)
CM+OLS	294	195	0.032	(0.037)	620	285	-0.014	(0.022)
OLS	750	445	0.016	(0.034)	3,850	503	0.014	(0.021)
SM+OLS	-	-	-	-	494	184	-0.039	(0.026)
KBAL+OLS	-	-	-	-	-	-	-	-
KM+OLS	-	-	-	-	-	-	-	-
RE	-	-	-	-	3,850	503	0.014	(0.021)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C35. Estimated Effects of Taking TCMS (Compared to Precalculus/Calculus) on College Enrollment

	School Fixed Effects								School-Cohort Controls							
	N		Any Enrollment		Two-Year Enrollment		Four-Year Enrollment		N		Any Enrollment		Two-Year Enrollment		Four-Year Enrollment	
	Precalc or Calc	TCMS	b	se	b	se	b	se	Precalc or Calc	TCMS	b	se	b	se	b	se
Group 4: Math A-G Complete with a "C"																
Unadjust	774	583	-0.055*	(0.028)	0.072*	(0.032)	-0.128***	(0.030)	4,728	626	-0.040	(0.027)	0.071**	(0.025)	-0.111***	(0.031)
CM+OLS	454	336	-0.027	(0.035)	0.017	(0.031)	-0.044	(0.024)	1,238	526	-0.019	(0.017)	0.007	(0.024)	-0.026	(0.019)
OLS	774	583	-0.008	(0.028)	0.033	(0.035)	-0.041	(0.024)	4,728	626	-0.023	(0.023)	-0.013	(0.023)	-0.010	(0.019)
SM+OLS	-	-	-	-	-	-	-	-	1,059	413	-0.010	(0.021)	0.001	(0.025)	-0.011	(0.022)
KBAL+OLS	774	583	-0.001	(0.039)	0.034	(0.032)	-0.035	(0.033)	4,728	626	-0.021	(0.024)	-0.020	(0.023)	-0.001	(0.021)
KM+OLS	774	525	0.019	(0.030)	0.052	(0.031)	-0.033	(0.026)	4,728	622	-0.016	(0.015)	-0.016	(0.019)	0.001	(0.019)
RE	-	-	-	-	-	-	-	-	4,728	626	-0.019	(0.021)	0.003	(0.022)	-0.023	(0.018)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	750	445	-0.032	(0.024)	0.172***	(0.028)	-0.204***	(0.035)	3,850	503	-0.046*	(0.023)	0.147***	(0.024)	-0.194***	(0.031)
CM+OLS	294	195	0.010	(0.044)	0.112*	(0.049)	-0.102*	(0.051)	620	285	0.012	(0.024)	0.060	(0.036)	-0.048	(0.041)
OLS	750	445	-0.007	(0.035)	0.028	(0.043)	-0.035	(0.049)	3,850	503	-0.001	(0.023)	-0.006	(0.030)	0.005	(0.032)
SM+OLS	-	-	-	-	-	-	-	-	494	184	-0.087***	(0.023)	-0.030	(0.043)	-0.056	(0.043)
KBAL+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RE	-	-	-	-	-	-	-	-	3,850	503	0.001	(0.023)	-0.001	(0.029)	0.005	(0.033)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C36. Estimated Effects of Taking TCMS (Compared to Precalculus/Calculus) on College Persistence

	School Fixed Effects								School-Cohort Controls							
	N		Any Persistence		Two-Year Persistence		Four-Year Persistence		N		Any Persistence		Two-Year Persistence		Four-Year Persistence	
	Precalc or Calc	TCMS	b	se	b	se	b	se	Precalc or Calc	TCMS	b	se	b	se	b	se
Group 4: Math A-G Complete with a "C"																
Unadjust	774	583	-0.102**	(0.034)	0.024	(0.027)	-0.126***	(0.027)	4,728	626	-0.087*	(0.034)	0.021	(0.025)	-0.108***	(0.029)
CM+OLS	454	336	-0.049	(0.043)	0.009	(0.029)	-0.058*	(0.026)	1,238	526	-0.046*	(0.020)	-0.012	(0.021)	-0.035	(0.019)
OLS	774	583	-0.036	(0.033)	0.012	(0.031)	-0.048*	(0.024)	4,728	626	-0.059*	(0.026)	-0.038	(0.023)	-0.021	(0.017)
SM+OLS	-	-	-	-	-	-	-	-	1,059	413	-0.034	(0.023)	-0.015	(0.026)	-0.019	(0.022)
KBAL+OLS	774	583	0.015	(0.048)	-0.008	(0.031)	0.023	(0.036)	4,728	626	-0.065**	(0.024)	-0.051*	(0.021)	-0.014	(0.018)
KM+OLS	774	525	-0.014	(0.032)	0.012	(0.027)	-0.026	(0.026)	4,728	622	-0.054**	(0.019)	-0.042*	(0.019)	-0.012	(0.017)
RE	-	-	-	-	-	-	-	-	4,728	626	-0.050*	(0.024)	-0.019	(0.022)	-0.025	(0.017)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	750	445	-0.101*	(0.046)	0.115***	(0.033)	-0.215***	(0.038)	3,850	503	-0.100*	(0.043)	0.106***	(0.027)	-0.205***	(0.035)
CM+OLS	294	195	-0.052	(0.072)	0.062	(0.054)	-0.114	(0.063)	620	285	0.012	(0.038)	0.042	(0.035)	-0.030	(0.044)
OLS	750	445	-0.050	(0.047)	-0.004	(0.042)	-0.046	(0.054)	3,850	503	0.010	(0.037)	0.004	(0.029)	0.006	(0.035)
SM+OLS	-	-	-	-	-	-	-	-	494	184	-0.090*	(0.042)	-0.066	(0.043)	-0.024	(0.048)
KBAL+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RE	-	-	-	-	-	-	-	-	3,850	503	0.009	(0.038)	0.002	(0.030)	0.005	(0.037)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C37. Estimated Effects of Taking IDS (Compared to Precalculus) on Cumulative Overall GPA

	School Fixed Effects						School-Cohort Controls					
	N		Weighted GPA		Unweighted GPA		N		Weighted GPA		Unweighted GPA	
	Precalc	IDS	b	se	b	se	Precalc	IDS	b	se	b	se
Group 4: Math A-G Complete with a "C"												
Unadjust	644	248	-0.243***	(0.072)	-0.194***	(0.053)	4,732	267	-0.200**	(0.068)	-0.176**	(0.055)
CM+OLS	269	150	0.054***	(0.010)	0.073***	(0.013)	648	217	0.031***	(0.009)	0.050***	(0.011)
OLS	644	248	0.043***	(0.009)	0.063***	(0.011)	4,732	267	0.027*	(0.011)	0.047***	(0.012)
SM+OLS	-	-	-	-	-	-	502	161	0.018	(0.010)	0.049***	(0.013)
KBAL+OLS	-	-	-	-	-	-	4,732	267	0.027*	(0.011)	0.044***	(0.013)
KM+OLS	644	231	0.042***	(0.011)	0.053***	(0.011)	4,732	267	0.032***	(0.009)	0.047***	(0.011)
RE	-	-	-	-	-	-	4,732	267	0.036***	(0.008)	0.054***	(0.010)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C38. Estimated Effects of Taking IDS (Compared to Precalculus) on Completion of Overall A-G Requirements with a "C" or Better

	School Fixed Effects				School-Cohort Controls			
	N		Overall A-G Complete with a "C"		N		Overall A-G Complete with a "C"	
	Precalc	IDS	b	se	Precalc	IDS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	644	248	-0.048	(0.029)	4,732	267	-0.041	(0.031)
CM+OLS	269	150	0.018	(0.048)	648	217	0.029	(0.024)
OLS	644	248	0.018	(0.036)	4,732	267	0.026	(0.021)
SM+OLS	-	-	-	-	502	161	-0.016	(0.021)
KBAL+OLS	-	-	-	-	4,732	267	0.022	(0.021)
KM+OLS	644	231	0.008	(0.040)	4,732	267	0.018	(0.019)
RE	-	-	-	-	4,732	267	0.014	(0.022)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C39. Estimated Effects of Taking IDS (Compared to Precalculus) on College Enrollment

	School Fixed Effects								School-Cohort Controls							
	N		Any Enrollment		Two-Year Enrollment		Four-Year Enrollment		N		Any Enrollment		Two-Year Enrollment		Four-Year Enrollment	
	Precalc	IDS	b	se	b	se	b	se	Precalc	IDS	b	se	b	se	b	se
Group 4: Math A-G Complete with a "C"																
Unadjust	644	248	-0.056	(0.034)	0.065*	(0.032)	-0.121***	(0.031)	4,732	267	-0.079**	(0.026)	0.039	(0.030)	-0.118***	(0.025)
CM+OLS	269	150	-0.020	(0.051)	0.037	(0.042)	-0.058	(0.056)	648	217	-0.024	(0.036)	0.004	(0.034)	-0.029	(0.028)
OLS	644	248	-0.030	(0.044)	0.014	(0.038)	-0.045	(0.044)	4,732	267	-0.067**	(0.025)	-0.036	(0.028)	-0.030	(0.017)
SM+OLS	-	-	-	-	-	-	-	-	502	161	-0.026	(0.032)	-0.020	(0.033)	-0.006	(0.027)
KBAL+OLS	-	-	-	-	-	-	-	-	4,732	267	-0.072*	(0.030)	-0.033	(0.030)	-0.039*	(0.020)
KM+OLS	644	231	-0.041	(0.056)	0.042	(0.051)	-0.084	(0.048)	4,732	267	-0.079***	(0.023)	-0.036	(0.024)	-0.042*	(0.017)
RE	-	-	-	-	-	-	-	-	4,732	267	-0.066*	(0.026)	-0.034	(0.029)	-0.033	(0.020)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C40. Estimated Effects of Taking IDS (Compared to Precalculus) on College Persistence

	School Fixed Effects								School-Cohort Controls							
	N		Any Persistence		Two-Year Persistence		Four-Year Persistence		N		Any Persistence		Two-Year Persistence		Four-Year Persistence	
	Precalc	IDS	b	se	b	se	b	se	Precalc	IDS	b	se	b	se	b	se
Group 4: Math A-G Complete with a "C"																
Unadjust	644	248	-0.065	(0.039)	0.042	(0.030)	-0.107***	(0.031)	4,732	267	-0.083*	(0.036)	0.013	(0.026)	-0.096***	(0.029)
CM+OLS	269	150	-0.011	(0.030)	0.054	(0.049)	-0.065	(0.044)	648	217	-0.020	(0.029)	-0.004	(0.032)	-0.016	(0.027)
OLS	644	248	-0.017	(0.039)	0.022	(0.045)	-0.039	(0.036)	4,732	267	-0.055*	(0.024)	-0.037	(0.025)	-0.018	(0.020)
SM+OLS	-	-	-	-	-	-	-	-	502	161	-0.035	(0.036)	-0.034	(0.033)	-0.001	(0.030)
KBAL+OLS	-	-	-	-	-	-	-	-	4,732	267	-0.064*	(0.031)	-0.038	(0.027)	-0.027	(0.022)
KM+OLS	644	231	-0.040	(0.046)	0.051	(0.056)	-0.090*	(0.046)	4,732	267	-0.066**	(0.024)	-0.037	(0.024)	-0.029	(0.017)
RE	-	-	-	-	-	-	-	-	4,732	267	-0.052*	(0.024)	-0.034	(0.026)	-0.016	(0.021)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C41. Estimated Effects of Taking TCMS (Compared to Statistics) on Cumulative Overall GPA

	School Fixed Effects						School-Cohort Controls					
	N		Weighted GPA		Unweighted GPA		N		Weighted GPA		Unweighted GPA	
	Stat	TCMS	b	se	b	se	Stat	TCMS	b	se	b	se
Group 4: Math A-G Complete with a "C"												
Unadjust	334	285	-0.205*	(0.091)	-0.176*	(0.085)	1,599	630	-0.155**	(0.053)	-0.142**	(0.051)
CM+OLS	-	-	-	-	-	-	827	538	0.008	(0.010)	-0.002	(0.010)
OLS	334	285	-0.007	(0.013)	0.003	(0.015)	1,599	630	0.006	(0.010)	-0.006	(0.010)
SM+OLS	-	-	-	-	-	-	474	338	0.008	(0.011)	-0.008	(0.009)
KBAL+OLS	-	-	-	-	-	-	1,599	630	0.005	(0.010)	-0.008	(0.008)
KM+OLS	334	257	-0.010	(0.012)	0.002	(0.013)	1,599	627	0.005	(0.010)	-0.008	(0.008)
RE	-	-	-	-	-	-	1,599	630	-0.004	(0.009)	0.004	(0.010)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math												
Unadjust	518	322	-0.263***	(0.065)	-0.177***	(0.039)	3,687	498	-0.195***	(0.056)	-0.152***	(0.034)
CM+OLS	316	220	0.023*	(0.012)	0.041*	(0.018)	1,017	394	0.026**	(0.009)	0.009	(0.012)
OLS	518	322	0.014	(0.007)	0.021	(0.012)	3,687	498	0.027*	(0.011)	0.002	(0.013)
SM+OLS	-	-	-	-	-	-	519	262	0.028*	(0.012)	-0.001	(0.014)
KBAL+OLS	-	-	-	-	-	-	3,687	498	0.031**	(0.010)	0.015	(0.013)
KM+OLS	518	302	0.022*	(0.011)	0.045**	(0.017)	3,687	480	0.031***	(0.009)	0.011	(0.011)
RE	-	-	-	-	-	-	3,687	498	0.009	(0.008)	0.010	(0.011)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C42. Estimated Effects of Taking TCMS (Compared to Statistics) on Completion of Overall A-G Requirements with a "C" or Better

	School Fixed Effects				School-Cohort Controls			
	N		Overall A-G Complete with a "C"		N		Overall A-G Complete with a "C"	
	Stat	TCMS	b	se	Stat	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	334	285	-0.064	(0.047)	1,599	630	-0.045	(0.033)
CM+OLS	-	-	-	-	827	538	-0.016	(0.022)
OLS	334	285	-0.010	(0.025)	1,599	630	0.014	(0.020)
SM+OLS	-	-	-	-	474	338	0.017	(0.027)
KBAL+OLS	-	-	-	-	1,599	630	0.020	(0.025)
KM+OLS	334	257	-0.013	(0.021)	1,599	627	0.024	(0.021)
RE	-	-	-	-	1,599	630	0.007	(0.017)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	518	322	-0.016	(0.030)	3,687	498	-0.046	(0.026)
CM+OLS	316	220	0.013	(0.021)	1,017	394	-0.028	(0.016)
OLS	518	322	-0.008	(0.017)	3,687	498	-0.018	(0.015)
SM+OLS	-	-	-	-	519	262	-0.038	(0.023)
KBAL+OLS	-	-	-	-	3,687	498	-0.014	(0.017)
KM+OLS	518	302	0.026	(0.020)	3,687	480	-0.026	(0.015)
RE	-	-	-	-	3,687	498	-0.023	(0.014)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C43. Estimated Effects of Taking TCMS (Compared to Statistics) on College Enrollment

	School Fixed Effects								School-Cohort Controls							
	N		Any Enrollment		Two-Year Enrollment		Four-Year Enrollment		N		Any Enrollment		Two-Year Enrollment		Four-Year Enrollment	
	Stat	TCMS	b	se	b	se	b	se	Stat	TCMS	b	se	b	se	b	se
Group 4: Math A-G Complete with a "C"																
Unadjust	334	285	-0.039	(0.039)	0.066	(0.042)	-0.105	(0.059)	1,599	630	-0.045	(0.029)	0.055*	(0.026)	-0.100**	(0.031)
CM+OLS	-	-	-	-	-	-	-	-	827	538	-0.011	(0.021)	-0.023	(0.030)	0.013	(0.026)
OLS	334	285	-0.003	(0.034)	0.059	(0.046)	-0.062	(0.041)	1,599	630	-0.013	(0.020)	0.015	(0.025)	-0.028	(0.022)
SM+OLS	-	-	-	-	-	-	-	-	474	338	-0.024	(0.023)	0.008	(0.038)	-0.032	(0.037)
KBAL+OLS	-	-	-	-	-	-	-	-	1,599	630	-0.024	(0.021)	0.008	(0.034)	-0.032	(0.027)
KM+OLS	334	257	-0.007	(0.034)	0.062	(0.040)	-0.069*	(0.031)	1,599	627	-0.011	(0.019)	0.016	(0.025)	-0.027	(0.022)
RE	-	-	-	-	-	-	-	-	1,599	630	-0.012	(0.021)	0.018	(0.026)	-0.028	(0.024)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	518	322	0.007	(0.031)	0.036	(0.036)	-0.029	(0.046)	3,687	498	-0.025	(0.025)	0.072**	(0.025)	-0.096**	(0.033)
CM+OLS	316	220	0.027	(0.032)	-0.069	(0.053)	0.096	(0.053)	1,017	394	0.025	(0.021)	0.010	(0.025)	0.015	(0.024)
OLS	518	322	0.042	(0.028)	-0.007	(0.041)	0.049	(0.030)	3,687	498	-0.002	(0.021)	0.019	(0.023)	-0.021	(0.024)
SM+OLS	-	-	-	-	-	-	-	-	519	262	0.011	(0.028)	0.038	(0.040)	-0.027	(0.039)
KBAL+OLS	-	-	-	-	-	-	-	-	3,687	498	0.004	(0.024)	0.012	(0.027)	-0.008	(0.027)
KM+OLS	518	302	0.107**	(0.039)	0.010	(0.059)	0.097*	(0.045)	3,687	480	-0.008	(0.017)	0.014	(0.023)	-0.022	(0.022)
RE	-	-	-	-	-	-	-	-	3,687	498	0.004	(0.021)	0.005	(0.024)	0.003	(0.023)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C44. Estimated Effects of Taking TCMS (Compared to Statistics) on College Persistence

	School Fixed Effects								School-Cohort Controls							
	N		Any Persistence		Two-Year Persistence		Four-Year Persistence		N		Any Persistence		Two-Year Persistence		Four-Year Persistence	
	Stat	TCMS	b	se	b	se	b	se	Stat	TCMS	b	se	b	se	b	se
Group 4: Math A-G Complete with a "C"																
Unadjust	334	285	-0.063	(0.048)	0.044	(0.042)	-0.107*	(0.053)	1,599	630	-0.082*	(0.037)	0.020	(0.027)	-0.102***	(0.029)
CM+OLS	-	-	-	-	-	-	-	-	827	538	-0.030	(0.024)	-0.033	(0.029)	0.003	(0.022)
OLS	334	285	-0.007	(0.046)	0.066	(0.055)	-0.073	(0.043)	1,599	630	-0.027	(0.023)	0.005	(0.025)	-0.032	(0.019)
SM+OLS	-	-	-	-	-	-	-	-	474	338	-0.002	(0.029)	0.045	(0.035)	-0.048	(0.033)
KBAL+OLS	-	-	-	-	-	-	-	-	1,599	630	-0.044*	(0.022)	-0.005	(0.032)	-0.039	(0.030)
KM+OLS	334	257	-0.024	(0.034)	0.063	(0.042)	-0.087**	(0.027)	1,599	627	-0.034	(0.023)	-0.003	(0.024)	-0.031	(0.023)
RE	-	-	-	-	-	-	-	-	1,599	630	-0.025	(0.024)	0.013	(0.027)	-0.035	(0.020)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	518	322	-0.034	(0.058)	-0.008	(0.035)	-0.026	(0.057)	3,687	498	-0.058	(0.045)	0.041	(0.026)	-0.099**	(0.037)
CM+OLS	316	220	0.053	(0.045)	-0.063	(0.072)	0.116	(0.065)	1,017	394	0.031	(0.031)	0.008	(0.028)	0.024	(0.029)
OLS	518	322	0.056	(0.046)	-0.009	(0.052)	0.066	(0.046)	3,687	498	0.006	(0.036)	0.014	(0.026)	-0.008	(0.029)
SM+OLS	-	-	-	-	-	-	-	-	519	262	0.000	(0.040)	0.021	(0.043)	-0.021	(0.040)
KBAL+OLS	-	-	-	-	-	-	-	-	3,687	498	0.025	(0.035)	0.018	(0.033)	0.007	(0.034)
KM+OLS	518	302	0.104**	(0.036)	-0.013	(0.062)	0.118*	(0.052)	3,687	480	0.015	(0.030)	0.027	(0.027)	-0.012	(0.027)
RE	-	-	-	-	-	-	-	-	3,687	498	0.033	(0.030)	0.008	(0.026)	0.020	(0.029)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM +OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C45. Estimated Effects of Taking IDS (Compared to Statistics) on Cumulative Overall GPA

	School Fixed Effects						School-Cohort Controls					
	N		Weighted GPA		Unweighted GPA		N		Weighted GPA		Unweighted GPA	
	Stat	IDS	b	se	b	se	Stat	IDS	b	se	b	se
Group 4: Math A-G Complete with a "C"												
Unadjust	286	104	-0.133**	(0.049)	-0.072	(0.040)	1,599	268	-0.099	(0.070)	-0.083	(0.058)
CM+OLS	140	68	0.017	(0.010)	0.026	(0.016)	484	245	0.037**	(0.013)	0.031**	(0.011)
OLS	286	104	0.037***	(0.009)	0.047***	(0.010)	1,599	268	0.031*	(0.013)	0.029**	(0.010)
SM+OLS	-	-	-	-	-	-	-	-	-	-	-	-
KBAL+OLS	286	104	0.059***	(0.009)	0.063***	(0.011)	1,599	268	0.035**	(0.014)	0.029**	(0.010)
KM+OLS	286	85	0.037***	(0.006)	0.042***	(0.011)	1,599	267	0.037**	(0.013)	0.031***	(0.008)
RE	-	-	-	-	-	-	1,599	268	0.028**	(0.010)	0.038***	(0.011)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math												
Unadjust	343	57	-0.091	(0.075)	-0.031	(0.076)	3,690	212	-0.005	(0.047)	-0.019	(0.045)
CM+OLS	-	-	-	-	-	-	328	105	0.018	(0.011)	0.028	(0.018)
OLS	-	-	-	-	-	-	3,690	212	0.037*	(0.016)	-0.005	(0.033)
SM+OLS	-	-	-	-	-	-	-	-	-	-	-	-
KBAL+OLS	-	-	-	-	-	-	3,690	212	0.038	(0.020)	0.006	(0.031)
KM+OLS	-	-	-	-	-	-	3,690	203	0.016	(0.012)	0.011	(0.013)
RE	-	-	-	-	-	-	3,690	212	0.016	(0.011)	0.026	(0.016)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C46. Estimated Effects of Taking IDS (Compared to Statistics) on Completion of Overall A-G Requirements with a "C" or Better

	School Fixed Effects				School-Cohort Controls			
	N		Overall A-G Complete with a "C"		N		Overall A-G Complete with a "C"	
	Stat	IDS	b	se	Stat	IDS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	286	104	-0.059	(0.042)	1,599	268	-0.022	(0.035)
CM+OLS	140	68	-0.001	(0.046)	484	245	0.041	(0.027)
OLS	286	104	0.004	(0.043)	1,599	268	0.026	(0.024)
SM+OLS	-	-	-	-	-	-	-	-
KBAL+OLS	286	104	0.053	(0.058)	1,599	268	0.054*	(0.025)
KM+OLS	286	85	0.010	(0.042)	1,599	267	0.032	(0.024)
RE	-	-	-	-	1,599	268	0.016	(0.026)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	343	57	-0.027	(0.061)	3,690	212	-0.022	(0.032)
CM+OLS	-	-	-	-	328	105	-0.013	(0.023)
OLS	-	-	-	-	3,690	212	-0.024	(0.021)
SM+OLS	-	-	-	-	-	-	-	-
KBAL+OLS	-	-	-	-	3,690	212	-0.017	(0.023)
KM+OLS	-	-	-	-	3,690	203	-0.007	(0.015)
RE	-	-	-	-	3,690	212	-0.021	(0.023)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C47. Estimated Effects of Taking IDS (Compared to Statistics) on College Enrollment

	School Fixed Effects								School-Cohort Controls							
	N		Any Enrollment		Two-Year Enrollment		Four-Year Enrollment		N		Any Enrollment		Two-Year Enrollment		Four-Year Enrollment	
	Stat	IDS	b	se	b	se	b	se	Stat	IDS	b	se	b	se	b	se
Group 4: Math A-G Complete with a "C"																
Unadjust	286	104	-0.091*	(0.035)	0.065	(0.045)	-0.156***	(0.033)	1,599	268	-0.082**	(0.027)	0.028	(0.033)	-0.110***	(0.029)
CM+OLS	140	68	-0.025	(0.084)	-0.053	(0.082)	0.028	(0.065)	484	245	-0.005	(0.030)	0.003	(0.030)	-0.008	(0.022)
OLS	286	104	-0.014	(0.053)	0.009	(0.072)	-0.023	(0.057)	1,599	268	-0.042	(0.027)	-0.004	(0.031)	-0.038	(0.022)
SM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KBAL+OLS	286	104	0.028	(0.040)	0.000	(0.073)	0.027	(0.084)	1,599	268	-0.025	(0.035)	0.005	(0.033)	-0.029	(0.022)
KM+OLS	286	85	-0.012	(0.054)	-0.010	(0.061)	-0.002	(0.070)	1,599	267	-0.023	(0.028)	0.009	(0.029)	-0.032	(0.019)
RE	-	-	-	-	-	-	-	-	1,599	268	-0.044	(0.028)	0.002	(0.032)	-0.048*	(0.024)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	343	57	0.011	(0.048)	0.065	(0.081)	-0.054	(0.057)	3,690	212	-0.022	(0.021)	0.077	(0.046)	-0.098*	(0.050)
CM+OLS	-	-	-	-	-	-	-	-	328	105	-0.040	(0.049)	-0.013	(0.054)	-0.026	(0.033)
OLS	-	-	-	-	-	-	-	-	3,690	212	-0.007	(0.025)	0.017	(0.033)	-0.024	(0.038)
SM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KBAL+OLS	-	-	-	-	-	-	-	-	3,690	212	-0.010	(0.033)	0.022	(0.039)	-0.031	(0.049)
KM+OLS	-	-	-	-	-	-	-	-	3,690	203	-0.011	(0.025)	0.044	(0.024)	-0.056*	(0.028)
RE	-	-	-	-	-	-	-	-	3,690	212	-0.005	(0.026)	0.022	(0.034)	-0.022	(0.034)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table C48. Estimated Effects of Taking IDS (Compared to Statistics) on College Persistence

	School Fixed Effects								School-Cohort Controls							
	N		Any Persistence		Two-Year Persistence		Four-Year Persistence		N		Any Persistence		Two-Year Persistence		Four-Year Persistence	
	Stat	IDS	b	se	b	se	b	se	Stat	IDS	b	se	b	se	b	se
Group 4: Math A-G Complete with a "C"																
Unadjust	286	104	-0.066	(0.056)	0.037	(0.051)	-0.102***	(0.029)	1,599	268	-0.081*	(0.038)	0.012	(0.029)	-0.093**	(0.032)
CM+OLS	140	68	0.005	(0.064)	-0.057	(0.059)	0.062	(0.053)	484	245	-0.034	(0.038)	-0.030	(0.034)	-0.005	(0.025)
OLS	286	104	0.022	(0.056)	-0.014	(0.051)	0.037	(0.044)	1,599	268	-0.020	(0.031)	-0.000	(0.032)	-0.020	(0.022)
SM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KBAL+OLS	286	104	0.043	(0.045)	-0.037	(0.062)	0.080	(0.056)	1,599	268	-0.025	(0.034)	0.004	(0.031)	-0.029	(0.023)
KM+OLS	286	85	0.043	(0.053)	-0.005	(0.037)	0.047	(0.054)	1,599	267	-0.006	(0.033)	0.011	(0.029)	-0.018	(0.021)
RE	-	-	-	-	-	-	-	-	1,599	268	-0.015	(0.033)	0.013	(0.033)	-0.023	(0.023)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	343	57	-0.030	(0.078)	0.007	(0.096)	-0.037	(0.062)	3,690	212	-0.048	(0.032)	0.051	(0.054)	-0.099*	(0.042)
CM+OLS	-	-	-	-	-	-	-	-	328	105	-0.079	(0.062)	-0.033	(0.058)	-0.047	(0.036)
OLS	-	-	-	-	-	-	-	-	3,690	212	-0.030	(0.033)	-0.005	(0.042)	-0.025	(0.035)
SM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KBAL+OLS	-	-	-	-	-	-	-	-	3,690	212	-0.020	(0.041)	0.021	(0.047)	-0.041	(0.048)
KM+OLS	-	-	-	-	-	-	-	-	3,690	203	-0.045	(0.034)	0.001	(0.028)	-0.046	(0.025)
RE	-	-	-	-	-	-	-	-	3,690	212	-0.041	(0.040)	-0.014	(0.043)	-0.027	(0.032)

Note: For information on how we define each outcome, see Appendix Table A2. Unadjust = Difference in Means. CM+OLS = Cluster Matching with OLS. OLS = OLS without Matching. SM+OLS = Propensity Score Matching after Stratifying Key Predictors with OLS. KBAL+OLS = Kernel Balancing Weights with OLS. KM+OLS = Kernel Matching with OLS. RE = Random Effects. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. We also redact estimates for which the associated matching or weighting yielded poor covariate balance. *p<0.05, **p<0.01, and ***p<0.001.

Table D1. Sensitivity Analysis Results for Math vs. No Math, Group 3

	OLS Estimate	R2 with Treatment		R2 with Outcome		Robustness of Sign of Estimate			Robustness of Statistical Significance at 0.05 Level		
		Total	Without Academics+	Total	Without Academics+	X Times as Strong as Academics+	Partial R2 with Treatment	Partial R2 with Outcome	X Times as Strong as Academics+	Partial R2 with Treatment	Partial R2 with Outcome
Overall Cumulative Weighted GPA	-0.057***	0.366	0.278	0.922	0.230	0.24	0.033	1.000	0.24	0.033	1.000
Overall Cumulative Unweighted GPA	-0.061***	0.366	0.278	0.896	0.226	0.24	0.033	1.000	0.24	0.033	1.000
Overall A-G Complete with a "C"	0.229***	0.366	0.278	0.357	0.256	1.65	0.228	0.353	1.48	0.204	0.314
Any Enrollment	0.011	0.366	0.278	0.147	0.108	0.11	0.015	0.006	0.00	0.000	0.000
Two-Year Enrollment	-0.055	0.366	0.278	0.103	0.081	0.66	0.091	0.021	0.00	0.000	0.000
Four-Year Enrollment	0.066***	0.366	0.278	0.210	0.133	0.81	0.112	0.104	0.53	0.073	0.067
Any Persistence	0.025	0.366	0.278	0.152	0.118	0.25	0.035	0.013	0.00	0.000	0.000
Two-Year Persistence	-0.015	0.366	0.278	0.109	0.091	0.2	0.028	0.005	0.00	0.000	0.000
Four-Year Persistence	0.04***	0.366	0.278	0.177	0.116	0.64	0.088	0.062	0.31	0.043	0.030

Note: The "OLS Estimate" corresponds to the estimate from the "OLS without Matching" model that uses school fixed effects. The "R2 with Treatment" set of columns gives the R2 from a linear regression of math-taking on all predictors ("Total"), and the R2 after removing the Academics+ predictors ("Without Academics+"). The "R2 with Outcome" set of columns gives the R2 from a linear regression of the outcome on all the predictors and whether or not the student took 12th grade math ("Total"), and the R2 after removing the Academics+ predictors ("Without Academics+"). *p<0.05, **p<0.01, and ***p<0.001.

Table D2. Sensitivity Analysis Results for Math vs. No Math, Group 4

	OLS Estimate	R2 with Treatment		R2 with Outcome		Robustness of Sign of Estimate			Robustness of Statistical Significance at 0.05 Level		
		Total	Without Academics+	Total	Without Academics+	X Times as Strong as Academics+	Partial R2 with Treatment	Partial R2 with Outcome	X Times as Strong as Academics+	Partial R2 with Treatment	Partial R2 with Outcome
Overall Cumulative Weighted GPA	-0.042***	0.324	0.23	0.956	0.265	0.15	0.021	1.000	0.15	0.021	1.000
Overall Cumulative Unweighted GPA	-0.058***	0.324	0.23	0.930	0.252	0.22	0.031	1.000	0.22	0.031	1.000
Overall A-G Complete with a "C"	0.008	0.324	0.23	0.437	0.116	0.02	0.003	0.015	0.00	0.000	0.000
Any Enrollment	0.053***	0.324	0.23	0.100	0.065	0.61	0.085	0.031	0.38	0.053	0.019
Two-Year Enrollment	0.003	0.324	0.23	0.103	0.046	0.02	0.003	0.002	0.00	0.000	0.000
Four-Year Enrollment	0.05***	0.324	0.23	0.253	0.116	0.26	0.036	0.062	0.15	0.021	0.035
Any Persistence	0.071***	0.324	0.23	0.138	0.087	0.58	0.081	0.044	0.40	0.056	0.030
Two-Year Persistence	0.024*	0.324	0.23	0.073	0.044	0.27	0.038	0.011	0.01	0.001	0.000
Four-Year Persistence	0.047***	0.324	0.23	0.233	0.102	0.26	0.036	0.057	0.15	0.021	0.033

Note: The "OLS Estimate" corresponds to the estimate from the "OLS without Matching" model that uses school fixed effects. The "R2 with Treatment" set of columns gives the R2 from a linear regression of math-taking on all predictors ("Total"), and the R2 after removing the Academics+ predictors ("Without Academics+"). The "R2 with Outcome" set of columns gives the R2 from a linear regression of the outcome on all the predictors and whether or not the student took 12th grade math ("Total"), and the R2 after removing the Academics+ predictors ("Without Academics+"). *p<0.05, **p<0.01, and ***p<0.001.

Table D3. Sensitivity Analysis Results for Math vs. No Math, Group 5

		R2 with Treatment		R2 with Outcome		Robustness of Sign of Estimate			Robustness of Statistical Significance at 0.05 Level		
	OLS Estimate	Total	Without Academics+	Total	Without Academics+	X Times as Strong as Academics+	Partial R2 with Treatment	Partial R2 with Outcome	X Times as Strong as Academics+	Partial R2 with Treatment	Partial R2 with Outcome
Overall Cumulative Weighted GPA	-0.037***	0.273	0.201	0.965	0.313	0.18	0.018	1.000	0.18	0.018	1.000
Overall Cumulative Unweighted GPA	-0.046***	0.273	0.201	0.938	0.287	0.21	0.021	1.000	0.21	0.021	1.000
Overall A-G Complete with a "C"	0.003	0.273	0.201	0.393	0.098	0.01	0.001	0.006	0.00	0.000	0.000
Any Enrollment	0.033***	0.273	0.201	0.086	0.056	0.56	0.056	0.022	0.29	0.029	0.012
Two-Year Enrollment	-0.009	0.273	0.201	0.169	0.077	0.07	0.007	0.009	0.00	0.000	0.000
Four-Year Enrollment	0.042***	0.273	0.201	0.267	0.126	0.24	0.024	0.056	0.12	0.012	0.028
Any Persistence	0.040***	0.273	0.201	0.129	0.085	0.46	0.046	0.028	0.24	0.024	0.015
Two-Year Persistence	-0.005	0.273	0.201	0.123	0.062	0.04	0.004	0.003	0.00	0.000	0.000
Four-Year Persistence	0.044***	0.273	0.201	0.264	0.126	0.26	0.026	0.059	0.14	0.014	0.031

Note: The "OLS Estimate" corresponds to the estimate from the "OLS without Matching" model that uses school fixed effects. The "R2 with Treatment" set of columns gives the R2 from a linear regression of math-taking on all predictors ("Total"), and the R2 after removing the Academics+ predictors ("Without Academics+"). The "R2 with Outcome" set of columns gives the R2 from a linear regression of the outcome on all the predictors and whether or not the student took 12th grade math ("Total"), and the R2 after removing the Academics+ predictors ("Without Academics+"). *p<0.05, **p<0.01, and ***p<0.001.

Table E1. Estimated Inequalities in Math-taking for Group 3 (Math A-G Complete with a "D")

	Enrollment Disparities			Disparities among Similar Students					Disparities among Similar Students Attending Similar Schools					Disparities among Similar Students Attending the Same School				
	N	Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE
Gender																		
Female vs. Male	1,332 vs. 1,523	0.046*	(0.020)	1,332 vs. 1,523	0.005	(0.027)	0.004	(0.024)	1,332 vs. 1,523	0.012	(0.029)	0.010	(0.022)	1,130 vs. 1,317	-0.001	(0.036)	0.001	(0.023)
Race/Ethnicity																		
Latinx vs. Asian	2,270 vs. 34	0.102	(0.098)	2,270 vs. 34	0.100	(0.143)	0.086	(0.118)	2,270 vs. 34	-0.074	(0.125)	-0.048	(0.096)	1,912 vs. 32	-0.146	(0.124)	-0.085	(0.089)
Latinx vs. African American	2,270 vs. 293	0.072	(0.062)	2,270 vs. 293	-0.002	(0.061)	-0.002	(0.055)	2,270 vs. 293	0.029	(0.059)	0.021	(0.046)	1,912 vs. 257	0.007	(0.068)	0.016	(0.042)
Latinx vs. White	2,270 vs. 165	0.137*	(0.069)	2,270 vs. 165	0.151*	(0.072)	0.130*	(0.065)	2,270 vs. 165	0.029	(0.057)	0.024	(0.045)	1,912 vs. 159	-0.010	(0.063)	-0.005	(0.043)
Latinx vs. Filipinx	2,270 vs. 71	0.036	(0.059)	2,270 vs. 71	0.043	(0.066)	0.037	(0.057)	2,270 vs. 71	-0.103	(0.057)	-0.077	(0.050)	1,912 vs. 66	-0.112	(0.078)	-0.073	(0.054)
Asian vs. African American	34 vs. 293	-0.030	(0.105)	34 vs. 293	-0.102	(0.146)	-0.088	(0.120)	34 vs. 293	0.102	(0.124)	0.069	(0.094)	32 vs. 257	0.153	(0.125)	0.102	(0.085)
Asian vs. White	34 vs. 165	0.035	(0.117)	34 vs. 165	0.051	(0.160)	0.044	(0.133)	34 vs. 165	0.102	(0.139)	0.072	(0.107)	32 vs. 159	0.135	(0.149)	0.080	(0.103)
Asian vs. Filipinx	34 vs. 71	-0.066	(0.111)	34 vs. 71	-0.058	(0.155)	-0.049	(0.129)	34 vs. 71	-0.030	(0.138)	-0.029	(0.107)	32 vs. 66	0.034	(0.137)	0.012	(0.097)
African American vs. White	293 vs. 165	0.065	(0.092)	293 vs. 165	0.153	(0.087)	0.131	(0.078)	293 vs. 165	-0.000	(0.077)	0.003	(0.059)	257 vs. 159	-0.017	(0.090)	-0.022	(0.058)
African American vs. Filipinx	293 vs. 71	-0.036	(0.085)	293 vs. 71	0.044	(0.085)	0.039	(0.075)	293 vs. 71	-0.132	(0.083)	-0.098	(0.068)	257 vs. 66	-0.119	(0.105)	-0.090	(0.069)

Note: These results show differences in predicted probabilities for the average student. "Enrollment Disparities" are raw differences in the empirical rates of 12th grade math-taking between the demographic groups of interest. Models for "Disparities among Similar Students" include the student-level characteristics in Appendix Table A1 as regressors. Models for "Disparities among Similar Students Attending the Same School" include the student-level characteristics in Appendix Table A1 as regressors, and additionally include school fixed effects. Models for "Disparities among Similar Students Attending Similar Schools" include student-level and school-cohort-level characteristics in Appendix Table A1 as regressors. Standard errors have all been clustered by school. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. LEP = Limited English Proficient. EO = English Only. IFEP = Initial Fluent English Proficient. RFEP = Reclassified Fluent English Proficient. *p<0.05, **p<0.01, and ***p<0.001.

Table E1 Continued. Estimated Inequalities in Math-taking for Group 3 (Math A-G Complete with a "D")

	Enrollment Disparities			Disparities among Similar Students					Disparities among Similar Students Attending Similar Schools					Disparities among Similar Students Attending the Same School				
	N	Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE
Race/Ethnicity																		
White vs. Filipinx	165 vs. 71	-0.101	(0.089)	165 vs. 71	-0.109	(0.089)	-0.092	(0.079)	165 vs. 71	-0.132	(0.079)	-0.101	(0.066)	159 vs. 66	-0.102	(0.097)	-0.068	(0.068)
Ever Subsidized Meal Eligible from 9th to 11th Grade																		
Eligible vs. Not Eligible	2,643 vs. 159	0.084	(0.055)	2,643 vs. 159	0.107*	(0.054)	0.094*	(0.047)	2,643 vs. 159	-0.000	(0.054)	0.001	(0.043)	2,243 vs. 155	0.037	(0.058)	0.017	(0.040)
Parents'/Guardians' Educational Attainment																		
Not HS Grad vs. HS Grad	737 vs. 662	0.048	(0.030)	737 vs. 662	0.029	(0.033)	0.026	(0.029)	737 vs. 662	0.005	(0.034)	0.003	(0.027)	628 vs. 572	0.006	(0.038)	0.005	(0.025)
Not HS Grad vs. Some College	737 vs. 361	0.057	(0.039)	737 vs. 361	0.031	(0.039)	0.026	(0.035)	737 vs. 361	-0.027	(0.041)	-0.020	(0.031)	628 vs. 329	-0.033	(0.052)	-0.021	(0.032)
Not HS Grad vs. College Grad	737 vs. 168	0.020	(0.042)	737 vs. 168	-0.027	(0.044)	-0.026	(0.039)	737 vs. 168	-0.077	(0.052)	-0.068	(0.040)	628 vs. 150	-0.025	(0.074)	-0.029	(0.043)
Not HS Grad vs. Grad School	737 vs. 70	-0.008	(0.059)	737 vs. 70	-0.064	(0.064)	-0.055	(0.056)	737 vs. 70	-0.113	(0.068)	-0.090	(0.059)	628 vs. 64	-0.121	(0.084)	-0.087	(0.056)
HS Grad vs. Some College	662 vs. 361	0.008	(0.038)	662 vs. 361	0.002	(0.038)	0.000	(0.033)	662 vs. 361	-0.033	(0.038)	-0.023	(0.030)	572 vs. 329	-0.039	(0.050)	-0.027	(0.033)
HS Grad vs. College Grad	662 vs. 168	-0.028	(0.043)	662 vs. 168	-0.056	(0.039)	-0.051	(0.035)	662 vs. 168	-0.082	(0.047)	-0.071*	(0.036)	572 vs. 150	-0.031	(0.070)	-0.034	(0.042)
HS Grad vs. Grad School	662 vs. 70	-0.056	(0.063)	662 vs. 70	-0.093	(0.067)	-0.081	(0.059)	662 vs. 70	-0.119	(0.069)	-0.093	(0.059)	572 vs. 64	-0.127	(0.083)	-0.092	(0.056)
Some College vs. College Grad	361 vs. 168	-0.037	(0.046)	361 vs. 168	-0.058	(0.047)	-0.052	(0.041)	361 vs. 168	-0.050	(0.050)	-0.048	(0.039)	329 vs. 150	0.008	(0.067)	-0.007	(0.041)

See the note on the first page of the table.

Table E1 Continued. Estimated Inequalities in Math-taking for Group 3 (Math A-G Complete with a "D")

	Enrollment Disparities			Disparities among Similar Students					Disparities among Similar Students Attending Similar Schools					Disparities among Similar Students Attending the Same School				
	N	Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE
Parents'/Guardians' Educational Attainment																		
Some College vs. Grad School	361 vs. 70	-0.064	(0.061)	361 vs. 70	-0.095	(0.069)	-0.081	(0.060)	361 vs. 70	-0.086	(0.071)	-0.070	(0.060)	329 vs. 64	-0.088	(0.083)	-0.066	(0.055)
College Grad vs. Grad School	168 vs. 70	-0.027	(0.066)	168 vs. 70	-0.037	(0.068)	-0.029	(0.059)	168 vs. 70	-0.036	(0.073)	-0.023	(0.061)	150 vs. 64	-0.096	(0.094)	-0.059	(0.062)
English Learner Status in 11th Grade																		
LEP vs. EO	192 vs. 829	-0.099	(0.051)	192 vs. 829	0.047	(0.057)	0.041	(0.050)	192 vs. 829	-0.039	(0.053)	-0.028	(0.041)	169 vs. 737	-0.098	(0.070)	-0.047	(0.040)
LEP vs. IFEP	192 vs. 407	-0.193***	(0.049)	192 vs. 407	-0.008	(0.058)	-0.008	(0.052)	192 vs. 407	-0.074	(0.059)	-0.057	(0.045)	169 vs. 345	-0.129	(0.075)	-0.068	(0.043)
LEP vs. RFEP	192 vs. 1,427	-0.184***	(0.039)	192 vs. 1,427	-0.019	(0.050)	-0.017	(0.044)	192 vs. 1,427	-0.058	(0.051)	-0.045	(0.039)	169 vs. 1,196	-0.133	(0.069)	-0.063	(0.041)
EO vs. IFEP	829 vs. 407	-0.094**	(0.034)	829 vs. 407	-0.055	(0.031)	-0.049	(0.027)	829 vs. 407	-0.035	(0.037)	-0.029	(0.028)	737 vs. 345	-0.031	(0.045)	-0.021	(0.030)
EO vs. RFEP	829 vs. 1,427	-0.085**	(0.029)	829 vs. 1,427	-0.066*	(0.030)	-0.058*	(0.026)	829 vs. 1,427	-0.019	(0.031)	-0.018	(0.024)	737 vs. 1,196	-0.035	(0.038)	-0.016	(0.024)
IFEP vs. RFEP	407 vs. 1,427	0.008	(0.030)	407 vs. 1,427	-0.011	(0.032)	-0.009	(0.029)	407 vs. 1,427	0.016	(0.036)	0.011	(0.028)	345 vs. 1,196	-0.004	(0.045)	0.005	(0.029)

See the note on the first page of the table.

Table E2. Estimated Inequalities in Math-taking for Group 4 (Math A-G Complete with a "C")

	Enrollment Disparities			Disparities among Similar Students					Disparities among Similar Students Attending Similar Schools					Disparities among Similar Students Attending the Same School				
	N	Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE
Gender																		
Female vs. Male	6,092 vs. 5,163	-0.009	(0.011)	6,092 vs. 5,163	-0.033*	(0.014)	-0.029*	(0.012)	6,092 vs. 5,163	-0.038**	(0.012)	-0.030**	(0.010)	5,399 vs. 4,594	-0.052***	(0.013)	-0.039***	(0.010)
Race/Ethnicity																		
Latinx vs. Asian	8,996 vs. 243	-0.024	(0.039)	8,996 vs. 243	0.025	(0.036)	0.023	(0.028)	8,996 vs. 243	-0.048	(0.033)	-0.052	(0.030)	7,931 vs. 230	-0.025	(0.035)	-0.028	(0.028)
Latinx vs. African American	8,996 vs. 1,011	0.040	(0.051)	8,996 vs. 1,011	0.003	(0.042)	0.004	(0.040)	8,996 vs. 1,011	0.029	(0.030)	0.028	(0.026)	7,931 vs. 878	0.069**	(0.026)	0.053**	(0.020)
Latinx vs. White	8,996 vs. 619	0.133**	(0.047)	8,996 vs. 619	0.160***	(0.040)	0.131***	(0.034)	8,996 vs. 619	0.044	(0.031)	0.038	(0.028)	7,931 vs. 589	0.089**	(0.033)	0.061*	(0.025)
Latinx vs. Filipinx	8,996 vs. 288	-0.005	(0.040)	8,996 vs. 288	0.054	(0.037)	0.043	(0.030)	8,996 vs. 288	-0.001	(0.032)	-0.007	(0.027)	7,931 vs. 276	0.013	(0.025)	0.007	(0.018)
Asian vs. African American	243 vs. 1,011	0.064	(0.059)	243 vs. 1,011	-0.022	(0.051)	-0.019	(0.044)	243 vs. 1,011	0.077	(0.041)	0.080*	(0.036)	230 vs. 878	0.094*	(0.041)	0.081*	(0.032)
Asian vs. White	243 vs. 619	0.157***	(0.047)	243 vs. 619	0.135**	(0.045)	0.108**	(0.037)	243 vs. 619	0.093*	(0.038)	0.090**	(0.035)	230 vs. 589	0.114**	(0.042)	0.088**	(0.032)
Asian vs. Filipinx	243 vs. 288	0.019	(0.044)	243 vs. 288	0.029	(0.045)	0.021	(0.035)	243 vs. 288	0.047	(0.044)	0.045	(0.038)	230 vs. 276	0.038	(0.040)	0.035	(0.030)
African American vs. White	1,011 vs. 619	0.093	(0.065)	1,011 vs. 619	0.157**	(0.053)	0.127**	(0.047)	1,011 vs. 619	0.016	(0.041)	0.010	(0.035)	878 vs. 589	0.020	(0.037)	0.008	(0.029)
African American vs. Filipinx	1,011 vs. 288	-0.045	(0.062)	1,011 vs. 288	0.052	(0.053)	0.040	(0.046)	1,011 vs. 288	-0.030	(0.039)	-0.035	(0.034)	878 vs. 276	-0.056	(0.035)	-0.046	(0.026)

Note: These results show differences in predicted probabilities for the average student. "Enrollment Disparities" are raw differences in the empirical rates of 12th grade math-taking between the demographic groups of interest. Models for "Disparities among Similar Students" include the student-level characteristics in Appendix Table A1 as regressors. Models for "Disparities among Similar Students Attending the Same School" include the student-level characteristics in Appendix Table A1 as regressors, and additionally include school fixed effects. Models for "Disparities among Similar Students Attending Similar Schools" include student-level and school-cohort-level characteristics in Appendix Table A1 as regressors. Standard errors have all been clustered by school. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. LEP = Limited English Proficient. EO = English Only. IFEP = Initial Fluent English Proficient. RFEP = Reclassified Fluent English Proficient. *p<0.05, **p<0.01, and ***p<0.001.

Table E2 Continued. Estimated Inequalities in Math-taking for Group 4 (Math A-G Complete with a "C")

	Enrollment Disparities			Disparities among Similar Students					Disparities among Similar Students Attending Similar Schools					Disparities among Similar Students Attending the Same School				
	N	Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE
Race/Ethnicity																		
White vs. Filipinx	619 vs. 288	-0.138**	(0.053)	619 vs. 288	-0.106*	(0.052)	-0.088*	(0.043)	619 vs. 288	-0.046	(0.048)	-0.045	(0.042)	589 vs. 276	-0.076	(0.044)	-0.054	(0.033)
Ever Subsidized Meal Eligible from 9th to 11th Grade																		
Eligible vs. Not Eligible	10,440 vs. 602	0.053	(0.034)	10,440 vs. 602	0.041	(0.028)	0.034	(0.026)	10,440 vs. 602	0.011	(0.028)	0.005	(0.025)	9,223 vs. 565	0.000	(0.027)	-0.005	(0.023)
Parents'/Guardians' Educational Attainment																		
Not HS Grad vs. HS Grad	2,814 vs. 2,365	0.003	(0.016)	2,814 vs. 2,365	-0.004	(0.016)	-0.004	(0.014)	2,814 vs. 2,365	-0.014	(0.015)	-0.011	(0.013)	2,464 vs. 2,102	-0.019	(0.017)	-0.015	(0.012)
Not HS Grad vs. Some College	2,814 vs. 1,354	0.045	(0.027)	2,814 vs. 1,354	0.024	(0.024)	0.023	(0.021)	2,814 vs. 1,354	-0.004	(0.021)	-0.003	(0.018)	2,464 vs. 1,223	-0.016	(0.021)	-0.010	(0.017)
Not HS Grad vs. College Grad	2,814 vs. 811	0.041	(0.030)	2,814 vs. 811	0.016	(0.020)	0.016	(0.018)	2,814 vs. 811	-0.025	(0.020)	-0.017	(0.017)	2,464 vs. 753	-0.037	(0.021)	-0.023	(0.016)
Not HS Grad vs. Grad School	2,814 vs. 307	-0.071*	(0.033)	2,814 vs. 307	-0.078**	(0.027)	-0.071**	(0.024)	2,814 vs. 307	-0.107***	(0.025)	-0.103***	(0.023)	2,464 vs. 283	-0.121***	(0.026)	-0.106***	(0.026)
HS Grad vs. Some College	2,365 vs. 1,354	0.042	(0.022)	2,365 vs. 1,354	0.028	(0.021)	0.026	(0.019)	2,365 vs. 1,354	0.010	(0.020)	0.008	(0.018)	2,102 vs. 1,223	0.003	(0.024)	0.005	(0.019)
HS Grad vs. College Grad	2,365 vs. 811	0.038	(0.028)	2,365 vs. 811	0.020	(0.020)	0.019	(0.018)	2,365 vs. 811	-0.011	(0.020)	-0.006	(0.017)	2,102 vs. 753	-0.017	(0.023)	-0.008	(0.018)
HS Grad vs. Grad School	2,365 vs. 307	-0.074*	(0.033)	2,365 vs. 307	-0.074**	(0.028)	-0.067**	(0.025)	2,365 vs. 307	-0.093***	(0.026)	-0.092***	(0.025)	2,102 vs. 283	-0.102***	(0.029)	-0.091***	(0.027)

See the note on the first page of the table.

Table E2 Continued. Estimated Inequalities in Math-taking for Group 4 (Math A-G Complete with a "C")

	Enrollment Disparities			Disparities among Similar Students					Disparities among Similar Students Attending Similar Schools					Disparities among Similar Students Attending the Same School				
	N	Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE
Parents'/Guardians' Educational Attainment																		
Some College vs. College Grad	1,354 vs. 811	-0.004	(0.025)	1,354 vs. 811	-0.009	(0.022)	-0.007	(0.020)	1,354 vs. 811	-0.021	(0.022)	-0.014	(0.019)	1,223 vs. 753	-0.020	(0.023)	-0.014	(0.019)
College Grad vs. Grad School	811 vs. 307	-0.112***	(0.029)	811 vs. 307	-0.093***	(0.027)	-0.087***	(0.025)	811 vs. 307	-0.082**	(0.026)	-0.086***	(0.024)	753 vs. 283	-0.085**	(0.029)	-0.083**	(0.027)
English Learner Status in 11th Grade																		
LEP vs. EO	668 vs. 3,100	-0.120*	(0.048)	668 vs. 3,100	0.044	(0.034)	0.032	(0.034)	668 vs. 3,100	0.013	(0.033)	0.003	(0.030)	595 vs. 2,813	-0.070	(0.038)	-0.045	(0.026)
LEP vs. IFEP	668 vs. 1,649	-0.178***	(0.045)	668 vs. 1,649	0.027	(0.034)	0.018	(0.034)	668 vs. 1,649	-0.004	(0.034)	-0.004	(0.031)	595 vs. 1,484	-0.083*	(0.039)	-0.049	(0.027)
LEP vs. RFEP	668 vs. 5,838	-0.196***	(0.038)	668 vs. 5,838	-0.024	(0.029)	-0.026	(0.029)	668 vs. 5,838	-0.040	(0.030)	-0.037	(0.028)	595 vs. 5,101	-0.113***	(0.034)	-0.076**	(0.024)
EO vs. IFEP	3,100 vs. 1,649	-0.058*	(0.023)	3,100 vs. 1,649	-0.018	(0.016)	-0.015	(0.014)	3,100 vs. 1,649	-0.017	(0.017)	-0.006	(0.014)	2,813 vs. 1,484	-0.013	(0.019)	-0.005	(0.014)
EO vs. RFEP	3,100 vs. 5,838	-0.077**	(0.024)	3,100 vs. 5,838	-0.068***	(0.019)	-0.058***	(0.017)	3,100 vs. 5,838	-0.053***	(0.015)	-0.040**	(0.013)	2,813 vs. 5,101	-0.043*	(0.017)	-0.032**	(0.012)
IFEP vs. RFEP	1,649 vs. 5,838	-0.019	(0.016)	1,649 vs. 5,838	-0.051**	(0.017)	-0.044**	(0.015)	1,649 vs. 5,838	-0.036*	(0.015)	-0.033**	(0.012)	1,484 vs. 5,101	-0.030*	(0.014)	-0.027*	(0.011)

See the note on the first page of the table.

Table E3. Estimated Inequalities in Math-taking for Group 5 (Math A-G Complete with a "C" + 1 Advanced Math)

	Enrollment Disparities			Disparities among Similar Students					Disparities among Similar Students Attending Similar Schools					Disparities among Similar Students Attending the Same School				
	N	Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE
Gender																		
Female vs. Male	7,362 vs. 5,463	-0.019	(0.010)	7,362 vs. 5,463	-0.022	(0.012)	-0.021	(0.011)	7,362 vs. 5,463	-0.029**	(0.011)	-0.030**	(0.010)	6,897 vs. 5,115	-0.038***	(0.010)	-0.038***	(0.010)
Race/Ethnicity																		
Latinx vs. Asian	9,474 vs. 645	-0.052	(0.031)	9,474 vs. 645	0.020	(0.035)	0.020	(0.028)	9,474 vs. 645	-0.041*	(0.021)	-0.046*	(0.020)	8,778 vs. 628	-0.017	(0.019)	-0.024	(0.017)
Latinx vs. African American	9,474 vs. 910	0.097*	(0.049)	9,474 vs. 910	0.036	(0.037)	0.041	(0.039)	9,474 vs. 910	0.036	(0.029)	0.042	(0.029)	8,778 vs. 867	0.036	(0.019)	0.037	(0.020)
Latinx vs. White	9,474 vs. 1,090	0.113**	(0.042)	9,474 vs. 1,090	0.142***	(0.036)	0.125***	(0.032)	9,474 vs. 1,090	0.046*	(0.023)	0.044*	(0.022)	8,778 vs. 1,068	0.046*	(0.023)	0.040	(0.021)
Latinx vs. Filipinx	9,474 vs. 603	-0.033	(0.032)	9,474 vs. 603	-0.010	(0.031)	-0.012	(0.030)	9,474 vs. 603	-0.051*	(0.026)	-0.056*	(0.027)	8,778 vs. 573	-0.019	(0.016)	-0.024	(0.016)
Asian vs. African American	645 vs. 910	0.149**	(0.056)	645 vs. 910	0.016	(0.049)	0.021	(0.046)	645 vs. 910	0.077*	(0.031)	0.088**	(0.031)	628 vs. 867	0.052*	(0.023)	0.061**	(0.022)
Asian vs. White	645 vs. 1,090	0.165***	(0.042)	645 vs. 1,090	0.122**	(0.044)	0.105**	(0.037)	645 vs. 1,090	0.087**	(0.032)	0.090**	(0.031)	628 vs. 1,068	0.062*	(0.029)	0.063*	(0.026)
Asian vs. Filipinx	645 vs. 603	0.019	(0.031)	645 vs. 603	-0.030	(0.038)	-0.032	(0.033)	645 vs. 603	-0.010	(0.030)	-0.010	(0.030)	628 vs. 573	-0.002	(0.022)	-0.001	(0.020)
African American vs. White	910 vs. 1,090	0.016	(0.056)	910 vs. 1,090	0.106*	(0.044)	0.084	(0.044)	910 vs. 1,090	0.010	(0.030)	0.002	(0.030)	867 vs. 1,068	0.010	(0.023)	0.003	(0.022)
African American vs. Filipinx	910 vs. 603	-0.130*	(0.055)	910 vs. 603	-0.047	(0.044)	-0.053	(0.045)	910 vs. 603	-0.087**	(0.032)	-0.099**	(0.034)	867 vs. 573	-0.055**	(0.019)	-0.061**	(0.021)

Note: These results show differences in predicted probabilities for the average student. "Enrollment Disparities" are raw differences in the empirical rates of 12th grade math-taking between the demographic groups of interest. Models for "Disparities among Similar Students" include the student-level characteristics in Appendix Table A1 as regressors. Models for "Disparities among Similar Students Attending the Same School" include the student-level characteristics in Appendix Table A1 as regressors, and additionally include school fixed effects. Models for "Disparities among Similar Students Attending Similar Schools" include student-level and school-cohort-level characteristics in Appendix Table A1 as regressors. Standard errors have all been clustered by school. We redact cells with 10 or fewer students, cells that contain 1% or less of the sample, and cells that contain 99% or more of the sample. LEP = Limited English Proficient. EO = English Only. IFEP = Initial Fluent English Proficient. RFEP = Reclassified Fluent English Proficient. *p<0.05, **p<0.01, and ***p<0.001.

Table E3 Continued. Estimated Inequalities in Math-taking for Group 5 (Math A-G Complete with a "C" + 1 Advanced Math)

	Enrollment Disparities			Disparities among Similar Students					Disparities among Similar Students Attending Similar Schools					Disparities among Similar Students Attending the Same School				
	N	Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE
Race/Ethnicity																		
White vs. Filipinx	1,090 vs. 603	-0.146**	(0.048)	1,090 vs. 603	-0.152***	(0.046)	-0.137**	(0.042)	1,090 vs. 603	-0.097**	(0.038)	-0.100**	(0.039)	1,068 vs. 573	-0.065*	(0.027)	-0.064*	(0.025)
Ever Subsidized Meal Eligible from 9th to 11th Grade																		
Eligible vs. Not Eligible	11,517 vs. 1,135	0.025	(0.025)	11,517 vs. 1,135	0.028	(0.017)	0.026	(0.016)	11,517 vs. 1,135	-0.008	(0.014)	-0.009	(0.015)	10,740 vs. 1,104	-0.010	(0.013)	-0.012	(0.014)
Parents'/Guardians' Educational Attainment																		
Not HS Grad vs. HS Grad	3,078 vs. 2,534	0.032*	(0.014)	3,078 vs. 2,534	0.026*	(0.013)	0.027*	(0.013)	3,078 vs. 2,534	0.017	(0.012)	0.016	(0.012)	2,820 vs. 2,365	0.005	(0.012)	0.005	(0.011)
Not HS Grad vs. Some College	3,078 vs. 1,580	0.071**	(0.023)	3,078 vs. 1,580	0.057**	(0.018)	0.056**	(0.017)	3,078 vs. 1,580	0.040*	(0.016)	0.038*	(0.016)	2,820 vs. 1,510	0.030	(0.016)	0.030*	(0.015)
Not HS Grad vs. College Grad	3,078 vs. 1,370	0.038	(0.029)	3,078 vs. 1,370	0.048*	(0.020)	0.044*	(0.019)	3,078 vs. 1,370	0.024	(0.017)	0.019	(0.016)	2,820 vs. 1,307	0.011	(0.016)	0.009	(0.015)
Not HS Grad vs. Grad School	3,078 vs. 558	0.029	(0.026)	3,078 vs. 558	0.042*	(0.021)	0.034	(0.020)	3,078 vs. 558	0.023	(0.019)	0.010	(0.018)	2,820 vs. 543	0.014	(0.020)	-0.000	(0.019)
HS Grad vs. Some College	2,534 vs. 1,580	0.039	(0.022)	2,534 vs. 1,580	0.031	(0.018)	0.029	(0.017)	2,534 vs. 1,580	0.023	(0.017)	0.022	(0.017)	2,365 vs. 1,510	0.025	(0.016)	0.025	(0.016)
HS Grad vs. College Grad	2,534 vs. 1,370	0.006	(0.027)	2,534 vs. 1,370	0.022	(0.019)	0.018	(0.018)	2,534 vs. 1,370	0.007	(0.017)	0.003	(0.017)	2,365 vs. 1,307	0.006	(0.015)	0.004	(0.015)
HS Grad vs. Grad School	2,534 vs. 558	-0.004	(0.025)	2,534 vs. 558	0.016	(0.021)	0.007	(0.020)	2,534 vs. 558	0.006	(0.019)	-0.005	(0.018)	2,365 vs. 543	0.009	(0.020)	-0.005	(0.019)
Some College vs. College Grad	1,580 vs. 1,370	-0.033	(0.021)	1,580 vs. 1,370	-0.009	(0.020)	-0.011	(0.018)	1,580 vs. 1,370	-0.016	(0.019)	-0.019	(0.018)	1,510 vs. 1,307	-0.019	(0.019)	-0.021	(0.017)

See the note on the first page of the table.

Table E3 Continued. Estimated Inequalities in Math-taking for Group 5 (Math A-G Complete with a "C" + 1 Advanced Math)

	Enrollment Disparities			Disparities among Similar Students					Disparities among Similar Students Attending Similar Schools					Disparities among Similar Students Attending the Same School				
	N	Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE	N	Logit Est.	SE	OLS Est.	SE
Parents'/Guardians' Educational Attainment																		
Some College vs. Grad School	1,580 vs. 558	-0.043*	(0.021)	1,580 vs. 558	-0.015	(0.022)	-0.022	(0.021)	1,580 vs. 558	-0.016	(0.021)	-0.027	(0.020)	1,510 vs. 543	-0.016	(0.021)	-0.030	(0.021)
College Grad vs. Grad School	1,370 vs. 558	-0.010	(0.022)	1,370 vs. 558	-0.006	(0.024)	-0.010	(0.022)	1,370 vs. 558	-0.001	(0.023)	-0.008	(0.022)	1,307 vs. 543	0.003	(0.025)	-0.010	(0.024)
English Learner Status in 11th Grade																		
LEP vs. EO	175 vs. 3,750	-0.043	(0.049)	175 vs. 3,750	0.098**	(0.032)	0.123**	(0.045)	175 vs. 3,750	0.052	(0.038)	0.072	(0.046)	169 vs. 3,581	-0.033	(0.047)	-0.000	(0.041)
LEP vs. IFEP	175 vs. 2,538	-0.105*	(0.048)	175 vs. 2,538	0.087**	(0.033)	0.113*	(0.046)	175 vs. 2,538	0.040	(0.038)	0.063	(0.047)	169 vs. 2,402	-0.050	(0.048)	-0.013	(0.041)
LEP vs. RFEP	175 vs. 6,362	-0.110*	(0.045)	175 vs. 6,362	0.055	(0.029)	0.082	(0.043)	175 vs. 6,362	0.021	(0.035)	0.046	(0.044)	169 vs. 5,860	-0.063	(0.046)	-0.024	(0.040)
EO vs. IFEP	3,750 vs. 2,538	-0.061**	(0.022)	3,750 vs. 2,538	-0.012	(0.016)	-0.011	(0.015)	3,750 vs. 2,538	-0.012	(0.014)	-0.010	(0.014)	3,581 vs. 2,402	-0.017	(0.013)	-0.013	(0.012)
EO vs. RFEP	3,750 vs. 6,362	-0.067**	(0.023)	3,750 vs. 6,362	-0.043**	(0.016)	-0.041**	(0.015)	3,750 vs. 6,362	-0.031*	(0.014)	-0.026*	(0.013)	3,581 vs. 5,860	-0.030*	(0.012)	-0.024*	(0.012)
IFEP vs. RFEP	2,538 vs. 6,362	-0.005	(0.014)	2,538 vs. 6,362	-0.032*	(0.014)	-0.031*	(0.013)	2,538 vs. 6,362	-0.019	(0.013)	-0.017	(0.012)	2,402 vs. 5,860	-0.013	(0.011)	-0.010	(0.011)

See the note on the first page of the table.