

**Twelfth Grade Math and College Success
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. Note that this Technical Appendix borrows much of its text directly from the Technical Appendix we authored for *Twelfth Grade Math and College Access* (Wainstein et al., 2023).

Appendix A. Data Sources, Measures, and Sample

Data Sources

We use four data sources for this report: (1) the Los Angeles Unified School District's (L.A. Unified) administrative data files; (2) the California Partnership for Achieving Student Success (Cal-PASS) transcript data; (3) students' responses to L.A. Unified's School Experience Survey (SES); and (4) the National Student Clearinghouse's (NSC) Graduates files. 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.

California Partnership for Achieving Student Success' (Cal-PASS) Transcript Data: We use Cal-PASS transcript data from academic years 2017-18 to 2019-20 to track students' course taking, credit accumulation, and GPAs in California community colleges and at the California State University, Northridge (CSUN). We use Cal-PASS transcript data from 2009-10 to 2017-18 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).

National Student Clearinghouse's (NSC) Graduates Data: We use the National Student Clearinghouse (NSC) Graduates files from 2018-2020 to track students' four-year college enrollment. These data help us determine whether students who were enrolled in a course at a California community college were primarily enrolled in that community college, or were primarily enrolled in a four-year college and were taking a community college course to supplement their four-year education. In 2018-2020, the NSC data cover 97% of enrollments nationwide at Title IV-eligible¹, degree-granting postsecondary institutions (National Student Clearinghouse, 2021).

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

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.

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 any 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 count 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 count 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 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 twelfth grade (for example, Precalculus and Statistics), we exclude those students from our comparisons between different types of math courses.⁵

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.”

⁵ Students rarely took more than one type of math course in a given year (no more than 1.50% of the sample for any of our comparisons did this). Also, note that while we exclude these students who took

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 community college and CSUN 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.

Samples and Descriptive Statistics

Our analyses use two distinct analytic samples: one that enrolled in community college, and one that enrolled in CSUN. We limit both samples 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 did not have sufficient data, or not enough time had passed, to track later cohorts’ college progression and performance.

We then further restrict both samples 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 (independent study, schools for expectant mothers, and home/hospital schools), continuation high schools⁷,

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 took 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.

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.

community day schools⁸, 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, only enrolled in math courses that do *not* fulfill 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 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.¹¹ For the other predictors,¹² we include dummy variables for missing-ness.

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 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.

¹² We include dummy variables reflecting missing data 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, number of science credits accumulated, PSAT scores, educational expectations, growth mindset, and academic self-efficacy. See [Table A1](#) for the full set of predictors and information on how we measure them.

Then, for our community college analytic sample, we further restrict the sample to students who enrolled in a California community college in the academic year following their 12th grade year and received at least one letter grade in a credit-bearing course within their first two years of college. We define students' "first two years of college" as the two academic years following their 12th grade year, even if the students did not immediately enroll in community college in the fall after their 12th grade year. We also exclude students who first enrolled in a four-year college in the same term that they first enrolled in a community college, as we suspect these students enrolled in community college to supplement their progression at the four-year college.

For our CSUN analytic sample, we further restrict the sample to students who enrolled in CSUN in the academic year following their 12th grade year and received at least one letter grade in a credit-bearing course within their first two years of college.

[Appendix Tables A3](#) and [A4](#) show how our community college analytic sample differs from 1) all students who were first-time 11th graders in the 2015-16 and 2016-17 cohorts; and from 2) community college students in those cohorts who attended traditional or affiliated charter schools, did not have a documented disability, and had transcript data from 11th and 12th grade. Similarly, [Appendix Tables A5](#) and [A6](#) show how our CSUN analytic sample differs from 1) all students who were first-time 11th graders in the 2015-16 and 2016-17 cohorts; and from 2) CSUN students in those cohorts who attended traditional or affiliated charter schools, did not have a documented disability, and had transcript data from 11th and 12th grade. We use the middle (i.e., second) samples from both the community college set of tables ([Appendix Tables A3](#) and [A4](#)) and the CSUN set of tables ([Appendix Tables A5](#) and [A6](#)) for Table 1 in the main report. The descriptive statistics in these appendix tables show that the community college sample is more likely than the population of first-time 11th graders to be on-track to graduate and to complete their UC/CSU eligibility requirements as of the end of 11th grade. The CSUN sample is, as expected, higher performing in 11th grade than the population of first-time 11th graders. These comparisons thus make it clear that readers should only generalize our results to students like those in our community college or CSUN samples.

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 community college 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 3A 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 includes school-level predictors. Finally, we replicate all our estimation strategies (i.e., both preferred and alternative) with one small change: including community college-related predictors – college campus fixed effects

and a full-time student indicator – as regressors when modeling the outcome. We describe each of these strategies in detail below.

For our analysis of CSUN students, we follow a similar analytic strategy, but make two important adjustments because our CSUN sample is much smaller than our community college sample. First, although we classify the CSUN sample into the same six student groups (see Table 3B in the main report), we analyze the groups together rather than separately, and we only analyze students in Groups 4 and 5. We drop students in Group 3 from our analyses because we have very few Group 3 students in our CSUN sample and almost all of them (93%) took math in 12th grade.

Second, for the CSUN sample, we only report the estimates that use school-level predictors instead of school fixed effects. This is because the estimates that use school fixed effects fail to compare sufficiently similar groups of students.

Preferred Estimation Strategy for Community College Analysis: Cluster Matching with OLS

Our preferred estimation strategy in our community college analysis 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:

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

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](#))¹³, α_t are cohort fixed effects, and μ_j are school fixed

¹³ 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, number of science credits accumulated 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 courses 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 have not taken any advanced math courses before 12th grade, and few students in Group 3 have. Additionally, X_{ijt} includes dummy variables for missingness (1 if the variable had a missing value, and 0 otherwise) on the following predictors: subsidized meal eligibility, nonresident school enrollment, number of school moves, number of semesters of AP classes taken, number of science credits, PSAT scores, educational expectations, growth mindset, and academic self-efficacy. We impute missing values 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

effects. 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.¹⁴

Our preferred matching specification matches each student to five 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 five 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 five matches. We prioritize matching students within schools because we hypothesize that certain school conditions, e.g., the number and types of 12th grade math classes 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 needed 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).

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 treated and control groups after matching is poor, we increase the level of trimming and discard treated students whose estimated propensity scores fall below the

race/ethnicity" category. We do 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."

¹⁴ 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 these schools.

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. 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 in our community college analysis.

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 community college 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 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.¹⁵ 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.¹⁶ For course comparisons that examine TCMS (i.e., TCMS vs. Precalculus/Calculus and TCMS vs. Statistics), however, we only estimate the effects in the dataset that matched students to those taking TCMS (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, Calculus, or Statistics who were sufficiently similar to all the students taking TCMS but the reverse was less true). Thus, for the comparisons involving TCMS, we estimate the average effect of TCMS for the students who took TCMS (i.e., the average treatment effect for the treated students, or ATT).¹⁷

After matching, we estimate linear models of the form:

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

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

¹⁵ 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 $1/(\# \text{ of control students matched to treated student } i)$. For example, if a control student was matched to a treated student that had three matches, and another treated student that had two matches, the control student would be given a weight of $1/3 + 1/2 = 5/6$.

¹⁶ 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).

¹⁷ Technically, we are estimating the ATT only for the TCMS students remaining in the analytic sample and not removed by trimming.

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.¹⁸ We cluster standard errors at the school-level (Cameron & Miller, 2015).¹⁹

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' 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).

Additional Estimation Strategies for the Community College Analysis

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, the alternative strategies employ 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 the above-listed 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. Finally, we replicate all the estimation strategies mentioned thus far (i.e., both preferred and alternative) with one small change to the model for the outcome: including community college-related predictors – college campus fixed effects and a full-time student indicator – as regressors.

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 community college 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

¹⁸ We estimate linear models for ease of interpretation, but also run logistic regression models for our binary outcomes and find similar results (available from the authors).

¹⁹ 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 (2022) 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.

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 attempt to compare. This is because equation 2 controls for schools with fixed effects, and it is theoretically 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.²⁰

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. So, we stratify using a set of key predictors, including:

- Gender (*Female or Not*)
- English Learned Status in 11th Grade (*English Only or Not*)
- Weighted Math GPA in 11th Grade (*Categorical: 0-1.99, 2-2.99, 3-3.99, or 4+*)
- Standardized Math SBAC Score in 11th Grade (*Quintiles*)
- Took a Precalculus Course by the end of 11th Grade (*Yes or No*)
 - Only for Group 5

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. As with the within-school propensity score matching, we perform five-to-one nearest neighbor matching with a caliper of at most 0.20, and we trim for common support of the estimated propensity

²⁰ 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_i 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.

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 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 transformations²¹) 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, we find weights that equate the unweighted means of the predictors (and their non-linear transformations) among the students who took TCMS 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 on those who took TCMS, 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-

²¹ 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.

level predictors and their nonlinear transformations. However, they 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 two courses that 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 use “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.²² Some kernels assign students weights of 0 (i.e., they are not 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 $0.06 \times 5^{1/2} = 0.134$ 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 using a “probit” model to be consistent with Schudde & Keisler’s (2019) methods:

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

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

²² 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 .

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 the 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 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. 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:

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

where U_{jt} is a vector of the cohort-specific, school-level predictors shown in [Appendix Table A1](#).²³ For Kernel Matching with OLS, which previously estimated the propensity score with equation 3, we instead estimate the propensity score using:

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

After matching or weighting, or immediately in the case of OLS without Matching, we then estimate linear outcome models of the form:²⁴

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

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

²³ Note that U_{jt} also includes the squared term of the size of the 12th grade class.

²⁴ As before, we also run logistic models for our binary outcomes and find similar results (available from the authors).

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).

Community College Predictors

In addition, we replicate all the estimation strategies mentioned thus far (i.e., both preferred and alternative), but with controls for the community college the student attended and whether or not the student enrolled “full-time.” More specifically, whenever we estimate equation 2 or 6, we include community college campus fixed effects and an indicator of being a full-time student in X_{ijt} . We define students’ community college campus as the campus at which students attempted the most credits in their first two years of college.²⁵ We define being a full-time community college student as attempting 12 or more credits in one’s first term at community college.²⁶

We do not use community college campus fixed effects or the full-time indicator in our primary estimation strategy because these variables are determined *after* students have taken (or not taken) math in 12th grade. However, estimating these models can help us understand whether the effects we see of taking 12th grade math operate mainly through their effect on which community college a student attends or on whether a student enrolls full-time or not. These models can also help us understand whether the effects of 12th grade math persist regardless of the college attended and regardless of a student’s full-time status.

Estimation Strategies for the CSUN Analysis

Our analytical strategy for the CSUN analysis differs in two key ways from our community college analysis. First, because of sample size limitations, we analyze the student groups together, rather than separately, and we only retain Groups 4 and 5. Second, while we use the same estimation strategies as those from the community college analysis, we only report estimates that use school-level predictors instead of school fixed effects.

The primary estimation strategy we report for our CSUN outcomes analysis is thus Cluster Matching with OLS, where we estimate the propensity score with equation 4, we estimate linear models with equation 6, and we cluster standard errors by school. Additionally, because we analyze Groups 4 and 5 together, we include indicators of student group in X_{ijt} from equations 4 and 6. [Appendix Table B2](#) shows the preferred matching parameters for each comparison in the CSUN outcomes analysis. Note that

²⁵ In very few cases, there were (at least) two campuses at which students took an equal number of credits. Because there were so few instances of this, we chose the campus with the lower ID number per the Integrated Postsecondary Education Data System (IPEDS).

²⁶ We exclude courses that the student dropped or withdrew from in this calculation.

because we analyze Groups 4 and 5 together, we compare Statistics to Precalculus or Calculus in those groups, rather than Statistics to only Precalculus in Group 4 and Statistics to only Calculus in Group 5.

We also report many of the same alternative estimation strategies for the CSUN sample, including:

- OLS without Matching
- Propensity Score Matching after Stratifying Key Predictors with OLS (see [Appendix Table B2](#) for matching parameters)
- Kernel Balancing Weights with OLS
- Kernel Matching with OLS

where we estimate the propensity score with equation 4 for Propensity Score Matching after Stratifying Key Predictors with OLS and with equation 5 for Kernel Matching with OLS, and we estimate all linear models with equation 6, all while including student group indicators in X_{ijt} and clustering standard errors by school. We also report an estimate from a school random effects model without matching, where we estimate equation 6 with random effects for schools, including student group indicators in X_{ijt} and again clustering standard errors by school.

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.²⁷ 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.²⁸ 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).

We present matching diagnostics for a large number of comparisons. First, we evaluate matching diagnostics separately among (1) community college and (2) CSUN students. Second, among community college students or CSUN students, we examine matching diagnostics for four subsamples of students who differ in the completeness of their data for a specific outcome of interest: (1) all students; (2) students who have non-missing college-level math GPAs; (3) students who have non-missing non-math STEM GPAs; and (4) students who took a math course within their first two years of college (so that we can measure whether or not they started in college-level math in community college or avoided developmental math at CSUN). Finally, for community college students, we match within each student group, and thus report diagnostics separately for students in Groups 4 and 5, and, depending on the course comparison, students in Group 3. Therefore, for the Math vs. No Math comparison, we evaluate 16 sets of matching diagnostics – 12 sets for community college students (4 each from Groups 3-5), and 4 sets for CSUN students. For the Statistics vs. Precalculus or Calculus comparison, we evaluate 12 sets of matching diagnostics – 8 sets for community college students (4 each from Groups 4-5), and 4 sets for CSUN students.²⁹ For the course comparisons that involve TCMS, we report fewer sets of matching diagnostics because our primary estimation approach often struggles to obtain good balance on the predictors due to small number of students who took TCMS in the years we examine. For these comparisons we only report the diagnostics on subsamples and student groups for which we obtain reasonably good balance, and thus correspond to outcomes that we

²⁷ Regression tables for the propensity score models are available from the authors upon request.

²⁸ 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.

²⁹ We redo the matching/weighting from [Appendix B](#) for each of these subsamples, which involves re-estimating the propensity score model within each subsample.

discuss in the “Estimated Effects of 12th Grade Math Courses” section below. We do not report any diagnostics (or effect estimates) for course comparisons involving IDS, because too few community college and CSUN students took IDS in high school in the years we examine to have sufficient statistical power to estimate the effects of IDS.

Math vs. No Math

Community College Students. We begin with the matching diagnostics for all community college students, which correspond to the models that produce the estimated effects of taking 12th grade math on overall GPA in Table 5 of the main report.³⁰ [Appendix Figures C1, C3, and C4](#) show the distributions of the estimated propensity scores from our preferred matching method, and [Appendix Tables C1, C3, and C4](#) show the balance on the predictors from our preferred matching method. Our preferred matching method obtains good overlap and balance in Groups 4 and 5 – the distributions of the estimated propensity scores are well-aligned after matching (see [Appendix Figures C3 and C4](#)), and all of the standardized mean differences are within the 0.10 benchmark and the large majority of the variance ratios are within the 0.80 to 1.20 range (see [Appendix Tables C3 and C4](#)). However, while our preferred matching method improves the overlap and balance in Group 3 over those in the unmatched sample, the post-matching overlap and balance are less than ideal – there are some small misalignments in the estimated propensity scores after matching (see [Appendix Figure C1](#)) and several standardized mean differences fall outside the 0.10 benchmark (see [Appendix Table C1](#)). This is likely due to 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. Note that our estimated effects use all the same predictors in modeling the outcome, which provides an additional layer of robustness. Nevertheless, we also provide matching diagnostics for Group 3 after replacing the school fixed effects in the propensity score and outcome models with school-cohort-level controls, which improves overlap and balance – see [Appendix Figure C2](#) and [Appendix Table C2](#).

Next, we examine the matching diagnostics for community college students who took a math course in the first two years of college, which correspond to the models that produce the estimated effects of taking 12th grade math on starting in college-level math in Table 5 of the main report. [Appendix Figures C5, C6, and C7](#) show the distributions

³⁰ Note, however, that the diagnostics we report in this appendix do *not* correspond exactly to the models that produce the estimated effects for the credits earned outcomes in Table 5 of the main report. This is because we drop students who had extremely high credits earned values because we were concerned that outliers might unduly influence the estimates. Thus, we drop students from analyses of credits earned outcomes if they had overall, college-level math, or non-math STEM credits earned values that were above the 99th percentile of credits earned values among all 2015-16 and 2016-17 first-time 11th graders in our data who earned at least one credit at a California community college in the first two years after their expected high school graduation. Because we drop very few students (at most, 2.26% of Group 5 community college students), the diagnostics for all community college students reported here look extremely similar to those from the models that drop the students with outlier credits earned values. Therefore, we do not report diagnostics for those models in this appendix, but they are available upon request.

of the estimated propensity scores from our preferred matching method, and [Appendix Tables C5, C6, and C7](#) show the balance on the predictors from our preferred matching method. Our preferred matching method reveals very good overlap and balance in Groups 4 and 5 and acceptable overlap and balance in Group 3, with a couple of standardized mean differences in Group 3 outside the 0.10 benchmark.

We then examine the matching diagnostics for community college students who had non-missing college-level math GPAs, which correspond to the models that produce the estimated effects of taking 12th grade math on college-level math GPA in Table 5 of the main report. [Appendix Figures C9](#) and [C11](#) show the distributions of the estimated propensity scores from our preferred matching method for Groups 4 and 5, and [Appendix Tables C9](#) and [C11](#) show the accompanying balance on the predictors. Our preferred matching method fails to run for Group 3 students, so we omit the associated matching diagnostics here and do not provide corresponding estimates of taking 12th grade math in Group 3 on college-level math GPA in Table 5 of the main report. Our preferred matching method shows good overlap and balance in Group 5 and decent overlap and balance in Group 4, with a couple of standardized mean differences outside of the 0.10 benchmark and several variance ratios outside the 0.80 to 1.20 range for Group 4 (see [Appendix Table C9](#)). Matching diagnostics for Group 4 are slightly better after replacing the school fixed effects in the propensity score model with school-cohort-level controls (see [Appendix Figure C10](#) and [Appendix Table C10](#)). However, matching diagnostics for Group 3 remain poor even after replacing the school fixed effects in the propensity score model with school-cohort-level controls (see [Appendix Figure C8](#) and [Appendix Table C8](#)).

Our last set of diagnostics for this comparison among community college students is for community college students with non-missing non-math STEM GPAs, which correspond to the models that produce the estimated effects of taking 12th grade math on non-math STEM GPA in Table 5 of the main report. [Appendix Figures C12, C14, and C16](#) show the distributions of the estimated propensity scores from our preferred matching method, and [Appendix Tables C12, C14, and C16](#) show the balance on the predictors from our preferred matching method. Our preferred matching method obtains good overlap and balance in Group 5 (see [Appendix Figure C16](#) and [Appendix Table C16](#)), obtains decent, but not perfect, overlap and balance in Group 4 (see [Appendix Figure C14](#) and [Appendix Table C14](#)), and poor balance in Group 3 (see [Appendix Figure C12](#) and [Appendix Table C12](#)). Matching diagnostics for Group 3 do not improve after replacing the school fixed effects in the propensity score model with school-cohort-level controls (see [Appendix Figure and Table C13](#)), so we omit estimates of taking 12th grade math in Group 3 on non-math STEM GPA in Table 5 of the main report. In contrast, overlap and balance improve for Group 4 after replacing the school fixed effects in the propensity score model with school-cohort-level controls (see [Appendix Figure and Table C15](#)).

CSUN Students. We first examine matching diagnostics for all CSUN students. These diagnostics correspond to the model that produces the estimated effect of taking 12th grade math on CSUN overall GPA in Table 5 of the main report.³¹ Our preferred matching method obtains good overlap and balance for the sample of all CSUN students (see [Appendix Figure and Table C17](#)), though a couple of standardized mean differences fall outside the 0.10 benchmark.

Matching diagnostics for CSUN students who took a math course in the first two years of college, which correspond to the model that produces the estimated effect of taking 12th grade math on avoiding developmental math in Table 5 of the main report, show that our preferred matching method obtains good overlap and balance (see [Appendix Figure and Table C18](#)), despite a couple standardized mean differences outside the 0.10 benchmark and several variance ratios outside the 0.80 to 1.20 range.

Matching diagnostics for CSUN students with non-missing college-level math GPAs, which correspond to the model that produces the estimated effect of taking 12th grade math on college-level math GPA in Table 5 of the main report, show that the distributions of the estimated propensity scores are well-aligned (see [Appendix Figure C19](#)), and the balance is acceptable, though there are a few predictors with standardized mean differences outside of the 0.10 benchmark, and some variance ratios outside of the 0.80 to 1.20 range (see [Appendix Table C19](#)).

Matching diagnostics for CSUN students with non-missing non-math STEM GPAs, which correspond to the model that produces the estimated effect of taking 12th grade math on non-math STEM GPA in Table 5 of the main report, show that the overlap in the distributions of the estimated propensity scores is good ([Appendix Figure C20](#)) and the balance is acceptable, though a couple predictors have standardized mean differences outside of the 0.10 benchmark and variance ratios outside of the 0.80 to 1.20 range ([Appendix Table C20](#)).

Statistics vs. Precalculus or Calculus

Community College Students. Matching diagnostics for the full sample of community college students, which correspond to the models that produce the estimated effects of taking Statistics over Precalculus or Calculus on community college overall GPA in Table 6 of the main report, show that the balance and overlap are acceptable for Group 4 (see [Appendix Figure C21](#) and [Appendix Table C21](#)), despite a couple of

³¹ As in the community college analyses, these diagnostics do not *perfectly* correspond to the models that produce the estimated effects for the CSUN credits earned outcomes in Table 5 of the main report because we drop students from the credit analyses who had overall, college-level math, or non-math STEM credits earned values that were above the 99th percentile of credits earned values among all 2015-16 and 2016-17 first-time 11th graders in our data who earned at least one credit at CSUN in the first two years after their expected high school graduation. This excludes few students (1.83% of CSUN students in Groups 4 and 5), however, so the diagnostics for all CSUN students reported here closely resemble diagnostics from models that drop students with high credits earned values.

standardized mean differences outside the 0.10 benchmark.³² The overlap is good for Group 5 (see [Appendix Figure C22](#)), but the balance is only decent (see [Appendix Table C22](#)), with a few more variables with standardized mean differences outside the 0.10 benchmark than there are in Group 4 (see [Appendix Table C21](#)). As a result, we also include matching diagnostics for Group 5 after replacing the school fixed effects in the propensity score model with school-cohort-level controls, with balance slightly improved (see [Appendix Figure C23](#) and [Appendix Table C23](#)).

Matching diagnostics for community college students who took a math course in the first two years of college, which correspond to the models that produce the estimated effects of taking Statistics over Precalculus or Calculus on starting in college-level math in Table 6 of the main report, are similar to the diagnostics for the whole sample (see [Appendix Figures and Tables C24](#), [C25](#), and [C26](#)).

Matching diagnostics for community college students with non-missing college-level math GPAs, which correspond to the models that produce the estimated effects of taking Statistics over Precalculus or Calculus on college-level math GPA in Table 6 of the main report, show that our primary estimation approach struggles to obtain good overlap and adequate balance on the predictors for Group 4 (see [Appendix Figure C27](#) and [Appendix Table C27](#)). This is why we omit estimated effects of taking Statistics over Precalculus in Group 4 on college-level math GPA in Table 6 of the main report. Overlap and balance are much improved for Group 4 after replacing the school fixed effects in the propensity score model with school-cohort-level controls (see [Appendix Figure C28](#) and [Appendix Table C28](#)). We provide estimates from these models in this appendix. Overlap and balance are decent in Group 5 (see [Appendix Figure C29](#) and [Appendix Table C29](#)), though there are several variables with standardized mean differences outside of the 0.10 benchmark and several variance ratios outside the 0.80 to 1.20 range. We thus additionally include matching diagnostics for Group 5 after replacing the school fixed effects in the propensity score model with school-cohort-level controls in [Appendix Figure C30](#) and [Appendix Table C30](#), in which balance is improved.

Matching diagnostics for community college students with non-missing non-math STEM GPAs, which correspond to the models that produce the estimated effects of taking Statistics over Precalculus or Calculus on non-math STEM GPA in Table 6 of the main report, show that our primary estimation method yields poor overlap and balance on the predictors for Group 4 (see [Appendix Figure C31](#) and [Appendix Table C31](#)). As a result, we do not show estimated effects of taking Statistics over Precalculus in Group 4 on non-math STEM GPA in Table 6 of the main report. However, overlap and balance improve after replacing the school fixed effects in the propensity score model with school-cohort-level controls (see [Appendix Figure C32](#) and [Appendix Table C32](#)), and

³² We omit diagnostics for the models that produce the estimated effects for the community college credits earned outcomes in Table 6 of the main report because those diagnostics are very similar to those for all community college students.

we show estimates from these models in this appendix. Overlap and balance are decent in Group 5 (see [Appendix Figure C33](#) and [Appendix Table C33](#)), but there are several variables with standardized mean differences outside of the 0.10 benchmark. We therefore also provide matching diagnostics for Group 5 after replacing the school fixed effects in the propensity score model with school-cohort-level controls, which yields improved balance (see [Appendix Figure C34](#) and [Appendix Table C34](#)).

CSUN Students. Matching diagnostics for all CSUN students, which correspond to the model that produces the estimated effect of taking Statistics over Precalculus or Calculus on CSUN overall GPA in Table 6 of the main report, show that the balance and overlap from our primary matching approach are acceptable despite a few predictors with standardized mean differences outside of the 0.10 benchmark, and some variance ratios outside of the 0.80 to 1.20 range (see [Appendix Figure C35](#) and [Appendix Table C35](#)).³³

The matching diagnostics for CSUN students who took a math course in the first two years of college, which correspond to the model that produces the estimated effect of taking Statistics over Precalculus or Calculus on avoiding developmental math at CSUN in Table 6 of the main report, are similar to those for the full CSUN sample (see [Appendix Figure C36](#) and [Appendix Table C36](#)).

The matching diagnostics for CSUN students with non-missing college-level math GPAs, which correspond to the model that produces the estimated effect of taking Statistics over Precalculus or Calculus on college-level math GPA in Table 6 of the main report, also show that our primary matching method yields acceptable overlap and balance (see [Appendix Figure C37](#) and [Appendix Table C37](#)).

Finally, matching diagnostics for CSUN students with non-missing non-math STEM GPAs, which correspond to the model that produces the estimated effect of taking Statistics over Precalculus or Calculus on non-math STEM GPA in Table 6 of the main report, also show that our primary matching method yields good overlap and balance, though there are some small misalignments in the distributions of the estimated propensity scores after matching (see [Appendix Figure C38](#) and [Appendix Table C38](#)).

TCMS vs. Precalculus or Calculus

We do not report diagnostics for these comparisons among CSUN students because too few CSUN students took TCMS to estimate the effects of TCMS. We also only report diagnostics that correspond to models that use school-level controls instead of school fixed effects because all models that use school fixed effects fail to achieve acceptable balance on the predictors. Similarly, we only report diagnostics for Group 4

³³ We omit diagnostics for the CSUN models that produce the estimated effects for the credits earned outcomes in Table 6 of the main report because those diagnostics are very similar to those for all CSUN students.

because our primary matching method fails to achieve acceptable balance on the predictors for Group 5.

Community College Students. [Appendix Figure and Table C39](#) report the diagnostics for all community college students in Group 4, which correspond to the estimated effect from our primary matching method of taking TCMS over Precalculus on community college overall GPA in [Table C74](#).³⁴

[Appendix Figure and Table C40](#) report the matching diagnostics for all community college students in Group 4 who took a math course in the first two years of college, which correspond to the estimated effect from our primary matching method of taking TCMS over Precalculus on starting in college-level math in [Table C73](#).

We do not report diagnostics for all community college students in Group 4 with non-missing college-level math GPAs because our primary matching method fails to achieve acceptable balance on the predictors for this subsample.

[Appendix Figure and Table C41](#) report the matching diagnostics for all community college students in Group 4 with non-missing non-math STEM GPAs, which correspond to the estimated effect from our primary matching method of taking TCMS over Precalculus on non-math STEM GPA in [Table C76](#).

TCMS vs. Statistics

As with the comparison of TCMS to Precalculus or Calculus, we do not report diagnostics for these comparisons among CSUN students because too few CSUN students took TCMS to estimate the effects of TCMS. We also only report diagnostics that correspond to models that use school-level controls instead of school fixed effects because all models that use school fixed effects fail to achieve acceptable balance on the predictors.

Community College Students. [Appendix Figures and Tables C42](#) and [C43](#) report the diagnostics for all community college students in Groups 4 and 5, which correspond to the estimated effects from our primary matching method of taking TCMS instead of Statistics on community college overall GPA in [Appendix Table C82](#).³⁵

[Appendix Figures and Tables C44](#) and [C45](#) report the matching diagnostics for all community college students in Groups 4 and 5 who took a math course in the first two years of college, which correspond to the estimated effects from our primary matching method of taking TCMS instead of Statistics on starting in college-level math in [Table C81](#).

³⁴ Note that we omit diagnostics for the sample that drops students with particularly high credits earned values from the credits earned analyses in [Appendix Table C72](#) because those diagnostics closely resemble the diagnostics for the overall GPA sample.

³⁵ Note that we omit diagnostics for the sample that drops students with high credits earned values, which correspond to the credits earned results in [Appendix Table C80](#), because those diagnostics closely resemble the diagnostics for this overall sample.

We do not report diagnostics for community college students with non-missing college-level math GPAs or with non-missing non-math STEM GPAs because our primary matching method fails to achieve acceptable balance on the predictors for these subsamples.

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 C46-C55](#) show the results from the various methods of estimating the effects of taking 12th grade math compared to not taking 12th grade math on each of the main community college and CSUN outcomes. For the community college estimates in [Appendix Tables C46-C50](#), 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, and the second set of columns shows estimates from models that substitute out fixed effects for school-level predictors in both the propensity score estimation (if any) and the modeling of the outcome. For the CSUN estimates in [Appendix Tables C51-C55](#), as in the main report, we only report the estimates from models that use school-level predictors instead of school fixed effects. In all these tables, the first row of estimates (for each group, in the community college tables) 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 results for credit accumulation in community college ([Appendix Table C46](#)) are consistent in (positive) sign and statistical significance for college-level math credits earned in Groups 4 and 5. However, the statistical significance of the positive estimate for college-level math credits earned in Group 3 from the main report (Table 5) is sensitive to our alternative estimation approaches, though all the estimates are positive. This is also the case for the estimated effect on college-level math credits earned in CSUN ([Appendix Table C51](#)) – none of the alternative estimation approaches are statistically significant at the 0.05 level.³⁶

From [Appendix Table C46](#), we also see that the statistical significance of the positive estimates for overall and non-math STEM credits among Group 3 community college students from the main report (Table 5) are sensitive to alternative estimation approaches. Further, the statistical significance of the positive estimate for non-math STEM credits in Group 4 at community colleges from the main report (Table 5) is largely

³⁶ Recall that we reduce the influence of outliers on the estimates by dropping students if their overall, college-level math, or non-math STEM credits were above the 99th percentile of credits earned values. This has the effect of making the analyses more statistically conservative and reducing the statistical significance of some estimates.

consistent across our alternative approaches, with the exception of the method that uses stratification to match students.

The tables that show the results for starting in college-level math at community colleges ([Appendix Table C47](#)) or avoiding developmental math at CSUN ([Appendix Table C52](#)) are consistent in (positive) sign and statistical significance for Groups 4 and 5. The only exception is the method that uses stratification to match students in CSUN, which we omit because of poor balance on the predictors.

The estimated effects on GPAs in community colleges ([Appendix Tables C48-C50](#)) and CSUN ([Appendix Tables C53-C55](#)) are largely statistically insignificant for overall and college-level math GPA, with the exception of one statistically significant negative alternative estimate for overall GPAs in CSUN (see [Appendix Table C53](#)). As for non-math STEM GPAs, the estimates for Groups 3 and 5 in community colleges are consistently not statistically significant (see [Appendix Table C50](#)). The negative and statistically significant estimates for Group 4 in community colleges, and Groups 4 and 5 in CSUN from the main report (Table 5) are slightly sensitive to our alternative estimation approaches (see [Appendix Tables C50](#) and [C55](#)).

[Appendix Tables C56-C58](#) show estimated effects of taking 12th grade math on three supplemental outcomes related to degree-applicable math courses in community college: degree-applicable math credits earned, starting in degree-applicable math, and degree-applicable math GPA. The results for degree-applicable math credits earned ([Appendix Table C56](#)) are consistently positive and statistically significant in Groups 3 and 4, with the exception of the method that uses stratification in Group 3. The results for degree-applicable math credits earned in Group 5 are all positive, and are largely consistent in statistical significance, though there is a bit of sensitivity to alternative estimation methods. Generally speaking, these results suggest that taking 12th grade math increases degree-applicable math credit accumulation, just like it seems to do for college-level math credit accumulation. As for starting in degree-applicable math (in [Appendix Table C57](#)), the estimates are all positive, but consistently insignificant in Group 3, and any statistical significance is sensitive in Groups 4 and 5. The estimates for degree-applicable math GPA are consistently not statistically significant (see [Appendix Table C58](#)).

Statistics vs. Precalculus or Calculus

[Appendix Tables C59-C68](#) show the results from all the methods of estimating the effects of taking Statistics over Precalculus or Calculus on the main outcomes. In community colleges, we compare Statistics to Precalculus in Group 4, and Statistics to Calculus in Group 5. In CSUN, we compare Statistics to Precalculus or Calculus in Groups 4 and 5 combined. We do not find reasonable overlap and balance when comparing Statistics to Precalculus in Group 3, so we do not report estimates for that comparison. The results for college-level math credit accumulation are consistent in (negative) sign and statistical significance in Group 5 in community college ([Appendix](#)

[Table C59](#)), and in Groups 4 and 5 in CSUN ([Appendix Table C64](#)). From [Appendix Table C59](#), we also see that the negative and statistically significant estimate on college-level math credit accumulation in Group 4 at community colleges from the main report (Table 6) shows sensitivity to alternative estimation approaches.

We also see in [Appendix Table C59](#) consistently negative estimates of taking Statistics instead of Precalculus or Calculus on non-math STEM credits earned in community colleges, though these estimates are not consistently statistically significant. And in [Appendix Table C64](#) the negative estimate on non-math STEM credits earned in CSUN from the main report (Table 6) is largely consistent across the alternative approaches.

The estimated effects of taking Statistics on starting in college-level math at community colleges are consistently negative and statistically significant (see [Appendix Table C60](#)), with the lone exception being one estimate that uses stratification to match students. The estimated effects of taking Statistics on avoiding developmental math at CSUN ([Appendix Table C65](#)) are consistently not statistically significant.

The results for GPAs in community colleges ([Appendix Tables C61-C63](#)) are consistently not statistically significant for overall and college-level math GPAs, and mostly not statistically significant for non-math STEM GPAs. There are a few positive and statistically significant estimates of taking Statistics on non-math STEM GPAs for Group 5 community college students (see [Appendix Table C63](#)). At CSUN, the estimates for overall and non-math STEM GPAs ([Appendix Tables C66](#) and [C68](#)) are consistently not statistically significant. There are a couple of statistically significant and positive estimates for college-level math GPAs at CSUN (see [Appendix Table C67](#)).

[Appendix Tables C69-C71](#) report results of taking Statistics instead of Precalculus or Calculus for the supplemental community college outcomes. For degree-applicable math credits earned (in [Appendix Table C69](#)), the estimates for Group 4 are consistently not statistically significant. Most of the estimates for Group 5 are not statistically significant, but almost all of the estimates are negative and a few are statistically significant. For starting in degree-applicable math (in [Appendix Table C70](#)), most of the estimates for Group 4 are not statistically significant, and the estimates for Group 5 are consistently negative and statistically significant, implying that taking Statistics instead of Calculus in Group 5 decreases students' likelihood of starting in degree-applicable math. As for degree-applicable math GPA (in [Appendix Table C71](#)), none of the estimates for Group 4 are statistically significant, and some of the estimates for Group 5 are statistically significant and positive.

TCMS vs. Precalculus or Calculus

We report results that compare TCMS to Precalculus or Calculus but do not report results that compare IDS to Precalculus or Calculus because too few community college and CSUN students took IDS in high school in the years we examine to have sufficient statistical power to estimate the effects of IDS.

[Appendix Tables C72-C79](#) show estimated effects on the main and supplemental outcomes of taking TCMS instead of Precalculus (Group 4) or Calculus (Group 5) for community college students. We do not find reasonable overlap and balance when comparing TCMS to Precalculus or Calculus in CSUN for Groups 4 and 5, or in community colleges for Group 3, so we do not report estimates for those comparisons. Also, none of our matching and weighting approaches yield good overlap or balance when comparing TCMS to Calculus in Group 5 among community students who had non-missing college-level math GPAs, non-missing non-math STEM GPAs, or non-missing degree-applicable math GPAs, so we omit all estimates for Group 5 in the associated tables ([Appendix Tables C75](#), [C76](#), and [C79](#)).

We do not find *consistently* statistically significant estimated effects of taking TCMS instead of Precalculus or Calculus for any of our outcomes. Although a couple of our models yield negative and statistically significant estimated effects of taking TCMS on college-level math and non-math STEM credits earned (see [Appendix Table C72](#)) and on starting in college-level math (see [Appendix Table C73](#)), these results do not hold across estimation approaches.

TCMS vs. Statistics

We report results that compare TCMS to Statistics but do not report results that compare IDS to Statistics because too few community college and CSUN students took IDS in high school in the years we examine to have sufficient statistical power to estimate the effects of IDS.

[Appendix Tables C80-C86](#) show estimated effects on the main and supplemental outcomes of taking TCMS instead of Statistics for community college students from Groups 4 and 5. We do not find good overlap and balance when comparing TCMS to Statistics in CSUN for Groups 4 and 5 or in community colleges for Group 3, so we omit results for those comparisons. Additionally, we omit estimated effects on college-level math GPAs because none of our matching and weighting approaches yield good balance among students who had non-missing college-level math GPAs. We find fairly consistent statistically significant and negative estimated effects of taking TCMS instead of Statistics in Group 5 on non-math STEM credits earned for models that use school-level predictors ([Appendix Table C80](#)). We do not find consistently statistically significant results for other outcomes, though there are a few statistically significant and positive estimated effects of taking TCMS instead of Statistics in Group 4 on starting in degree-applicable math ([Appendix Table C85](#)).

Descriptive Analysis of College Math Course-Taking Patterns

In the main report, we discuss the results of a descriptive analysis that examines how the college math course-taking patterns of students differed between students who did and did not take math in 12th grade, or between those who took Statistics instead of Precalculus or Calculus. We use course descriptions from CSUN and various community college campuses to categorize each of the college math courses students

in our samples took during their first two years of college into one of six categories: Algebra 2 or Lower, Statistics, Precalculus, Calculus, Higher Level, or Other. Courses in the Algebra 2 or Lower category include Algebra 1, Geometry, Algebra 2, and anything more basic. We define the college-level Statistics, Precalculus, and Calculus courses similarly to how we define them using L.A. Unified’s math courses. We include in the “Higher Level” category any course that covers material beyond what is taught in AP Calculus AB or BC (e.g., multivariable calculus, differential equations, or linear algebra). We categorize courses that do not fit into the five previous categories as “Other” (e.g., discrete math or computer programming).³⁷

[Appendix Table C87](#) reports the results of this descriptive analysis for comparing students who took math in 12th grade and those who did not. In both community colleges and CSUN, and for every student group, the percentage of students who took Calculus and/or higher-level math courses in their first two years of college was higher for students who took math in 12th grade than for students who did not. Although this is only a descriptive finding, it potentially explains why we fail to see a positive effect of taking math in 12th grade on college-level math GPA (see [Appendix Tables C49](#) and [C54](#)) despite a positive effect on college-level math credit accumulation (see [Appendix Tables C46](#) and [C51](#)) – students who took math in 12th grade tended to also take more advanced, and potentially more difficult, math courses in college. Taking more advanced college math courses would presumably make it more difficult to obtain a higher math GPA, which could cancel out any GPA gains coming from the increased preparation that taking math in 12th grade offers. Further, although this descriptive analysis only considers math courses, it is plausible that a similar pattern could potentially explain why we see some statistically significant negative estimated effects of taking math on non-math STEM GPAs for CSUN students in Groups 4 and 5 (see [Appendix Table C55](#)). However, note also that the statistical significance of these estimates is sensitive to alternative estimation approaches.

[Appendix Table C88](#) then compares the college math course-taking patterns of those who took Statistics to those who took Precalculus or Calculus. These results show a similar association to that in the comparison of math and no math – in both community colleges and CSUN, and for every student group, the percentage of students who took Calculus or higher-level math courses in their first two years of college was lower for students who took Statistics than for students who took Precalculus or Calculus. In other words, students who took Statistics in 12th grade tended to take less advanced, and likely less difficult, math courses in college than did those who took Precalculus or Calculus in 12th grade. This potentially explains why we do not see a statistically significant effect of taking Statistics on college-level math GPA (see [Appendix Tables C62](#) and [C67](#)) despite seeing a negative effect of taking Statistics instead of Calculus in Group 5 on college-level math credit accumulation (see [Appendix Tables C59](#) and [C64](#)).

³⁷ More information on how we categorize each individual college math course is available from the authors upon request.

Appendix D. Sensitivity Analyses

Our preferred estimation approach suggests a positive relationship between taking a 12th grade math course, compared to not taking one, and college-level math credits accumulated. This approach also suggests that taking Statistics over Calculus has a negative effect on college-level math credits earned. [Appendix C](#) shows that these conclusions are largely consistent across our various alternative modeling approaches, at least for some student groups. However, all these models, both preferred and alternative, assume that we have perfectly accounted for all the possible confounders in the relationship between math course taking and our outcomes. Our models arguably account for the main reasons that students take math in 12th grade or take a particular type of math course, 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 their 12th grade math course taking, including their perceptions of the extent to which math is important for their planned major or occupation, 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' outcomes at community college or CSUN, our estimated effects are 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).³⁸

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:

- all of the following academic predictors from [Appendix Table A1](#) (and their squared terms, when continuous): weighted 11th grade math GPA; cumulative

³⁸ 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 for the vast majority of outcomes, course comparisons, and student groups, however, this is not an important limitation. One notable difference between our preferred estimation approach and OLS without matching can be found in [Appendix Table C51](#), where our preferred estimated effect of taking 12th grade math on college-level math credits accumulated for CSUN students is statistically significant, but the estimate from OLS without matching is not statistically significant. However, this means that we have already deemed the preferred estimate sensitive to alternative estimation approaches even before considering bias due to omitted variables. Note, too, that the adjusted standard error estimate that the procedure from Cinelli & Hazlett (2020) calculates is only assured to be valid under homoscedastic errors for the outcome after having accounted for omitted predictors.

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 STEM credits accumulated from 9th to 11th grade; number of A-G semesters off-track with a C or D in various subjects; 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 11th grade; an indicator of taking a college or career seminar course in 11th grade; math course taking prior to 12th grade; and an indicator of ever attending a STEM-focused school from 9th 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

For CSUN students, we also include an indicator for the student's group (Group 4 or 5) in this set of predictors. We refer to this set of predictors as the "Academics+" predictors.

Math vs. No Math

[Appendix Tables D1](#), [D2](#), and [D3](#) show the sensitivity results for the main outcomes for community college students in Groups 3, 4, and 5, respectively, for this course comparison. [Appendix Table D4](#) shows the sensitivity results for the main outcomes for CSUN students in Groups 4 and 5 combined. Among all community college students, the Academics+ predictors account for 24.9%, 33.5%, and 31.3% of the total explained variance in math course taking in our models for Groups 3, 4, and 5 respectively.³⁹ The Academics+ predictors then account for 23.7% to 54.2% of the total explained variance in our community college outcomes.⁴⁰ Among CSUN students, the Academics+ predictors account for 36.1% of the total explained variance in math course taking in our

³⁹ Per [Appendix Tables D1-D3](#), including the Academics+ predictors in the linear model for math-taking increases the R² from 25.0% to 33.3% in Group 3 ($\frac{0.333-0.250}{0.333} * 100\% = 24.9\%$), 20.6% to 31.0% in Group 4 ($\frac{0.310-0.206}{0.310} * 100\% = 33.5\%$), and 18.4% to 26.8% in Group 5 ($\frac{0.268-0.184}{0.268} * 100\% = 31.3\%$). These calculations come from the "R2 with Treatment" columns in the "Overall GPA" row of [Appendix Tables D1-D3](#).

⁴⁰ At their least predictive, the Academics+ predictors increase the R² for the linear model for college-level math credits earned in Group 3 from 17.7% to 23.2% ($\frac{0.232-0.177}{0.232} * 100\% = 23.7\%$). At their most predictive, this set of predictors increases the R² for the linear model for non-math STEM GPA in Group 5 from 11.5% to 25.1% ($\frac{0.251-0.115}{0.251} * 100\% = 54.2\%$). See [Appendix Tables D1-D3](#) for more detailed results.

models for Groups 4 and 5 combined,⁴¹ and 43.9% to 59.4% of the total explained variance in our CSUN outcomes.⁴²

Recall from the report (and [Appendix C](#)) that our estimates imply that (i) taking a 12th grade math course has a positive effect on college-level math credit accumulation, which we suspect is due to (ii) the positive estimated effect we also find on starting in college-level math in community college, or avoiding developmental math in CSUN. 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. For college-level math credit accumulation at community colleges, the unobserved set of confounders would need be over half (0.59) as strong as the Academics+ predictors in Group 3, over half (0.57) as strong in Group 4, and over one third (0.40) as strong in Group 5 to bring the estimated effects to 0. The unobserved predictors would need to be only 0.03 times as strong as the Academics+ predictors in Group 3, over one third (0.36) as strong in Group 4, and about one tenth (0.13) as strong in Group 5 to render the estimated effects insignificant at the 0.05 level. The 0.03 number in Group 3 is certainly plausible, and the 0.13 number in Group 5 approaches plausibility as well – unobserved predictors that strong in Group 5 would explain 1.5% and 1.9% of the remaining variation in math-taking and the outcome, respectively, which would increase the total R² of the linear model for the treatment from 26.9% to 28.0%, and that for the outcome from 22.8% to 24.3%. The 0.36 number in Group 4 that would render the estimate insignificant at the 0.05 level is less plausible, but not completely implausible – unobserved predictors that strong would explain 5.4% and 5.5% of the remaining variation in math-taking and the outcome, respectively, which would increase the total R² of the linear model for the treatment from 30.9% to 34.6%, and that for the outcome from 23.8% to 28.0%. For credit accumulation at CSUN, the OLS estimate is not statistically significant to begin with, but unobserved predictors would need to be two-fifths (0.40) times as strong as the Academics+ predictors to yield a zero-estimate.

As for starting in college-level math in community colleges, the estimate in Group 3 is essentially 0 to begin with and is not statistically significant. Unobserved predictors would need be one third (0.34) as strong as the Academics+ predictors in Group 4 and 0.39 times as strong in Group 5 to bring the estimated effects to 0. Unobserved predictors would need to be over a tenth (0.13) as strong as the Academics+ predictors in Group 4 and nearly one fifth (0.19) as strong in Group 5 to render the estimated effects insignificant at the 0.05 level. Neither the 0.13 number in Group 4 nor the 0.19

⁴¹ Per [Appendix Table D4](#), including the Academics+ predictors in the linear model for math-taking increases the R² from 11.5% to 18.0% ($\frac{0.180-0.115}{0.180} * 100\% = 36.1\%$). This calculation comes from the “R2 with Treatment” columns in the “Overall GPA” row of [Appendix Table D4](#).

⁴² At their least predictive, the Academics+ predictors increase the R² for the linear model for overall credits earned in CSUN from 11.1% to 19.8% ($\frac{0.198-0.111}{0.198} * 100\% = 43.9\%$). At their most predictive, this set of predictors increases the R² for the linear model for avoiding developmental math from 14.5% to 35.7% ($\frac{0.357-0.145}{0.357} * 100\% = 59.4\%$). See [Appendix Table D4](#) for more detailed results.

number in Group 5 is implausible. Unobserved predictors that strong in Group 4 would explain 2.1% and 2.3% of the remaining variation in math-taking and the outcome, respectively, which would increase the total R² of the linear model for the treatment from 31.1% to 32.5%, and that for the outcome from 27.2% to 28.9%. Unobserved predictors that would render the Group 5 estimate insignificant at the 0.05 level would explain 2.3% and 5.5% of the remaining variation in math-taking and the outcome, respectively, which would increase the total R² of the linear model for the treatment from 27.2% to 28.9%, and that for the outcome from 36.6% to 40.1%. In CSUN, the estimate for avoiding developmental math is more robust – unobserved predictors would need to be 0.61 times as strong as the Academics+ predictors to yield an estimate of 0, and 0.38 times as strong to render the estimate insignificant at the 0.05 level.

In the main report, our estimates also imply that taking math in 12th grade seems to have a positive effect on community college non-math STEM credits earned for Group 4 students (see Table 5), and per [Appendix C](#), this result is largely robust to other methods of estimating the effect. [Appendix Table D2](#) shows that unobserved predictors would need to be 0.37 times as strong as the Academics+ predictors to yield an estimate of 0, and 0.10 times as strong to render the estimate insignificant at the 0.05 level. The 0.10 number approaches plausibility – unobserved predictors that strong in Group 4 would explain 1.5% and 1.0% of the remaining variation in math-taking and the outcome, respectively, which would increase the total R² of the linear model for the treatment from 30.9% to 31.9%, and that for the outcome from 17.7% to 18.5%.

In conclusion, these sensitivity results indicate that the following positive estimated effects of taking a math course in 12th grade are particularly robust to unobserved confounders: (1) the positive effect on college-level math credit accumulation for community college students in Group 4 and (2) the positive effect on avoiding developmental math for CSUN students from Groups 4 and 5.

Statistics vs. Precalculus or Calculus

[Appendix Tables D5](#) and [D6](#) show the sensitivity results for the main outcomes for community college students in Groups 4 and 5, respectively, for Statistics vs. Precalculus (in Group 4) or Calculus (in Group 5). [Appendix Table D7](#) presents the sensitivity results for the main outcomes for CSUN students in Groups 4 and 5 combined for Statistics vs. Precalculus or Calculus. Among community college students, the Academics+ predictors account for 19.9% and 49.1% of the total explained variance in the treatment in our models for Groups 4 and 5 respectively.⁴³ The Academics+ predictors also account for 23.3% to 50.0% of the total explained variance in the

⁴³ Per [Appendix Tables D5-D6](#), including the Academics+ predictors in the linear model for math-taking increases the R² from 24.2% to 30.2% in Group 4 ($\frac{0.302-0.242}{0.302} * 100\% = 19.9\%$) and 16.2% to 31.8% in Group 5 ($\frac{0.318-0.162}{0.318} * 100\% = 49.1\%$). These calculations come from the “R2 with Treatment” columns in the “Overall GPA” row of [Appendix Tables D5-D6](#).

community college outcomes.⁴⁴ Among CSUN students, the Academics+ predictors account for 41.9% of the total explained variance in the treatment for Groups 4 and 5 combined,⁴⁵ and 38.8% to 63.9% of the total explained variance in the CSUN outcomes.⁴⁶

Estimates from the main report (and [Appendix C](#)) imply that (i) taking Statistics instead of Calculus has a negative effect on college-level math credit accumulation, and (ii) taking Statistics instead of Precalculus or Calculus has a negative effect on starting in college-level math in community college. For the community college sample, unobserved predictors would need to be nearly three-fourths (0.70) as strong as the Academics+ predictors in Group 5 to reduce the estimated negative effect of taking Statistics instead of Calculus on college-level math credit accumulation to 0. These unobserved predictors would need to be over two-fifths (0.41) as strong as the Academics+ predictors in Group 5 to render the estimated effect insignificant at the 0.05 level. It seems unlikely that our models for Group 5 have omitted predictors over two-fifths as strong as the Academic+ predictors, but it is not entirely out of the question. Were unobserved predictors that strong in Group 5, they would explain 9.5% and 5.3% of the remaining variation in the treatment and outcome, respectively, which would increase the total R² of the linear model for the treatment from 32.0% to 38.5%, and that for the outcome from 26.6% to 30.5%.

For college-level math credit accumulation at CSUN, unobserved predictors would need to be 0.94 times as strong as the Academics+ predictors to yield a zero-estimate, and 0.43 times as strong to render the estimate insignificant at the 0.05 level. Neither scenario seems particularly likely, but the 0.43 number is not entirely implausible – it corresponds to unobserved predictors that explain 4.3% and 4.5% of the remaining variation in the treatment and the outcome, respectively, which would increase the total R² of the linear model for the treatment from 19.7% to 23.2%, and that for the outcome from 18.3% to 22.0%, neither of which are huge increases.

Unobserved predictors would need be almost two-thirds (0.64) as strong as the Academics+ predictors in Group 4 and over half (0.58) as strong in Group 5 to bring the estimated effects on community college students starting in college-level math to 0. To

⁴⁴ At their least predictive, the Academics+ predictors increase the R² for the linear model for college-level math credits earned in Group 5 from 20.4% to 26.6% ($\frac{0.266-0.204}{0.266} * 100\% = 23.3\%$). At their most predictive, this set of predictors increases the R² for the linear model for non-math STEM GPA in Group 5 from 16.3% to 32.6% ($\frac{0.326-0.163}{0.326} * 100\% = 50.0\%$). See [Appendix Tables D5-D6](#) for more detailed results.

⁴⁵ Per [Appendix Table D7](#), including the Academics+ predictors in the linear model for the treatment increases the R² from 11.5% to 19.8% ($\frac{0.198-0.115}{0.198} * 100\% = 41.9\%$). This calculation comes from the “R2 with Treatment” columns in the “Overall GPA” row of [Appendix Table D7](#).

⁴⁶ At their least predictive, the Academics+ predictors increase the R² for the linear model for college-level math credits earned from 11.2% to 18.3% ($\frac{0.183-0.112}{0.183} * 100\% = 38.8\%$). At their most predictive, this set of predictors increases the R² for the linear model for avoiding developmental math from 12.7% to 35.2% ($\frac{0.352-0.127}{0.352} * 100\% = 63.9\%$). See [Appendix Table D7](#) for more detailed results.

render the estimated effects insignificant at the 0.05 level, unobserved predictors would need to be over a tenth (0.11) times as strong as the Academics+ predictors in Group 4 and 0.40 times as strong in Group 5. These numbers are not entirely implausible, particularly the 0.11 number in Group 4. Unobserved predictors that strong in Group 4 would explain 1.1% and 1.7% of the remaining variation in the treatment and outcome, respectively, which would increase the total R^2 of the linear model for the treatment from 30.0% to 30.8%, and that for the outcome from 31.4% to 32.6%.

Finally, our preferred estimates also suggest that taking Statistics instead of Precalculus or Calculus seems to have a negative effect on CSUN non-math STEM credits earned for Group 4 and 5 students, and [Appendix C](#) reports that this result is mostly robust to our alternative estimation approaches. Unobserved predictors would need to be 0.51 times as strong as the Academics+ predictors to yield an estimate of 0, and 0.08 times as strong to render the estimate insignificant at the 0.05 level. The 0.08 number is certainly plausible, as unobserved predictors that strong would explain 0.8% and 1.3% of the remaining variation in the treatment and the outcome, respectively, which would increase the total R^2 of the linear model for the treatment from 19.7% to 20.3%, and that for the outcome from 24.1% to 25.1%.

In conclusion, these sensitivity results indicate that the following negative estimated effects of taking Statistics in 12th grade instead Precalculus or Calculus are particularly robust to unobserved confounders: (1) the negative effect of taking Statistics instead of Calculus for college-level math credit accumulation among community college students from Group 5; (2) the negative effect of taking Statistics instead of Precalculus or Calculus for college-level math credit accumulation among CSUN students from Groups 4 and 5; and (3) the negative effect of taking Statistics instead of Calculus for starting in college-level math among community college students from Group 5.

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Table A1. Descriptions of Predictor Variables

Demographics	
Age (in Months)	We calculate students' age (in months) as of August 1 st of their 11 th grade year.
Gender	We code students' gender based on their classification in the spring of their 11 th 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 according to their classification in the spring of their 11 th 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 9 th to 11 th Grade	We code students as eligible for subsidized meals if they were eligible in any term during their 9 th through 11 th grade years. If their subsidized meal eligibility was missing in every term from 9 th through 11 th 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 11 th 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 11 th Grade	We code students as attending a school other than their resident school (i.e., a school that is not their neighborhood school) in 11 th grade if their enrollment records indicate they were enrolled in a school other than their resident school in either term of their 11 th grade year.
Number of School Moves from 9 th to 11 th Grade	We calculate the number of times students changed schools (i.e., changed from one preferred location school code to another) during their 9 th through 11 th grade years. If students' preferred school code was missing in any year from 9 th to 11 th grade, we give them a missing value for this variable.
English Learner Status in 11 th Grade	We code students' English learner status based on their status in the spring of their 11 th 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 11 th Grade	We code students' gifted and talented program participation status based on their participation status in their 11 th 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

Academic Variables

Math 11 th Grade Weighted GPA	<p>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 content course in the spring of their 11th grade year.</p> <p>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.</p>
Cumulative Overall Weighted GPA at the End of 11 th Grade	<p>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.</p>
Standardized ELA SBAC Score in 11 th Grade	<p>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.</p>
Standardized Math SBAC Score in 11 th Grade	<p>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.</p>
Number of Semesters of AP Classes Taken from 9 th to 11 th Grade	<p>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.</p>
Science Credits Accumulated from 9 th to 11 th Grade	<p>We calculate the number of credits students accumulated during their 9th through 11th grade years from courses that L.A. Unified's data codes as being science, engineering, or computer science. We also include in this calculation several environmental and agricultural science courses. If students were not continuously enrolled in L.A. Unified from 9th to 11th grade, we assign them a missing value for this variable.</p>
A-G C or better Semesters Off-Track in English ("A" in A-G) and History ("B" in A-G) at the End of 11 th Grade	<p>We calculate the number of semesters in 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.</p>

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 11 th Grade	We calculate the number of semesters in 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 11 th 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 11 th 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 11 th Grade	We calculate the number of semesters in 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 11 th 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 11 th 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 11 th Grade	We calculate the number of semesters in 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 L.A. Unified's graduation requirements in those subjects by the end of their 11 th 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 11 th grade year.
Highest Evidence-Based Reading and Writing (ERW) PSAT Score by the End of 11 th Grade	This measure reflects the highest PSAT Evidence-Based Reading and Writing (ERW) scores students received in their 10 th and 11 th 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 11 th Grade	This measure reflects the highest PSAT Math scores students received in their 10 th and 11 th 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 12 th Grade	This measure reflects whether students had taken the SAT or ACT prior to September 1 st of their 12 th grade year.
Participated in the Advancement via Individual Determination (AVID) Program in 11 th Grade	We identify students as having participated in the Advancement via Individual Determination (AVID) program in 11 th grade if they enrolled in an AVID course during their 11 th grade year.
Took a College or Career Seminar Course in 11 th Grade	We identify students as having taken a college, career, or senior seminar course in 11 th grade if their transcript data indicated they enrolled in the course in either term of their 11 th grade year.

See the note on the first page of the table.

Table A1 Continued. Descriptions of Predictor Variables

Academic Variables

Ever Enrolled in a STEM-focused School from 9th to 12th Grade	We determine if students enrolled in a STEM-focused school at any point from the fall of their 9 th grade year through the fall of their 12 th grade year. To identify STEM-focused schools, we read through all the names of the schools and tagged those that mentioned a STEM field. We often cross-checked this with school websites to ensure that we were not wrongfully counting a school as STEM-focused. We also made sure to count all of L.A. Unified's STEM magnet schools (https://lausdmagnets.com/) as STEM-focused.
Took an AP Computer Science Course by the End of 11 th Grade	This measure reflects whether students enrolled in AP Computer Science A (which partially fulfills the "C", or math, A-G requirement) during their 6 th through 11 th grade years. We include courses students completed at a community college.
Took a Precalculus Course by the End of 11 th Grade	This measure reflects whether students enrolled in a Precalculus course during their 6 th through 11 th grade years. We include courses students completed at a community college.
Took a Calculus Course by the End of 11 th Grade	This measure reflects whether students enrolled in a Calculus course during their 6 th through 11 th grade years. We include courses students completed at a community college.
Took a Discrete Math Course by the End of 11 th Grade	This measure reflects whether students enrolled in a Discrete Math course during their 6 th through 11 th grade years. We include courses students completed at a community college.
Took an Introduction to Data Science (IDS) Course by the End of 11 th Grade	This measure reflects whether students enrolled in an Introduction to Data Science (IDS) course during their 6 th through 11 th grade years.
Took a Quantitative Reasoning with Statistics (QRS) Course by the End of 11 th Grade	This measure reflects whether student enrolled in a Quantitative Reasoning with Statistics (QRS) course during their 6 th through 11 th grade years.
Took a Statistics Course by the End of 11 th Grade	This measure reflects whether students enrolled in a Statistics course during their 6 th through 11 th 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 11 th Grade	This measure reflects whether students enrolled in Transition to College Math and Statistics (TCMS) during their 6 th through 11 th grade years.
Took a Community College Advanced Math Course by the End of 11 th 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 6 th through 11 th grade years.

Behavioral Variables

Work Effort GPA in 11 th Grade	We calculate students' 11 th grade overall work effort GPAs by first computing the number of work effort grade points they were awarded for each course in their 11 th 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.
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See the note on the first page of the table.

Table A1 Continued. Descriptions of Predictor Variables

Behavioral Variables	
Cooperation GPA in 11 th Grade	We calculate students' 11 th grade cooperation GPAs by first computing the number of cooperation grade points they were awarded for each course in their 11 th 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 11 th Grade	We calculate students' attendance rates in 11 th grade as the number of days they were marked as present divided by the number of days they were enrolled in their 11 th grade year.
Ever Suspended from 9 th to 11 th Grade	We code students as having been suspended during their 9 th through 11 th grade years if they received any type of suspension during that time period.
Self-Perception Variables	
Educational Expectations in 11 th Grade	We measure students' educational expectations based on their responses to L.A. Unified's School Experience Survey during their 11 th grade year. Because L.A. Unified changed the response set for the educational expectations question on the School Experience Survey in 2016-17, we recoded the 2016-17 responses to align with the options from 2015-16: "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 11 th Grade	<p>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 four items on L.A. Unified's School Experience Survey: (i) My intelligence is something I can't change much; (ii) "Challenging myself won't make me smarter"; (iii) "There are some things I am not capable of learning"; and (iv) "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."</p> <p>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 averaged the scores from the four items ($\alpha=0.7965$ for the 2015-16 cohort of first-time 11th graders, and $\alpha=0.8638$ 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 standardized 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.</p>

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 standardized 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 12 th Grade)	We define students' 12 th grade school as the school in which they were enrolled in the fall of their 12 th 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.
12 th Grade Enrollment	This measure reflects the number of 12 th graders enrolled at students' 12 th grade school during the fall and spring terms.
Proportion of 12 th Grade Class who Identify as African American or Latinx	We determine the proportion of the 12 th grade class in students' 12 th grade school who identified as African American or Latinx by dividing the number of African American or Latinx 12 th graders by the total 12 th grade enrollment.
Proportion of 12 th Grade Class who were Subsidized Meal Eligible	We determine the proportion of the 12 th grade class in students' 12 th grade school who were subsidized meal eligible by dividing the number of subsidized meal eligible 12 th graders by the total 12 th 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 12 th grade year who held a full math credential in the <i>prior</i> year, i.e., the proportion of teachers in students' 11 th 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' 12 th grade school in the <i>prior</i> year, i.e., the proportion of 11 th graders who enrolled in a CTE course in students' 11 th grade year among all 11 th graders at that school in the same year.
Average 11 th Grade Math SBAC Score in the 12 th Grade Class	We calculate the average standardized 11 th grade math SBAC score among 12 th graders enrolled at students' 12 th grade school.
Standard Deviation of the 11 th Grade Math SBAC Scores in the 12 th Grade Class	We calculate the standard deviation of the standardized 11 th grade math SBAC scores among 12 th graders enrolled at students' 12 th grade school.

See the note on the first page of the table.

Table A1 Continued. Descriptions of Predictor Variables

12th Grade School Variables

Average End-of-11 th Grade Cumulative Weighted GPA in the 12 th Grade Class	We calculate the average end-of-11 th grade cumulative weighted GPA among 12 th graders enrolled at students' 12 th grade school.
Proportion of 12 th Grade Class who were in Student Group 4	We determine the proportion of the 12 th grade class at students' 12 th grade school who were in Student Group 4 (see the main text for information about this student group).
Proportion of 12 th Grade Class who were in Student Groups 5-6	We determine the proportion of the 12 th grade class at students' 12 th grade school who were in Student Groups 5-6 (see the main text for information about these student groups).

See the note on the first page of the table.

Table A2. Descriptions of Outcome Variables

Main

Overall Credits Earned	We sum up the number of credits of any subject students earned in their first two years of college. We drop students from analyses of this variable if they had overall, college-level math, or non-math STEM credits earned values that were above the 99th percentile of credits earned values among all 2015-16 and 2016-17 first-time 11th graders in our data who earned at least one credit at a community college or CSUN in the first two years after their expected high school graduation.
Overall GPA	We calculate students' GPA for all courses of any subject they took during their first two years of college. We exclude courses that were not worth college credit or for which students did not receive a letter grade (e.g., courses taken pass/fail). We assign students missing values for this variable if they did not take a credit-bearing course of any subject for a letter grade in their first two years of college.
College-Level Math Credits Earned	We sum up the number of credits from college-level math courses students earned in their first two years of college. We drop students from analyses of this variable if they had overall, college-level math, or non-math STEM credits earned values that were above the 99th percentile of credits earned values among all 2015-16 and 2016-17 first-time 11th graders in our data who earned at least one credit at a community college or CSUN in the first two years after their expected high school graduation.
College-Level Math GPA	We calculate students' GPA for all college-level math courses they took during their first two years of college. We exclude courses that were not worth college credit or for which students did not receive a letter grade (e.g., courses taken pass/fail). We assign students missing values for this variable if they did not take a credit-bearing college-level math course for a letter grade in their first two years of college.

Note: We define students' first two years of college as the two academic years following their expected graduation date, even if the student did not immediately enroll in a community college or CSUN. For example, first-time 11th graders in 2015-16 would be expected to graduate in Spring 2017. Their first two years of college would then span Fall 2017 through Summer 2019, even if the student did not enroll in college in Fall 2017. We code students as having attempted a course if the course appeared on their transcript, regardless of whether they withdrew from the course, received an incomplete, or received a letter grade. In community colleges, college-level math courses are math courses that would theoretically count towards a degree from a UC or CSU, were the student to transfer to a UC or CSU. These courses are often referred to as "transfer-level" courses (e.g., Melguizo et al., 2014). In CSUN, college-level math courses are math courses that count towards a degree from CSUN. We define developmental math courses in CSUN as non-corequisite courses that either (i) do not count towards a degree from CSUN or (ii) come from the Math 196 series (QR or S). Although the Math 196 series counts toward a degree from CSUN, we count it as developmental math because it does not fulfill the math requirement at CSUN, and its material is developmental in nature. In community colleges, degree-applicable math courses are math courses that count towards a community college degree. We categorized courses as STEM using the Department of Homeland Security's STEM designated program list.

Table A2 Continued. Descriptions of Outcome Variables

Main	
Non-Math STEM Credits Earned	We sum up the number of credits from non-math STEM courses students earned in their first two years of college. We drop students from analyses of this variable if they had overall, college-level math, or non-math STEM credits earned values that were above the 99th percentile of credits earned values among all 2015-16 and 2016-17 first-time 11th graders in our data who earned at least one credit at a community college or CSUN in the first two years after their expected high school graduation.
Non-Math STEM GPA	We calculate students' GPA for all non-math STEM courses they took during their first two years of college. We exclude courses that were not worth college credit or for which students did not receive a letter grade (e.g., courses taken pass/fail). We assign students missing values for this variable if they did not take a credit-bearing non-math STEM course for a letter grade in their first two years of college.
Started in College-Level Math (<i>Community College Only</i>)	We determine if the first math course students took was college-level. If students took at least two math courses at the same time, (at least) one was college-level and (at least) one was not, we still count their first attempted math course as being college-level. We assign students missing values for this variable if they did not take a math course in their first two years of college.
Avoided Developmental Math (<i>CSUN Only</i>)	We code students as avoiding developmental math if their first attempted math course was <i>not</i> developmental. If students took at least two math courses at the same time, (at least) one was developmental and (at least) one was not, we still count their first attempted math course as being developmental. We assign students missing values for this variable if they did not take a math course in their first two years of college.

Supplemental

Degree-Applicable Math Credits Earned (<i>Community College Only</i>)	We sum up the number of credits from degree-applicable math courses students earned in their first two years of community college. We drop students from analyses of this variable if they had degree-applicable math credits earned values that were above the 99th percentile of degree-applicable math credits earned values among all 2015-16 and 2016-17 first-time 11th graders in our data who earned at least one credit at a community college in the first two years after their expected high school graduation.
Degree-Applicable Math GPA (<i>Community College Only</i>)	We calculate students' GPA for all degree-applicable math courses they took during their first two years of community college. We exclude courses that were not worth college credit or for which students did not receive a letter grade (e.g., courses taken pass/fail). We assign students missing values for this variable if they did not take a credit-bearing degree-applicable math course for a letter grade in their first two years of community college.
Started in Degree-Applicable Math (<i>Community College Only</i>)	We determine if the first math course students took at community college was degree-applicable. If students took at least two math courses at the same time, (at least) one was degree-applicable and (at least) one was not, we still count their first attempted math course as being degree-applicable. We assign students missing values for this variable if they did not take a math course in their first two years of community college.

See the note on the first page of the table.

Table A3. Descriptives Statistics on Predictors for Community College Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016- 17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in Community College (N=14,729)			Community College Analytic Sample (N=12,167)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Age (in Months)	61,319	196.550	6.860	14,714	195.170	5.270	12,167	195.100	5.230
Gender: Female	61,319	0.500	0.500	14,714	0.520	0.500	12,167	0.510	0.500
Race/Ethnicity: Native American or Alaskan Native	61,223	-	-	14,702	-	-	12,155	-	-
Race/Ethnicity: Asian	61,223	0.040	0.200	14,702	0.030	0.180	12,155	0.040	0.190
Race/Ethnicity: African American	61,223	0.090	0.290	14,702	0.080	0.270	12,155	0.070	0.260
Race/Ethnicity: Filipinx	61,223	0.030	0.170	14,702	0.040	0.180	12,155	0.040	0.190
Race/Ethnicity: Latinx	61,223	0.760	0.430	14,702	0.770	0.420	12,155	0.770	0.420
Race/Ethnicity: Pacific Islander	61,223	-	-	14,702	-	-	12,155	-	-
Race/Ethnicity: White	61,223	0.080	0.260	14,702	0.080	0.270	12,155	0.080	0.270
Ever Subsidized Meal Eligible from 9th-11th	60,548	0.930	0.260	14,441	0.930	0.250	11,928	0.930	0.250

Note: For information on how we defined 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.

Table A3 Continued. Descriptives Statistics on Predictors for Community College Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016- 17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in Community College (N=14,729)			Community College Analytic Sample (N=12,167)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Parents'/Guardians' Educational Attainment: Not HS Graduate	63,108	0.250	0.430	14,729	0.250	0.430	12,167	0.250	0.430
Parents'/Guardians' Educational Attainment: HS Graduate	63,108	0.200	0.400	14,729	0.210	0.410	12,167	0.210	0.410
Parents'/Guardians' Educational Attainment: Some College	63,108	0.120	0.320	14,729	0.130	0.340	12,167	0.130	0.340
Parents'/Guardians' Educational Attainment: College Graduate	63,108	0.080	0.280	14,729	0.090	0.280	12,167	0.090	0.290
Parents'/Guardians' Educational Attainment: Graduate School	63,108	0.040	0.190	14,729	0.030	0.180	12,167	0.030	0.180
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	63,108	0.310	0.460	14,729	0.290	0.450	12,167	0.290	0.450
Nonresident School Enrollment in 11th	62,568	0.340	0.470	14,582	0.320	0.470	12,052	0.320	0.470
Number of School Moves from 9th-11th	55,644	0.140	0.420	13,739	0.090	0.320	11,402	0.080	0.310
English Learner Status in 11th: English Only	63,108	0.290	0.460	14,729	0.290	0.450	12,167	0.290	0.450
English Learner Status in 11th: Initial Fluent English Proficient	63,108	0.150	0.350	14,729	0.160	0.370	12,167	0.160	0.370
English Learner Status in 11th: Limited English Proficient	63,108	0.100	0.300	14,729	0.050	0.220	12,167	0.050	0.210

See the note on the first page of the table.

Table A3 Continued. Descriptives Statistics on Predictors for Community College Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016- 17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in Community College (N=14,729)			Community College Analytic Sample (N=12,167)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
English Learner Status in 11th: Reclassified to Fluent English Proficient	63,108	0.430	0.490	14,729	0.490	0.500	12,167	0.500	0.500
Gifted and Talented Program Participation in 11th	63,108	0.180	0.380	14,729	0.180	0.380	12,167	0.180	0.390
Math 11th Grade Weighted GPA	55,706	2.350	1.310	14,186	2.160	1.180	12,167	2.220	1.180
Cumulative Overall Weighted GPA at the End of 11th	61,801	2.690	0.860	14,729	2.710	0.660	12,167	2.740	0.660
Standardized ELA SBAC Score in 11th	53,914	0.030	0.990	14,467	0.070	0.830	12,167	0.090	0.820
Standardized Math SBAC Score in 11th	53,817	0.030	0.990	14,437	0.030	0.830	12,167	0.060	0.840
Number of Semesters of AP Classes Taken from 9th-11th	56,925	2.150	3.100	14,278	1.910	2.650	11,803	1.980	2.720
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	58,567	1.530	2.390	14,647	1.080	1.580	12,167	1.010	1.530
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	58,567	0.910	1.660	14,647	0.510	0.980	12,167	0.480	0.930
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	58,567	0.850	1.960	14,647	0.400	0.960	12,167	0.360	0.910
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	58,567	0.510	1.290	14,647	0.190	0.580	12,167	0.170	0.550

See the note on the first page of the table.

Table A3 Continued. Descriptives Statistics on Predictors for Community College Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016- 17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in Community College (N=14,729)			Community College Analytic Sample (N=12,167)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Highest Evidence-Based Reading and Writing PSAT Score by the End of 11th	51,617	435.320	89.620	13,418	432.070	77.440	11,165	433.500	77.940
Highest Math PSAT Score by the End of 11th	51,936	439.250	90.320	13,492	435.920	77.640	11,224	437.490	77.980
Science Credits Accumulated from 9th-11th	56,925	28.810	10.780	14,278	30.640	9.170	11,803	30.960	9.220
Took the SAT or ACT before 12th	63,108	0.280	0.450	14,729	0.280	0.450	12,167	0.290	0.460
Participation in the AVID Program in 11th	63,108	0.030	0.160	14,729	0.030	0.160	12,167	0.030	0.170
Took a College or Career Seminar Course in 11th	63,108	0.190	0.390	14,729	0.190	0.390	12,167	0.190	0.390
Took an AP Computer Science Course by the End of 11th	63,108	-	-	14,729	-	-	12,167	-	-
Took a Precalculus Course by the End of 11th	63,108	0.330	0.470	14,729	0.340	0.470	12,167	0.360	0.480
Took a Calculus Course by the End of 11th	63,108	0.070	0.250	14,729	0.050	0.210	12,167	0.050	0.220
Took a Discrete Math Course by the End of 11th	63,108	-	-	14,729	-	-	12,167	-	-
Took an IDS Course by the End of 11th	63,108	0.020	0.120	14,729	0.020	0.120	12,167	-	-

See the note on the first page of the table.

Table A3 Continued. Descriptives Statistics on Predictors for Community College Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016- 17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in Community College (N=14,729)			Community College Analytic Sample (N=12,167)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Took a QRS Course by the End of 11th	63,108	-	-	14,729	-	-	12,167	-	-
Took a Statistics Course by the End of 11th	63,108	0.040	0.200	14,729	0.040	0.210	12,167	0.050	0.210
Took a TCMS Course by the End of 11th	63,108	-	-	14,729	-	-	12,167	-	-
Took a Community College Advanced Math Course by the End of 11th	63,108	-	-	14,729	-	-	12,167	-	-
Ever Attended STEM-Focused School from 9th-12th	62,649	0.140	0.340	14,729	0.150	0.350	12,167	0.150	0.360
Work Effort GPA in 11th	61,551	2.320	0.480	14,716	2.330	0.380	12,167	2.350	0.380
Cooperation GPA in 11th	61,551	2.510	0.390	14,716	2.540	0.310	12,167	2.550	0.300
Attendance Rate in 11th	60,851	0.950	0.080	14,728	0.960	0.040	12,167	0.970	0.040
Ever Suspended from 9th-11th	63,108	0.020	0.120	14,729	-	-	12,167	-	-
Educational Expectations in 11th: Unsure	63,108	0.090	0.280	14,729	0.100	0.300	12,167	0.100	0.300
Educational Expectations in 11th: HS or Less	63,108	0.040	0.210	14,729	0.030	0.160	12,167	0.030	0.160

See the note on the first page of the table.

Table A3 Continued. Descriptives Statistics on Predictors for Community College Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016- 17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in Community College (N=14,729)			Community College Analytic Sample (N=12,167)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Educational Expectations in 11th: Associate Degree or Certificate	63,108	0.060	0.230	14,729	0.060	0.240	12,167	0.060	0.240
Educational Expectations in 11th: Bachelor's Degree or Higher	63,108	0.480	0.500	14,729	0.540	0.500	12,167	0.550	0.500
Educational Expectations in 11th: Missing	63,108	0.340	0.470	14,729	0.280	0.450	12,167	0.270	0.440
Growth Mindset in 11th	42,762	0.000	1.000	10,829	0.020	0.980	9,052	0.030	0.980
Academic Self-Efficacy in 11th	42,736	0.000	1.000	10,832	-0.070	0.990	9,052	-0.070	0.990

See the note on the first page of the table.

Table A4. Descriptives Statistics on Outcomes for Community College Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in Community College (N=14,729)			Community College Analytic Sample (N=12,167)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Overall Credits Earned	22,450	22.970	20.740	14,729	28.610	21.200	12,167	29.340	21.270
Overall GPA	21,518	2.120	1.140	14,729	2.100	1.080	12,167	2.140	1.070
College-Level Math Credits Earned	22,450	1.430	3.330	14,729	1.850	3.800	12,167	1.970	3.900
College-level Math GPA	6,437	1.990	1.320	5,225	2.000	1.310	4,525	2.020	1.300
Non-Math STEM Credits Earned	22,450	2.420	5.040	14,729	3.110	5.690	12,167	3.260	5.840
Non-Math STEM GPA	8,611	2.240	1.290	6,781	2.250	1.260	5,739	2.290	1.260
Started in College-Level Math	18,443	0.260	0.440	14,123	0.240	0.430	12,071	0.240	0.430
Degree-Applicable Math Credits Earned	22,450	2.950	4.700	14,729	3.830	5.180	12,167	3.990	5.260
Degree-Applicable Math GPA	11,140	1.730	1.270	8,914	1.760	1.260	7,539	1.780	1.250
Started in Degree-Applicable Math	18,443	0.610	0.490	14,123	0.610	0.490	12,071	0.600	0.490

Note: For information on how we defined these variables, see Table A2. 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 A5. Descriptives Statistics on Predictors for CSUN Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in CSUN (N=2,925)			CSUN Analytic Sample (N=2,534)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Age (in Months)	61,319	196.550	6.860	2,925	194.990	5.030	2,534	194.930	5.040
Gender: Female	61,319	0.500	0.500	2,925	0.570	0.490	2,534	0.570	0.490
Race/Ethnicity: Native American or Alaskan Native	61,223	-	-	2,924	-	-	2,533	-	-
Race/Ethnicity: Asian	61,223	0.040	0.200	2,924	0.050	0.230	2,533	0.050	0.230
Race/Ethnicity: African American	61,223	0.090	0.290	2,924	0.040	0.200	2,533	0.040	0.190
Race/Ethnicity: Filipinx	61,223	0.030	0.170	2,924	0.040	0.190	2,533	0.040	0.190
Race/Ethnicity: Latinx	61,223	0.760	0.430	2,924	0.770	0.420	2,533	0.780	0.420
Race/Ethnicity: Pacific Islander	61,223	-	-	2,924	-	-	2,533	-	-
Race/Ethnicity: White	61,223	0.080	0.260	2,924	0.090	0.280	2,533	0.090	0.280
Ever Subsidized Meal Eligible from 9th-11th	60,548	0.930	0.260	2,900	0.940	0.250	2,514	0.930	0.250

Note: For information on how we defined 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.

Table A5 Continued. Descriptives Statistics on Predictors for CSUN Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in CSUN (N=2,925)			CSUN Analytic Sample (N=2,534)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Parents'/Guardians' Educational Attainment: Not HS Graduate	63,108	0.250	0.430	2,925	0.260	0.440	2,534	0.260	0.440
Parents'/Guardians' Educational Attainment: HS Graduate	63,108	0.200	0.400	2,925	0.220	0.410	2,534	0.220	0.410
Parents'/Guardians' Educational Attainment: Some College	63,108	0.120	0.320	2,925	0.130	0.340	2,534	0.130	0.340
Parents'/Guardians' Educational Attainment: College Graduate	63,108	0.080	0.280	2,925	0.110	0.310	2,534	0.110	0.310
Parents'/Guardians' Educational Attainment: Graduate School	63,108	0.040	0.190	2,925	0.030	0.180	2,534	0.030	0.180
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	63,108	0.310	0.460	2,925	0.250	0.430	2,534	0.250	0.430
Nonresident School Enrollment in 11th	62,568	0.340	0.470	2,891	0.360	0.480	2,502	0.350	0.480
Number of School Moves from 9th-11th	55,644	0.140	0.420	2,797	0.070	0.280	2,418	0.060	0.270
English Learner Status in 11th: English Only	63,108	0.290	0.460	2,925	0.230	0.420	2,534	0.230	0.420
English Learner Status in 11th: Initial Fluent English Proficient	63,108	0.150	0.350	2,925	0.210	0.410	2,534	0.210	0.400
English Learner Status in 11th: Limited English Proficient	63,108	0.100	0.300	2,925	0.020	0.150	2,534	0.020	0.150

See the note on the first page of the table.

Table A5 Continued. Descriptives Statistics on Predictors for CSUN Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in CSUN (N=2,925)			CSUN Analytic Sample (N=2,534)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
English Learner Status in 11th: Reclassified to Fluent English Proficient	63,108	0.430	0.490	2,925	0.540	0.500	2,534	0.540	0.500
Gifted and Talented Program Participation in 11th	63,108	0.180	0.380	2,925	0.230	0.420	2,534	0.230	0.420
Math 11th Grade Weighted GPA	55,706	2.350	1.310	2,744	2.860	1.100	2,534	2.880	1.090
Cumulative Overall Weighted GPA at the End of 11th	61,801	2.690	0.860	2,925	3.260	0.480	2,534	3.280	0.480
Standardized ELA SBAC Score in 11th	53,914	0.030	0.990	2,905	0.420	0.700	2,534	0.440	0.700
Standardized Math SBAC Score in 11th	53,817	0.030	0.990	2,906	0.390	0.750	2,534	0.410	0.750
Number of Semesters of AP Classes Taken from 9th-11th	56,925	2.150	3.100	2,863	2.900	2.810	2,481	2.960	2.800
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	58,567	1.530	2.390	2,922	0.230	0.680	2,534	0.220	0.660
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	58,567	0.910	1.660	2,922	0.130	0.480	2,534	0.120	0.460
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	58,567	0.850	1.960	2,922	0.090	0.480	2,534	0.090	0.470

See the note on the first page of the table.

Table A5 Continued. Descriptives Statistics on Predictors for CSUN Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in CSUN (N=2,925)			CSUN Analytic Sample (N=2,534)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	58,567	0.510	1.290	2,922	0.070	0.380	2,534	0.060	0.350
Highest Evidence-Based Reading and Writing PSAT Score by the End of 11th	51,617	435.320	89.620	2,789	457.160	73.480	2,418	458.580	73.930
Highest Math PSAT Score by the End of 11th	51,936	439.250	90.320	2,800	463.120	71.830	2,429	464.140	72.110
Science Credits Accumulated from 9th-11th	56,925	28.810	10.780	2,863	32.460	9.060	2,481	32.520	9.150
Took the SAT or ACT before 12th	63,108	0.280	0.450	2,925	0.510	0.500	2,534	0.530	0.500
Participation in the AVID Program in 11th	63,108	0.030	0.160	2,925	0.050	0.220	2,534	0.060	0.230
Took a College or Career Seminar Course in 11th	63,108	0.190	0.390	2,925	0.170	0.370	2,534	0.170	0.370
Took an AP Computer Science Course by the End of 11th	63,108	-	-	2,925	-	-	2,534	-	-
Took a Precalculus Course by the End of 11th	63,108	0.330	0.470	2,925	0.530	0.500	2,534	0.540	0.500
Took a Calculus Course by the End of 11th	63,108	0.070	0.250	2,925	0.090	0.280	2,534	0.090	0.290
Took a Discrete Math Course by the End of 11th	63,108	-	-	2,925	-	-	2,534	-	-

See the note on the first page of the table.

Table A5 Continued. Descriptives Statistics on Predictors for CSUN Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in CSUN (N=2,925)			CSUN Analytic Sample (N=2,534)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Took an IDS Course by the End of 11th	63,108	0.020	0.120	2,925	0.020	0.140	2,534	0.020	0.140
Took a QRS Course by the End of 11th	63,108	-	-	2,925	-	-	2,534	-	-
Took a Statistics Course by the End of 11th	63,108	0.040	0.200	2,925	0.070	0.250	2,534	0.070	0.250
Took a TCMS Course by the End of 11th	63,108	-	-	2,925	-	-	2,534	-	-
Took a Community College Advanced Math Course by the End of 11th	63,108	-	-	2,925	-	-	2,534	-	-
Ever Attended STEM-Focused School from 9th-12th	62,649	0.140	0.340	2,925	0.160	0.370	2,534	0.160	0.370
Work Effort GPA in 11th	61,551	2.320	0.480	2,925	2.620	0.280	2,534	2.630	0.270
Cooperation GPA in 11th	61,551	2.510	0.390	2,925	2.740	0.220	2,534	2.750	0.220
Attendance Rate in 11th	60,851	0.950	0.080	2,925	0.980	0.030	2,534	0.980	0.030
Ever Suspended from 9th-11th	63,108	0.020	0.120	2,925	-	-	2,534	-	-
Educational Expectations in 11th: Unsure	63,108	0.090	0.280	2,925	0.060	0.240	2,534	0.060	0.240

See the note on the first page of the table.

Table A5 Continued. Descriptives Statistics on Predictors for CSUN Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in CSUN (N=2,925)			CSUN Analytic Sample (N=2,534)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Educational Expectations in 11th: HS or Less	63,108	0.040	0.210	2,925	-	-	2,534	-	-
Educational Expectations in 11th: Associate Degree or Certificate	63,108	0.060	0.230	2,925	0.020	0.130	2,534	0.020	0.120
Educational Expectations in 11th: Bachelor's Degree or Higher	63,108	0.480	0.500	2,925	0.670	0.470	2,534	0.670	0.470
Educational Expectations in 11th: Missing	63,108	0.340	0.470	2,925	0.240	0.430	2,534	0.240	0.430
Growth Mindset in 11th	42,762	0.000	1.000	2,254	0.170	0.950	1,954	0.180	0.950
Academic Self-Efficacy in 11th	42,736	0.000	1.000	2,255	0.110	0.940	1,955	0.110	0.950

See the note on the first page of the table.

Table A6. Descriptives Statistics on Outcomes for CSUN Students

	All 2015-16 and 2016-17 First-time 11th Graders (N=63,108)			All Non-SPED 2015-16 and 2016-17 First-time 11th Graders in Traditional or Affiliated Charter Schools With Complete 11th and 12th Grade Transcripts Data who Enrolled in CSUN (N=2,925)			CSUN Analytic Sample (N=2,534)		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
Overall Credits Earned	3,161	40.230	17.960	2,925	41.150	17.580	2,534	41.590	17.320
Overall GPA	3,153	2.530	0.920	2,925	2.540	0.920	2,534	2.560	0.900
College-Level Math Credits Earned	3,161	4.950	4.630	2,925	5.070	4.660	2,534	5.150	4.710
College-Level Math GPA	2,465	2.340	1.120	2,317	2.340	1.110	2,020	2.350	1.110
Non-Math STEM Credits Earned	3,161	7.680	7.050	2,925	7.940	7.110	2,534	8.110	7.120
Non-Math STEM GPA	2,672	2.510	1.090	2,508	2.520	1.080	2,194	2.530	1.070
Avoided Developmental Math	2,975	0.650	0.480	2,762	0.660	0.470	2,384	0.670	0.470

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

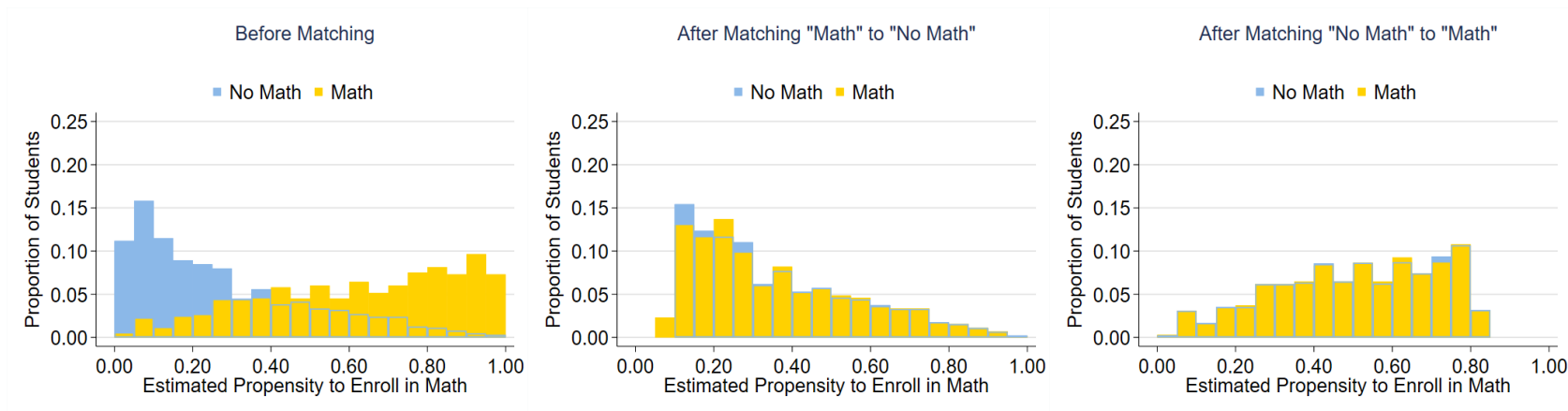
Table B1. Tuning Parameters in Matching Methods for Community College Analysis

		Cluster Matching			Propensity Score Matching after Stratifying Key Predictors		
		Caliper	Number of Matches	Level of Trimming	Caliper	Number of Matches	Level of Trimming
Group 3: Math A-G Complete with a "D"							
Math vs. None	Fixed Effects	0.05	5	0.025	0.20	5	0.010
	School-Level Controls	0.05	5	0.010	0.20	5	0.010
Group 4: Math A-G Complete with a "C"							
Math vs. None	Fixed Effects	0.05	5	0.010	0.10	5	0.010
	School-Level Controls	0.05	5	0.010	0.10	5	0.010
Statistics vs. Precalculus	Fixed Effects	0.10	5	0.010	0.20	5	0.010
	School-Level Controls	0.10	5	0.010	0.10	5	0.010
TCMS vs. Precalculus	Fixed Effects	0.05	5	0.010	0.15	5	0.010
	School-Level Controls	0.05	5	0.010	0.15	5	0.010
TCMS vs. Statistics	Fixed Effects	0.10	5	0.010	0.10	5	0.010
	School-Level Controls	0.05	5	0.010	0.15	5	0.010
Group 5: Math A-G Complete with a "C" + 1 Advanced Math							
Math vs. None	Fixed Effects	0.05	5	0.010	0.10	5	0.010
	School-Level Controls	0.05	5	0.010	0.10	5	0.010
Statistics vs. Calculus	Fixed Effects	0.10	5	0.010	0.20	5	0.010
	School-Level Controls	0.10	5	0.010	0.10	5	0.010
TCMS vs. Calculus	Fixed Effects	0.10	5	0.010	0.10	5	0.010
	School-Level Controls	0.10	5	0.010	0.10	5	0.010
TCMS vs. Statistics	Fixed Effects	0.10	5	0.010	0.10	5	0.010
	School-Level Controls	0.10	5	0.010	0.10	5	0.010

Table B2. Tuning Parameters in Matching Methods for CSUN Analysis

	Cluster Matching			Propensity Score Matching after Stratifying Key Predictors		
	Caliper	Number of Matches	Level of Trimming	Caliper	Number of Matches	Level of Trimming
Math vs. None	0.10	5	0.010	0.10	5	0.010
Statistics vs. Precalculus or Calculus	0.10	5	0.010	0.10	5	0.010

Figure C1. Community College Analysis 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.

Table C1. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
Age (in Months)	195.201	195.054	-0.029	1.077	195.041	194.602	-0.095	1.050	195.055	195.055	0.000	1.187
Gender: Female	0.460	0.519	0.119	1.005	0.454	0.479	0.050	1.014	0.468	0.503	0.069	1.002
Race/Ethnicity: Asian	-	-	-0.013	0.897	-	-	-0.020	0.841	-	-	-0.010	0.925
Race/Ethnicity: African American	0.109	0.062	-0.166	0.603	0.073	0.055	-0.072	0.777	0.054	0.068	0.057	1.229

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. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
Race/Ethnicity: Latinx	0.743	0.800	0.137	0.837	0.784	0.814	0.074	0.901	0.824	0.784	-0.100	1.164
Race/Ethnicity: Filipinx	0.032	0.041	0.047	1.265	0.040	0.052	0.060	1.309	0.045	0.043	-0.008	0.965
Race/Ethnicity: White	0.088	0.077	-0.039	0.890	0.079	0.062	-0.069	0.798	0.056	0.083	0.107	1.437
Race/Ethnicity: Other	-	-	-0.078	0.452	-	-	-0.052	0.567	-	-	0.026	1.423
Ever Subsidized Meal Eligible from 9th-11th	0.904	0.910	0.020	0.947	0.903	0.917	0.050	0.872	0.934	0.914	-0.077	1.277

See the note on the first page of the table.

Table C1 Continued. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th- 11th	-	-	0.028	1.217	-	-	-0.052	0.607	-	-	0.050	1.654
Parents/ Guardians' Educational Attainment: Not HS Graduate	0.241	0.232	-0.022	0.973	0.256	0.273	0.040	1.051	0.235	0.235	-0.001	0.996
Parents/ Guardians' Educational Attainment: HS Graduate	0.244	0.219	-0.060	0.926	0.233	0.184	-0.122	0.844	0.195	0.210	0.037	1.054
Parents/ Guardians' Educational Attainment: Some College	0.145	0.157	0.031	1.064	0.156	0.179	0.061	1.122	0.154	0.167	0.033	1.061
Parents/ Guardians' Educational Attainment: College Graduate	0.083	0.064	-0.071	0.791	0.075	0.086	0.042	1.148	0.069	0.065	-0.018	0.938

See the note on the first page of the table.

Table C1 Continued. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
Parents/ Guardians' Educational Attainment: Graduate School	-	-	-0.017	0.898	-	-	-0.009	0.948	-	-	0.080	1.706
Parents/ Guardians' Educational Attainment: Decline to Answer or	0.262	0.307	0.100	1.101	0.258	0.257	-0.002	1.004	0.330	0.296	-0.073	0.941
Nonresident School Enrollment in 11th	0.270	0.273	0.006	1.007	0.256	0.190	-0.158	0.814	0.273	0.250	-0.052	0.943
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.047	1.673	-	-	-0.094	0.135	-	-	0.024	1.244
Number of School Moves from 9th-11th	0.102	0.120	0.051	1.109	0.099	0.075	-0.077	0.700	0.098	0.115	0.048	1.118

See the note on the first page of the table.

Table C1 Continued. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	0.054	0.043	-0.053	0.800	-	-	-0.080	0.675	0.030	0.046	0.084	1.502
English Learner Status in 11th: English Only	0.350	0.281	-0.148	0.889	0.333	0.282	-0.109	0.919	0.273	0.302	0.064	1.060
English Learner Status in 11th: Initial Fluent English Proficient	0.149	0.142	-0.020	0.962	0.141	0.155	0.040	1.089	0.162	0.133	-0.082	0.846
English Learner Status in 11th: Limited English Proficient	0.061	0.041	-0.091	0.686	0.044	0.045	0.002	1.018	0.041	0.040	-0.003	0.983
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.441	0.536	0.192	1.009	0.482	0.518	0.072	1.007	0.524	0.525	0.001	0.998

See the note on the first page of the table.

Table C1 Continued. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
Gifted and Talented Program Participation in 11th	0.080	0.092	0.044	1.140	0.086	0.080	-0.020	0.948	0.073	0.077	0.015	1.046
Math 11th Grade Weighted GPA	1.458	1.449	-0.015	1.168	1.462	1.452	-0.014	0.882	1.456	1.457	0.002	1.020
Cumulative Overall Weighted GPA at the End of 11th	2.240	2.406	0.372	0.966	2.308	2.329	0.050	0.976	2.394	2.371	-0.055	1.094
Standardized ELA SBAC Score in 11th	-0.335	-0.102	0.295	0.900	-0.191	-0.133	0.078	0.840	-0.108	-0.132	-0.031	1.060
Standardized Math SBAC Score in 11th	-0.444	-0.239	0.294	1.004	-0.362	-0.353	0.013	0.858	-0.253	-0.292	-0.058	1.088

See the note on the first page of the table.

Table C1 Continued. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	0.669	1.263	0.370	1.883	0.790	0.715	-0.053	0.898	1.006	1.020	0.009	0.966
Science Credits Accumulated from 9th-11th	27.732	29.980	0.272	1.147	28.886	29.608	0.094	0.914	29.560	29.369	-0.024	1.052
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	0.030	0.024	-0.042	0.784	-	-	0.014	1.096	-	-	-0.004	0.979
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	1.835	1.464	-0.218	0.805	1.630	1.574	-0.034	0.970	1.459	1.525	0.040	1.066

See the note on the first page of the table.

Table C1 Continued. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	1.010	0.665	-0.312	0.624	0.852	0.760	-0.090	0.705	0.687	0.747	0.060	0.927
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.522	0.388	-0.141	0.611	0.427	0.345	-0.097	0.805	0.334	0.401	0.081	1.104
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.294	0.150	-0.247	0.437	0.200	0.125	-0.158	0.547	0.140	0.173	0.068	1.125
Highest ERW PSAT Score by the End of 11th	406.079	414.331	0.129	1.024	410.228	414.042	0.060	0.996	415.311	411.419	-0.061	0.897

See the note on the first page of the table.

Table C1 Continued. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.101	0.088	-0.043	0.887	0.093	0.083	-0.033	0.915	0.062	0.093	0.116	1.447
Highest Math PSAT Score by the End of 11th	407.069	412.492	0.082	0.959	409.342	414.000	0.074	0.699	413.374	410.678	-0.042	1.088
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.094	0.082	-0.045	0.878	0.084	0.078	-0.021	0.944	0.056	0.083	0.107	1.437
Took the SAT or ACT before 12th	0.085	0.195	0.323	2.029	0.104	0.136	0.100	1.275	0.131	0.142	0.033	1.071
Participation in the AVID Program in 11th	-	-	-0.026	0.809	-	-	0.095	1.992	-	-	0.013	1.150

See the note on the first page of the table.

Table C1 Continued. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
Took a College or Career Seminar Course in 11th	0.165	0.197	0.085	1.153	0.172	0.126	-0.130	0.777	0.170	0.188	0.047	1.079
Ever Attended STEM-Focused School from 9th-12th	0.065	0.131	0.221	1.860	0.066	0.059	-0.029	0.908	0.065	0.074	0.036	1.129
Math 11th Grade Weighted GPA (Squared)	2.537	2.578	0.017	1.019	2.574	2.493	-0.035	0.705	2.568	2.582	0.006	0.880
Cumulative Overall Weighted GPA at the End of 11th (Squared)	5.220	5.983	0.359	1.067	5.512	5.607	0.046	1.008	5.909	5.814	-0.045	1.065
Standardized ELA SBAC Score in 11th (Squared)	0.764	0.596	-0.167	0.610	0.629	0.512	-0.131	0.711	0.545	0.584	0.047	1.215

See the note on the first page of the table.

Table C1 Continued. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
Standardized Math SBAC Score in 11th (Squared)	0.685	0.546	-0.152	0.778	0.616	0.538	-0.093	0.778	0.484	0.543	0.077	1.225
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	2.236	4.961	0.301	2.694	2.718	2.379	-0.045	1.020	3.798	3.738	-0.006	0.963
Science Credits Accumulated from 9th-11th (Squared)	832.759	971.809	0.267	1.503	895.682	932.271	0.077	0.963	934.704	926.803	-0.016	1.148
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	6.586	4.730	-0.198	0.585	5.401	5.121	-0.032	0.840	4.719	5.093	0.044	1.014
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	2.518	1.378	-0.289	0.419	1.958	1.440	-0.164	0.490	1.532	1.543	0.004	0.981

See the note on the first page of the table.

Table C1 Continued. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.385	0.830	-0.150	0.363	0.982	0.759	-0.071	0.782	0.769	0.889	0.041	1.008
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.556	0.227	-0.230	0.324	0.333	0.175	-0.167	0.333	0.234	0.272	0.034	1.182
Highest ERW PSAT Score by the End of 11th (Squared)	168,906.327	175,771.609	0.126	1.049	172,311.396	175,410.913	0.058	0.967	176,799.088	173,144.827	-0.066	0.866
Highest Math PSAT Score by the End of 11th (Squared)	170,194.849	174,450.432	0.081	0.956	172,247.800	174,649.641	0.048	0.715	174,803.954	172,936.715	-0.036	1.017
Work Effort GPA in 11th	2.111	2.174	0.188	0.961	2.145	2.183	0.109	1.180	2.191	2.172	-0.058	1.306
Cooperation GPA in 11th	2.396	2.448	0.186	0.916	2.428	2.467	0.141	0.963	2.459	2.447	-0.045	1.159

See the note on the first page of the table.

Table C1 Continued. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
Attendance Rate in 11th Ever	0.957	0.962	0.124	0.871	0.959	0.960	0.004	0.911	0.966	0.962	-0.109	1.426
Suspended from 9th-11th	-	-	-0.026	0.770	-	-	-0.105	0.152	-	-	-0.022	0.769
Educational Expectations in 11th: Unsure	0.153	0.088	-0.202	0.618	0.121	0.125	0.011	1.033	0.115	0.090	-0.085	0.797
Educational Expectations in 11th: HS or Less	0.043	0.036	-0.034	0.852	-	-	-0.082	0.637	0.039	0.043	0.023	1.108
Educational Expectations in 11th: Associate Degree or Certificate	0.120	0.071	-0.167	0.624	0.112	0.154	0.122	1.316	0.094	0.090	-0.015	0.956
Educational Expectations in 11th: Bachelor's Degree or Higher	0.444	0.528	0.168	1.010	0.469	0.461	-0.016	1.005	0.492	0.512	0.041	0.997
Educational Expectations in 11th: Missing	0.240	0.277	0.085	1.099	0.260	0.237	-0.054	0.946	0.260	0.265	0.012	1.010

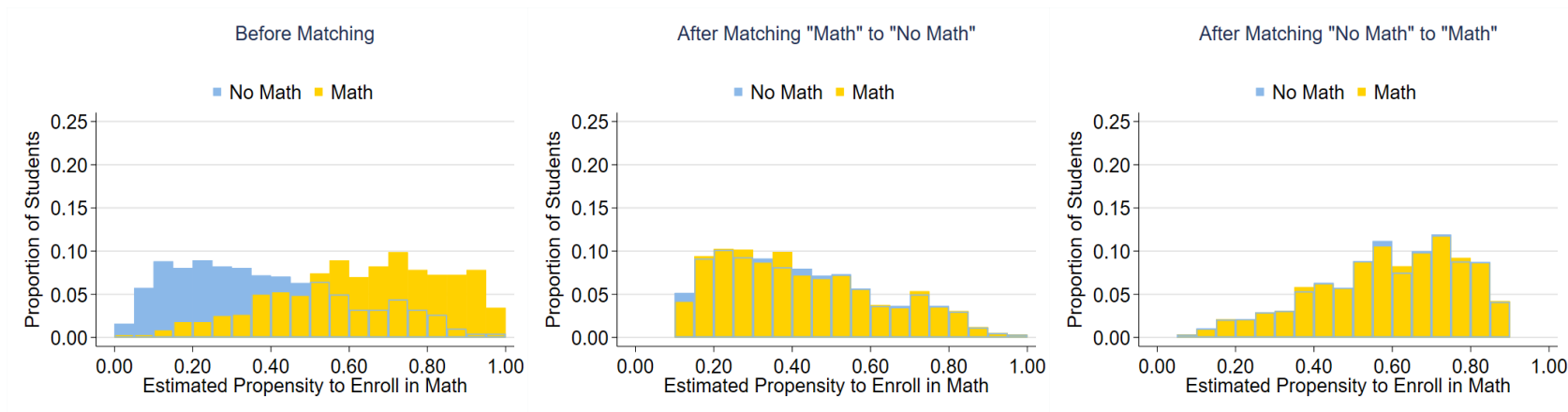
See the note on the first page of the table.

Table C1 Continued. Community College Analysis 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=626)	Math (N=466)	SMD	VR	No Math (N=454)	Math (N=345)	SMD	VR	No Math (N=385)	Math (N=324)	SMD	VR
Growth Mindset in 11th	-0.130	-0.023	0.127	0.836	-0.095	-0.229	-0.140	1.444	-0.026	-0.024	0.003	1.047
Missing Dummy: Growth Mindset in 11th	0.236	0.270	0.078	1.093	0.251	0.227	-0.056	0.940	0.242	0.262	0.046	1.051
Academic Self-Efficacy in 11th	-0.203	-0.239	-0.042	0.916	-0.208	-0.288	-0.092	1.171	-0.234	-0.247	-0.015	1.000
Missing Dummy: Academic Self-Efficacy in 11th	0.236	0.273	0.083	1.099	0.253	0.227	-0.061	0.934	0.244	0.262	0.043	1.048
Indicator of 2016-17 Cohort	0.621	0.620	-0.003	1.002	0.632	0.685	0.111	0.935	0.654	0.648	-0.012	1.005

See the note on the first page of the table.

Figure C2. Community College Analysis Distributions of Estimated Propensities of Taking Math over No Math 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 C2. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Age (in Months)	195.081	195.120	0.008	1.065	195.100	194.651	-0.095	0.889	194.939	195.079	0.029	1.172
Gender: Female	0.466	0.505	0.077	1.004	0.477	0.474	-0.006	1.002	0.523	0.505	-0.036	1.000
Race/Ethnicity: Asian	-	-	-0.020	0.833	-	-	-0.023	0.804	-	-	0.006	1.058
Race/Ethnicity: African American	0.116	0.069	-0.164	0.624	0.100	0.078	-0.077	0.800	0.068	0.073	0.020	1.068

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Race/Ethnicity: Latinx	0.742	0.833	0.223	0.728	0.761	0.786	0.060	0.927	0.803	0.820	0.045	0.929
Race/Ethnicity: Filipinx	0.029	0.029	-0.003	0.983	0.032	0.026	-0.036	0.818	0.038	0.031	-0.041	0.810
Race/Ethnicity: White	0.087	0.053	-0.130	0.641	0.083	0.091	0.028	1.089	0.073	0.058	-0.059	0.811
Race/Ethnicity: Other	-	-	-0.080	0.419	-	-	-0.024	0.806	-	-	-0.015	0.833
Ever Subsidized Meal Eligible from 9th-11th	0.908	0.936	0.104	0.719	0.909	0.927	0.068	0.815	0.926	0.929	0.011	0.962

See the note on the first page of the table.

Table C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.018	0.018	0.002	1.013	-	-	-0.075	0.505	0.022	0.019	-0.020	0.870
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.243	0.252	0.021	1.025	0.254	0.290	0.081	1.089	0.262	0.257	-0.011	0.986
Parents'/Guardians' Educational Attainment: HS Graduate	0.239	0.213	-0.063	0.920	0.233	0.247	0.035	1.046	0.220	0.220	-0.001	0.997
Parents'/Guardians' Educational Attainment: Some College	0.147	0.130	-0.047	0.906	0.150	0.140	-0.027	0.949	0.128	0.134	0.019	1.040
Parents'/Guardians' Educational Attainment: College Graduate	0.078	0.066	-0.046	0.858	0.073	0.075	0.007	1.024	0.070	0.065	-0.019	0.933

See the note on the first page of the table.

Table C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.025	0.023	-0.010	0.937	-	-	-0.051	0.720	0.025	0.026	0.006	1.036
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.268	0.316	0.104	1.100	0.264	0.229	-0.082	0.910	0.295	0.298	0.006	1.003
Nonresident School Enrollment in 11th	0.268	0.272	0.007	1.008	0.266	0.234	-0.074	0.921	0.242	0.244	0.007	1.006
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.012	1.168	-	-	-0.071	0.302	-	-	0.054	2.070
Number of School Moves from 9th- 11th	0.107	0.106	-0.001	0.951	0.111	0.095	-0.048	0.848	0.095	0.110	0.047	1.082

See the note on the first page of the table.

Table C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.057	0.043	-0.067	0.755	0.047	0.043	-0.019	0.920	0.038	0.045	0.036	1.175
English Learner Status in 11th: English Only	0.358	0.257	-0.221	0.830	0.342	0.328	-0.031	0.981	0.282	0.275	-0.015	0.983
English Learner Status in 11th: Initial Fluent English Proficient	0.148	0.137	-0.031	0.938	0.150	0.165	0.044	1.088	0.147	0.134	-0.038	0.923
English Learner Status in 11th: Limited English Proficient	0.059	0.044	-0.067	0.760	0.050	0.043	-0.034	0.864	0.037	0.049	0.056	1.286
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.435	0.562	0.256	1.001	0.458	0.464	0.012	1.004	0.533	0.542	0.017	0.995

See the note on the first page of the table.

Table C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Gifted and Talented Program Participation in 11th	0.079	0.082	0.011	1.036	0.081	0.089	0.026	1.082	0.076	0.083	0.023	1.071
Math 11th Grade Weighted GPA	1.471	1.446	-0.038	1.066	1.456	1.480	0.036	1.001	1.484	1.442	-0.064	1.029
Cumulative Overall Weighted GPA at the End of 11th	2.238	2.350	0.256	0.890	2.276	2.294	0.039	0.937	2.346	2.329	-0.040	0.993
Standardized ELA SBAC Score in 11th	-0.329	-0.110	0.281	0.868	-0.268	-0.207	0.080	0.985	-0.115	-0.152	-0.051	1.147
Standardized Math SBAC Score in 11th	-0.434	-0.290	0.205	1.013	-0.391	-0.360	0.046	0.924	-0.275	-0.332	-0.084	1.099

See the note on the first page of the table.

Table C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	0.685	1.085	0.256	1.706	0.734	0.750	0.011	1.001	0.958	0.956	-0.001	1.175
Science Credits Accumulated from 9th-11th	27.806	30.870	0.356	1.322	28.324	28.862	0.068	1.028	29.853	29.799	-0.007	1.012
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	0.029	0.019	-0.066	0.662	0.023	0.024	0.004	1.027	0.021	0.021	-0.002	0.983
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	1.826	1.420	-0.244	0.760	1.654	1.612	-0.026	1.040	1.548	1.487	-0.038	0.959
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.974	0.664	-0.282	0.670	0.872	0.872	0.000	0.834	0.736	0.691	-0.046	0.972

See the note on the first page of the table.

Table C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.538	0.362	-0.192	0.555	0.447	0.393	-0.062	0.899	0.396	0.374	-0.028	1.006
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.284	0.158	-0.217	0.499	0.223	0.194	-0.053	0.770	0.164	0.163	0.000	0.861
Highest ERW PSAT Score by the End of 11th	406.483	413.327	0.109	0.917	408.158	410.684	0.039	1.133	409.082	410.064	0.016	1.037
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.097	0.066	-0.113	0.704	0.085	0.080	-0.017	0.951	0.067	0.073	0.021	1.071
Highest Math PSAT Score by the End of 11th	407.072	414.947	0.123	0.862	409.061	408.463	-0.009	0.957	412.049	412.182	0.002	1.023

See the note on the first page of the table.

Table C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.091	0.062	-0.110	0.701	0.078	0.075	-0.012	0.966	0.062	0.068	0.024	1.087
Took the SAT or ACT before 12th	0.085	0.218	0.377	2.191	0.096	0.109	0.040	1.115	0.195	0.175	-0.053	0.916
Participation in the AVID Program in 11th	-	-	0.054	1.486	-	-	-0.003	0.977	-	-	0.089	2.069
Took a College or Career Seminar Course in 11th	0.188	0.198	0.025	1.040	0.193	0.208	0.039	1.063	0.226	0.196	-0.074	0.899
Ever Attended STEM-Focused School from 9th- 12th	0.070	0.137	0.220	1.809	0.078	0.071	-0.025	0.924	0.110	0.115	0.015	1.034

See the note on the first page of the table.

Table C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	2.575	2.530	-0.019	0.977	2.538	2.606	0.030	0.826	2.639	2.529	-0.046	0.936
Cumulative Overall Weighted GPA at the End of 11th (Squared)	5.213	5.706	0.237	0.965	5.378	5.444	0.032	0.962	5.689	5.608	-0.039	0.977
Standardized ELA SBAC Score in 11th (Squared)	0.756	0.574	-0.186	0.587	0.670	0.631	-0.039	1.138	0.507	0.591	0.102	1.376
Standardized Math SBAC Score in 11th (Squared)	0.681	0.583	-0.107	0.841	0.630	0.569	-0.071	0.839	0.508	0.586	0.096	1.408
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	2.270	4.252	0.229	2.421	2.489	2.510	0.003	1.093	3.136	3.526	0.049	1.867

See the note on the first page of the table.

Table C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	836.748	1,037.017	0.362	1.811	864.336	896.724	0.067	1.069	959.897	957.613	-0.004	1.042
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	6.477	4.405	-0.229	0.543	5.432	5.392	-0.005	0.944	5.004	4.717	-0.035	0.897
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	2.390	1.407	-0.251	0.488	2.018	1.807	-0.058	0.598	1.533	1.442	-0.030	1.061
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.374	0.733	-0.183	0.311	1.002	0.873	-0.040	0.864	0.758	0.746	-0.005	0.957
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.534	0.251	-0.201	0.354	0.382	0.293	-0.080	0.588	0.283	0.248	-0.036	0.625

See the note on the first page of the table.

Table C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	169,367.409	174,637.309	0.098	0.938	170,549.188	173,131.723	0.047	1.136	170,947.973	171,893.181	0.018	1.043
Highest Math PSAT Score by the End of 11th (Squared)	170,088.250	175,957.009	0.115	0.883	171,799.557	171,107.486	-0.013	0.887	173,639.648	173,845.548	0.004	0.907
Work Effort GPA in 11th	2.114	2.153	0.119	0.897	2.137	2.168	0.092	1.131	2.182	2.149	-0.101	1.027
Cooperation GPA in 11th	2.394	2.416	0.080	0.876	2.407	2.433	0.092	1.032	2.432	2.409	-0.085	0.996
Attendance Rate in 11th	0.958	0.961	0.079	0.940	0.958	0.958	0.017	0.989	0.962	0.960	-0.053	1.276

See the note on the first page of the table.

Table C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Ever Suspended from 9th-11th	-	-	-0.021	0.820	-	-	-0.023	0.804	-	-	0.044	1.657
Educational Expectations in 11th: Unsure	0.150	0.100	-0.150	0.708	0.130	0.109	-0.062	0.865	0.121	0.108	-0.040	0.907
Educational Expectations in 11th: HS or Less	0.043	0.037	-0.028	0.876	0.045	0.021	-0.134	0.480	0.036	0.042	0.033	1.172
Educational Expectations in 11th: Associate Degree or Certificate	0.119	0.082	-0.121	0.722	0.110	0.139	0.088	1.228	0.090	0.087	-0.008	0.975
Educational Expectations in 11th: Bachelor's Degree or Higher	0.449	0.524	0.151	1.008	0.467	0.498	0.062	1.007	0.513	0.506	-0.013	0.999

See the note on the first page of the table.

Table C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Educational Expectations in 11th: Missing	0.240	0.257	0.037	1.044	0.249	0.233	-0.037	0.958	0.241	0.256	0.034	1.039
Growth Mindset in 11th	-0.135	-0.063	0.082	0.902	-0.111	-0.142	-0.035	1.036	-0.039	-0.060	-0.024	1.018
Missing Dummy: Growth Mindset in 11th	0.233	0.239	0.013	1.016	0.239	0.220	-0.045	0.946	0.228	0.241	0.032	1.039
Academic Self-Efficacy in 11th	-0.193	-0.231	-0.044	0.919	-0.204	-0.223	-0.021	1.117	-0.215	-0.206	0.010	0.981
Missing Dummy: Academic Self-Efficacy in 11th	0.235	0.243	0.019	1.024	0.243	0.222	-0.049	0.942	0.228	0.243	0.035	1.042

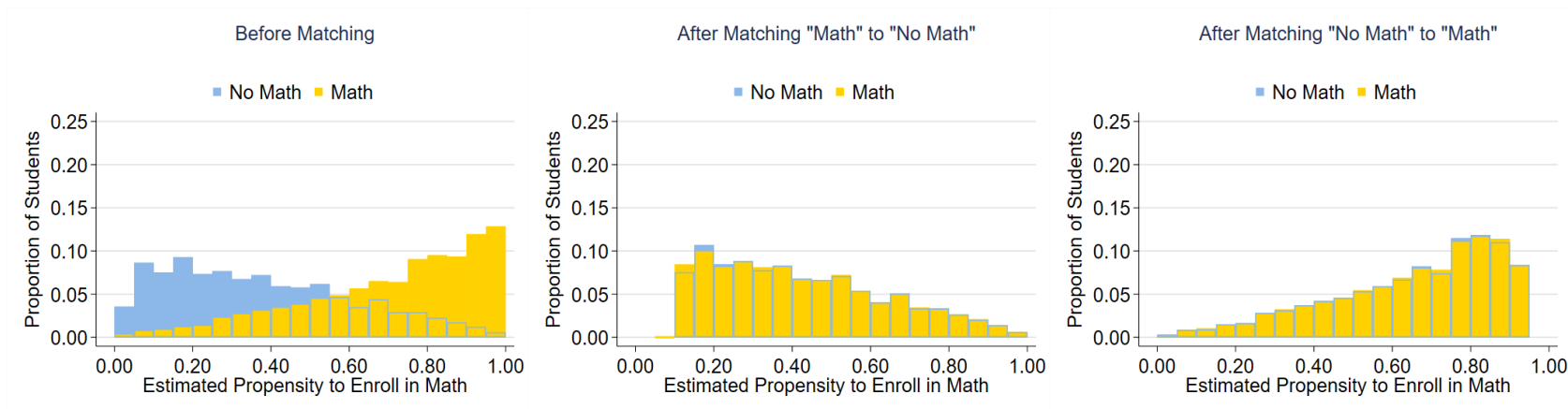
See the note on the first page of the table.

Table C2 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=682)	Math (N=729)	SMD	VR	No Math (N=602)	Math (N=575)	SMD	VR	No Math (N=537)	Math (N=618)	SMD	VR
Indicator of 2016-17 Cohort	0.597	0.605	0.017	0.993	0.603	0.618	0.030	0.989	0.621	0.618	-0.005	1.000

See the note on the first page of the table.

Figure C3. Community College Analysis 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.

Table C3. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Age (in Months)	195.468	195.023	-0.078	0.750	195.189	195.343	0.028	0.918	194.854	195.015	0.032	0.973
Gender: Female	0.543	0.505	-0.076	1.007	0.529	0.526	-0.006	1.002	0.515	0.513	-0.003	0.998
Race/Ethnicity: Asian	0.018	0.024	0.041	1.314	0.019	0.015	-0.028	0.812	0.019	0.024	0.036	1.265
Race/Ethnicity: African American	0.091	0.083	-0.030	0.916	0.086	0.077	-0.034	0.901	0.083	0.082	-0.006	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 C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Race/Ethnicity: Latinx	0.765	0.788	0.054	0.930	0.775	0.794	0.047	0.938	0.808	0.782	-0.064	1.097
Race/Ethnicity: Filipinx	0.029	0.035	0.030	1.176	0.033	0.023	-0.059	0.713	0.024	0.034	0.055	1.366
Race/Ethnicity: White	0.089	0.060	-0.114	0.687	0.081	0.078	-0.009	0.974	0.057	0.067	0.042	1.163
Race/Ethnicity: Other	-	-	0.049	1.689	-	-	0.058	1.836	-	-	0.029	1.337
Ever Subsidized Meal Eligible from 9th-11th	0.910	0.926	0.059	0.836	0.916	0.926	0.037	0.891	0.924	0.920	-0.016	1.050

See the note on the first page of the table.

Table C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.025	0.016	-0.065	0.635	0.022	0.019	-0.017	0.893	0.017	0.018	0.008	1.061
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.247	0.239	-0.020	0.976	0.248	0.251	0.006	1.008	0.246	0.250	0.009	1.009
Parents'/Guardians' Educational Attainment: HS Graduate	0.185	0.218	0.080	1.127	0.192	0.179	-0.033	0.948	0.206	0.203	-0.008	0.987
Parents'/Guardians' Educational Attainment: Some College	0.139	0.127	-0.038	0.921	0.138	0.125	-0.039	0.920	0.136	0.133	-0.010	0.977
Parents'/Guardians' Educational Attainment: College Graduate	0.087	0.082	-0.019	0.944	0.085	0.101	0.053	1.162	0.088	0.084	-0.012	0.964

See the note on the first page of the table.

Table C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.024	0.032	0.049	1.323	0.024	0.022	-0.016	0.903	0.027	0.032	0.031	1.185
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.317	0.304	-0.029	0.976	0.313	0.324	0.022	1.019	0.297	0.297	0.001	0.999
Nonresident School Enrollment in 11th	0.254	0.283	0.064	1.069	0.264	0.253	-0.024	0.975	0.284	0.279	-0.012	0.987
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.042	1.481	-	-	-0.032	0.717	-	-	0.052	1.797
Number of School Moves from 9th- 11th	0.101	0.079	-0.071	0.661	0.091	0.079	-0.037	0.833	0.079	0.081	0.009	1.045

See the note on the first page of the table.

Table C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.060	0.074	0.053	1.202	0.059	0.051	-0.035	0.872	0.074	0.073	-0.001	0.995
English Learner Status in 11th: English Only	0.318	0.281	-0.081	0.931	0.308	0.286	-0.047	0.960	0.288	0.290	0.004	1.002
English Learner Status in 11th: Initial Fluent English Proficient	0.143	0.140	-0.011	0.978	0.149	0.143	-0.017	0.967	0.131	0.138	0.021	1.045
English Learner Status in 11th: Limited English Proficient	0.075	0.040	-0.152	0.550	0.059	0.058	-0.006	0.980	0.036	0.043	0.037	1.192
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.464	0.540	0.153	0.999	0.484	0.513	0.058	1.002	0.545	0.529	-0.032	1.003

See the note on the first page of the table.

Table C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Gifted and Talented Program Participation in 11th	0.079	0.116	0.125	1.408	0.084	0.090	0.021	1.064	0.124	0.111	-0.041	0.906
Math 11th Grade Weighted GPA	2.223	2.618	0.505	1.142	2.282	2.276	-0.008	0.969	2.532	2.549	0.021	1.035
Cumulative Overall Weighted GPA at the End of 11th	2.617	2.866	0.470	1.115	2.667	2.675	0.018	0.983	2.827	2.822	-0.010	1.014
Standardized ELA SBAC Score in 11th	-0.185	0.107	0.383	0.868	-0.103	-0.091	0.017	1.021	0.123	0.070	-0.072	0.993
Standardized Math SBAC Score in 11th	-0.263	0.073	0.511	0.981	-0.187	-0.152	0.056	0.970	0.049	0.021	-0.042	0.952

See the note on the first page of the table.

Table C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	0.916	1.668	0.398	1.754	0.989	1.064	0.045	0.990	1.592	1.455	-0.069	0.982
Science Credits Accumulated from 9th-11th	29.042	31.637	0.310	1.273	29.511	29.607	0.012	1.135	30.644	30.740	0.012	1.041
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	0.026	0.036	0.056	1.356	0.025	0.034	0.055	1.364	0.037	0.035	-0.008	0.960
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	1.080	0.660	-0.309	0.594	0.944	0.891	-0.039	0.851	0.697	0.714	0.014	1.050
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.525	0.280	-0.300	0.541	0.442	0.416	-0.031	0.902	0.323	0.312	-0.016	0.879

See the note on the first page of the table.

Table C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.402	0.206	-0.235	0.418	0.318	0.283	-0.044	0.674	0.229	0.222	-0.011	0.985
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.183	0.096	-0.177	0.529	0.152	0.147	-0.011	0.827	0.105	0.106	0.002	0.858
Highest ERW PSAT Score by the End of 11th	409.101	427.353	0.282	1.108	411.939	413.379	0.023	0.946	426.185	424.656	-0.023	1.046
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.108	0.075	-0.113	0.722	0.092	0.100	0.029	1.084	0.098	0.081	-0.060	0.838
Highest Math PSAT Score by the End of 11th	412.394	428.163	0.257	0.975	414.509	415.517	0.017	0.957	422.959	425.052	0.034	1.006

See the note on the first page of the table.

Table C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.102	0.068	-0.123	0.689	0.086	0.095	0.031	1.095	0.086	0.073	-0.047	0.863
Took the SAT or ACT before 12th	0.193	0.309	0.270	1.370	0.213	0.204	-0.021	0.971	0.306	0.285	-0.046	0.958
Participation in the AVID Program in 11th	0.023	0.038	0.083	1.583	0.027	0.029	0.014	1.088	0.034	0.037	0.013	1.067
Took a College or Career Seminar Course in 11th	0.204	0.198	-0.015	0.978	0.206	0.195	-0.029	0.959	0.219	0.205	-0.035	0.950
Ever Attended STEM-Focused School from 9th- 12th	0.088	0.163	0.226	1.693	0.096	0.087	-0.029	0.922	0.124	0.133	0.024	1.054

See the note on the first page of the table.

Table C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	5.511	7.505	0.497	1.427	5.769	5.724	-0.012	0.953	7.021	7.126	0.025	1.039
Cumulative Overall Weighted GPA at the End of 11th (Squared)	7.113	8.505	0.473	1.298	7.363	7.405	0.016	0.962	8.269	8.244	-0.008	1.003
Standardized ELA SBAC Score in 11th (Squared)	0.653	0.549	-0.121	0.636	0.568	0.577	0.010	1.091	0.563	0.550	-0.017	0.984
Standardized Math SBAC Score in 11th (Squared)	0.505	0.433	-0.104	0.656	0.427	0.403	-0.037	1.115	0.440	0.417	-0.037	1.019
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	3.435	7.336	0.316	2.565	3.761	3.884	0.012	1.127	6.550	6.066	-0.038	1.142

See the note on the first page of the table.

Table C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	905.123	1,079.500	0.305	1.636	930.465	944.113	0.027	1.109	1,003.825	1,012.497	0.016	1.024
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	3.492	1.816	-0.245	0.414	2.889	2.492	-0.062	0.600	1.873	1.968	0.018	1.040
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	1.143	0.547	-0.245	0.419	0.917	0.824	-0.040	0.682	0.681	0.605	-0.036	0.653
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.148	0.455	-0.179	0.289	0.827	0.569	-0.076	0.270	0.488	0.479	-0.004	0.990
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.349	0.176	-0.131	0.459	0.288	0.241	-0.039	0.357	0.211	0.183	-0.025	0.548

See the note on the first page of the table.

Table C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	171,343.571	187,042.832	0.279	1.215	173,722.054	174,689.638	0.018	0.943	185,867.992	184,770.889	-0.019	1.048
Highest Math PSAT Score by the End of 11th (Squared)	173,893.337	187,052.734	0.264	1.090	175,600.852	176,269.599	0.014	1.003	182,731.003	184,533.430	0.036	1.073
Work Effort GPA in 11th	2.332	2.452	0.371	0.942	2.362	2.365	0.010	0.956	2.439	2.437	-0.006	1.034
Cooperation GPA in 11th	2.531	2.612	0.298	0.926	2.553	2.551	-0.007	1.044	2.602	2.604	0.008	1.100
Attendance Rate in 11th	0.963	0.971	0.239	0.829	0.966	0.964	-0.042	1.495	0.970	0.970	0.029	1.265

See the note on the first page of the table.

Table C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.033	1.409	-	-	-0.031	0.694	0.012	0.011	-0.007	0.937
Educational Expectations in 11th: Unsure	0.112	0.087	-0.084	0.798	0.103	0.103	-0.002	0.996	0.086	0.095	0.032	1.094
Educational Expectations in 11th: HS or Less	0.030	0.020	-0.063	0.677	0.026	0.021	-0.031	0.822	0.012	0.020	0.066	1.684
Educational Expectations in 11th: Associate Degree or Certificate	0.075	0.050	-0.106	0.677	0.068	0.075	0.026	1.090	0.054	0.049	-0.022	0.912
Educational Expectations in 11th: Bachelor's Degree or Higher	0.514	0.552	0.078	0.990	0.525	0.525	0.000	1.001	0.593	0.564	-0.057	1.017

See the note on the first page of the table.

Table C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Educational Expectations in 11th: Missing	0.269	0.291	0.049	1.049	0.277	0.276	-0.002	0.999	0.256	0.272	0.035	1.037
Growth Mindset in 11th	-0.068	0.058	0.148	0.750	-0.039	-0.020	0.023	0.791	0.061	0.050	-0.013	0.818
Missing Dummy: Growth Mindset in 11th	0.256	0.280	0.055	1.059	0.262	0.266	0.007	1.009	0.247	0.261	0.034	1.037
Academic Self-Efficacy in 11th	-0.047	0.038	0.101	0.893	-0.051	-0.034	0.020	0.867	-0.001	0.019	0.024	0.966
Missing Dummy: Academic Self-Efficacy in 11th	0.254	0.279	0.056	1.061	0.261	0.265	0.011	1.013	0.249	0.261	0.026	1.028

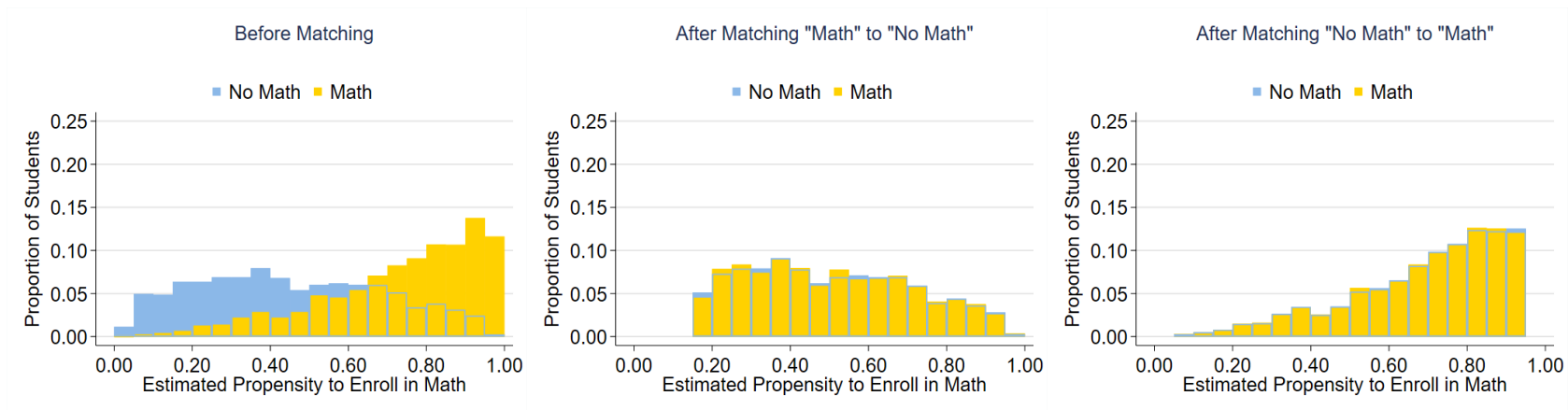
See the note on the first page of the table.

Table C3 Continued. Community College Analysis 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=1,542)	Math (N=1,999)	SMD	VR	No Math (N=1,338)	Math (N=1,330)	SMD	VR	No Math (N=1,205)	Math (N=1,637)	SMD	VR
Indicator of 2016-17 Cohort	0.540	0.553	0.025	0.995	0.538	0.573	0.069	0.986	0.562	0.547	-0.032	1.005

See the note on the first page of the table.

Figure C4. Community College Analysis 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 C4. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
Age (in Months)	195.026	194.835	-0.039	0.943	194.931	194.597	-0.069	0.932	194.570	194.892	0.069	1.176
Gender: Female	0.570	0.504	-0.133	1.019	0.567	0.577	0.020	0.995	0.540	0.513	-0.055	1.004
Race/Ethnicity: Asian	0.045	0.066	0.091	1.430	0.048	0.048	-0.001	0.997	0.069	0.063	-0.025	0.914
Race/Ethnicity: African American	0.075	0.054	-0.087	0.731	0.076	0.088	0.043	1.141	0.060	0.058	-0.008	0.968

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. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
Race/Ethnicity: Latinx	0.699	0.727	0.063	0.942	0.712	0.709	-0.006	1.007	0.715	0.723	0.018	0.981
Race/Ethnicity: Filipinx	0.036	0.061	0.119	1.667	0.038	0.034	-0.023	0.894	0.052	0.056	0.016	1.065
Race/Ethnicity: White	0.132	0.083	-0.157	0.667	0.114	0.106	-0.024	0.942	0.097	0.090	-0.027	0.926
Race/Ethnicity: Other	-	-	-0.050	0.625	0.012	0.015	0.026	1.247	-	-	0.050	1.807
Ever Subsidized Meal Eligible from 9th-11th	0.869	0.908	0.124	0.733	0.875	0.891	0.050	0.887	0.902	0.898	-0.011	1.028

See the note on the first page of the table.

Table C4 Continued. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.023	0.016	-0.046	0.725	0.022	0.023	0.009	1.063	0.025	0.019	-0.045	0.742
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.226	0.232	0.013	1.016	0.230	0.223	-0.016	0.980	0.214	0.226	0.029	1.038
Parents'/Guardians' Educational Attainment: HS Graduate	0.186	0.197	0.028	1.045	0.193	0.197	0.010	1.016	0.222	0.191	-0.077	0.892
Parents'/Guardians' Educational Attainment: Some College	0.168	0.133	-0.100	0.822	0.158	0.158	0.001	1.003	0.156	0.140	-0.044	0.914
Parents'/Guardians' Educational Attainment: College Graduate	0.118	0.121	0.009	1.020	0.116	0.124	0.023	1.057	0.128	0.126	-0.004	0.989

See the note on the first page of the table.

Table C4 Continued. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.037	0.040	0.019	1.096	0.038	0.038	-0.001	0.996	0.038	0.040	0.012	1.056
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.265	0.277	0.028	1.029	0.265	0.260	-0.011	0.989	0.243	0.277	0.077	1.086
Nonresident School Enrollment in 11th	0.361	0.393	0.067	1.034	0.369	0.384	0.031	1.016	0.387	0.393	0.012	1.003
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.096	2.800	-	-	-0.018	0.761	-	-	-0.026	0.777
Number of School Moves from 9th- 11th	0.070	0.071	0.001	0.995	0.063	0.070	0.026	1.280	0.071	0.069	-0.008	1.060

See the note on the first page of the table.

Table C4 Continued. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.029	0.035	0.034	1.198	0.029	0.026	-0.021	0.887	0.027	0.034	0.043	1.266
English Learner Status in 11th: English Only	0.341	0.286	-0.119	0.909	0.331	0.338	0.015	1.011	0.292	0.299	0.015	1.012
English Learner Status in 11th: Initial Fluent English Proficient	0.196	0.197	0.003	1.004	0.197	0.195	-0.005	0.993	0.197	0.195	-0.004	0.992
English Learner Status in 11th: Limited English Proficient	0.019	0.012	-0.056	0.643	0.016	0.018	0.018	1.148	0.014	0.014	0.007	1.059
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.443	0.504	0.122	1.013	0.456	0.449	-0.015	0.998	0.498	0.491	-0.012	0.998

See the note on the first page of the table.

Table C4 Continued. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
Gifted and Talented Program Participation in 11th	0.246	0.313	0.150	1.160	0.267	0.286	0.042	1.044	0.329	0.304	-0.054	0.956
Math 11th Grade Weighted GPA	2.301	2.619	0.246	1.156	2.329	2.290	-0.031	1.023	2.571	2.539	-0.025	0.972
Cumulative Overall Weighted GPA at the End of 11th	2.969	3.131	0.292	1.017	3.013	3.008	-0.011	0.994	3.094	3.098	0.007	0.939
Standardized ELA SBAC Score in 11th	0.230	0.456	0.301	0.805	0.304	0.303	-0.001	1.069	0.453	0.426	-0.037	0.967
Standardized Math SBAC Score in 11th	0.247	0.570	0.457	1.030	0.322	0.305	-0.025	1.065	0.515	0.510	-0.007	1.051

See the note on the first page of the table.

Table C4 Continued. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	2.209	3.239	0.381	1.350	2.368	2.383	0.006	0.973	3.074	2.991	-0.029	0.956
Science Credits Accumulated from 9th-11th	30.184	32.913	0.323	1.277	30.670	30.515	-0.020	0.985	31.967	31.926	-0.005	0.972
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.034	0.734	-	-	-0.030	0.757	-	-	0.004	1.032
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.713	0.499	-0.189	0.748	0.657	0.723	0.055	1.126	0.567	0.541	-0.024	0.943
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.280	0.167	-0.183	0.569	0.240	0.226	-0.022	0.995	0.192	0.183	-0.016	1.012

See the note on the first page of the table.

Table C4 Continued. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.229	0.166	-0.097	0.849	0.218	0.238	0.029	1.206	0.200	0.182	-0.027	0.955
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.106	0.050	-0.152	0.441	0.080	0.075	-0.015	0.970	0.076	0.057	-0.057	0.749
Highest ERW PSAT Score by the End of 11th	446.828	464.307	0.235	1.008	450.368	452.098	0.023	0.989	461.898	461.652	-0.003	0.946
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.078	0.058	-0.083	0.751	0.071	0.076	0.018	1.060	0.072	0.062	-0.039	0.873
Highest Math PSAT Score by the End of 11th	451.182	471.086	0.290	1.167	454.222	455.319	0.017	0.947	464.029	467.119	0.045	1.060

See the note on the first page of the table.

Table C4 Continued. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.072	0.053	-0.080	0.748	0.064	0.067	0.012	1.044	0.063	0.057	-0.029	0.895
Took the SAT or ACT before 12th	0.337	0.419	0.169	1.089	0.359	0.360	0.002	1.002	0.405	0.399	-0.013	0.993
Participation in the AVID Program in 11th	0.032	0.037	0.024	1.133	0.036	0.034	-0.012	0.942	0.040	0.040	0.001	1.001
Took a College or Career Seminar Course in 11th	0.171	0.159	-0.032	0.944	0.171	0.145	-0.072	0.874	0.167	0.170	0.006	1.009
Ever Attended STEM-Focused School from 9th- 12th	0.098	0.177	0.233	1.657	0.107	0.111	0.012	1.032	0.144	0.159	0.043	1.084

See the note on the first page of the table.

Table C4 Continued. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
Took a Precalculus Course by the End of 11th	0.846	0.911	0.200	0.623	0.865	0.856	-0.026	1.056	0.897	0.903	0.021	0.944
Took an IDS Course by the End of 11th	0.048	0.017	-0.173	0.373	0.041	0.038	-0.014	0.935	0.019	0.020	0.008	1.054
Took a Statistics Course by the End of 11th	0.103	0.065	-0.138	0.656	0.090	0.103	0.043	1.125	0.074	0.070	-0.016	0.947
Took Other Advanced Math by the End of 11th	-	-	0.050	2.040	-	-	-0.013	0.801	-	-	-0.036	0.672
Math 11th Grade Weighted GPA (Squared)	6.841	8.648	0.280	1.329	7.024	6.875	-0.024	0.957	8.386	8.173	-0.031	0.882

See the note on the first page of the table.

Table C4 Continued. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th (Squared)	9.119	10.110	0.294	1.080	9.376	9.339	-0.011	0.982	9.897	9.902	0.001	0.917
Standardized ELA SBAC Score in 11th (Squared)	0.679	0.712	0.039	0.987	0.659	0.698	0.045	1.200	0.739	0.699	-0.046	0.963
Standardized Math SBAC Score in 11th (Squared)	0.551	0.830	0.311	1.762	0.553	0.571	0.024	1.066	0.722	0.741	0.022	1.046
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	11.099	18.885	0.318	1.688	12.016	11.910	-0.005	0.772	17.633	16.786	-0.031	0.705
Science Credits Accumulated from 9th-11th (Squared)	973.789	1,163.357	0.307	1.634	1,003.294	992.813	-0.019	0.986	1,090.413	1,086.002	-0.007	1.006

See the note on the first page of the table.

Table C4 Continued. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.975	1.346	-0.125	0.825	1.789	2.051	0.047	1.440	1.554	1.456	-0.020	1.046
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.562	0.303	-0.158	0.437	0.454	0.445	-0.005	1.133	0.336	0.337	0.001	0.935
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.506	0.413	-0.036	1.535	0.492	0.592	0.034	2.078	0.468	0.443	-0.009	1.386
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.202	0.087	-0.121	0.210	0.142	0.137	-0.006	0.586	0.133	0.099	-0.046	0.491
Highest ERW PSAT Score by the End of 11th (Squared)	205,166.526	221,141.166	0.228	1.057	208,427.394	209,921.513	0.021	1.007	219,291.793	218,752.391	-0.007	0.944

See the note on the first page of the table.

Table C4 Continued. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	207,902.753	226,984.676	0.305	1.284	210,666.660	211,429.791	0.013	0.991	219,956.641	223,123.371	0.050	1.111
Work Effort GPA in 11th	2.420	2.497	0.220	0.943	2.441	2.435	-0.017	1.039	2.480	2.482	0.006	0.996
Cooperation GPA in 11th	2.615	2.676	0.228	0.947	2.632	2.634	0.005	1.053	2.657	2.663	0.022	1.112
Attendance Rate in 11th	0.967	0.973	0.180	0.936	0.968	0.967	-0.025	1.483	0.970	0.973	0.085	1.010
Ever Suspended from 9th-11th	-	-	0.005	1.072	-	-	0.028	1.498	-	-	0.008	1.151

See the note on the first page of the table.

Table C4 Continued. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
Educational Expectations in 11th: Unsure	0.097	0.075	-0.076	0.798	0.088	0.089	0.003	1.009	0.076	0.082	0.023	1.073
Educational Expectations in 11th: HS or Less	-	-	-0.108	0.411	-	-	-0.065	0.569	-	-	0.060	1.985
Educational Expectations in 11th: Associate Degree or Certificate	0.054	0.026	-0.143	0.495	0.045	0.036	-0.045	0.812	0.027	0.027	0.000	0.998
Educational Expectations in 11th: Bachelor's Degree or Higher	0.548	0.641	0.191	0.928	0.573	0.569	-0.008	1.003	0.607	0.619	0.024	0.987
Educational Expectations in 11th: Missing	0.279	0.248	-0.069	0.928	0.277	0.296	0.043	1.042	0.285	0.261	-0.053	0.945

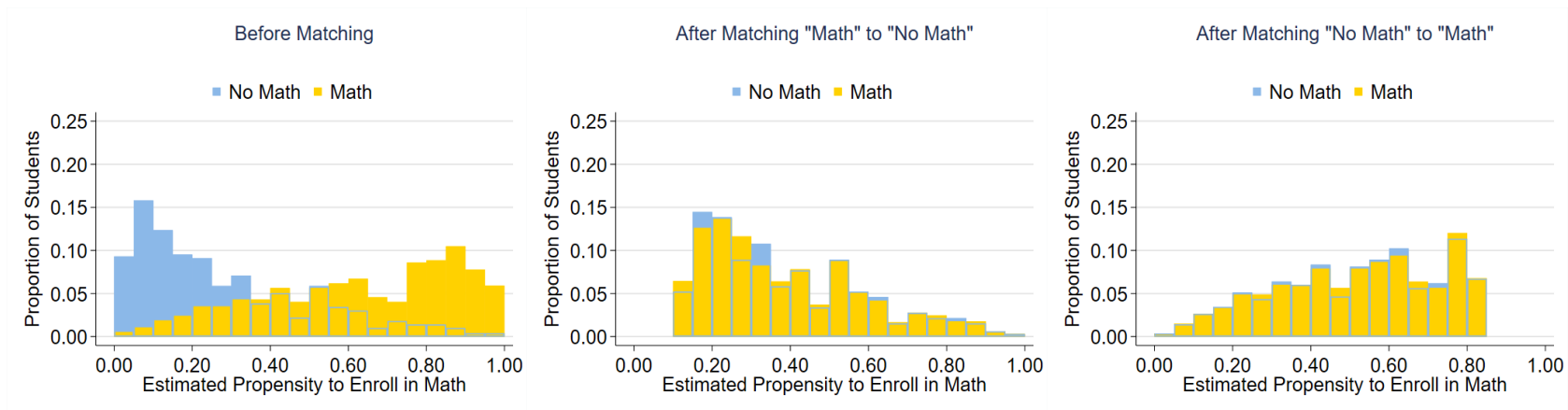
See the note on the first page of the table.

Table C4 Continued. Community College Analysis 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=1,148)	Math (N=1,962)	SMD	VR	No Math (N=1,000)	Math (N=1,293)	SMD	VR	No Math (N=986)	Math (N=1,663)	SMD	VR
Growth Mindset in 11th	0.067	0.159	0.114	1.037	0.093	0.054	-0.050	1.042	0.113	0.142	0.036	1.027
Missing Dummy: Growth Mindset in 11th	0.268	0.236	-0.073	0.919	0.265	0.280	0.034	1.036	0.272	0.248	-0.053	0.942
Academic Self-Efficacy in 11th	-0.093	0.022	0.135	1.101	-0.068	-0.092	-0.027	1.183	-0.082	-0.008	0.085	0.972
Missing Dummy: Academic Self-Efficacy in 11th	0.269	0.235	-0.079	0.913	0.265	0.279	0.032	1.034	0.273	0.248	-0.055	0.940
Indicator of 2016-17 Cohort	0.484	0.487	0.006	1.000	0.491	0.495	0.008	1.001	0.509	0.485	-0.047	0.997

See the note on the first page of the table.

Figure C5. Community College Analysis Distributions of Estimated Propensities of Taking Math over No Math in Group 3 Before and After Matching for Students who Took a Math Course in the First Two Years, 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 C5. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Age (in Months)	195.007	195.158	0.030	1.134	194.987	194.610	-0.081	1.023	195.275	195.128	-0.029	1.194
Gender: Female	0.468	0.511	0.086	1.004	0.480	0.490	0.020	1.006	0.504	0.500	-0.009	0.997
Race/Ethnicity: Asian	-	-	-0.016	0.888	-	-	-0.044	0.707	-	-	0.029	1.241
Race/Ethnicity: African American	0.097	0.067	-0.109	0.715	0.077	0.082	0.020	1.071	0.069	0.075	0.025	1.082

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 C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Race/Ethnicity: Latinx	0.755	0.798	0.104	0.871	0.782	0.805	0.058	0.924	0.796	0.789	-0.016	1.021
Race/Ethnicity: Filipinx	0.026	0.040	0.078	1.511	-	-	0.000	1.005	-	-	-0.049	0.762
Race/Ethnicity: White	0.087	0.070	-0.064	0.819	0.077	0.056	-0.084	0.748	0.079	0.079	0.002	1.002
Race/Ethnicity: Other	-	-	-0.074	0.502	-	-	-0.028	0.739	-	-	0.048	1.654
Ever Subsidized Meal Eligible from 9th-11th	0.899	0.903	0.015	0.961	0.902	0.926	0.088	0.774	0.932	0.902	-0.107	1.383

See the note on the first page of the table.

Table C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	0.027	1.191	-	-	-0.089	0.406	-	-	0.131	2.857
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.261	0.223	-0.089	0.899	0.262	0.260	-0.004	1.000	0.230	0.237	0.016	1.018
Parents'/Guardians' Educational Attainment: HS Graduate	0.225	0.210	-0.036	0.952	0.222	0.214	-0.019	0.979	0.164	0.214	0.129	1.226
Parents'/Guardians' Educational Attainment: Some College	0.154	0.175	0.056	1.108	0.154	0.172	0.050	1.101	0.200	0.173	-0.069	0.892
Parents'/Guardians' Educational Attainment: College Graduate	0.079	0.075	-0.014	0.958	0.080	0.076	-0.014	0.962	0.090	0.075	-0.054	0.846

See the note on the first page of the table.

Table C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	-	-	0.027	1.191	-	-	0.038	1.299	-	-	0.036	1.232
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.261	0.293	0.071	1.074	0.265	0.254	-0.024	0.978	0.292	0.271	-0.048	0.951
Nonresident School Enrollment in 11th	0.249	0.266	0.039	1.045	0.246	0.227	-0.046	0.949	0.264	0.267	0.006	1.004
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.052	1.652	-	-	-0.079	0.337	-	-	0.019	1.170
Number of School Moves from 9th- 11th	0.100	0.111	0.030	1.023	0.092	0.084	-0.026	0.860	0.116	0.111	-0.014	0.935

See the note on the first page of the table.

Table C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.051	0.040	-0.049	0.806	-	-	-0.169	0.355	-	-	0.055	1.334
English Learner Status in 11th: English Only	0.342	0.285	-0.123	0.906	0.317	0.290	-0.057	0.956	0.305	0.305	-0.001	0.996
English Learner Status in 11th: Initial Fluent English Proficient	0.144	0.140	-0.011	0.978	0.138	0.158	0.054	1.118	0.135	0.135	0.002	1.001
English Learner Status in 11th: Limited English Proficient	0.053	0.035	-0.086	0.677	-	-	-0.063	0.702	-	-	0.058	1.388
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.462	0.540	0.158	1.000	0.511	0.529	0.035	1.002	0.536	0.526	-0.020	0.999

See the note on the first page of the table.

Table C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Gifted and Talented Program Participation in 11th	0.087	0.094	0.025	1.073	0.086	0.093	0.024	1.078	0.083	0.083	0.000	0.996
Math 11th Grade Weighted GPA	1.455	1.446	-0.013	1.090	1.471	1.472	0.001	1.008	1.417	1.425	0.012	0.969
Cumulative Overall Weighted GPA at the End of 11th	2.253	2.420	0.381	0.988	2.340	2.335	-0.011	0.828	2.392	2.378	-0.033	1.029
Standardized ELA SBAC Score in 11th	-0.298	-0.095	0.257	0.900	-0.151	-0.127	0.033	0.909	-0.094	-0.129	-0.048	1.073
Standardized Math SBAC Score in 11th	-0.412	-0.234	0.252	0.982	-0.326	-0.308	0.028	0.730	-0.261	-0.280	-0.029	1.164

See the note on the first page of the table.

Table C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	0.674	1.305	0.388	1.929	0.798	0.776	-0.015	0.978	1.035	1.099	0.039	1.175
Science Credits Accumulated from 9th-11th	27.978	29.978	0.243	1.083	28.886	29.429	0.070	0.945	29.910	29.631	-0.036	1.241
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.026	0.858	-	-	-0.056	0.684	-	-	0.017	1.091
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	1.812	1.460	-0.206	0.791	1.575	1.545	-0.019	0.928	1.401	1.530	0.078	1.090
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.970	0.626	-0.311	0.624	0.815	0.714	-0.098	0.648	0.718	0.733	0.015	0.948

See the note on the first page of the table.

Table C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.538	0.390	-0.151	0.545	0.415	0.357	-0.070	0.784	0.338	0.414	0.091	1.131
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.275	0.142	-0.231	0.443	0.215	0.130	-0.166	0.476	0.137	0.177	0.084	1.254
Highest ERW PSAT Score by the End of 11th	405.971	414.561	0.138	0.914	410.983	413.655	0.043	1.006	412.623	413.134	0.009	1.007
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.091	0.099	0.028	1.083	0.092	0.076	-0.057	0.845	0.081	0.102	0.073	1.227
Highest Math PSAT Score by the End of 11th	407.505	413.856	0.097	0.913	412.489	413.865	0.022	0.813	412.885	413.876	0.016	1.155

See the note on the first page of the table.

Table C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.087	0.091	0.015	1.046	0.086	0.073	-0.048	0.866	0.072	0.094	0.078	1.266
Took the SAT or ACT before 12th	0.091	0.212	0.343	2.022	0.123	0.112	-0.033	0.929	0.177	0.180	0.010	1.014
Participation in the AVID Program in 11th	-	-	-0.062	0.595	-	-	-0.050	0.647	-	-	-0.007	0.935
Took a College or Career Seminar Course in 11th	0.152	0.175	0.062	1.121	0.151	0.128	-0.066	0.876	0.160	0.180	0.054	1.096
Ever Attended STEM-Focused School from 9th- 12th	0.063	0.116	0.186	1.739	0.065	0.060	-0.018	0.942	0.066	0.083	0.065	1.235

See the note on the first page of the table.

Table C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	2.542	2.554	0.005	0.937	2.614	2.618	0.001	0.894	2.449	2.458	0.004	0.758
Cumulative Overall Weighted GPA at the End of 11th (Squared)	5.268	6.049	0.372	1.096	5.667	5.612	-0.027	0.814	5.899	5.837	-0.030	1.013
Standardized ELA SBAC Score in 11th (Squared)	0.746	0.601	-0.145	0.610	0.596	0.534	-0.067	0.911	0.540	0.588	0.056	0.983
Standardized Math SBAC Score in 11th (Squared)	0.672	0.548	-0.134	0.755	0.606	0.458	-0.188	0.539	0.483	0.563	0.102	1.251
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	2.254	5.171	0.315	2.737	2.803	2.712	-0.011	1.202	3.517	4.092	0.065	1.758

See the note on the first page of the table.

Table C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	847.936	969.231	0.235	1.324	895.688	923.683	0.059	0.976	948.086	944.564	-0.007	1.344
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	6.540	4.707	-0.194	0.548	5.206	4.905	-0.036	0.789	4.537	5.154	0.075	1.147
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	2.435	1.325	-0.279	0.461	1.966	1.349	-0.172	0.305	1.583	1.553	-0.009	1.011
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.547	0.836	-0.177	0.318	0.945	0.730	-0.071	0.804	0.759	0.902	0.052	1.411
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.534	0.223	-0.209	0.333	0.400	0.185	-0.182	0.207	0.218	0.282	0.058	1.589

See the note on the first page of the table.

Table C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	168,850.377	175,548.798	0.127	0.891	172,784.074	174,992.716	0.042	0.959	173,698.303	174,156.435	0.009	0.995
Highest Math PSAT Score by the End of 11th (Squared)	170,526.489	175,353.370	0.092	0.895	174,321.946	174,663.777	0.007	0.750	173,819.916	175,171.887	0.028	1.127
Work Effort GPA in 11th	2.120	2.192	0.215	0.979	2.176	2.188	0.033	1.117	2.193	2.184	-0.028	1.151
Cooperation GPA in 11th	2.405	2.468	0.222	0.955	2.452	2.459	0.024	0.975	2.457	2.460	0.010	1.075
Attendance Rate in 11th	0.958	0.963	0.105	0.921	0.961	0.958	-0.072	1.222	0.964	0.961	-0.067	1.209

See the note on the first page of the table.

Table C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Ever Suspended from 9th-11th	-	-	-0.041	0.667	-	-	-0.008	0.905	-	-	0.027	1.659
Educational Expectations in 11th: Unsure	0.168	0.089	-0.239	0.579	0.114	0.127	0.041	1.106	0.096	0.083	-0.046	0.873
Educational Expectations in 11th: HS or Less	0.034	0.030	-0.027	0.864	-	-	-0.097	0.484	-	-	0.020	1.119
Educational Expectations in 11th: Associate Degree or Certificate	0.097	0.067	-0.109	0.715	0.092	0.133	0.128	1.381	0.097	0.079	-0.065	0.824
Educational Expectations in 11th: Bachelor's Degree or Higher	0.457	0.559	0.204	0.994	0.505	0.457	-0.095	0.997	0.521	0.538	0.034	0.993

See the note on the first page of the table.

Table C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Educational Expectations in 11th: Missing	0.243	0.255	0.029	1.035	0.265	0.271	0.015	1.021	0.259	0.271	0.026	1.025
Growth Mindset in 11th	-0.120	-0.011	0.130	0.860	-0.020	0.037	0.076	0.757	0.024	0.010	-0.018	1.106
Missing Dummy: Growth Mindset in 11th	0.239	0.247	0.020	1.025	0.258	0.268	0.022	1.029	0.248	0.267	0.043	1.046
Academic Self-Efficacy in 11th	-0.200	-0.263	-0.073	0.927	-0.188	-0.312	-0.150	0.969	-0.289	-0.204	0.103	1.049
Missing Dummy: Academic Self-Efficacy in 11th	0.239	0.250	0.026	1.032	0.262	0.268	0.015	1.021	0.248	0.267	0.043	1.046

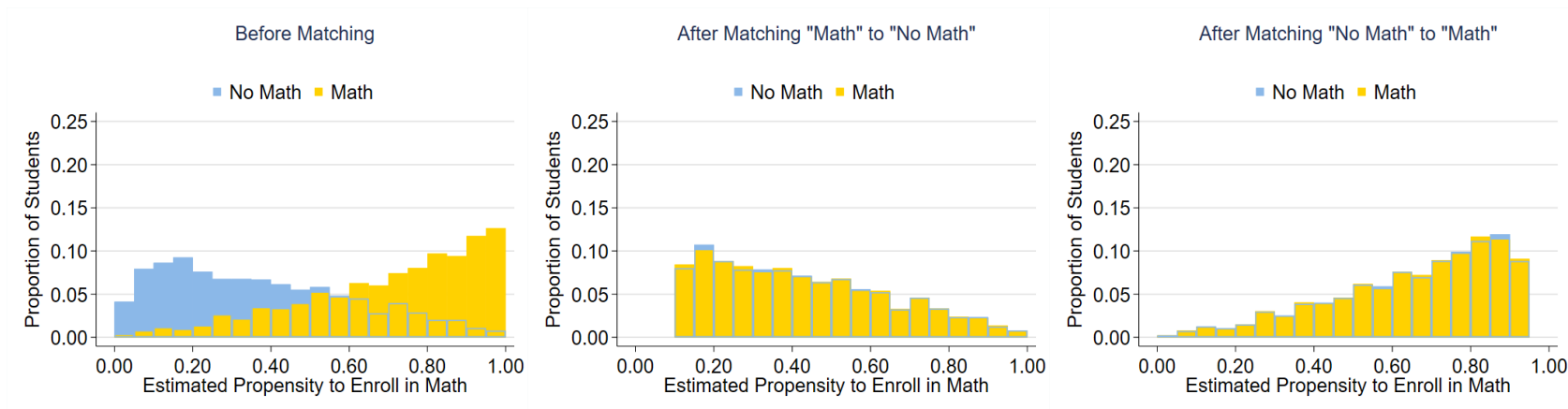
See the note on the first page of the table.

Table C5 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=494)	Math (N=372)	SMD	VR	No Math (N=325)	Math (N=293)	SMD	VR	No Math (N=316)	Math (N=266)	SMD	VR
Indicator of 2016-17 Cohort	0.603	0.599	-0.008	1.004	0.625	0.694	0.146	0.910	0.600	0.590	-0.020	1.005

See the note on the first page of the table.

Figure C6. Community College Analysis Distributions of Estimated Propensities of Taking Math over No Math in Group 4 Before and After Matching for Students who Took a Math Course in the First Two Years, 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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Age (in Months)	195.355	194.933	-0.074	0.728	195.196	195.163	-0.006	0.897	195.019	194.955	-0.012	0.824
Gender: Female	0.557	0.504	-0.106	1.013	0.538	0.534	-0.008	1.003	0.526	0.514	-0.024	1.000
Race/Ethnicity: Asian	0.020	0.024	0.026	1.182	0.021	0.014	-0.051	0.684	0.020	0.025	0.031	1.224
Race/Ethnicity: African American	0.084	0.077	-0.026	0.922	0.077	0.083	0.023	1.075	0.073	0.074	0.003	1.009

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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Race/Ethnicity: Latinx	0.773	0.791	0.044	0.941	0.781	0.788	0.016	0.979	0.805	0.786	-0.046	1.068
Race/Ethnicity: Filipinx	0.031	0.038	0.037	1.207	0.035	0.023	-0.074	0.656	0.032	0.035	0.019	1.102
Race/Ethnicity: White	0.087	0.061	-0.101	0.716	0.081	0.084	0.009	1.030	0.062	0.069	0.031	1.113
Race/Ethnicity: Other	-	-	0.054	1.865	-	-	0.044	1.696	-	-	0.022	1.245
Ever Subsidized Meal Eligible from 9th-11th	0.912	0.927	0.054	0.846	0.918	0.927	0.034	0.900	0.932	0.923	-0.034	1.118

See the note on the first page of the table.

Table C6 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.024	0.014	-0.076	0.578	0.021	0.018	-0.017	0.891	0.013	0.016	0.023	1.203
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.252	0.237	-0.035	0.959	0.250	0.254	0.007	1.010	0.247	0.247	0.000	0.998
Parents'/Guardians' Educational Attainment: HS Graduate	0.182	0.217	0.088	1.141	0.188	0.180	-0.022	0.967	0.195	0.205	0.025	1.037
Parents'/Guardians' Educational Attainment: Some College	0.139	0.134	-0.014	0.971	0.138	0.146	0.023	1.050	0.141	0.136	-0.014	0.969
Parents'/Guardians' Educational Attainment: College Graduate	0.087	0.081	-0.020	0.943	0.086	0.095	0.029	1.090	0.088	0.084	-0.014	0.957

See the note on the first page of the table.

Table C6 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.025	0.032	0.042	1.269	0.023	0.021	-0.016	0.904	0.021	0.032	0.073	1.541
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.315	0.298	-0.036	0.970	0.314	0.305	-0.019	0.986	0.308	0.295	-0.028	0.974
Nonresident School Enrollment in 11th	0.251	0.289	0.086	1.093	0.259	0.249	-0.024	0.974	0.283	0.278	-0.011	0.987
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.049	1.535	-	-	-0.073	0.434	-	-	0.081	2.753
Number of School Moves from 9th-11th	0.101	0.076	-0.083	0.653	0.091	0.080	-0.033	1.015	0.072	0.078	0.022	1.100

See the note on the first page of the table.

Table C6 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.061	0.069	0.031	1.114	0.059	0.046	-0.059	0.791	0.069	0.070	0.003	1.008
English Learner Status in 11th: English Only	0.310	0.280	-0.064	0.944	0.296	0.300	0.008	1.009	0.276	0.285	0.019	1.017
English Learner Status in 11th: Initial Fluent English Proficient	0.149	0.140	-0.025	0.950	0.153	0.125	-0.081	0.845	0.118	0.138	0.060	1.143
English Learner Status in 11th: Limited English Proficient	0.073	0.036	-0.164	0.512	0.060	0.069	0.036	1.137	0.054	0.040	-0.067	0.747
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.468	0.543	0.151	0.996	0.490	0.506	0.031	1.002	0.553	0.538	-0.030	1.003

See the note on the first page of the table.

Table C6 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Gifted and Talented Program Participation in 11th	0.081	0.121	0.134	1.433	0.086	0.086	-0.003	0.992	0.111	0.113	0.006	1.013
Math 11th Grade Weighted GPA	2.225	2.634	0.521	1.144	2.294	2.325	0.040	1.058	2.578	2.566	-0.016	1.040
Cumulative Overall Weighted GPA at the End of 11th	2.620	2.884	0.500	1.104	2.674	2.713	0.079	0.910	2.845	2.836	-0.018	0.972
Standardized ELA SBAC Score in 11th	-0.162	0.127	0.386	0.886	-0.088	-0.085	0.003	1.066	0.116	0.092	-0.032	0.911
Standardized Math SBAC Score in 11th	-0.240	0.102	0.525	0.944	-0.160	-0.131	0.047	0.971	0.060	0.052	-0.012	0.956

See the note on the first page of the table.

Table C6 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	0.939	1.695	0.394	1.747	1.024	1.079	0.033	0.999	1.514	1.485	-0.014	1.011
Science Credits Accumulated from 9th-11th	29.113	31.883	0.332	1.265	29.555	29.952	0.050	1.125	30.419	30.941	0.066	1.108
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	0.028	0.032	0.026	1.152	0.026	0.025	-0.005	0.975	0.034	0.034	-0.002	0.986
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	1.047	0.639	-0.305	0.599	0.923	0.835	-0.065	0.849	0.675	0.682	0.006	1.002
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.519	0.266	-0.314	0.532	0.438	0.406	-0.038	0.874	0.334	0.295	-0.053	0.820

See the note on the first page of the table.

Table C6 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.380	0.200	-0.222	0.417	0.315	0.298	-0.021	0.745	0.257	0.212	-0.066	0.712
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.182	0.086	-0.200	0.479	0.155	0.148	-0.014	0.860	0.095	0.093	-0.004	0.794
Highest ERW PSAT Score by the End of 11th	408.787	428.663	0.308	1.120	411.840	413.213	0.022	0.925	423.575	425.670	0.032	1.044
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.103	0.073	-0.106	0.732	0.090	0.115	0.083	1.245	0.085	0.078	-0.026	0.922
Highest Math PSAT Score by the End of 11th	412.419	430.076	0.289	0.942	415.640	415.366	-0.005	0.940	423.190	426.775	0.058	0.973

See the note on the first page of the table.

Table C6 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.097	0.066	-0.114	0.702	0.083	0.108	0.084	1.265	0.079	0.069	-0.038	0.882
Took the SAT or ACT before 12th	0.203	0.309	0.244	1.318	0.223	0.206	-0.039	0.949	0.283	0.288	0.009	1.007
Participation in the AVID Program in 11th	0.023	0.037	0.081	1.572	0.027	0.033	0.033	1.202	0.053	0.035	-0.090	0.665
Took a College or Career Seminar Course in 11th	0.196	0.174	-0.058	0.909	0.196	0.200	0.010	1.017	0.203	0.179	-0.061	0.907
Ever Attended STEM-Focused School from 9th- 12th	0.085	0.158	0.222	1.699	0.093	0.082	-0.039	0.894	0.124	0.130	0.019	1.041

See the note on the first page of the table.

Table C6 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	5.524	7.589	0.515	1.455	5.828	6.000	0.046	1.119	7.253	7.216	-0.009	1.039
Cumulative Overall Weighted GPA at the End of 11th (Squared)	7.128	8.609	0.503	1.298	7.406	7.592	0.069	0.928	8.382	8.321	-0.020	0.957
Standardized ELA SBAC Score in 11th (Squared)	0.623	0.545	-0.094	0.647	0.561	0.596	0.042	1.042	0.594	0.539	-0.072	0.836
Standardized Math SBAC Score in 11th (Squared)	0.493	0.421	-0.107	0.598	0.416	0.396	-0.032	1.121	0.419	0.401	-0.031	0.850
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	3.555	7.544	0.317	2.527	3.937	4.046	0.011	1.001	6.294	6.258	-0.003	1.234

See the note on the first page of the table.

Table C6 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	908.989	1,094.206	0.323	1.661	932.492	963.377	0.060	1.186	983.630	1,022.102	0.073	1.135
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	3.335	1.750	-0.242	0.433	2.825	2.370	-0.073	0.583	1.847	1.863	0.003	0.962
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	1.119	0.522	-0.246	0.420	0.903	0.786	-0.051	0.654	0.703	0.573	-0.060	0.608
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.085	0.432	-0.170	0.272	0.845	0.643	-0.056	0.307	0.610	0.433	-0.070	0.520
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.345	0.157	-0.144	0.409	0.299	0.258	-0.032	0.356	0.197	0.158	-0.036	0.441

See the note on the first page of the table.

Table C6 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	171,031.405	188,148.115	0.306	1.245	173,623.165	174,448.855	0.016	0.933	183,603.495	185,575.737	0.034	1.057
Highest Math PSAT Score by the End of 11th (Squared)	173,929.666	188,583.737	0.294	1.069	176,523.507	176,063.570	-0.010	0.969	182,955.349	185,906.590	0.058	1.065
Work Effort GPA in 11th	2.336	2.462	0.388	0.939	2.367	2.381	0.044	0.946	2.452	2.448	-0.013	1.019
Cooperation GPA in 11th	2.536	2.623	0.328	0.926	2.558	2.565	0.025	1.042	2.615	2.614	-0.004	1.045
Attendance Rate in 11th	0.964	0.972	0.259	0.756	0.966	0.967	0.035	1.290	0.971	0.971	0.012	1.187

See the note on the first page of the table.

Table C6 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.009	1.092	-	-	-0.020	0.820	0.011	0.011	-0.001	0.985
Educational Expectations in 11th: Unsure	0.107	0.085	-0.075	0.814	0.098	0.097	-0.002	0.995	0.086	0.092	0.019	1.055
Educational Expectations in 11th: HS or Less	0.026	0.019	-0.044	0.753	0.023	0.026	0.018	1.122	0.013	0.019	0.042	1.387
Educational Expectations in 11th: Associate Degree or Certificate	0.072	0.050	-0.094	0.705	0.068	0.079	0.044	1.158	0.049	0.047	-0.009	0.961
Educational Expectations in 11th: Bachelor's Degree or Higher	0.527	0.560	0.065	0.989	0.541	0.548	0.014	0.999	0.584	0.575	-0.020	1.004

See the note on the first page of the table.

Table C6 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Educational Expectations in 11th: Missing	0.268	0.286	0.041	1.042	0.270	0.250	-0.047	0.951	0.267	0.268	0.002	1.000
Growth Mindset in 11th	-0.067	0.066	0.157	0.728	-0.037	-0.017	0.023	0.845	0.070	0.053	-0.021	0.830
Missing Dummy: Growth Mindset in 11th	0.255	0.276	0.049	1.053	0.258	0.239	-0.043	0.952	0.259	0.259	0.000	0.998
Academic Self-Efficacy in 11th	-0.052	0.031	0.099	0.920	-0.056	-0.025	0.036	0.870	-0.015	0.010	0.031	0.998
Missing Dummy: Academic Self-Efficacy in 11th	0.253	0.276	0.051	1.056	0.256	0.238	-0.040	0.955	0.261	0.258	-0.007	0.990

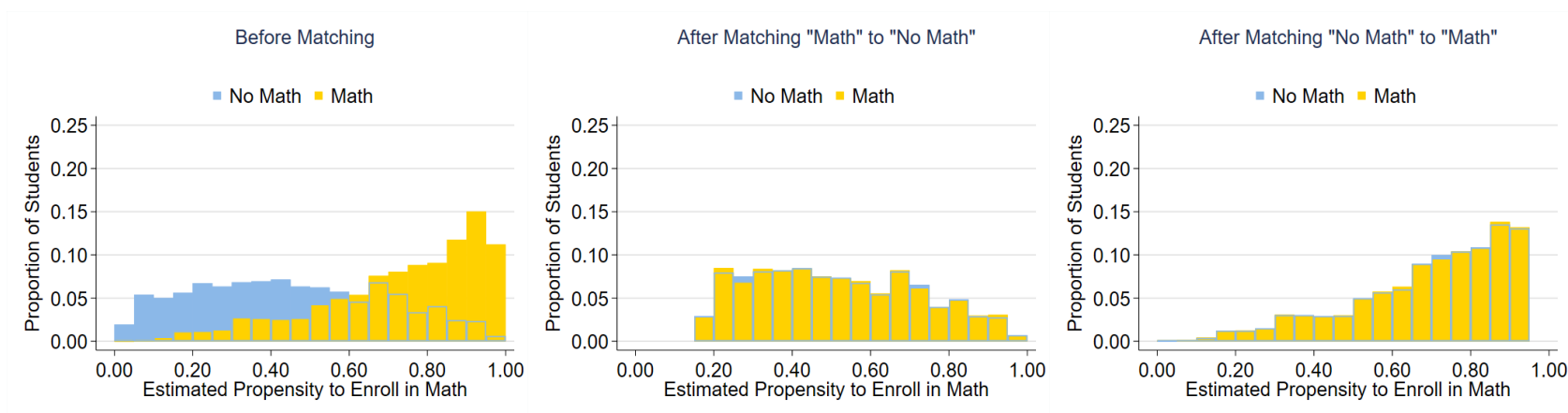
See the note on the first page of the table.

Table C6 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=1,288)	Math (N=1,669)	SMD	VR	No Math (N=1,110)	Math (N=1,116)	SMD	VR	No Math (N=1,005)	Math (N=1,387)	SMD	VR
Indicator of 2016-17 Cohort	0.521	0.549	0.056	0.992	0.527	0.563	0.073	0.988	0.554	0.534	-0.040	1.005

See the note on the first page of the table.

Figure C7. Community College Analysis Distributions of Estimated Propensities of Taking Math over No Math in Group 5 Before and After Matching for Students who Took a Math Course in the First Two Years, 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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
Age (in Months)	195.040	194.707	-0.069	0.825	194.884	194.808	-0.016	0.894	194.410	194.779	0.081	1.005
Gender: Female	0.576	0.507	-0.138	1.023	0.571	0.571	0.000	1.001	0.542	0.518	-0.047	1.003
Race/Ethnicity: Asian	0.050	0.066	0.069	1.301	0.053	0.052	-0.005	0.979	0.062	0.063	0.006	1.021
Race/Ethnicity: African American	0.068	0.052	-0.067	0.780	0.074	0.082	0.031	1.102	0.066	0.058	-0.033	0.885

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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
Race/Ethnicity: Latinx	0.699	0.730	0.070	0.935	0.714	0.705	-0.019	1.018	0.725	0.732	0.016	0.981
Race/Ethnicity: Filipinx	0.034	0.063	0.135	1.803	0.035	0.031	-0.022	0.894	0.041	0.053	0.055	1.265
Race/Ethnicity: White	0.136	0.079	-0.183	0.622	0.112	0.121	0.027	1.068	0.097	0.085	-0.043	0.882
Race/Ethnicity: Other	-	-	-0.041	0.677	-	-	-0.033	0.723	-	-	0.003	1.029
Ever Subsidized Meal Eligible from 9th-11th	0.866	0.909	0.135	0.716	0.873	0.881	0.023	0.950	0.901	0.901	0.000	0.997

See the note on the first page of the table.

Table C7 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.022	0.017	-0.037	0.774	0.023	0.023	0.002	1.011	0.020	0.019	-0.008	0.943
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.227	0.232	0.013	1.016	0.225	0.214	-0.026	0.966	0.230	0.228	-0.005	0.991
Parents'/Guardians' Educational Attainment: HS Graduate	0.194	0.201	0.018	1.027	0.202	0.210	0.020	1.031	0.195	0.199	0.012	1.016
Parents'/Guardians' Educational Attainment: Some College	0.169	0.134	-0.098	0.825	0.168	0.158	-0.027	0.952	0.150	0.142	-0.024	0.950
Parents'/Guardians' Educational Attainment: College Graduate	0.119	0.117	-0.008	0.981	0.112	0.121	0.026	1.066	0.119	0.118	-0.003	0.989

See the note on the first page of the table.

Table C7 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.041	0.041	-0.001	0.993	0.042	0.043	0.004	1.017	0.035	0.040	0.026	1.131
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.250	0.275	0.058	1.064	0.251	0.255	0.008	1.010	0.271	0.273	0.005	1.003
Nonresident School Enrollment in 11th	0.364	0.392	0.057	1.029	0.377	0.406	0.060	1.028	0.404	0.390	-0.029	0.985
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.107	3.469	-	-	0.010	1.150	-	-	0.004	1.042
Number of School Moves from 9th-11th	0.070	0.072	0.010	0.976	0.061	0.074	0.047	1.449	0.067	0.068	0.005	0.964

See the note on the first page of the table.

Table C7 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.031	0.035	0.022	1.125	0.029	0.031	0.014	1.081	0.025	0.032	0.040	1.252
English Learner Status in 11th: English Only	0.331	0.275	-0.120	0.902	0.324	0.324	0.000	1.001	0.274	0.285	0.025	1.023
English Learner Status in 11th: Initial Fluent English Proficient	0.193	0.197	0.011	1.017	0.197	0.200	0.007	1.012	0.191	0.196	0.011	1.015
English Learner Status in 11th: Limited English Proficient	0.019	0.011	-0.066	0.589	0.016	0.012	-0.029	0.788	-	-	0.026	1.260
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.457	0.516	0.118	1.006	0.464	0.464	0.001	1.001	0.525	0.506	-0.037	1.000

See the note on the first page of the table.

Table C7 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
Gifted and Talented Program Participation in 11th	0.246	0.307	0.137	1.147	0.271	0.299	0.063	1.062	0.311	0.298	-0.027	0.975
Math 11th Grade Weighted GPA	2.294	2.595	0.234	1.180	2.321	2.322	0.000	1.039	2.553	2.520	-0.026	1.003
Cumulative Overall Weighted GPA at the End of 11th	2.980	3.117	0.252	1.018	3.026	3.033	0.014	1.062	3.083	3.088	0.009	0.918
Standardized ELA SBAC Score in 11th	0.243	0.447	0.276	0.814	0.312	0.322	0.013	0.989	0.417	0.416	-0.002	0.909
Standardized Math SBAC Score in 11th	0.265	0.574	0.441	1.013	0.344	0.345	0.002	1.023	0.473	0.511	0.056	0.972

See the note on the first page of the table.

Table C7 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	2.198	3.194	0.373	1.328	2.397	2.437	0.016	0.978	2.962	2.943	-0.007	0.963
Science Credits Accumulated from 9th-11th	30.288	32.783	0.295	1.252	30.711	30.756	0.006	1.043	32.604	32.018	-0.068	0.892
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	0.015	0.011	-0.035	0.743	-	-	-0.004	0.961	-	-	0.043	1.558
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.680	0.496	-0.166	0.758	0.639	0.666	0.024	1.008	0.529	0.519	-0.010	1.003
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.278	0.171	-0.173	0.580	0.246	0.230	-0.027	0.930	0.175	0.182	0.012	1.120

See the note on the first page of the table.

Table C7 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.221	0.158	-0.101	0.758	0.204	0.213	0.013	1.168	0.201	0.169	-0.051	0.803
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.106	0.051	-0.145	0.426	0.086	0.086	0.001	1.049	0.062	0.053	-0.027	0.848
Highest ERW PSAT Score by the End of 11th	446.745	462.941	0.220	1.016	451.158	453.594	0.032	1.069	457.245	459.673	0.032	0.924
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.079	0.060	-0.075	0.774	0.070	0.068	-0.008	0.975	0.078	0.062	-0.062	0.809
Highest Math PSAT Score by the End of 11th	451.364	469.606	0.267	1.172	454.951	457.140	0.034	0.959	460.964	465.437	0.063	0.934

See the note on the first page of the table.

Table C7 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.072	0.055	-0.069	0.779	0.065	0.061	-0.016	0.945	0.068	0.058	-0.042	0.858
Took the SAT or ACT before 12th	0.350	0.420	0.145	1.071	0.373	0.389	0.032	1.016	0.446	0.410	-0.074	0.976
Participation in the AVID Program in 11th	0.029	0.030	0.007	1.042	0.033	0.026	-0.037	0.813	0.029	0.032	0.017	1.097
Took a College or Career Seminar Course in 11th	0.163	0.162	-0.003	0.994	0.159	0.159	-0.001	0.999	0.162	0.169	0.019	1.032
Ever Attended STEM-Focused School from 9th- 12th	0.096	0.177	0.236	1.675	0.111	0.112	0.002	1.006	0.161	0.161	-0.001	0.995

See the note on the first page of the table.

Table C7 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
Took a Precalculus Course by the End of 11th	0.845	0.911	0.203	0.618	0.867	0.881	0.042	0.910	0.908	0.903	-0.017	1.045
Took an IDS Course by the End of 11th	0.049	0.019	-0.165	0.402	0.042	0.029	-0.075	0.684	0.016	0.022	0.039	1.314
Took a Statistics Course by the End of 11th	0.102	0.063	-0.141	0.646	0.086	0.086	0.000	1.001	0.069	0.069	-0.002	0.990
Took Other Advanced Math by the End of 11th	-	-	0.034	1.602	-	-	-0.004	0.951	-	-	0.002	1.020
Math 11th Grade Weighted GPA (Squared)	6.774	8.516	0.273	1.345	6.954	7.015	0.010	0.989	8.220	8.060	-0.024	0.885

See the note on the first page of the table.

Table C7 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th (Squared)	9.172	10.012	0.254	1.062	9.443	9.506	0.019	1.051	9.821	9.828	0.002	0.894
Standardized ELA SBAC Score in 11th (Squared)	0.665	0.694	0.034	0.903	0.661	0.661	-0.001	1.061	0.728	0.677	-0.060	0.933
Standardized Math SBAC Score in 11th (Squared)	0.554	0.819	0.301	1.705	0.559	0.570	0.014	0.973	0.704	0.730	0.030	0.966
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	10.958	18.342	0.314	1.685	12.117	12.170	0.003	0.801	16.494	16.110	-0.015	0.732
Science Credits Accumulated from 9th-11th (Squared)	980.694	1,153.981	0.281	1.567	1,007.884	1,013.419	0.010	1.065	1,141.209	1,095.060	-0.072	0.884

See the note on the first page of the table.

Table C7 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.853	1.301	-0.113	0.824	1.745	1.791	0.008	1.299	1.353	1.349	-0.001	1.197
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.559	0.309	-0.152	0.397	0.469	0.432	-0.023	0.924	0.297	0.332	0.028	1.284
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.495	0.363	-0.054	1.229	0.450	0.522	0.025	2.281	0.473	0.377	-0.041	1.159
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.212	0.088	-0.123	0.189	0.151	0.158	0.008	0.795	0.108	0.091	-0.027	0.776
Highest ERW PSAT Score by the End of 11th (Squared)	204,973.794	219,797.861	0.215	1.064	208,993.889	211,571.828	0.037	1.108	214,960.633	216,751.416	0.025	0.947

See the note on the first page of the table.

Table C7 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	208,020.427	225,562.868	0.283	1.282	211,253.130	213,070.982	0.031	1.000	217,691.098	221,505.911	0.060	1.002
Work Effort GPA in 11th	2.423	2.494	0.203	0.959	2.446	2.456	0.029	1.063	2.490	2.481	-0.025	1.017
Cooperation GPA in 11th	2.619	2.675	0.216	0.983	2.638	2.644	0.026	1.107	2.663	2.664	0.003	1.160
Attendance Rate in 11th	0.967	0.973	0.178	0.987	0.969	0.968	-0.025	1.624	0.970	0.973	0.080	1.086
Ever Suspended from 9th-11th	-	-	0.004	1.051	-	-	-0.017	0.735	-	-	-0.012	0.799

See the note on the first page of the table.

Table C7 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
Educational Expectations in 11th: Unsure	0.093	0.070	-0.082	0.776	0.083	0.075	-0.030	0.910	0.071	0.077	0.022	1.071
Educational Expectations in 11th: HS or Less	-	-	-0.121	0.350	0.017	0.014	-0.026	0.817	-	-	0.041	1.615
Educational Expectations in 11th: Associate Degree or Certificate	0.054	0.027	-0.139	0.510	0.047	0.043	-0.021	0.912	0.030	0.029	-0.007	0.957
Educational Expectations in 11th: Bachelor's Degree or Higher	0.547	0.654	0.220	0.913	0.568	0.578	0.020	0.995	0.609	0.630	0.044	0.976
Educational Expectations in 11th: Missing	0.284	0.241	-0.097	0.900	0.285	0.291	0.013	1.013	0.284	0.255	-0.066	0.931

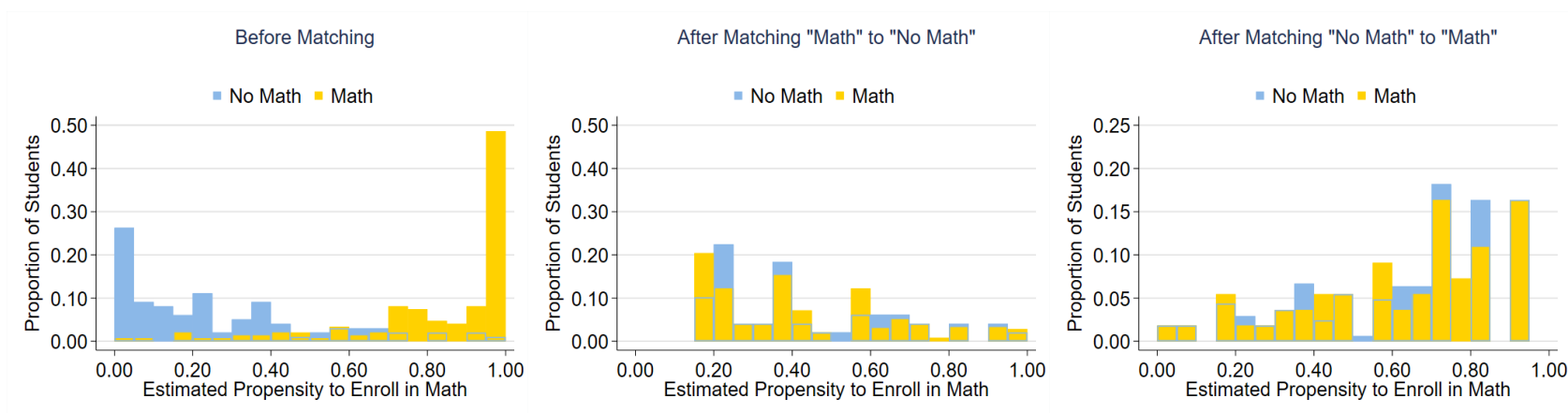
See the note on the first page of the table.

Table C7 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=980)	Math (N=1,677)	SMD	VR	No Math (N=828)	Math (N=1,086)	SMD	VR	No Math (N=844)	Math (N=1,425)	SMD	VR
Growth Mindset in 11th	0.086	0.165	0.099	1.086	0.105	0.090	-0.020	1.040	0.108	0.149	0.052	1.073
Missing Dummy: Growth Mindset in 11th	0.271	0.229	-0.098	0.892	0.272	0.282	0.024	1.025	0.269	0.242	-0.061	0.932
Academic Self-Efficacy in 11th	-0.087	0.011	0.115	1.159	-0.082	-0.105	-0.027	1.233	-0.111	-0.026	0.098	1.008
Missing Dummy: Academic Self-Efficacy in 11th	0.272	0.227	-0.105	0.885	0.272	0.283	0.025	1.026	0.270	0.242	-0.063	0.929
Indicator of 2016-17 Cohort	0.471	0.482	0.022	1.002	0.482	0.501	0.039	1.002	0.503	0.479	-0.049	0.996

See the note on the first page of the table.

Figure C8. Community College Analysis Distributions of Estimated Propensities of Taking Math over No Math in Group 3 Before and After Matching for Students with Non-Missing College-Level Math GPAs, 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 C8. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Age (in Months)	195.249	194.785	-0.098	1.245	195.236	198.412	0.689	1.423	195.550	195.226	-0.071	0.935
Gender: Female	0.495	0.547	0.104	0.988	0.551	0.420	-0.260	1.021	0.477	0.527	0.099	0.962
Race/Ethnicity: Asian	-	-	-0.074	0.676	-	-	-0.117	0.529	-	-	0.041	1.144
Race/Ethnicity: African American	-	-	0.088	1.528	-	-	-0.176	0.320	-	-	0.199	2.925

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Race/Ethnicity: Latinx	0.697	0.777	0.182	0.818	0.755	0.760	0.012	1.022	0.702	0.673	-0.063	1.014
Race/Ethnicity: Filipino	-	-	0.150	2.269	-	-	-0.012	0.979	-	-	0.143	1.716
Race/Ethnicity: White	0.182	0.088	-0.277	0.537	-	-	0.170	1.525	-	-	-0.228	0.604
Race/Ethnicity: Other	-	-	-0.114	0.452	-	-	-0.102	0.420	-	-	0.233	9.311
Ever Subsidized Meal Eligible from 9th-11th	-	-	0.272	0.506	-	-	0.169	0.643	-	-	-0.244	2.010

See the note on the first page of the table.

Table C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	0.045	1.324	-	-	-0.147	0.211	-	-	0.224	7.455
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.253	0.216	-0.085	0.895	0.306	0.297	-0.020	1.019	0.283	0.273	-0.022	0.942
Parents'/Guardians' Educational Attainment: HS Graduate	0.222	0.216	-0.014	0.977	-	-	0.021	1.070	-	-	0.169	1.275
Parents'/Guardians' Educational Attainment: Some College	0.162	0.122	-0.114	0.786	-	-	-0.181	0.568	-	-	0.192	1.958
Parents'/Guardians' Educational Attainment: College Graduate	-	-	-0.102	0.752	-	-	0.146	1.349	-	-	-0.065	0.837

See the note on the first page of the table.

Table C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	-	-	0.084	1.644	-	-	-0.102	0.420	-	-	0.086	2.118
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.232	0.331	0.220	1.238	-	-	0.013	1.054	0.365	0.273	-0.194	0.824
Nonresident School Enrollment in 11th	0.273	0.324	0.112	1.101	0.265	0.201	-0.149	0.855	-	-	0.121	1.167
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.064	0.674	-	-	-0.147	0.211	-	-	0.132	2.261
Number of School Moves from 9th-11th	0.082	0.081	-0.004	1.455	0.090	0.150	0.193	1.483	0.106	0.107	0.001	1.220

See the note on the first page of the table.

Table C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	-	-	-0.137	0.605	-	-	0.328	2.501	-	-	0.390	6.149
English Learner Status in 11th: English Only	0.333	0.291	-0.092	0.924	-	-	-0.336	0.637	0.236	0.309	0.162	1.140
English Learner Status in 11th: Initial Fluent English Proficient	0.152	0.149	-0.008	0.981	-	-	-0.042	0.922	-	-	0.144	1.359
English Learner Status in 11th: Limited English Proficient	-	-	-0.210	0.277	-	-	0.003	1.053	-	-	-0.075	0.683
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.465	0.547	0.165	0.993	0.571	0.722	0.313	0.849	0.614	0.509	-0.209	1.015

See the note on the first page of the table.

Table C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Gifted and Talented Program Participation in 11th	0.131	0.149	0.050	1.106	-	-	0.129	1.313	-	-	0.188	1.629
Math 11th Grade Weighted GPA	1.598	1.632	0.045	1.121	1.580	1.622	0.048	1.182	1.463	1.630	0.207	2.145
Cumulative Overall Weighted GPA at the End of 11th	2.468	2.539	0.155	0.645	2.564	2.538	-0.059	1.091	2.476	2.560	0.185	0.776
Standardized ELA SBAC Score in 11th	-0.023	0.187	0.288	0.627	0.029	-0.174	-0.307	0.755	0.078	0.120	0.062	1.479
Standardized Math SBAC Score in 11th	-0.063	-0.032	0.045	1.036	-0.126	-0.240	-0.169	0.884	0.083	0.042	-0.057	1.158

See the note on the first page of the table.

Table C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	0.917	1.591	0.371	2.138	1.312	1.232	-0.051	0.679	1.086	1.226	0.081	0.867
Science Credits Accumulated from 9th-11th	27.819	33.523	0.707	1.367	29.543	29.615	0.010	0.968	31.843	31.481	-0.047	0.794
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.163	0.413	-	-	0.306	2.927	-	-	0.265	6.118
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	1.374	1.176	-0.135	1.024	1.143	0.967	-0.132	0.764	1.155	1.309	0.107	1.066
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.687	0.514	-0.169	0.676	0.714	0.651	-0.058	0.814	0.511	0.564	0.054	1.389

See the note on the first page of the table.

Table C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.364	0.257	-0.150	0.637	0.245	0.275	0.042	1.028	0.338	0.455	0.141	1.285
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.222	0.068	-0.280	0.392	0.122	0.073	-0.103	0.933	0.052	0.164	0.218	4.817
Highest ERW PSAT Score by the End of 11th	423.217	431.008	0.119	0.694	426.257	425.431	-0.015	0.634	422.032	429.938	0.134	1.421
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	-0.077	0.809	-	-	0.237	1.716	-	-	-0.056	0.827
Highest Math PSAT Score by the End of 11th	423.654	430.484	0.104	0.816	427.678	428.186	0.008	1.264	434.991	436.841	0.028	0.911

See the note on the first page of the table.

Table C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.127	0.694	-	-	0.237	1.716	-	-	-0.056	0.827
Took the SAT or ACT before 12th	-	-	0.427	2.021	-	-	0.154	1.291	0.245	0.291	0.101	1.072
Participation in the AVID Program in 11th	-	-	N/A	N/A	-	-	N/A	N/A	-	-	N/A	N/A
Took a College or Career Seminar Course in 11th	0.152	0.189	0.100	1.189	-	-	-0.133	0.843	-	-	0.032	1.023
Ever Attended STEM-Focused School from 9th- 12th	-	-	0.331	2.630	-	-	-0.050	0.803	-	-	-0.179	0.534

See the note on the first page of the table.

Table C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	3.077	3.250	0.058	1.072	3.171	3.400	0.066	1.238	2.533	3.536	0.321	2.129
Cumulative Overall Weighted GPA at the End of 11th (Squared)	6.343	6.610	0.115	0.679	6.758	6.635	-0.053	1.160	6.349	6.729	0.162	0.802
Standardized ELA SBAC Score in 11th (Squared)	0.646	0.441	-0.282	0.466	0.485	0.382	-0.177	0.496	0.351	0.544	0.325	2.875
Standardized Math SBAC Score in 11th (Squared)	0.471	0.486	0.021	1.148	0.490	0.462	-0.044	0.574	0.453	0.539	0.115	1.046
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	2.920	6.992	0.384	3.757	4.678	3.452	-0.158	0.460	4.251	4.270	0.002	0.563

See the note on the first page of the table.

Table C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	828.298	1,198.418	0.680	2.075	929.808	930.297	0.001	1.007	1,077.013	1,043.016	-0.066	0.642
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	4.000	3.554	-0.069	1.005	3.265	2.379	-0.162	0.605	3.234	3.818	0.098	1.290
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	1.717	1.108	-0.177	0.620	1.816	1.449	-0.100	0.627	1.011	1.400	0.120	2.717
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.747	0.459	-0.134	0.453	0.571	0.583	0.005	0.817	0.681	0.964	0.112	1.204
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.485	0.176	-0.181	0.495	0.245	0.212	-0.023	1.486	0.088	0.455	0.219	11.314

See the note on the first page of the table.

Table C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	184,156.015	189,281.444	0.088	0.739	185,298.381	183,194.887	-0.044	0.599	180,815.628	188,840.376	0.152	1.618
Highest Math PSAT Score by the End of 11th (Squared)	184,181.875	189,166.930	0.090	0.710	186,683.355	187,947.281	0.022	0.747	193,670.099	195,043.352	0.023	0.664
Work Effort GPA in 11th	2.262	2.267	0.017	0.760	2.316	2.269	-0.126	1.668	2.211	2.292	0.239	0.874
Cooperation GPA in 11th	2.513	2.544	0.117	0.740	2.552	2.530	-0.084	0.962	2.489	2.533	0.181	1.103
Attendance Rate in 11th	0.962	0.964	0.072	1.594	0.967	0.975	0.287	1.248	0.955	0.962	0.210	1.545

See the note on the first page of the table.

Table C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Ever Suspended from 9th-11th	-	-	-0.142	0.000	-	-	N/A	N/A	-	-	N/A	N/A
Educational Expectations in 11th: Unsure	0.162	0.108	-0.156	0.709	-	-	-0.159	0.665	-	-	-0.144	0.764
Educational Expectations in 11th: HS or Less	-	-	0.000	1.000	-	-	-0.025	0.867	-	-	-0.004	0.932
Educational Expectations in 11th: Associate Degree or Certificate	-	-	-0.169	0.522	-	-	-0.163	0.477	-	-	-0.405	0.256
Educational Expectations in 11th: Bachelor's Degree or Higher	0.465	0.601	0.275	0.960	0.571	0.735	0.342	0.825	0.497	0.527	0.060	0.960

See the note on the first page of the table.

Table C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Educational Expectations in 11th: Missing	0.273	0.230	-0.099	0.889	-	-	-0.198	0.745	-	-	0.386	1.917
Growth Mindset in 11th	-0.048	0.085	0.166	0.754	-0.081	-0.108	-0.033	0.483	0.194	0.051	-0.191	0.477
Missing Dummy: Growth Mindset in 11th	0.253	0.209	-0.102	0.874	-	-	-0.149	0.798	-	-	0.397	1.977
Academic Self-Efficacy in 11th	-0.112	-0.219	-0.128	1.131	-0.146	-0.135	0.015	1.032	-0.455	-0.278	0.215	0.752
Missing Dummy: Academic Self-Efficacy in 11th	0.263	0.223	-0.092	0.892	-	-	-0.149	0.798	-	-	0.386	1.917

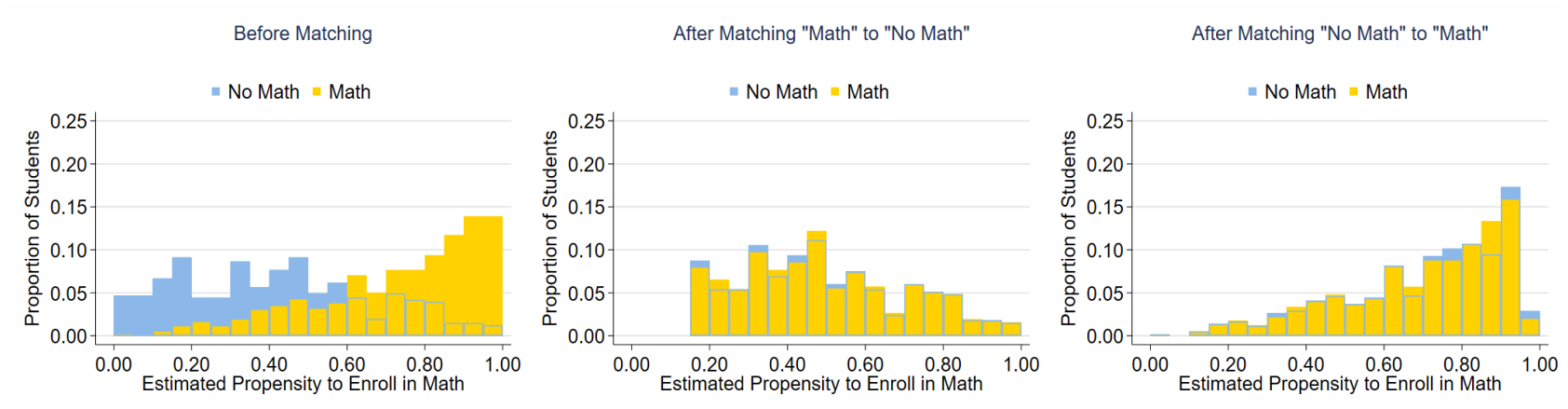
See the note on the first page of the table.

Table C8 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=99)	Math (N=148)	SMD	VR	No Math (N=49)	Math (N=55)	SMD	VR	No Math (N=55)	Math (N=55)	SMD	VR
Indicator of 2016-17 Cohort	0.727	0.723	-0.010	1.006	-	-	-0.083	1.148	0.732	0.673	-0.128	1.081

See the note on the first page of the table.

Figure C9. Community College Analysis Distributions of Estimated Propensities of Taking Math over No Math in Group 4 Before and After Matching for Students with Non-Missing College-Level Math GPAs, 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 C9. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Age (in Months)	195.327	194.821	-0.089	0.660	195.160	194.598	-0.104	0.849	194.383	194.795	0.088	1.435
Gender: Female	0.615	0.534	-0.163	1.050	0.599	0.628	0.059	0.975	0.554	0.555	0.002	0.991
Race/Ethnicity: Asian	0.042	0.041	-0.007	0.968	0.042	0.034	-0.044	0.809	-	-	0.054	1.291
Race/Ethnicity: African American	0.057	0.041	-0.075	0.727	0.060	0.047	-0.061	0.786	-	-	0.109	1.759

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 C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Race/Ethnicity: Latinx	0.711	0.752	0.091	0.908	0.720	0.731	0.024	0.978	0.781	0.747	-0.079	1.095
Race/Ethnicity: Filipinx	0.047	0.059	0.056	1.248	0.054	0.040	-0.068	0.746	0.060	0.053	-0.028	0.890
Race/Ethnicity: White	0.136	0.097	-0.122	0.745	0.114	0.144	0.089	1.222	0.094	0.101	0.024	1.059
Race/Ethnicity: Other	-	-	0.037	1.470	-	-	-0.051	0.537	-	-	0.029	1.337
Ever Subsidized Meal Eligible from 9th-11th	0.899	0.894	-0.016	1.043	0.898	0.918	0.071	0.820	0.868	0.893	0.078	0.824

See the note on the first page of the table.

Table C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.061	0.638	-	-	-0.056	0.554	-	-	0.091	2.453
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.235	0.217	-0.042	0.946	0.226	0.217	-0.022	0.973	0.207	0.228	0.050	1.062
Parents'/Guardians' Educational Attainment: HS Graduate	0.185	0.220	0.087	1.137	0.199	0.203	0.010	1.017	0.217	0.208	-0.021	0.962
Parents'/Guardians' Educational Attainment: Some College	0.143	0.161	0.049	1.100	0.160	0.167	0.021	1.041	0.177	0.153	-0.065	0.881
Parents'/Guardians' Educational Attainment: College Graduate	0.101	0.109	0.026	1.070	0.105	0.090	-0.053	0.868	0.133	0.103	-0.092	0.796

See the note on the first page of the table.

Table C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.035	0.052	0.084	1.464	0.039	0.045	0.029	1.143	-	-	0.124	1.850
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.301	0.241	-0.137	0.867	0.271	0.278	0.016	1.019	0.240	0.258	0.041	1.039
Nonresident School Enrollment in 11th	0.289	0.331	0.092	1.077	0.292	0.269	-0.050	0.954	0.277	0.313	0.078	1.063
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.075	1.880	-	-	0.026	1.249	-	-	0.104	3.270
Number of School Moves from 9th-11th	0.100	0.060	-0.148	0.541	0.084	0.063	-0.080	0.714	0.052	0.060	0.039	1.206

See the note on the first page of the table.

Table C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.062	0.078	0.064	1.242	0.063	0.058	-0.023	0.920	0.066	0.073	0.028	1.092
English Learner Status in 11th: English Only	0.314	0.294	-0.043	0.963	0.304	0.267	-0.081	0.928	0.296	0.299	0.006	0.997
English Learner Status in 11th: Initial Fluent English Proficient	0.148	0.158	0.027	1.052	0.148	0.171	0.065	1.132	0.161	0.148	-0.037	0.923
English Learner Status in 11th: Limited English Proficient	0.067	0.028	-0.182	0.439	0.060	0.043	-0.078	0.728	0.043	0.032	-0.057	0.750
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.472	0.520	0.097	1.001	0.488	0.518	0.060	1.002	0.500	0.521	0.042	0.989

See the note on the first page of the table.

Table C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Gifted and Talented Program Participation in 11th	0.106	0.158	0.153	1.399	0.114	0.110	-0.013	0.971	0.155	0.149	-0.015	0.962
Math 11th Grade Weighted GPA	2.406	2.850	0.555	1.225	2.484	2.508	0.032	1.042	2.767	2.767	-0.001	1.053
Cumulative Overall Weighted GPA at the End of 11th	2.831	3.123	0.569	0.964	2.908	2.930	0.046	0.956	3.088	3.069	-0.038	1.044
Standardized ELA SBAC Score in 11th	0.022	0.328	0.414	0.807	0.099	0.106	0.009	0.912	0.349	0.283	-0.094	0.984
Standardized Math SBAC Score in 11th	-0.059	0.328	0.624	0.877	0.034	0.030	-0.008	0.936	0.325	0.259	-0.111	0.901

See the note on the first page of the table.

Table C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	1.395	2.103	0.326	1.532	1.477	1.512	0.018	0.961	1.712	1.899	0.085	1.105
Science Credits Accumulated from 9th-11th	29.595	31.844	0.281	1.258	30.390	31.028	0.086	0.956	30.899	31.356	0.058	1.026
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	0.030	0.041	0.060	1.354	-	-	-0.052	0.718	-	-	0.074	1.505
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.780	0.438	-0.296	0.584	0.627	0.498	-0.116	0.829	0.392	0.480	0.087	1.094
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.351	0.195	-0.227	0.581	0.277	0.205	-0.117	0.660	0.214	0.199	-0.025	0.856

See the note on the first page of the table.

Table C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.291	0.138	-0.204	0.478	0.208	0.153	-0.080	0.680	0.165	0.148	-0.025	0.752
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.126	0.081	-0.102	0.836	0.090	0.068	-0.059	0.751	0.121	0.073	-0.109	0.573
Highest ERW PSAT Score by the End of 11th	424.020	446.215	0.329	1.105	427.583	427.862	0.004	0.992	453.924	442.031	-0.160	0.750
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.101	0.061	-0.148	0.628	0.072	0.074	0.007	1.025	0.058	0.064	0.025	1.085
Highest Math PSAT Score by the End of 11th	420.617	440.974	0.334	1.009	422.689	419.112	-0.060	0.933	443.312	437.358	-0.096	0.876

See the note on the first page of the table.

Table C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.099	0.055	-0.166	0.580	0.069	0.074	0.019	1.066	0.055	0.059	0.016	1.055
Took the SAT or ACT before 12th	0.183	0.309	0.297	1.429	0.211	0.218	0.017	1.026	0.300	0.286	-0.029	0.965
Participation in the AVID Program in 11th	-	-	0.028	1.189	-	-	-0.039	0.784	0.049	0.030	-0.095	0.626
Took a College or Career Seminar Course in 11th	0.153	0.162	0.026	1.049	0.166	0.145	-0.056	0.901	0.125	0.158	0.096	1.210
Ever Attended STEM-Focused School from 9th- 12th	0.069	0.147	0.252	1.945	0.075	0.073	-0.007	0.980	0.185	0.117	-0.189	0.681

See the note on the first page of the table.

Table C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	6.361	8.824	0.572	1.491	6.736	6.879	0.036	1.048	8.281	8.317	0.008	1.064
Cumulative Overall Weighted GPA at the End of 11th (Squared)	8.283	10.008	0.574	1.152	8.686	8.803	0.042	0.973	9.767	9.663	-0.035	1.007
Standardized ELA SBAC Score in 11th (Squared)	0.602	0.593	-0.011	0.824	0.578	0.529	-0.061	0.830	0.621	0.576	-0.058	0.971
Standardized Math SBAC Score in 11th (Squared)	0.413	0.467	0.088	1.029	0.361	0.336	-0.048	0.662	0.477	0.405	-0.124	0.707
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	5.675	10.144	0.296	2.391	6.134	6.078	-0.005	1.065	7.490	8.687	0.081	1.537

See the note on the first page of the table.

Table C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	932.256	1,085.108	0.275	1.594	979.135	1,015.807	0.073	1.018	1,016.163	1,046.819	0.055	1.026
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	2.296	1.178	-0.218	0.621	1.717	1.344	-0.081	0.835	1.122	1.299	0.039	1.156
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.716	0.383	-0.179	0.681	0.542	0.348	-0.132	0.537	0.433	0.374	-0.038	1.177
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.849	0.384	-0.134	0.841	0.605	0.405	-0.062	0.886	0.554	0.422	-0.037	0.931
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.225	0.181	-0.037	1.922	0.175	0.129	-0.050	0.892	0.261	0.148	-0.095	1.027

See the note on the first page of the table.

Table C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	184,097.456	203,870.408	0.324	1.204	187,210.239	187,403.098	0.003	1.019	212,303.894	200,125.710	-0.173	0.672
Highest Math PSAT Score by the End of 11th (Squared)	180,599.198	198,174.204	0.345	1.164	182,337.494	179,071.879	-0.067	0.948	200,618.731	194,898.784	-0.107	0.912
Work Effort GPA in 11th	2.447	2.585	0.446	0.744	2.488	2.493	0.017	0.919	2.593	2.565	-0.100	0.988
Cooperation GPA in 11th	2.633	2.738	0.436	0.662	2.662	2.657	-0.021	1.044	2.745	2.724	-0.099	0.954
Attendance Rate in 11th	0.965	0.976	0.360	0.659	0.970	0.968	-0.048	1.269	0.975	0.975	-0.010	1.275

See the note on the first page of the table.

Table C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Ever Suspended from 9th-11th	-	-	-0.103	0.319	-	-	-0.049	0.604	-	-	0.015	1.237
Educational Expectations in 11th: Unsure	0.101	0.075	-0.093	0.762	0.078	0.075	-0.014	0.960	0.070	0.078	0.030	1.092
Educational Expectations in 11th: HS or Less	-	-	-0.133	0.376	-	-	0.039	1.301	-	-	0.050	1.643
Educational Expectations in 11th: Associate Degree or Certificate	0.057	0.039	-0.083	0.700	0.060	0.063	0.012	1.046	0.044	0.039	-0.023	0.889
Educational Expectations in 11th: Bachelor's Degree or Higher	0.541	0.617	0.155	0.951	0.575	0.583	0.015	0.997	0.541	0.609	0.137	0.951

See the note on the first page of the table.

Table C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Educational Expectations in 11th: Missing	0.272	0.258	-0.031	0.966	0.268	0.256	-0.028	0.973	0.338	0.262	-0.166	0.856
Growth Mindset in 11th	0.000	0.153	0.182	0.728	0.028	0.060	0.037	0.853	0.074	0.124	0.058	0.704
Missing Dummy: Growth Mindset in 11th	0.274	0.256	-0.040	0.957	0.265	0.258	-0.015	0.986	0.317	0.256	-0.134	0.873
Academic Self-Efficacy in 11th	-0.015	0.108	0.149	1.054	0.006	0.051	0.053	1.069	0.069	0.080	0.014	1.202
Missing Dummy: Academic Self-Efficacy in 11th	0.269	0.256	-0.029	0.968	0.259	0.255	-0.010	0.991	0.325	0.256	-0.152	0.860

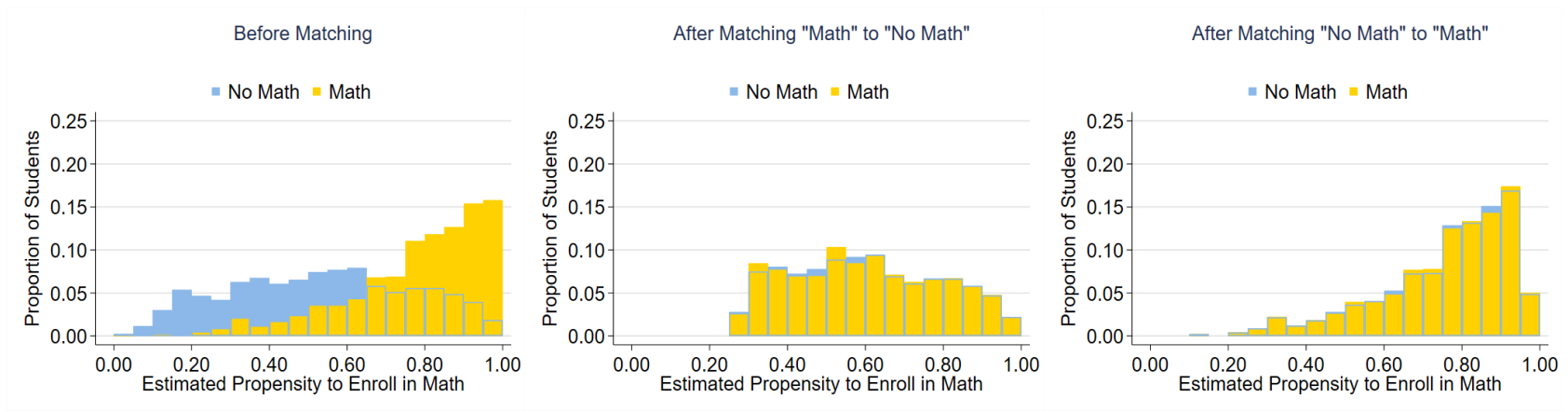
See the note on the first page of the table.

Table C9 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=405)	Math (N=640)	SMD	VR	No Math (N=332)	Math (N=395)	SMD	VR	No Math (N=322)	Math (N=562)	SMD	VR
Indicator of 2016-17 Cohort	0.598	0.655	0.118	0.939	0.605	0.644	0.080	0.962	0.696	0.642	-0.113	1.075

See the note on the first page of the table.

Figure C10. Community College Analysis Distributions of Estimated Propensities of Taking Math over No Math in Group 4 Before and After Matching for Students with Non-Missing College-Level Math GPAs, 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 C10. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Age (in Months)	195.269	194.878	-0.068	0.701	195.140	194.968	-0.031	0.875	194.751	194.944	0.037	0.962
Gender: Female	0.614	0.544	-0.141	1.045	0.611	0.587	-0.050	1.021	0.543	0.560	0.034	0.988
Race/Ethnicity: Asian	0.040	0.034	-0.029	0.864	0.039	0.038	-0.003	0.987	0.031	0.036	0.028	1.150
Race/Ethnicity: African American	0.056	0.059	0.012	1.045	0.050	0.062	0.053	1.230	0.055	0.052	-0.012	0.949

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Race/Ethnicity: Latinx	0.716	0.774	0.133	0.859	0.744	0.752	0.017	0.982	0.785	0.771	-0.034	1.041
Race/Ethnicity: Filipinx	0.047	0.052	0.025	1.110	0.053	0.044	-0.039	0.847	0.047	0.055	0.041	1.175
Race/Ethnicity: White	0.135	0.071	-0.212	0.564	0.106	0.099	-0.022	0.945	0.077	0.076	-0.004	0.981
Race/Ethnicity: Other	-	-	0.037	1.483	-	-	-0.049	0.536	-	-	0.044	1.652
Ever Subsidized Meal Eligible from 9th-11th	0.898	0.910	0.043	0.889	0.908	0.897	-0.038	1.110	0.899	0.906	0.024	0.933

See the note on the first page of the table.

Table C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.059	0.636	-	-	0.039	1.353	-	-	0.048	1.531
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.230	0.228	-0.006	0.991	0.228	0.232	0.009	1.012	0.232	0.231	-0.003	0.992
Parents'/Guardians' Educational Attainment: HS Graduate	0.188	0.227	0.095	1.146	0.197	0.183	-0.037	0.944	0.184	0.222	0.095	1.146
Parents'/Guardians' Educational Attainment: Some College	0.144	0.130	-0.040	0.918	0.136	0.173	0.102	1.217	0.176	0.125	-0.143	0.749
Parents'/Guardians' Educational Attainment: College Graduate	0.100	0.092	-0.028	0.924	0.111	0.085	-0.088	0.788	0.088	0.092	0.013	1.032

See the note on the first page of the table.

Table C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.035	0.043	0.044	1.234	0.039	0.031	-0.044	0.801	0.034	0.046	0.061	1.329
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.302	0.280	-0.050	0.954	0.289	0.297	0.017	1.016	0.286	0.285	-0.003	0.992
Nonresident School Enrollment in 11th	0.295	0.333	0.080	1.065	0.297	0.292	-0.010	0.991	0.295	0.309	0.032	1.023
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.068	1.812	-	-	0.006	1.066	-	-	0.094	2.548
Number of School Moves from 9th-11th	0.100	0.070	-0.104	0.702	0.099	0.086	-0.041	1.002	0.074	0.073	-0.003	1.092

See the note on the first page of the table.

Table C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.065	0.076	0.041	1.147	0.067	0.065	-0.008	0.971	0.095	0.075	-0.074	0.796
English Learner Status in 11th: English Only	0.307	0.264	-0.096	0.911	0.289	0.285	-0.009	0.992	0.254	0.272	0.041	1.040
English Learner Status in 11th: Initial Fluent English Proficient	0.149	0.158	0.025	1.048	0.153	0.174	0.056	1.109	0.132	0.152	0.056	1.116
English Learner Status in 11th: Limited English Proficient	0.063	0.039	-0.110	0.632	0.058	0.055	-0.013	0.950	0.053	0.042	-0.052	0.794
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.481	0.540	0.117	0.994	0.500	0.486	-0.027	1.000	0.561	0.535	-0.053	1.005

See the note on the first page of the table.

Table C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Gifted and Talented Program Participation in 11th	0.107	0.129	0.067	1.171	0.117	0.130	0.039	1.095	0.119	0.122	0.007	1.012
Math 11th Grade Weighted GPA	2.399	2.782	0.487	1.118	2.477	2.516	0.051	1.013	2.755	2.717	-0.048	0.964
Cumulative Overall Weighted GPA at the End of 11th	2.822	3.039	0.418	0.973	2.887	2.895	0.016	0.991	3.053	3.007	-0.090	0.947
Standardized ELA SBAC Score in 11th	0.019	0.266	0.335	0.806	0.093	0.073	-0.025	1.176	0.264	0.231	-0.047	1.004
Standardized Math SBAC Score in 11th	-0.060	0.253	0.491	0.943	0.021	0.044	0.035	1.101	0.252	0.203	-0.079	0.975

See the note on the first page of the table.

Table C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	1.396	1.952	0.265	1.374	1.518	1.600	0.041	1.076	1.899	1.879	-0.009	1.005
Science Credits Accumulated from 9th-11th	29.613	32.534	0.348	1.510	30.144	30.323	0.024	1.011	31.673	31.981	0.037	1.227
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	0.033	0.038	0.028	1.153	0.031	0.033	0.017	1.092	0.032	0.038	0.032	1.171
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.777	0.469	-0.267	0.617	0.678	0.716	0.031	1.064	0.520	0.502	-0.017	0.881
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.358	0.205	-0.217	0.594	0.297	0.325	0.038	1.045	0.217	0.221	0.006	1.063

See the note on the first page of the table.

Table C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.288	0.160	-0.170	0.560	0.247	0.321	0.086	1.238	0.217	0.169	-0.066	0.716
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.121	0.082	-0.092	0.785	0.094	0.141	0.101	1.520	0.072	0.088	0.040	1.135
Highest ERW PSAT Score by the End of 11th	424.020	438.120	0.214	1.046	427.162	432.981	0.087	1.080	443.443	434.989	-0.121	0.843
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.100	0.060	-0.146	0.631	0.072	0.087	0.053	1.180	0.059	0.065	0.025	1.088
Highest Math PSAT Score by the End of 11th	420.438	436.896	0.273	1.038	423.864	430.691	0.116	1.009	436.742	433.178	-0.056	0.830

See the note on the first page of the table.

Table C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.098	0.056	-0.158	0.597	0.069	0.086	0.062	1.216	0.056	0.060	0.016	1.059
Took the SAT or ACT before 12th	0.184	0.318	0.312	1.443	0.217	0.210	-0.016	0.978	0.270	0.299	0.063	1.057
Participation in the AVID Program in 11th	-	-	0.085	1.645	-	-	-0.028	0.829	-	-	0.014	1.077
Took a College or Career Seminar Course in 11th	0.163	0.181	0.049	1.088	0.175	0.163	-0.033	0.943	0.169	0.179	0.027	1.043
Ever Attended STEM-Focused School from 9th- 12th	0.072	0.197	0.371	2.358	0.083	0.095	0.040	1.124	0.172	0.158	-0.038	0.929

See the note on the first page of the table.

Table C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	6.337	8.391	0.487	1.369	6.721	6.924	0.050	1.100	8.237	8.006	-0.052	0.948
Cumulative Overall Weighted GPA at the End of 11th (Squared)	8.235	9.499	0.420	1.124	8.580	8.624	0.016	1.009	9.596	9.300	-0.095	0.913
Standardized ELA SBAC Score in 11th (Squared)	0.600	0.555	-0.056	0.683	0.569	0.664	0.105	1.196	0.555	0.543	-0.016	0.925
Standardized Math SBAC Score in 11th (Squared)	0.421	0.458	0.059	0.942	0.390	0.430	0.067	0.933	0.449	0.419	-0.051	0.887
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	5.639	8.888	0.233	2.009	6.222	6.773	0.044	1.341	8.515	8.488	-0.002	1.359

See the note on the first page of the table.

Table C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	933.080	1,143.430	0.347	2.123	965.162	976.572	0.023	1.027	1,064.995	1,098.963	0.057	1.328
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	2.247	1.234	-0.201	0.620	1.889	2.034	0.027	1.118	1.480	1.323	-0.033	0.930
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.749	0.411	-0.172	0.660	0.614	0.654	0.020	1.128	0.412	0.439	0.016	1.477
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.819	0.438	-0.114	0.820	0.708	0.904	0.051	1.480	0.669	0.476	-0.056	0.912
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.214	0.164	-0.048	1.420	0.178	0.277	0.087	2.049	0.154	0.177	0.022	1.650

See the note on the first page of the table.

Table C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	184,014.367	196,368.965	0.210	1.098	186,713.632	192,056.599	0.089	1.142	201,915.456	193,685.221	-0.129	0.807
Highest Math PSAT Score by the End of 11th (Squared)	180,324.997	194,573.228	0.284	1.161	183,075.339	188,939.017	0.120	1.119	195,112.000	191,288.330	-0.072	0.851
Work Effort GPA in 11th	2.440	2.538	0.306	0.792	2.469	2.471	0.008	0.925	2.552	2.528	-0.080	0.974
Cooperation GPA in 11th	2.625	2.684	0.231	0.797	2.642	2.649	0.028	0.855	2.690	2.677	-0.056	1.003
Attendance Rate in 11th	0.964	0.972	0.240	1.075	0.967	0.964	-0.065	2.017	0.971	0.971	0.005	1.393

See the note on the first page of the table.

Table C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Ever Suspended from 9th-11th	-	-	-0.084	0.409	-	-	0.014	1.199	-	-	0.054	2.288
Educational Expectations in 11th: Unsure	0.098	0.089	-0.030	0.917	0.086	0.087	0.002	1.006	0.058	0.089	0.118	1.476
Educational Expectations in 11th: HS or Less	0.028	0.014	-0.096	0.514	-	-	0.026	1.175	-	-	0.027	1.240
Educational Expectations in 11th: Associate Degree or Certificate	0.056	0.043	-0.057	0.788	0.061	0.060	-0.003	0.990	0.061	0.049	-0.052	0.810
Educational Expectations in 11th: Bachelor's Degree or Higher	0.553	0.599	0.093	0.970	0.569	0.555	-0.030	1.008	0.606	0.592	-0.028	1.006

See the note on the first page of the table.

Table C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Educational Expectations in 11th: Missing	0.265	0.254	-0.025	0.972	0.261	0.272	0.024	1.027	0.262	0.254	-0.019	0.974
Growth Mindset in 11th	0.006	0.146	0.165	0.725	0.036	0.085	0.057	0.763	0.134	0.118	-0.020	0.809
Missing Dummy: Growth Mindset in 11th	0.267	0.250	-0.041	0.955	0.264	0.270	0.013	1.014	0.244	0.248	0.007	1.003
Academic Self-Efficacy in 11th	-0.001	0.090	0.110	1.053	0.005	0.038	0.040	1.005	0.081	0.070	-0.014	1.167
Missing Dummy: Academic Self-Efficacy in 11th	0.263	0.249	-0.033	0.963	0.261	0.266	0.012	1.013	0.253	0.248	-0.013	0.980

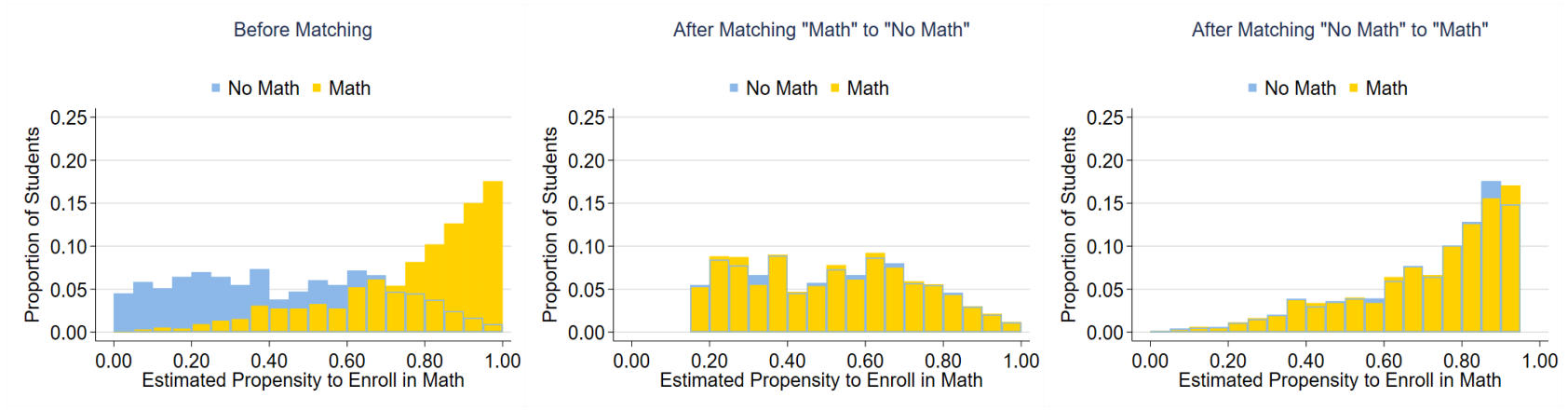
See the note on the first page of the table.

Table C10 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=430)	Math (N=1,058)	SMD	VR	No Math (N=360)	Math (N=597)	SMD	VR	No Math (N=384)	Math (N=937)	SMD	VR
Indicator of 2016-17 Cohort	0.600	0.637	0.076	0.962	0.617	0.615	-0.004	1.002	0.664	0.637	-0.056	1.031

See the note on the first page of the table.

Figure C11. Community College Analysis Distributions of Estimated Propensities of Taking Math over No Math in Group 5 Before and After Matching for Students with Non-Missing College-Level Math GPAs, 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 C11. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
Age (in Months)	194.934	194.553	-0.080	0.838	194.586	194.405	-0.041	0.757	194.513	194.589	0.018	1.144
Gender: Female	0.589	0.515	-0.148	1.031	0.589	0.607	0.037	0.987	0.583	0.529	-0.107	1.018
Race/Ethnicity: Asian	0.066	0.076	0.037	1.131	0.064	0.064	0.002	1.009	0.103	0.075	-0.096	0.751
Race/Ethnicity: African American	0.068	0.037	-0.140	0.558	0.071	0.074	0.012	1.043	0.043	0.044	0.005	1.016

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 C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
Race/Ethnicity: Latinx	0.636	0.671	0.075	0.952	0.667	0.672	0.012	0.994	0.664	0.681	0.038	0.966
Race/Ethnicity: Filipinx	0.036	0.094	0.237	2.459	0.041	0.031	-0.056	0.754	0.060	0.073	0.050	1.185
Race/Ethnicity: White	0.189	0.109	-0.225	0.635	0.153	0.154	0.001	1.005	0.113	0.114	0.004	1.004
Race/Ethnicity: Other	-	-	0.079	2.324	-	-	0.013	1.201	-	-	-0.043	0.701
Ever Subsidized Meal Eligible from 9th-11th	0.840	0.886	0.134	0.751	0.840	0.869	0.083	0.847	0.892	0.876	-0.052	1.125

See the note on the first page of the table.

Table C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.023	0.017	-0.038	0.770	-	-	-0.020	0.871	-	-	-0.016	0.895
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.206	0.198	-0.019	0.971	0.212	0.192	-0.052	0.928	0.191	0.199	0.022	1.028
Parents'/Guardians' Educational Attainment: HS Graduate	0.192	0.193	0.001	1.001	0.199	0.230	0.076	1.114	0.208	0.197	-0.026	0.955
Parents'/Guardians' Educational Attainment: Some College	0.187	0.149	-0.101	0.834	0.176	0.165	-0.030	0.951	0.135	0.157	0.062	1.126
Parents'/Guardians' Educational Attainment: College Graduate	0.155	0.150	-0.013	0.974	0.144	0.126	-0.051	0.898	0.120	0.147	0.078	1.177

See the note on the first page of the table.

Table C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.047	0.048	0.004	1.015	0.046	0.050	0.020	1.093	0.052	0.045	-0.030	0.875
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.213	0.262	0.115	1.152	0.224	0.238	0.033	1.046	0.295	0.255	-0.090	0.907
Nonresident School Enrollment in 11th	0.391	0.417	0.055	1.021	0.406	0.432	0.051	1.019	0.487	0.403	-0.169	0.957
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.146	5.053	-	-	0.007	1.102	-	-	0.141	8.997
Number of School Moves from 9th- 11th	0.047	0.067	0.085	1.393	0.049	0.046	-0.013	0.950	0.047	0.051	0.016	0.844

See the note on the first page of the table.

Table C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.023	0.036	0.078	1.555	-	-	0.046	1.317	-	-	0.062	1.470
English Learner Status in 11th: English Only	0.326	0.295	-0.068	0.945	0.333	0.301	-0.070	0.948	0.282	0.296	0.031	1.023
English Learner Status in 11th: Initial Fluent English Proficient	0.206	0.207	0.004	1.004	0.199	0.230	0.075	1.113	0.201	0.212	0.028	1.035
English Learner Status in 11th: Limited English Proficient	-	-	-0.104	0.383	-	-	-0.071	0.444	-	-	0.052	1.924
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.449	0.491	0.084	1.009	0.457	0.465	0.016	1.004	0.513	0.483	-0.060	0.993

See the note on the first page of the table.

Table C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
Gifted and Talented Program Participation in 11th	0.291	0.363	0.155	1.121	0.313	0.353	0.085	1.064	0.391	0.354	-0.076	0.954
Math 11th Grade Weighted GPA	2.443	2.818	0.303	1.196	2.514	2.507	-0.006	1.099	2.766	2.706	-0.047	0.954
Cumulative Overall Weighted GPA at the End of 11th	3.166	3.290	0.246	0.922	3.200	3.171	-0.054	1.168	3.260	3.256	-0.008	0.953
Standardized ELA SBAC Score in 11th	0.371	0.591	0.318	0.646	0.482	0.443	-0.057	1.038	0.567	0.563	-0.006	0.909
Standardized Math SBAC Score in 11th	0.429	0.770	0.545	0.967	0.531	0.552	0.036	0.984	0.679	0.689	0.017	1.148

See the note on the first page of the table.

Table C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	2.613	3.630	0.363	1.234	2.878	2.853	-0.009	1.018	3.397	3.348	-0.017	0.917
Science Credits Accumulated from 9th-11th	30.448	32.644	0.270	1.094	31.001	30.645	-0.044	1.026	32.389	32.095	-0.035	0.805
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.009	0.927	-	-	0.014	1.151	-	-	0.010	1.090
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.506	0.366	-0.150	0.675	0.454	0.579	0.121	1.299	0.370	0.384	0.016	1.013
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.179	0.109	-0.137	0.481	0.151	0.200	0.093	1.256	0.169	0.123	-0.102	0.863

See the note on the first page of the table.

Table C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.185	0.114	-0.123	0.501	0.162	0.219	0.087	1.303	0.119	0.127	0.016	0.934
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.091	0.035	-0.150	0.289	0.068	0.098	0.073	1.398	0.065	0.041	-0.076	0.650
Highest ERW PSAT Score by the End of 11th	459.841	477.929	0.247	0.963	465.541	462.478	-0.040	1.125	471.765	473.449	0.023	0.960
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.062	0.050	-0.053	0.813	0.050	0.055	0.022	1.094	0.084	0.054	-0.117	0.663
Highest Math PSAT Score by the End of 11th	463.709	483.987	0.306	1.441	467.338	470.112	0.046	0.937	480.924	477.930	-0.044	0.883

See the note on the first page of the table.

Table C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.060	0.045	-0.069	0.755	0.048	0.051	0.016	1.072	0.065	0.049	-0.071	0.756
Took the SAT or ACT before 12th	0.368	0.439	0.145	1.058	0.416	0.409	-0.013	0.997	0.519	0.440	-0.158	0.981
Participation in the AVID Program in 11th	0.025	0.024	0.000	0.998	-	-	-0.058	0.691	0.032	0.024	-0.052	0.737
Took a College or Career Seminar Course in 11th	0.130	0.130	-0.002	0.995	0.137	0.141	0.011	1.025	0.150	0.136	-0.041	0.914
Ever Attended STEM-Focused School from 9th- 12th	0.094	0.177	0.242	1.700	0.107	0.106	-0.003	0.995	0.169	0.156	-0.036	0.930

See the note on the first page of the table.

Table C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
Took a Precalculus Course by the End of 11th	0.868	0.936	0.229	0.524	0.879	0.901	0.069	0.842	0.927	0.925	-0.011	1.028
Took an IDS Course by the End of 11th	-	-	-0.152	0.325	-	-	0.025	1.177	-	-	-0.002	0.974
Took a Statistics Course by the End of 11th	0.094	0.048	-0.181	0.534	0.094	0.067	-0.097	0.741	0.052	0.056	0.019	1.070
Took Other Advanced Math by the End of 11th	-	-	0.006	1.080	-	-	0.011	1.134	-	-	-0.015	0.829
Math 11th Grade Weighted GPA (Squared)	7.356	9.598	0.346	1.330	7.732	7.835	0.017	0.988	9.290	8.897	-0.057	0.790

See the note on the first page of the table.

Table C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th (Squared)	10.285	11.063	0.243	0.956	10.504	10.364	-0.042	1.101	10.888	10.851	-0.012	0.943
Standardized ELA SBAC Score in 11th (Squared)	0.718	0.725	0.008	0.868	0.690	0.671	-0.023	1.153	0.754	0.712	-0.047	0.815
Standardized Math SBAC Score in 11th (Squared)	0.581	0.976	0.419	1.943	0.604	0.620	0.022	1.084	0.766	0.827	0.069	1.168
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	13.861	21.867	0.301	1.547	15.503	15.477	-0.001	0.824	19.942	18.962	-0.036	0.696
Science Credits Accumulated from 9th-11th (Squared)	990.306	1,134.835	0.240	1.293	1,026.690	1,006.356	-0.035	0.955	1,128.737	1,094.571	-0.053	0.783

See the note on the first page of the table.

Table C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.291	0.834	-0.119	0.524	1.126	1.526	0.090	1.608	0.866	0.891	0.008	1.155
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.387	0.183	-0.133	0.175	0.274	0.355	0.066	0.787	0.251	0.208	-0.045	0.799
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.472	0.233	-0.109	0.344	0.390	0.521	0.052	1.348	0.268	0.255	-0.008	1.157
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.223	0.063	-0.134	0.104	0.142	0.201	0.060	0.886	0.119	0.077	-0.064	0.593
Highest ERW PSAT Score by the End of 11th (Squared)	216,904.786	233,669.493	0.239	1.029	222,285.368	220,127.542	-0.030	1.137	227,940.690	229,348.906	0.020	1.009

See the note on the first page of the table.

Table C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	218,628.830	239,437.370	0.335	1.521	222,213.184	224,567.523	0.041	0.987	236,211.664	232,792.896	-0.053	0.903
Work Effort GPA in 11th	2.524	2.588	0.197	0.945	2.550	2.522	-0.083	1.348	2.545	2.572	0.084	1.045
Cooperation GPA in 11th	2.689	2.745	0.235	0.887	2.711	2.681	-0.122	1.261	2.722	2.730	0.034	1.158
Attendance Rate in 11th	0.971	0.977	0.188	1.014	0.972	0.966	-0.110	4.532	0.975	0.977	0.041	1.285
Ever Suspended from 9th-11th	-	-	0.046	1.885	-	-	0.007	1.102	-	-	-0.085	0.341

See the note on the first page of the table.

Table C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
Educational Expectations in 11th: Unsure	0.089	0.067	-0.080	0.777	0.082	0.087	0.016	1.050	0.076	0.068	-0.031	0.896
Educational Expectations in 11th: HS or Less	-	-	-0.065	0.435	-	-	-0.017	0.803	-	-	0.036	1.803
Educational Expectations in 11th: Associate Degree or Certificate	0.057	0.020	-0.189	0.374	0.039	0.039	-0.001	0.999	-	-	0.013	1.078
Educational Expectations in 11th: Bachelor's Degree or Higher	0.574	0.673	0.207	0.898	0.612	0.626	0.029	0.988	0.663	0.655	-0.016	1.004
Educational Expectations in 11th: Missing	0.272	0.235	-0.085	0.907	0.260	0.243	-0.040	0.957	0.236	0.247	0.027	1.026

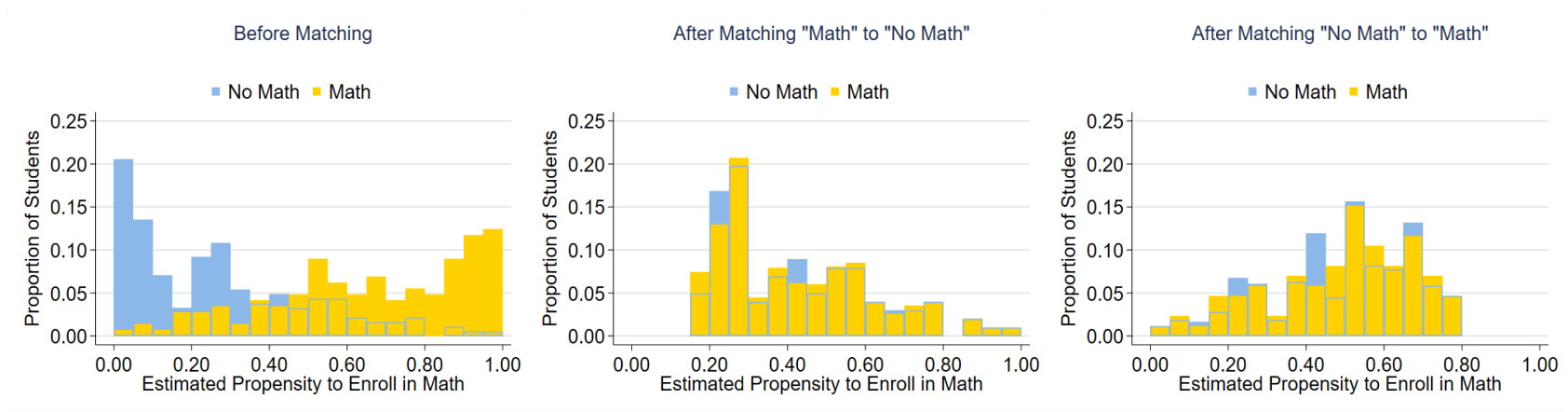
See the note on the first page of the table.

Table C11 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=530)	Math (N=980)	SMD	VR	No Math (N=438)	Math (N=577)	SMD	VR	No Math (N=446)	Math (N=797)	SMD	VR
Growth Mindset in 11th	0.107	0.185	0.097	1.038	0.137	0.096	-0.050	1.181	0.083	0.163	0.097	0.905
Missing Dummy: Growth Mindset in 11th	0.260	0.221	-0.091	0.894	0.247	0.239	-0.018	0.981	0.229	0.232	0.006	1.002
Academic Self-Efficacy in 11th	-0.082	0.064	0.174	1.164	-0.065	-0.096	-0.036	1.277	-0.063	0.022	0.102	1.170
Missing Dummy: Academic Self-Efficacy in 11th	0.260	0.222	-0.089	0.897	0.247	0.239	-0.017	0.982	0.235	0.233	-0.004	0.988
Indicator of 2016-17 Cohort	0.530	0.527	-0.007	1.000	0.532	0.528	-0.007	1.003	0.476	0.512	0.072	0.995

See the note on the first page of the table.

Figure C12. Community College Analysis Distributions of Estimated Propensities of Taking Math over No Math in Group 3 Before and After Matching for Students with Non-Missing Non-Math STEM GPAs, 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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Age (in Months)	194.938	194.892	-0.009	1.547	194.686	194.760	0.015	1.710	194.188	194.640	0.097	1.679
Gender: Female	0.465	0.490	0.049	1.006	0.495	0.439	-0.112	0.998	0.561	0.488	-0.144	1.006
Race/Ethnicity: Asian	-	-	-0.124	0.434	-	-	-0.064	0.458	-	-	0.102	3.934
Race/Ethnicity: African American	-	-	-0.176	0.567	-	-	-0.034	0.888	-	-	0.078	1.326

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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Race/Ethnicity: Latinx	0.665	0.766	0.224	0.807	0.782	0.752	-0.070	1.108	0.821	0.756	-0.159	1.247
Race/Ethnicity: Filipinx	-	-	0.197	2.445	-	-	0.196	2.132	-	-	0.137	2.090
Race/Ethnicity: White	0.135	0.090	-0.144	0.699	-	-	-0.036	0.921	-	-	0.012	1.024
Race/Ethnicity: Other	-	-	-0.210	0.188	-	-	0.108	Inf	-	-	0.111	4.915
Ever Subsidized Meal Eligible from 9th-11th	-	-	0.277	0.468	-	-	-0.054	1.189	-	-	-0.104	1.487

See the note on the first page of the table.

Table C12 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.210	0.000	-	-	N/A	N/A	-	-	N/A	N/A
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.227	0.228	0.001	1.003	0.317	0.311	-0.012	1.003	0.332	0.244	-0.194	0.825
Parents'/Guardians' Educational Attainment: HS Graduate	0.232	0.248	0.037	1.048	0.218	0.218	0.000	1.013	0.184	0.221	0.091	1.136
Parents'/Guardians' Educational Attainment: Some College	0.189	0.166	-0.062	0.902	0.149	0.125	-0.067	0.877	0.135	0.174	0.109	1.224
Parents'/Guardians' Educational Attainment: College Graduate	0.086	0.083	-0.013	0.962	-	-	0.101	1.382	-	-	0.142	1.673

See the note on the first page of the table.

Table C12 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	-	-	0.122	2.512	-	-	-0.044	0.610	-	-	0.023	1.237
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.254	0.248	-0.013	0.986	0.238	0.242	0.010	1.026	0.293	0.267	-0.056	0.939
Nonresident School Enrollment in 11th	0.303	0.324	0.046	1.039	0.287	0.329	0.090	1.092	0.314	0.326	0.024	1.011
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.087	0.430	-	-	0.022	1.246	-	-	-0.044	0.688
Number of School Moves from 9th- 11th	0.063	0.122	0.185	2.326	0.074	0.063	-0.037	0.732	0.092	0.063	-0.109	0.687

See the note on the first page of the table.

Table C12 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	-	-	-0.118	0.596	-	-	-0.063	0.682	-	-	0.013	1.060
English Learner Status in 11th: English Only	0.422	0.262	-0.340	0.794	0.297	0.266	-0.068	0.947	0.241	0.314	0.162	1.168
English Learner Status in 11th: Initial Fluent English Proficient	0.141	0.214	0.192	1.394	0.178	0.253	0.181	1.306	0.117	0.198	0.221	1.523
English Learner Status in 11th: Limited English Proficient	-	-	-0.128	0.490	-	-	-0.176	0.308	-	-	-0.193	0.384
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.395	0.503	0.219	1.048	0.485	0.469	-0.031	1.010	0.579	0.465	-0.228	1.013

See the note on the first page of the table.

Table C12 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Gifted and Talented Program Participation in 11th	0.092	0.083	-0.032	0.911	-	-	0.064	1.206	-	-	0.017	1.041
Math 11th Grade Weighted GPA	1.498	1.531	0.046	1.242	1.465	1.387	-0.121	0.792	1.474	1.526	0.069	0.906
Cumulative Overall Weighted GPA at the End of 11th	2.346	2.455	0.237	0.858	2.388	2.367	-0.048	0.865	2.387	2.423	0.086	1.299
Standardized ELA SBAC Score in 11th	-0.156	0.134	0.386	0.686	-0.067	-0.087	-0.030	0.668	-0.059	-0.006	0.073	0.917
Standardized Math SBAC Score in 11th	-0.294	-0.101	0.291	0.860	-0.262	-0.284	-0.034	1.108	-0.232	-0.199	0.051	0.846

See the note on the first page of the table.

Table C12 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	0.761	1.328	0.349	1.716	0.963	1.265	0.171	1.592	0.996	0.897	-0.061	0.714
Science Credits Accumulated from 9th-11th	28.725	30.829	0.266	1.319	29.085	28.453	-0.087	0.983	30.978	30.393	-0.068	0.942
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	0.003	1.022	-	-	-0.081	0.511	-	-	-0.021	0.829
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	1.476	1.393	-0.051	1.025	1.248	1.328	0.053	0.839	1.587	1.407	-0.103	0.712
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.741	0.552	-0.185	0.801	0.693	0.666	-0.027	0.809	0.540	0.570	0.031	0.919

See the note on the first page of the table.

Table C12 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.427	0.414	-0.014	0.825	0.327	0.370	0.054	1.394	0.410	0.302	-0.135	0.641
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.146	0.110	-0.076	1.055	0.099	0.066	-0.088	0.820	0.062	0.093	0.087	1.534
Highest ERW PSAT Score by the End of 11th	415.105	428.537	0.195	1.055	418.435	415.616	-0.045	0.994	414.655	418.976	0.065	1.019
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	-0.054	0.834	-	-	-0.114	0.615	-	-	-0.072	0.790
Highest Math PSAT Score by the End of 11th	418.483	425.470	0.109	0.856	414.015	422.002	0.121	0.902	416.845	420.645	0.059	0.850

See the note on the first page of the table.

Table C12 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.054	0.834	-	-	-0.114	0.615	-	-	-0.072	0.790
Took the SAT or ACT before 12th	0.103	0.172	0.203	1.551	0.129	0.151	0.064	1.159	0.109	0.163	0.158	1.398
Participation in the AVID Program in 11th	-	-	-0.124	0.324	-	-	-0.002	0.996	-	-	-0.107	0.444
Took a College or Career Seminar Course in 11th	0.114	0.166	0.150	1.375	-	-	-0.199	0.560	-	-	0.122	1.429
Ever Attended STEM-Focused School from 9th- 12th	-	-	-0.033	0.892	-	-	-0.082	0.720	-	-	0.046	1.152

See the note on the first page of the table.

Table C12 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	2.711	2.925	0.079	1.180	2.617	2.290	-0.149	0.601	2.736	2.841	0.038	0.903
Cumulative Overall Weighted GPA at the End of 11th (Squared)	5.732	6.226	0.219	0.916	5.911	5.780	-0.060	0.842	5.844	6.062	0.109	1.277
Standardized ELA SBAC Score in 11th (Squared)	0.689	0.473	-0.231	0.333	0.588	0.393	-0.262	0.422	0.534	0.491	-0.059	0.623
Standardized Math SBAC Score in 11th (Squared)	0.561	0.417	-0.185	0.595	0.451	0.499	0.062	1.170	0.482	0.405	-0.115	0.965
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	2.514	5.079	0.272	2.148	3.289	5.312	0.176	2.191	4.006	2.972	-0.101	0.428

See the note on the first page of the table.

Table C12 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	878.927	1,021.353	0.273	1.589	899.115	861.146	-0.082	0.905	1,033.911	994.248	-0.069	0.861
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	4.730	4.552	-0.022	0.853	4.000	3.789	-0.029	0.754	6.063	4.523	-0.155	0.419
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	1.703	1.228	-0.134	1.001	1.624	1.357	-0.086	0.673	1.234	1.198	-0.011	1.209
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.130	0.952	-0.054	0.455	0.624	0.849	0.105	1.254	0.927	0.581	-0.158	0.413
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.232	0.234	0.002	2.992	0.158	0.125	-0.048	0.950	0.103	0.163	0.088	1.601

See the note on the first page of the table.

Table C12 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	176,894.367	188,468.533	0.191	1.167	179,064.602	176,638.528	-0.044	1.006	176,251.301	179,970.056	0.065	1.066
Highest Math PSAT Score by the End of 11th (Squared)	179,512.520	184,774.013	0.098	0.831	175,924.963	182,107.534	0.114	0.764	178,227.236	180,767.689	0.046	0.722
Work Effort GPA in 11th	2.187	2.232	0.123	1.172	2.201	2.151	-0.134	1.243	2.201	2.225	0.065	1.257
Cooperation GPA in 11th	2.483	2.517	0.122	0.931	2.497	2.492	-0.019	0.941	2.514	2.523	0.033	1.148
Attendance Rate in 11th	0.964	0.961	-0.085	1.585	0.965	0.969	0.107	1.128	0.971	0.964	-0.204	1.791

See the note on the first page of the table.

Table C12 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Ever Suspended from 9th-11th	-	-	-0.147	0.000	-	-	N/A	N/A	-	-	N/A	N/A
Educational Expectations in 11th: Unsure	0.141	0.083	-0.184	0.629	0.129	0.132	0.008	1.031	-	-	-0.066	0.821
Educational Expectations in 11th: HS or Less	-	-	0.078	1.576	-	-	-0.200	0.139	-	-	0.039	1.301
Educational Expectations in 11th: Associate Degree or Certificate	-	-	-0.141	0.626	-	-	0.086	1.323	-	-	-0.046	0.878
Educational Expectations in 11th: Bachelor's Degree or Higher	0.497	0.572	0.151	0.981	0.525	0.551	0.052	1.005	0.566	0.547	-0.039	1.001

See the note on the first page of the table.

Table C12 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Educational Expectations in 11th: Missing	0.249	0.255	0.015	1.019	0.248	0.221	-0.063	0.935	0.209	0.256	0.110	1.142
Growth Mindset in 11th	-0.031	0.057	0.108	0.910	-0.019	-0.026	-0.007	1.159	0.061	0.097	0.042	0.899
Missing Dummy: Growth Mindset in 11th	0.238	0.248	0.024	1.031	0.248	0.211	-0.087	0.905	0.209	0.244	0.083	1.107
Academic Self-Efficacy in 11th	-0.144	-0.238	-0.111	1.090	-0.223	-0.411	-0.219	1.162	-0.225	-0.175	0.057	0.940
Missing Dummy: Academic Self-Efficacy in 11th	0.243	0.255	0.027	1.034	0.248	0.213	-0.082	0.911	0.209	0.244	0.083	1.107

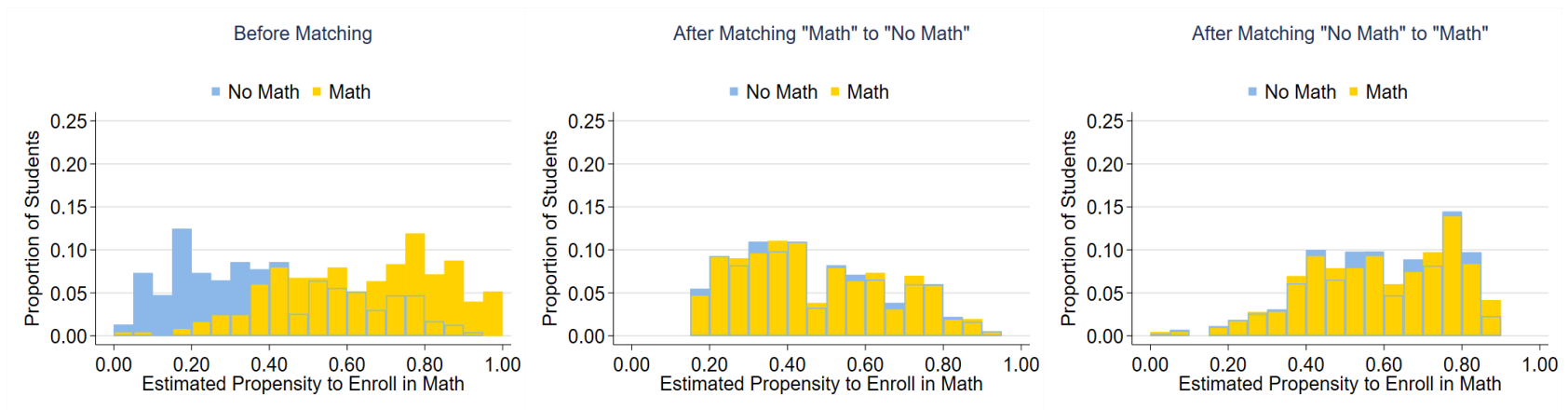
See the note on the first page of the table.

Table C12 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=185)	Math (N=145)	SMD	VR	No Math (N=101)	Math (N=104)	SMD	VR	No Math (N=111)	Math (N=86)	SMD	VR
Indicator of 2016-17 Cohort	0.665	0.628	-0.078	1.051	0.723	0.621	-0.217	1.190	0.650	0.674	0.051	0.958

See the note on the first page of the table.

Figure C13. Community College Analysis Distributions of Estimated Propensities of Taking Math over No Math in Group 3 Before and After Matching for Students with Non-Missing Non-Math STEM GPAs, 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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Age (in Months)	195.115	194.912	-0.041	1.394	194.906	195.482	0.118	1.655	194.791	194.867	0.015	1.361
Gender: Female	0.455	0.488	0.066	1.007	0.492	0.494	0.004	1.005	0.441	0.505	0.128	1.007
Race/Ethnicity: Asian	-	-	-0.102	0.469	-	-	0.003	1.026	-	-	0.029	1.291
Race/Ethnicity: African American	0.103	0.087	-0.053	0.862	0.093	0.092	-0.004	0.993	0.107	0.093	-0.049	0.870

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Race/Ethnicity: Latinx	0.678	0.774	0.215	0.802	0.738	0.696	-0.093	1.100	0.714	0.764	0.113	0.877
Race/Ethnicity: Filipinx	-	-	0.072	1.432	-	-	0.120	1.655	-	-	-0.025	0.890
Race/Ethnicity: White	0.133	0.071	-0.204	0.575	0.093	0.111	0.061	1.181	0.112	0.074	-0.129	0.687
Race/Ethnicity: Other	-	-	-0.127	0.404	-	-	-0.018	0.873	-	-	0.041	1.447
Ever Subsidized Meal Eligible from 9th-11th	0.863	0.929	0.216	0.560	0.885	0.875	-0.033	1.085	0.923	0.921	-0.005	1.008

See the note on the first page of the table.

Table C13 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.010	0.926	-	-	-0.076	0.558	-	-	0.000	0.993
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.236	0.218	-0.042	0.946	0.251	0.281	0.068	1.080	0.253	0.222	-0.073	0.907
Parents'/Guardians' Educational Attainment: HS Graduate	0.227	0.218	-0.022	0.971	0.240	0.224	-0.038	0.958	0.269	0.227	-0.097	0.886
Parents'/Guardians' Educational Attainment: Some College	0.176	0.131	-0.125	0.785	0.153	0.146	-0.019	0.969	0.119	0.148	0.085	1.195
Parents'/Guardians' Educational Attainment: College Graduate	0.090	0.079	-0.039	0.891	0.077	0.109	0.111	1.379	0.077	0.083	0.022	1.063

See the note on the first page of the table.

Table C13 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	-	-	0.185	4.046	-	-	-0.044	0.631	-	-	0.009	1.055
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.262	0.317	0.123	1.121	0.268	0.232	-0.082	0.914	0.259	0.296	0.082	1.078
Nonresident School Enrollment in 11th	0.275	0.349	0.161	1.140	0.284	0.293	0.020	1.024	0.294	0.319	0.055	1.040
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.097	0.311	-	-	0.000	1.005	-	-	0.049	2.476
Number of School Moves from 9th- 11th	0.095	0.082	-0.042	0.980	0.105	0.093	-0.036	0.834	0.102	0.091	-0.035	0.929

See the note on the first page of the table.

Table C13 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.064	0.048	-0.073	0.753	-	-	0.032	1.152	-	-	0.003	1.005
English Learner Status in 11th: English Only	0.403	0.298	-0.223	0.868	0.366	0.359	-0.015	0.997	0.301	0.315	0.030	1.018
English Learner Status in 11th: Initial Fluent English Proficient	0.150	0.159	0.024	1.046	0.148	0.202	0.143	1.288	0.195	0.157	-0.099	0.839
English Learner Status in 11th: Limited English Proficient	-	-	-0.058	0.765	-	-	0.000	1.005	-	-	0.062	1.390
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.399	0.508	0.219	1.042	0.454	0.406	-0.095	0.979	0.478	0.491	0.026	0.995

See the note on the first page of the table.

Table C13 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Gifted and Talented Program Participation in 11th	0.090	0.087	-0.010	0.971	0.082	0.106	0.082	1.267	0.091	0.088	-0.011	0.961
Math 11th Grade Weighted GPA	1.505	1.560	0.078	1.125	1.488	1.508	0.028	1.117	1.463	1.535	0.102	1.037
Cumulative Overall Weighted GPA at the End of 11th	2.367	2.419	0.108	0.906	2.397	2.411	0.032	0.860	2.408	2.412	0.008	0.942
Standardized ELA SBAC Score in 11th	-0.167	0.018	0.240	0.771	-0.110	-0.134	-0.030	1.077	-0.028	0.004	0.043	0.986
Standardized Math SBAC Score in 11th	-0.259	-0.185	0.104	1.014	-0.231	-0.263	-0.050	0.862	-0.224	-0.201	0.034	1.050

See the note on the first page of the table.

Table C13 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	0.860	1.273	0.246	1.569	0.966	0.891	-0.049	0.975	1.079	1.115	0.022	1.375
Science Credits Accumulated from 9th-11th	28.881	31.867	0.356	1.496	29.503	29.427	-0.010	1.082	31.056	30.841	-0.026	0.958
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.085	0.626	-	-	-0.083	0.570	-	-	-0.123	0.516
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	1.524	1.321	-0.129	0.794	1.339	1.304	-0.023	1.089	1.457	1.319	-0.093	0.929
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.764	0.583	-0.171	0.818	0.678	0.685	0.007	0.843	0.812	0.625	-0.163	0.728

See the note on the first page of the table.

Table C13 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.455	0.353	-0.110	0.552	0.350	0.310	-0.051	0.866	0.335	0.324	-0.016	1.182
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.180	0.115	-0.132	0.644	0.109	0.136	0.059	1.138	0.166	0.111	-0.098	0.442
Highest ERW PSAT Score by the End of 11th	414.943	421.928	0.104	0.906	414.968	413.738	-0.018	1.106	418.336	420.394	0.032	0.875
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.090	0.071	-0.069	0.809	0.071	0.078	0.027	1.097	0.076	0.074	-0.006	0.973
Highest Math PSAT Score by the End of 11th	417.492	422.886	0.084	0.773	418.143	416.933	-0.020	0.891	413.957	419.485	0.092	1.044

See the note on the first page of the table.

Table C13 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.082	0.067	-0.054	0.840	0.071	0.076	0.019	1.069	0.076	0.069	-0.024	0.917
Took the SAT or ACT before 12th	0.103	0.210	0.298	1.797	0.131	0.159	0.079	1.180	0.218	0.185	-0.082	0.879
Participation in the AVID Program in 11th	-	-	-0.044	0.697	-	-	-0.066	0.609	-	-	-0.037	0.748
Took a College or Career Seminar Course in 11th	0.155	0.194	0.105	1.199	0.175	0.188	0.034	1.063	0.204	0.181	-0.059	0.905
Ever Attended STEM-Focused School from 9th- 12th	0.082	0.155	0.228	1.746	0.098	0.080	-0.065	0.832	0.141	0.116	-0.076	0.838

See the note on the first page of the table.

Table C13 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	2.743	2.973	0.084	1.174	2.670	2.779	0.043	1.083	2.634	2.874	0.092	1.017
Cumulative Overall Weighted GPA at the End of 11th (Squared)	5.840	6.063	0.095	0.939	5.970	6.009	0.017	0.863	6.024	6.032	0.003	0.939
Standardized ELA SBAC Score in 11th (Squared)	0.698	0.517	-0.186	0.573	0.600	0.648	0.047	1.592	0.514	0.509	-0.005	1.106
Standardized Math SBAC Score in 11th (Squared)	0.564	0.538	-0.031	0.921	0.510	0.461	-0.068	0.785	0.496	0.512	0.020	0.975
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	2.921	5.046	0.220	1.972	3.296	3.084	-0.025	0.953	3.314	4.218	0.107	2.144

See the note on the first page of the table.

Table C13 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	890.226	1,099.457	0.366	2.047	926.648	926.454	0.000	1.059	1,031.644	1,015.892	-0.029	0.971
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	5.043	3.909	-0.144	0.559	3.918	4.004	0.013	1.045	4.345	3.819	-0.073	0.673
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	1.811	1.345	-0.126	0.910	1.596	1.421	-0.052	0.785	2.166	1.495	-0.162	0.759
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.296	0.726	-0.160	0.223	0.765	0.650	-0.048	0.525	0.569	0.648	0.041	1.004
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.326	0.202	-0.098	0.744	0.208	0.240	0.026	0.815	0.457	0.204	-0.131	0.252

See the note on the first page of the table.

Table C13 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	176,848.012	182,254.661	0.091	0.953	176,498.108	175,911.616	-0.010	1.100	179,432.612	180,633.640	0.021	0.897
Highest Math PSAT Score by the End of 11th (Squared)	178,919.745	182,406.853	0.065	0.744	178,893.330	177,421.553	-0.028	0.818	174,834.574	179,621.542	0.096	0.992
Work Effort GPA in 11th	2.183	2.210	0.076	0.991	2.198	2.203	0.014	1.113	2.180	2.214	0.099	1.006
Cooperation GPA in 11th	2.460	2.483	0.082	0.857	2.476	2.477	0.002	0.983	2.450	2.485	0.128	0.851
Attendance Rate in 11th	0.964	0.963	-0.035	1.410	0.965	0.966	0.017	1.214	0.969	0.963	-0.167	1.493

See the note on the first page of the table.

Table C13 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Ever Suspended from 9th-11th	-	-	-0.009	0.925	-	-	-0.118	0.271	-	-	0.020	1.239
Educational Expectations in 11th: Unsure	0.150	0.103	-0.141	0.725	0.137	0.080	-0.184	0.624	0.109	0.106	-0.009	0.971
Educational Expectations in 11th: HS or Less	-	-	0.106	1.814	-	-	0.059	1.379	-	-	-0.055	0.773
Educational Expectations in 11th: Associate Degree or Certificate	0.094	0.060	-0.131	0.654	0.087	0.088	0.003	1.015	0.063	0.069	0.025	1.083
Educational Expectations in 11th: Bachelor's Degree or Higher	0.494	0.567	0.148	0.982	0.514	0.508	-0.011	1.006	0.553	0.560	0.013	0.990

See the note on the first page of the table.

Table C13 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Educational Expectations in 11th: Missing	0.240	0.230	-0.024	0.970	0.235	0.286	0.116	1.142	0.226	0.227	0.002	0.996
Growth Mindset in 11th	-0.026	-0.056	-0.035	1.142	-0.022	0.068	0.113	0.848	0.032	-0.040	-0.084	1.263
Missing Dummy: Growth Mindset in 11th	0.219	0.210	-0.021	0.971	0.208	0.272	0.150	1.209	0.216	0.204	-0.029	0.952
Academic Self-Efficacy in 11th	-0.103	-0.216	-0.129	1.184	-0.148	-0.067	0.096	1.014	-0.152	-0.175	-0.026	1.172
Missing Dummy: Academic Self-Efficacy in 11th	0.223	0.214	-0.021	0.971	0.208	0.273	0.152	1.212	0.216	0.208	-0.018	0.968

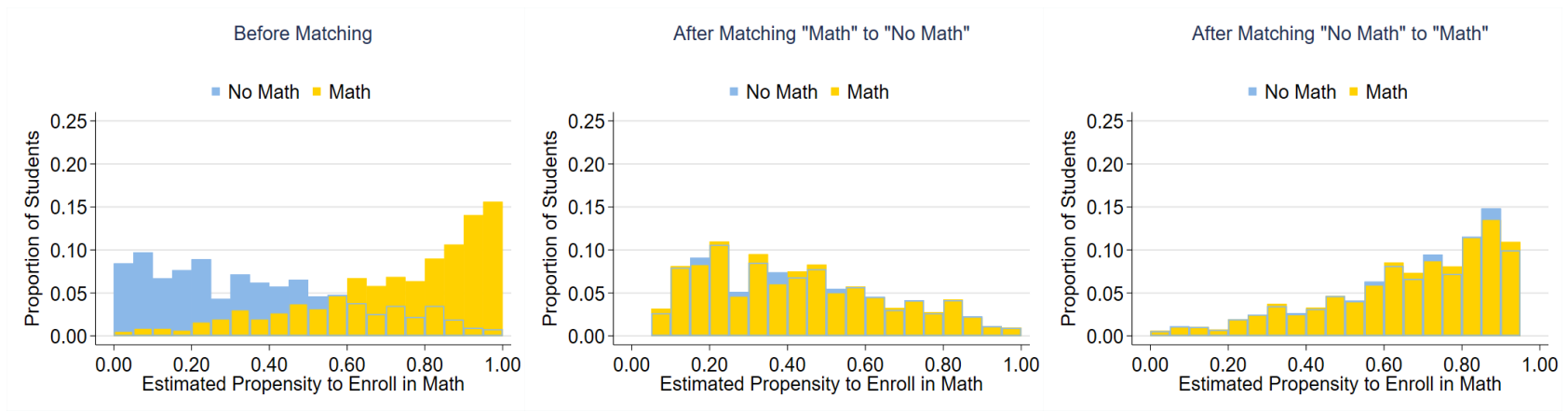
See the note on the first page of the table.

Table C13 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 3 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=233)	Math (N=252)	SMD	VR	No Math (N=183)	Math (N=201)	SMD	VR	No Math (N=183)	Math (N=216)	SMD	VR
Indicator of 2016-17 Cohort	0.588	0.623	0.072	0.969	0.601	0.643	0.087	0.962	0.562	0.634	0.146	0.936

See the note on the first page of the table.

Figure C14. Community College Analysis Distributions of Estimated Propensities of Taking Math over No Math in Group 4 Before and After Matching for Students with Non-Missing Non-Math STEM GPAs, 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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Age (in Months)	195.043	194.863	-0.032	0.717	194.786	194.861	0.014	0.816	194.756	194.688	-0.013	0.862
Gender: Female	0.594	0.531	-0.128	1.032	0.568	0.543	-0.051	1.015	0.551	0.554	0.006	0.994
Race/Ethnicity: Asian	0.021	0.035	0.089	1.687	-	-	-0.038	0.774	-	-	0.051	1.345
Race/Ethnicity: African American	0.084	0.069	-0.060	0.826	0.081	0.087	0.019	1.063	0.057	0.063	0.024	1.087

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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Race/Ethnicity: Latinx	0.718	0.754	0.082	0.916	0.723	0.765	0.095	0.903	0.815	0.766	-0.120	1.183
Race/Ethnicity: Filipinx	0.038	0.050	0.056	1.283	0.045	0.023	-0.120	0.531	0.034	0.045	0.059	1.317
Race/Ethnicity: White	0.137	0.079	-0.187	0.617	0.125	0.104	-0.065	0.856	0.070	0.088	0.067	1.226
Race/Ethnicity: Other	-	-	0.134	8.069	-	-	0.029	1.804	-	-	0.097	11.872
Ever Subsidized Meal Eligible from 9th-11th	0.898	0.902	0.013	0.966	0.894	0.896	0.006	0.988	0.950	0.903	-0.182	1.840

See the note on the first page of the table.

Table C14 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.027	0.017	-0.072	0.618	0.025	0.023	-0.007	0.959	-	-	0.057	1.566
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.228	0.221	-0.016	0.979	0.231	0.235	0.010	1.016	0.215	0.228	0.031	1.037
Parents'/Guardians' Educational Attainment: HS Graduate	0.189	0.207	0.044	1.068	0.193	0.182	-0.028	0.960	0.208	0.202	-0.014	0.974
Parents'/Guardians' Educational Attainment: Some College	0.145	0.149	0.011	1.023	0.153	0.180	0.072	1.142	0.155	0.142	-0.035	0.929
Parents'/Guardians' Educational Attainment: College Graduate	0.111	0.104	-0.024	0.941	0.121	0.132	0.032	1.078	0.080	0.109	0.102	1.322

See the note on the first page of the table.

Table C14 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.029	0.040	0.063	1.385	0.030	0.038	0.044	1.262	0.048	0.042	-0.027	0.881
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.298	0.279	-0.042	0.962	0.271	0.232	-0.089	0.906	0.296	0.277	-0.041	0.957
Nonresident School Enrollment in 11th	0.303	0.337	0.074	1.058	0.322	0.318	-0.008	0.998	0.317	0.319	0.005	0.998
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.064	1.683	-	-	-0.010	0.919	-	-	0.060	1.884
Number of School Moves from 9th-11th	0.093	0.067	-0.089	0.610	0.082	0.095	0.043	1.070	0.084	0.068	-0.058	0.716

See the note on the first page of the table.

Table C14 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.068	0.069	0.000	1.001	0.059	0.092	0.127	1.523	0.045	0.076	0.133	1.646
English Learner Status in 11th: English Only	0.336	0.288	-0.103	0.920	0.339	0.282	-0.124	0.906	0.229	0.301	0.163	1.186
English Learner Status in 11th: Initial Fluent English Proficient	0.150	0.154	0.011	1.021	0.155	0.148	-0.020	0.965	0.144	0.148	0.012	1.019
English Learner Status in 11th: Limited English Proficient	0.061	0.020	-0.206	0.346	0.040	0.058	0.085	1.439	0.038	0.024	-0.082	0.633
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.454	0.538	0.168	1.002	0.466	0.512	0.092	1.008	0.589	0.527	-0.125	1.024

See the note on the first page of the table.

Table C14 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Gifted and Talented Program Participation in 11th	0.092	0.150	0.178	1.521	0.106	0.111	0.017	1.049	0.124	0.139	0.046	1.099
Math 11th Grade Weighted GPA	2.264	2.738	0.603	1.261	2.324	2.301	-0.031	1.118	2.634	2.611	-0.028	0.972
Cumulative Overall Weighted GPA at the End of 11th	2.700	3.016	0.601	1.098	2.762	2.795	0.066	0.908	2.930	2.938	0.016	1.125
Standardized ELA SBAC Score in 11th	-0.031	0.271	0.410	0.764	0.061	0.118	0.076	1.117	0.193	0.226	0.046	0.928
Standardized Math SBAC Score in 11th	-0.173	0.216	0.623	0.919	-0.089	-0.065	0.040	0.933	0.135	0.136	0.002	0.976

See the note on the first page of the table.

Table C14 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	1.108	1.966	0.413	1.676	1.239	1.231	-0.004	1.005	1.689	1.612	-0.036	0.903
Science Credits Accumulated from 9th-11th	29.570	31.613	0.252	1.146	30.068	30.416	0.044	1.086	31.223	31.050	-0.021	0.973
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	0.033	0.039	0.030	1.159	0.030	0.029	-0.007	0.967	0.030	0.040	0.059	1.341
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.971	0.540	-0.326	0.579	0.809	0.876	0.045	1.544	0.589	0.608	0.016	1.057
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.443	0.235	-0.273	0.534	0.379	0.480	0.115	1.427	0.248	0.268	0.031	1.155

See the note on the first page of the table.

Table C14 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.333	0.171	-0.199	0.455	0.261	0.421	0.141	2.609	0.178	0.198	0.028	1.081
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.153	0.095	-0.121	0.670	0.144	0.249	0.154	2.322	0.089	0.100	0.026	1.075
Highest ERW PSAT Score by the End of 11th	418.593	440.347	0.318	1.103	421.730	432.104	0.153	0.970	437.446	435.053	-0.036	1.170
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.107	0.070	-0.130	0.680	0.080	0.112	0.109	1.359	0.067	0.072	0.019	1.060
Highest Math PSAT Score by the End of 11th	413.902	436.917	0.361	0.917	417.422	422.505	0.080	0.936	434.072	431.387	-0.043	0.983

See the note on the first page of the table.

Table C14 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.105	0.060	-0.163	0.602	0.078	0.110	0.111	1.373	0.061	0.066	0.020	1.067
Took the SAT or ACT before 12th	0.197	0.335	0.314	1.404	0.220	0.200	-0.048	0.937	0.299	0.299	0.002	0.996
Participation in the AVID Program in 11th	0.027	0.033	0.035	1.215	0.032	0.044	0.063	1.364	0.048	0.028	-0.100	0.606
Took a College or Career Seminar Course in 11th	0.197	0.156	-0.109	0.831	0.186	0.187	0.003	1.009	0.170	0.174	0.010	1.013
Ever Attended STEM-Focused School from 9th- 12th	0.084	0.167	0.250	1.797	0.095	0.072	-0.084	0.778	0.103	0.123	0.061	1.157

See the note on the first page of the table.

Table C14 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	5.671	8.182	0.611	1.657	5.951	5.906	-0.012	1.149	7.573	7.439	-0.032	0.995
Cumulative Overall Weighted GPA at the End of 11th (Squared)	7.552	9.387	0.606	1.320	7.883	8.038	0.056	0.935	8.822	8.901	0.027	1.122
Standardized ELA SBAC Score in 11th (Squared)	0.613	0.542	-0.086	0.626	0.536	0.606	0.086	1.081	0.563	0.542	-0.029	1.078
Standardized Math SBAC Score in 11th (Squared)	0.436	0.420	-0.027	0.785	0.382	0.352	-0.056	0.727	0.391	0.384	-0.012	0.892
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	4.446	9.258	0.340	2.491	5.087	5.070	-0.001	1.037	7.597	6.904	-0.049	0.871

See the note on the first page of the table.

Table C14 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	935.687	1,069.636	0.241	1.429	965.075	991.123	0.049	1.178	1,041.106	1,028.938	-0.022	0.950
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	3.153	1.571	-0.226	0.436	2.381	3.423	0.118	1.894	1.710	1.817	0.018	0.996
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.949	0.457	-0.211	0.381	0.784	1.141	0.117	1.971	0.450	0.522	0.041	1.246
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.014	0.441	-0.132	0.344	0.780	2.028	0.165	3.394	0.481	0.527	0.013	0.826
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.299	0.194	-0.070	0.534	0.299	0.706	0.154	3.184	0.188	0.205	0.012	0.954

See the note on the first page of the table.

Table C14 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	179,667.320	198,814.000	0.316	1.235	182,508.852	191,211.033	0.145	1.041	195,438.608	194,067.064	-0.023	1.237
Highest Math PSAT Score by the End of 11th (Squared)	175,540.500	194,773.854	0.371	1.071	178,386.576	182,376.800	0.077	1.054	192,243.076	189,873.088	-0.046	0.993
Work Effort GPA in 11th	2.374	2.530	0.494	0.909	2.405	2.415	0.034	0.910	2.492	2.491	-0.003	1.013
Cooperation GPA in 11th	2.578	2.686	0.424	0.786	2.603	2.607	0.017	0.894	2.662	2.659	-0.010	1.016
Attendance Rate in 11th	0.964	0.974	0.304	0.664	0.968	0.966	-0.062	1.629	0.971	0.972	0.033	1.342

See the note on the first page of the table.

Table C14 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.011	1.112	-	-	0.140	3.314	-	-	-0.014	0.872
Educational Expectations in 11th: Unsure	0.102	0.071	-0.110	0.720	0.087	0.076	-0.042	0.883	0.077	0.073	-0.016	0.946
Educational Expectations in 11th: HS or Less	-	-	-0.182	0.312	-	-	-0.034	0.811	-	-	0.040	1.415
Educational Expectations in 11th: Associate Degree or Certificate	0.072	0.031	-0.186	0.448	0.062	0.047	-0.070	0.762	0.042	0.036	-0.032	0.854
Educational Expectations in 11th: Bachelor's Degree or Higher	0.503	0.610	0.216	0.951	0.534	0.545	0.022	1.000	0.585	0.597	0.025	0.986

See the note on the first page of the table.

Table C14 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Educational Expectations in 11th: Missing	0.280	0.275	-0.011	0.989	0.290	0.311	0.047	1.046	0.285	0.278	-0.015	0.981
Growth Mindset in 11th	-0.040	0.107	0.175	0.780	0.027	0.030	0.004	0.808	0.019	0.088	0.079	0.738
Missing Dummy: Growth Mindset in 11th	0.279	0.272	-0.015	0.984	0.284	0.305	0.046	1.046	0.283	0.275	-0.018	0.977
Academic Self-Efficacy in 11th	-0.050	0.059	0.127	0.933	-0.027	0.060	0.105	0.859	0.035	0.022	-0.016	1.180
Missing Dummy: Academic Self-Efficacy in 11th	0.274	0.272	-0.005	0.995	0.278	0.301	0.050	1.052	0.282	0.274	-0.017	0.978

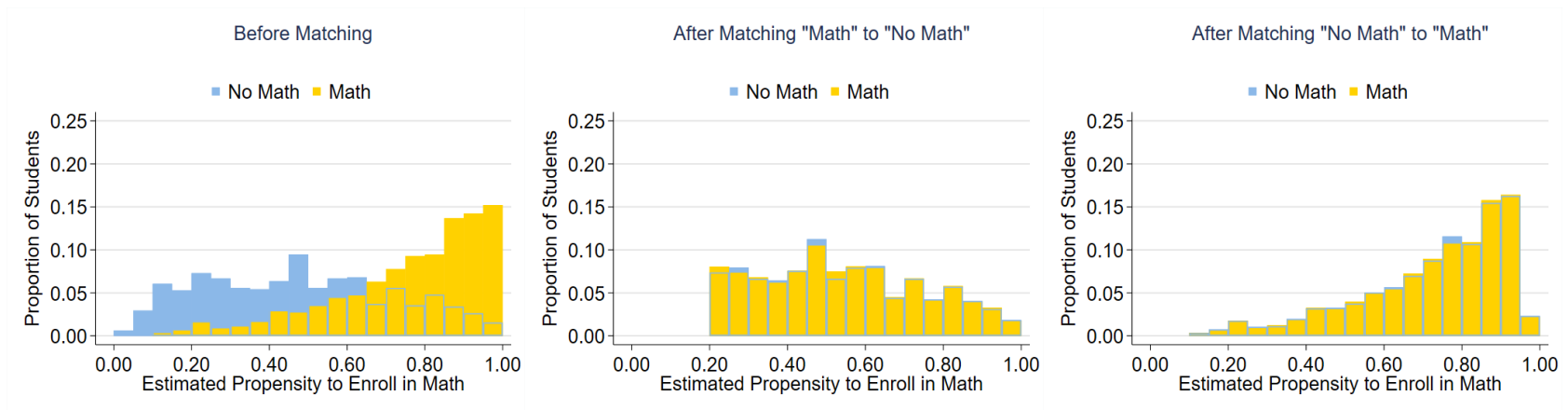
See the note on the first page of the table.

Table C14 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=628)	Math (N=846)	SMD	VR	No Math (N=528)	Math (N=516)	SMD	VR	No Math (N=462)	Math (N=668)	SMD	VR
Indicator of 2016-17 Cohort	0.557	0.572	0.030	0.992	0.561	0.608	0.097	0.971	0.613	0.569	-0.090	1.028

See the note on the first page of the table.

Figure C15. Community College Analysis Distributions of Estimated Propensities of Taking Math over No Math in Group 4 Before and After Matching for Students with Non-Missing Non-Math STEM GPAs, 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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Age (in Months)	195.053	195.049	-0.001	0.767	195.038	194.791	-0.046	0.859	194.563	194.939	0.072	0.872
Gender: Female	0.591	0.506	-0.171	1.033	0.570	0.570	-0.001	1.001	0.531	0.526	-0.011	0.997
Race/Ethnicity: Asian	0.022	0.029	0.048	1.334	0.026	0.019	-0.045	0.749	-	-	0.095	1.884
Race/Ethnicity: African American	0.082	0.061	-0.080	0.765	0.076	0.075	-0.004	0.987	0.064	0.064	0.001	0.999

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Race/Ethnicity: Latinx	0.715	0.796	0.189	0.797	0.745	0.749	0.008	0.992	0.792	0.790	-0.006	1.004
Race/Ethnicity: Filipinx	0.039	0.042	0.014	1.067	0.041	0.040	-0.004	0.983	0.047	0.043	-0.021	0.910
Race/Ethnicity: White	0.141	0.062	-0.263	0.481	0.111	0.115	0.014	1.035	0.073	0.069	-0.014	0.949
Race/Ethnicity: Other	-	-	0.112	6.386	-	-	0.016	1.400	-	-	-0.046	0.577
Ever Subsidized Meal Eligible from 9th-11th	0.896	0.919	0.077	0.803	0.908	0.905	-0.011	1.032	0.919	0.916	-0.012	1.034

See the note on the first page of the table.

Table C15 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.028	0.014	-0.098	0.503	-	-	-0.042	0.732	-	-	0.033	1.318
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.225	0.251	0.061	1.077	0.234	0.212	-0.053	0.933	0.261	0.251	-0.023	0.971
Parents'/Guardians' Educational Attainment: HS Graduate	0.194	0.211	0.042	1.063	0.199	0.210	0.026	1.040	0.225	0.205	-0.048	0.931
Parents'/Guardians' Educational Attainment: Some College	0.146	0.129	-0.048	0.903	0.146	0.170	0.066	1.132	0.141	0.129	-0.036	0.922
Parents'/Guardians' Educational Attainment: College Graduate	0.110	0.086	-0.081	0.803	0.109	0.111	0.007	1.018	0.087	0.091	0.017	1.046

See the note on the first page of the table.

Table C15 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.031	0.035	0.020	1.110	0.033	0.029	-0.023	0.882	0.035	0.036	0.009	1.040
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.295	0.289	-0.012	0.988	0.279	0.268	-0.024	0.977	0.252	0.288	0.081	1.083
Nonresident School Enrollment in 11th	0.310	0.324	0.029	1.022	0.308	0.313	0.010	1.009	0.308	0.316	0.017	1.010
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.027	1.270	-	-	-0.061	0.503	-	-	0.083	2.470
Number of School Moves from 9th-11th	0.091	0.071	-0.067	0.662	0.081	0.075	-0.021	0.857	0.064	0.076	0.044	0.955

See the note on the first page of the table.

Table C15 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.071	0.071	0.001	1.001	0.065	0.070	0.021	1.077	0.055	0.074	0.077	1.315
English Learner Status in 11th: English Only	0.333	0.257	-0.168	0.858	0.321	0.310	-0.023	0.983	0.277	0.275	-0.005	0.991
English Learner Status in 11th: Initial Fluent English Proficient	0.152	0.152	0.001	1.001	0.151	0.146	-0.014	0.973	0.129	0.147	0.052	1.111
English Learner Status in 11th: Limited English Proficient	0.062	0.032	-0.141	0.537	0.050	0.054	0.020	1.085	0.039	0.035	-0.019	0.909
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.453	0.559	0.213	0.994	0.478	0.489	0.023	1.002	0.555	0.543	-0.024	1.001

See the note on the first page of the table.

Table C15 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Gifted and Talented Program Participation in 11th	0.093	0.131	0.122	1.352	0.109	0.119	0.032	1.083	0.115	0.114	-0.003	0.990
Math 11th Grade Weighted GPA	2.258	2.691	0.553	1.187	2.324	2.369	0.058	1.129	2.634	2.584	-0.064	0.991
Cumulative Overall Weighted GPA at the End of 11th	2.703	2.942	0.452	1.121	2.757	2.763	0.012	1.045	2.911	2.892	-0.036	1.048
Standardized ELA SBAC Score in 11th	-0.030	0.223	0.343	0.794	0.033	0.080	0.062	0.994	0.155	0.190	0.050	1.034
Standardized Math SBAC Score in 11th	-0.168	0.151	0.498	1.003	-0.103	-0.117	-0.022	1.050	0.036	0.101	0.099	0.910

See the note on the first page of the table.

Table C15 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	1.133	1.822	0.342	1.514	1.243	1.279	0.020	0.985	1.623	1.661	0.018	1.171
Science Credits Accumulated from 9th-11th	29.522	32.179	0.312	1.362	29.933	30.060	0.016	1.034	31.511	31.372	-0.016	1.066
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	0.037	0.036	-0.006	0.971	0.033	0.026	-0.044	0.784	0.033	0.036	0.019	1.100
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.963	0.531	-0.333	0.529	0.804	0.814	0.008	1.027	0.532	0.572	0.036	1.027
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.448	0.235	-0.278	0.510	0.362	0.405	0.056	1.023	0.264	0.252	-0.018	0.973

See the note on the first page of the table.

Table C15 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.335	0.170	-0.208	0.408	0.275	0.291	0.020	0.957	0.161	0.182	0.033	1.012
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.161	0.095	-0.133	0.551	0.138	0.171	0.064	1.038	0.090	0.094	0.009	0.877
Highest ERW PSAT Score by the End of 11th	418.739	433.385	0.220	1.020	421.575	424.285	0.040	1.045	432.027	429.778	-0.034	1.026
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.104	0.058	-0.167	0.590	0.077	0.085	0.027	1.089	0.051	0.066	0.067	1.284
Highest Math PSAT Score by the End of 11th	413.876	433.820	0.314	0.934	417.378	415.535	-0.029	1.086	423.960	428.590	0.073	0.888

See the note on the first page of the table.

Table C15 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.102	0.051	-0.192	0.531	0.076	0.083	0.026	1.087	0.048	0.059	0.049	1.213
Took the SAT or ACT before 12th	0.198	0.341	0.324	1.411	0.229	0.210	-0.045	0.942	0.252	0.312	0.132	1.133
Participation in the AVID Program in 11th	0.028	0.041	0.070	1.439	0.030	0.041	0.063	1.380	0.049	0.035	-0.070	0.719
Took a College or Career Seminar Course in 11th	0.203	0.193	-0.026	0.961	0.203	0.211	0.020	1.030	0.166	0.193	0.070	1.119
Ever Attended STEM-Focused School from 9th- 12th	0.088	0.177	0.263	1.805	0.100	0.080	-0.068	0.824	0.120	0.153	0.096	1.223

See the note on the first page of the table.

Table C15 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	5.659	7.909	0.552	1.533	5.959	6.242	0.073	1.188	7.550	7.285	-0.063	0.979
Cumulative Overall Weighted GPA at the End of 11th (Squared)	7.570	8.951	0.459	1.300	7.855	7.899	0.015	1.057	8.739	8.644	-0.032	1.048
Standardized ELA SBAC Score in 11th (Squared)	0.608	0.532	-0.092	0.611	0.576	0.577	0.002	0.839	0.497	0.527	0.043	1.081
Standardized Math SBAC Score in 11th (Squared)	0.437	0.434	-0.006	0.823	0.416	0.439	0.036	0.965	0.437	0.408	-0.046	0.732
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	4.511	8.209	0.280	2.085	4.952	4.987	0.003	0.998	6.537	7.346	0.061	1.597

See the note on the first page of the table.

Table C15 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	932.755	1,118.961	0.311	1.830	958.617	968.326	0.019	1.019	1,061.579	1,057.634	-0.007	1.155
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	3.115	1.441	-0.250	0.348	2.387	2.449	0.010	0.875	1.501	1.582	0.016	0.991
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.978	0.452	-0.222	0.339	0.734	0.781	0.022	0.883	0.502	0.486	-0.009	1.000
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.008	0.394	-0.148	0.254	0.744	0.724	-0.006	0.931	0.420	0.434	0.005	1.261
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.341	0.183	-0.102	0.340	0.275	0.294	0.016	0.684	0.202	0.179	-0.018	0.745

See the note on the first page of the table.

Table C15 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	179,736.399	192,307.467	0.215	1.109	182,259.546	184,753.288	0.042	1.061	190,923.951	189,111.711	-0.031	1.033
Highest Math PSAT Score by the End of 11th (Squared)	175,454.626	192,089.370	0.324	1.071	178,170.686	176,972.859	-0.023	1.083	184,023.764	187,505.470	0.067	0.938
Work Effort GPA in 11th	2.378	2.490	0.351	0.955	2.401	2.394	-0.022	1.065	2.480	2.469	-0.035	1.026
Cooperation GPA in 11th	2.578	2.642	0.246	0.880	2.583	2.580	-0.012	1.017	2.634	2.629	-0.018	0.975
Attendance Rate in 11th	0.964	0.971	0.181	0.994	0.966	0.967	0.021	1.341	0.968	0.970	0.038	1.438

See the note on the first page of the table.

Table C15 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Ever Suspended from 9th-11th	-	-	-0.009	0.909	-	-	-0.016	0.842	-	-	0.057	2.066
Educational Expectations in 11th: Unsure	0.104	0.085	-0.066	0.831	0.094	0.100	0.019	1.053	0.101	0.086	-0.051	0.863
Educational Expectations in 11th: HS or Less	0.042	0.018	-0.143	0.433	0.031	0.034	0.012	1.069	-	-	0.072	1.774
Educational Expectations in 11th: Associate Degree or Certificate	0.070	0.039	-0.135	0.580	0.063	0.062	-0.002	0.995	0.034	0.043	0.042	1.222
Educational Expectations in 11th: Bachelor's Degree or Higher	0.507	0.606	0.201	0.954	0.537	0.517	-0.040	1.005	0.613	0.595	-0.037	1.012

See the note on the first page of the table.

Table C15 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Educational Expectations in 11th: Missing	0.278	0.252	-0.058	0.940	0.275	0.288	0.028	1.029	0.240	0.256	0.037	1.040
Growth Mindset in 11th	-0.036	0.092	0.150	0.826	0.015	-0.037	-0.059	0.936	0.056	0.074	0.021	0.746
Missing Dummy: Growth Mindset in 11th	0.276	0.248	-0.065	0.931	0.271	0.290	0.042	1.043	0.238	0.252	0.032	1.035
Academic Self-Efficacy in 11th	-0.049	0.067	0.135	0.930	-0.041	-0.068	-0.031	0.883	0.040	0.029	-0.013	1.032
Missing Dummy: Academic Self-Efficacy in 11th	0.271	0.248	-0.053	0.943	0.268	0.287	0.043	1.045	0.238	0.253	0.035	1.038

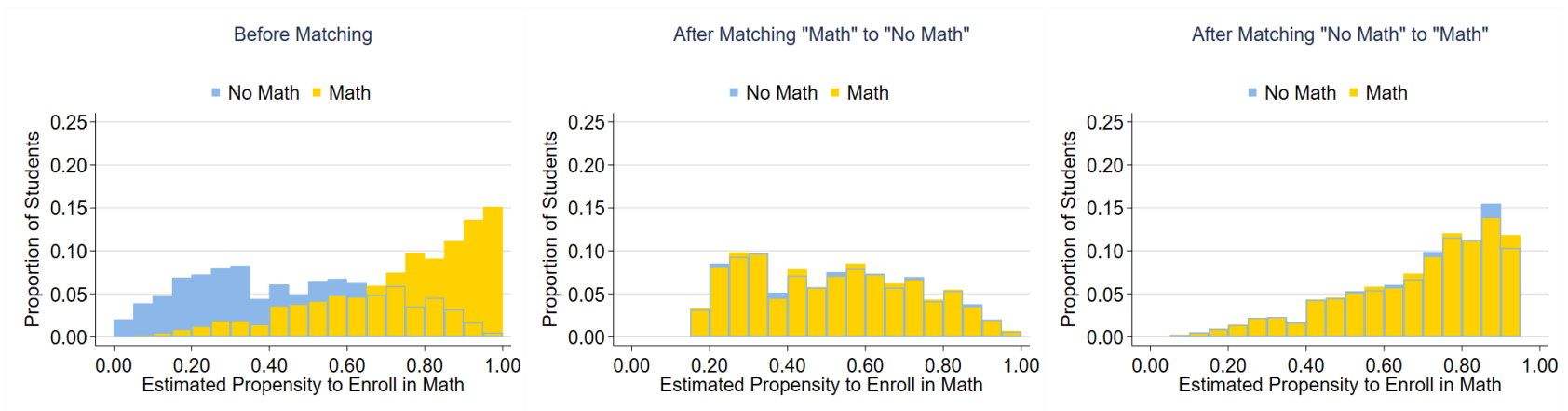
See the note on the first page of the table.

Table C15 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=645)	Math (N=1,301)	SMD	VR	No Math (N=542)	Math (N=788)	SMD	VR	No Math (N=545)	Math (N=1,128)	SMD	VR
Indicator of 2016-17 Cohort	0.560	0.566	0.014	0.996	0.570	0.580	0.021	0.995	0.627	0.579	-0.098	1.038

See the note on the first page of the table.

Figure C16. Community College Analysis Distributions of Estimated Propensities of Taking Math over No Math in Group 5 Before and After Matching for Students with Non-Missing Non-Math STEM GPAs, 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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
Age (in Months)	194.879	194.543	-0.072	0.959	194.661	194.384	-0.063	0.857	194.177	194.570	0.091	1.197
Gender: Female	0.582	0.491	-0.184	1.026	0.566	0.582	0.031	0.992	0.541	0.516	-0.051	1.002
Race/Ethnicity: Asian	0.049	0.086	0.148	1.689	0.051	0.049	-0.013	0.950	0.082	0.078	-0.014	0.954
Race/Ethnicity: African American	0.071	0.043	-0.118	0.631	0.067	0.064	-0.013	0.957	0.043	0.050	0.033	1.149

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. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
Race/Ethnicity: Latinx	0.661	0.665	0.009	0.993	0.675	0.686	0.024	0.983	0.702	0.677	-0.053	1.040
Race/Ethnicity: Filipinx	0.047	0.086	0.156	1.746	0.048	0.046	-0.006	0.977	0.062	0.069	0.029	1.102
Race/Ethnicity: White	0.162	0.110	-0.153	0.719	0.149	0.148	-0.002	0.997	0.106	0.116	0.031	1.076
Race/Ethnicity: Other	-	-	-0.007	0.934	-	-	-0.035	0.683	-	-	0.053	1.888
Ever Subsidized Meal Eligible from 9th-11th	0.853	0.888	0.102	0.797	0.855	0.885	0.088	0.823	0.901	0.878	-0.071	1.188

See the note on the first page of the table.

Table C16 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.024	0.019	-0.033	0.804	0.026	0.024	-0.013	0.926	0.025	0.021	-0.026	0.841
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.209	0.194	-0.038	0.944	0.210	0.238	0.067	1.094	0.198	0.202	0.012	1.014
Parents'/Guardians' Educational Attainment: HS Graduate	0.184	0.191	0.018	1.029	0.184	0.179	-0.013	0.979	0.191	0.189	-0.004	0.990
Parents'/Guardians' Educational Attainment: Some College	0.170	0.148	-0.060	0.894	0.164	0.172	0.020	1.038	0.172	0.154	-0.049	0.911
Parents'/Guardians' Educational Attainment: College Graduate	0.137	0.162	0.070	1.148	0.139	0.117	-0.065	0.866	0.125	0.147	0.065	1.143

See the note on the first page of the table.

Table C16 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.046	0.046	0.004	1.016	0.048	0.034	-0.068	0.728	0.045	0.048	0.012	1.049
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.255	0.259	0.010	1.010	0.255	0.260	0.011	1.013	0.268	0.258	-0.023	0.972
Nonresident School Enrollment in 11th	0.403	0.444	0.083	1.025	0.410	0.423	0.027	1.010	0.442	0.432	-0.022	0.990
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.201	Inf	-	-	N/A	N/A	-	-	N/A	N/A
Number of School Moves from 9th- 11th	0.054	0.067	0.051	1.129	0.052	0.051	-0.006	1.030	0.053	0.056	0.015	0.943

See the note on the first page of the table.

Table C16 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.035	0.032	-0.018	0.910	0.034	0.029	-0.025	0.876	-	-	0.080	1.619
English Learner Status in 11th: English Only	0.322	0.305	-0.036	0.971	0.327	0.303	-0.051	0.961	0.306	0.305	-0.002	0.994
English Learner Status in 11th: Initial Fluent English Proficient	0.212	0.198	-0.037	0.947	0.210	0.215	0.013	1.020	0.193	0.199	0.015	1.018
English Learner Status in 11th: Limited English Proficient	-	-	-0.043	0.643	-	-	0.040	1.435	-	-	-0.040	0.673
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.454	0.490	0.072	1.007	0.453	0.468	0.028	1.006	0.489	0.488	-0.002	0.996

See the note on the first page of the table.

Table C16 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
Gifted and Talented Program Participation in 11th	0.272	0.346	0.162	1.143	0.295	0.270	-0.056	0.948	0.342	0.330	-0.025	0.979
Math 11th Grade Weighted GPA	2.318	2.716	0.314	1.163	2.364	2.446	0.067	1.006	2.676	2.650	-0.020	0.940
Cumulative Overall Weighted GPA at the End of 11th	3.095	3.236	0.264	1.013	3.118	3.127	0.018	1.004	3.237	3.202	-0.064	0.918
Standardized ELA SBAC Score in 11th	0.347	0.581	0.339	0.768	0.415	0.386	-0.042	0.941	0.554	0.532	-0.033	0.998
Standardized Math SBAC Score in 11th	0.363	0.709	0.523	1.062	0.445	0.386	-0.090	1.193	0.636	0.609	-0.042	0.938

See the note on the first page of the table.

Table C16 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	2.471	3.479	0.364	1.214	2.661	2.558	-0.039	0.979	3.003	3.184	0.065	1.057
Science Credits Accumulated from 9th-11th	30.039	32.466	0.306	1.305	30.553	30.967	0.055	1.023	32.670	31.687	-0.121	0.853
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.011	0.911	-	-	-0.033	0.746	-	-	0.025	1.273
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.551	0.422	-0.126	0.822	0.537	0.551	0.013	0.986	0.424	0.451	0.028	1.063
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.194	0.125	-0.128	0.577	0.170	0.157	-0.024	0.830	0.136	0.139	0.007	1.045

See the note on the first page of the table.

Table C16 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.175	0.131	-0.076	0.764	0.180	0.171	-0.014	1.000	0.143	0.147	0.007	1.140
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.079	0.042	-0.106	0.427	0.067	0.050	-0.051	0.639	0.052	0.047	-0.017	0.858
Highest ERW PSAT Score by the End of 11th	454.244	475.079	0.281	0.950	460.871	457.144	-0.050	0.963	472.705	469.971	-0.036	0.876
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.062	0.054	-0.036	0.871	0.059	0.085	0.099	1.393	0.065	0.056	-0.035	0.874
Highest Math PSAT Score by the End of 11th	457.731	481.427	0.351	1.210	461.580	458.350	-0.051	0.906	475.425	474.019	-0.021	0.990

See the note on the first page of the table.

Table C16 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.057	0.051	-0.028	0.895	0.057	0.076	0.075	1.303	0.062	0.053	-0.039	0.858
Took the SAT or ACT before 12th	0.368	0.439	0.145	1.058	0.392	0.415	0.048	1.020	0.479	0.423	-0.111	0.974
Participation in the AVID Program in 11th	0.034	0.036	0.012	1.062	0.034	0.037	0.017	1.092	0.038	0.037	-0.005	0.972
Took a College or Career Seminar Course in 11th	0.132	0.131	0.000	0.998	0.129	0.137	0.024	1.056	0.119	0.131	0.036	1.082
Ever Attended STEM-Focused School from 9th- 12th	0.088	0.180	0.272	1.840	0.099	0.115	0.052	1.144	0.174	0.144	-0.083	0.852

See the note on the first page of the table.

Table C16 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
Took a Precalculus Course by the End of 11th	0.848	0.927	0.252	0.524	0.875	0.856	-0.058	1.133	0.919	0.916	-0.010	1.027
Took an IDS Course by the End of 11th	0.037	0.013	-0.153	0.365	0.032	0.041	0.051	1.289	-	-	-0.005	0.956
Took a Statistics Course by the End of 11th	0.111	0.053	-0.214	0.506	0.089	0.098	0.030	1.088	0.052	0.061	0.036	1.146
Took Other Advanced Math by the End of 11th	-	-	0.046	1.954	-	-	0.023	1.399	-	-	-0.051	0.589
Math 11th Grade Weighted GPA (Squared)	6.863	9.115	0.351	1.373	7.095	7.495	0.067	0.964	8.921	8.685	-0.034	0.846

See the note on the first page of the table.

Table C16 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th (Squared)	9.860	10.757	0.271	1.059	10.000	10.060	0.018	0.976	10.792	10.540	-0.073	0.895
Standardized ELA SBAC Score in 11th (Squared)	0.659	0.752	0.112	1.087	0.657	0.604	-0.068	0.908	0.739	0.716	-0.026	0.829
Standardized Math SBAC Score in 11th (Squared)	0.556	0.954	0.424	2.237	0.588	0.614	0.035	1.060	0.839	0.780	-0.064	0.873
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	13.010	20.494	0.287	1.282	14.165	13.466	-0.030	0.664	16.497	18.079	0.059	0.791
Science Credits Accumulated from 9th-11th (Squared)	956.870	1,125.255	0.295	1.714	988.452	1,015.119	0.052	1.058	1,138.395	1,064.888	-0.124	0.857

See the note on the first page of the table.

Table C16 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.455	1.126	-0.074	0.889	1.459	1.457	-0.001	0.996	1.143	1.233	0.021	1.266
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.410	0.231	-0.114	0.334	0.345	0.286	-0.039	0.612	0.246	0.258	0.010	0.932
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.415	0.311	-0.044	0.857	0.442	0.438	-0.001	0.866	0.316	0.360	0.019	1.611
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.184	0.078	-0.095	0.149	0.143	0.091	-0.057	0.320	0.101	0.087	-0.020	0.579
Highest ERW PSAT Score by the End of 11th (Squared)	211,972.771	231,057.028	0.270	1.013	218,016.483	214,383.114	-0.052	0.963	229,561.171	226,250.875	-0.045	0.865

See the note on the first page of the table.

Table C16 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	213,639.888	236,764.169	0.368	1.397	217,176.969	213,815.643	-0.059	0.936	230,644.971	229,284.397	-0.022	1.068
Work Effort GPA in 11th	2.490	2.556	0.197	0.987	2.506	2.515	0.029	0.998	2.559	2.541	-0.055	1.012
Cooperation GPA in 11th	2.674	2.722	0.196	1.013	2.687	2.687	-0.002	1.141	2.711	2.709	-0.007	1.120
Attendance Rate in 11th	0.971	0.976	0.190	1.006	0.972	0.971	-0.043	1.656	0.974	0.976	0.064	1.082
Ever Suspended from 9th-11th	-	-	0.032	1.490	-	-	0.005	1.068	-	-	0.003	1.037

See the note on the first page of the table.

Table C16 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
Educational Expectations in 11th: Unsure	0.086	0.079	-0.024	0.929	0.081	0.074	-0.028	0.916	0.073	0.077	0.018	1.055
Educational Expectations in 11th: HS or Less	-	-	-0.129	0.306	-	-	-0.119	0.293	-	-	0.051	1.928
Educational Expectations in 11th: Associate Degree or Certificate	0.059	0.025	-0.173	0.431	0.050	0.035	-0.071	0.724	0.023	0.030	0.048	1.324
Educational Expectations in 11th: Bachelor's Degree or Higher	0.573	0.637	0.130	0.945	0.594	0.588	-0.012	1.006	0.626	0.621	-0.010	1.001
Educational Expectations in 11th: Missing	0.260	0.252	-0.017	0.981	0.257	0.298	0.090	1.096	0.275	0.263	-0.026	0.969

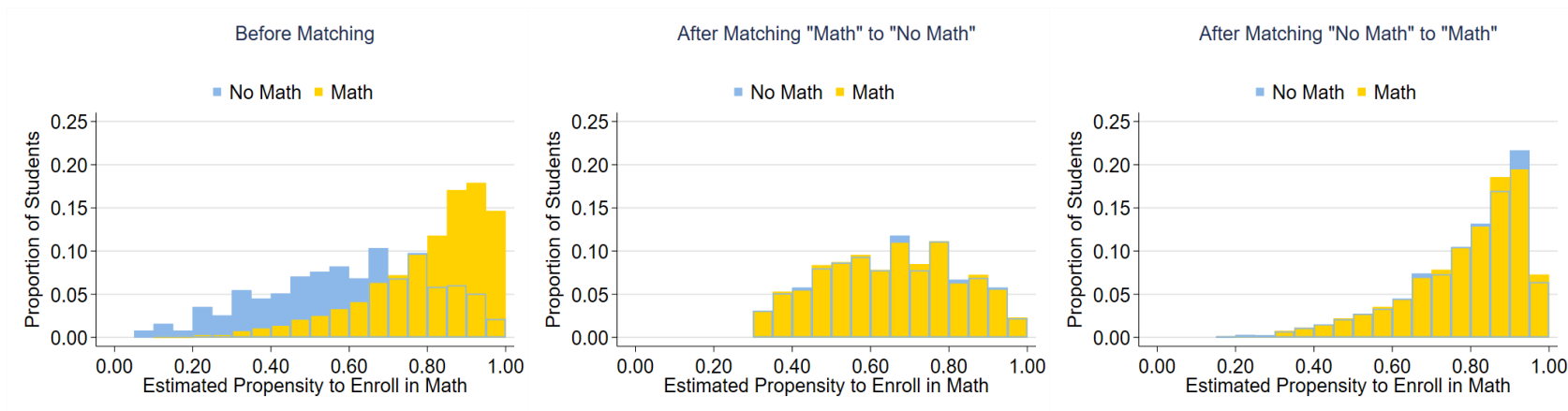
See the note on the first page of the table.

Table C16 Continued. Community College Analysis Matching Diagnostics for Math vs. No Math in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=593)	Math (N=1,058)	SMD	VR	No Math (N=505)	Math (N=658)	SMD	VR	No Math (N=504)	Math (N=855)	SMD	VR
Growth Mindset in 11th	0.088	0.163	0.093	1.026	0.128	0.134	0.007	0.919	0.126	0.131	0.006	1.002
Missing Dummy: Growth Mindset in 11th	0.250	0.238	-0.027	0.968	0.246	0.277	0.071	1.081	0.266	0.250	-0.035	0.957
Academic Self-Efficacy in 11th	-0.119	0.037	0.186	1.132	-0.109	-0.115	-0.008	1.135	0.061	-0.014	-0.091	1.122
Missing Dummy: Academic Self-Efficacy in 11th	0.251	0.236	-0.035	0.959	0.246	0.277	0.071	1.081	0.266	0.249	-0.038	0.955
Indicator of 2016-17 Cohort	0.479	0.491	0.025	1.001	0.493	0.475	-0.036	0.999	0.454	0.475	0.043	1.002

See the note on the first page of the table.

Figure C17. CSUN Analysis Distributions of Estimated Propensities of Taking Math over No Math in Groups 4 and 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. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Age (in Months)	195.141	194.912	-0.043	0.792	195.029	195.054	0.005	0.863	194.408	194.888	0.099	1.040
Gender: Female	0.646	0.549	-0.200	1.082	0.638	0.616	-0.046	1.024	0.558	0.562	0.010	0.993
Race/Ethnicity: Asian	0.049	0.049	0.001	1.003	0.056	0.061	0.023	1.090	0.053	0.051	-0.012	0.947
Race/Ethnicity: African American	0.051	0.037	-0.068	0.737	0.049	0.040	-0.043	0.826	0.026	0.037	0.067	1.435

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Race/Ethnicity: Latinx	0.734	0.804	0.167	0.805	0.767	0.759	-0.019	1.023	0.816	0.799	-0.043	1.065
Race/Ethnicity: Filipinx	0.025	0.038	0.073	1.483	0.027	0.036	0.056	1.353	0.030	0.039	0.048	1.273
Race/Ethnicity: White	0.135	0.064	-0.239	0.511	0.096	0.099	0.010	1.029	0.069	0.066	-0.008	0.968
Race/Ethnicity: Other	-	-	0.022	1.300	-	-	-0.017	0.801	-	-	0.015	1.189
Ever Subsidized Meal Eligible from 9th-11th	0.904	0.937	0.121	0.682	0.911	0.898	-0.045	1.133	0.938	0.934	-0.015	1.051

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.126	0.257	-	-	0.042	1.433	-	-	0.033	1.717
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.242	0.261	0.042	1.048	0.258	0.217	-0.095	0.889	0.230	0.262	0.075	1.087
Parents'/Guardians' Educational Attainment: HS Graduate	0.217	0.218	0.004	1.004	0.216	0.204	-0.027	0.962	0.221	0.217	-0.008	0.985
Parents'/Guardians' Educational Attainment: Some College	0.141	0.124	-0.050	0.895	0.136	0.153	0.049	1.105	0.100	0.125	0.078	1.206
Parents'/Guardians' Educational Attainment: College Graduate	0.119	0.101	-0.057	0.866	0.111	0.123	0.037	1.093	0.116	0.104	-0.038	0.906

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.035	0.035	-0.001	0.995	0.036	0.033	-0.012	0.939	0.048	0.037	-0.055	0.774
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.246	0.261	0.035	1.039	0.244	0.269	0.056	1.064	0.285	0.255	-0.069	0.927
Nonresident School Enrollment in 11th	0.330	0.334	0.009	1.005	0.329	0.311	-0.039	0.970	0.347	0.323	-0.050	0.961
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.048	0.655	-	-	0.055	1.522	-	-	0.027	1.302
Number of School Moves from 9th- 11th	0.087	0.064	-0.079	0.663	0.081	0.061	-0.073	0.630	0.064	0.067	0.014	0.881

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.045	0.046	0.008	1.032	0.040	0.039	-0.005	0.978	0.037	0.044	0.032	1.158
English Learner Status in 11th: English Only	0.260	0.222	-0.089	0.896	0.251	0.255	0.009	1.010	0.230	0.226	-0.011	0.982
English Learner Status in 11th: Initial Fluent English Proficient	0.213	0.189	-0.059	0.914	0.204	0.233	0.069	1.098	0.198	0.191	-0.018	0.969
English Learner Status in 11th: Limited English Proficient	0.031	0.021	-0.064	0.679	-	-	0.022	1.141	-	-	0.080	1.863
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.496	0.568	0.145	0.980	0.520	0.484	-0.072	1.000	0.560	0.562	0.003	0.995

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Gifted and Talented Program Participation in 11th	0.172	0.185	0.034	1.057	0.171	0.179	0.020	1.034	0.201	0.179	-0.057	0.909
Math 11th Grade Weighted GPA	2.672	2.974	0.294	0.962	2.713	2.715	0.002	0.923	3.069	2.936	-0.129	0.937
Cumulative Overall Weighted GPA at the End of 11th	3.217	3.280	0.140	0.891	3.225	3.265	0.086	0.863	3.292	3.280	-0.028	0.996
Standardized ELA SBAC Score in 11th	0.309	0.415	0.154	0.980	0.333	0.349	0.024	0.945	0.480	0.401	-0.113	1.002
Standardized Math SBAC Score in 11th	0.127	0.405	0.400	0.852	0.186	0.230	0.066	0.949	0.381	0.376	-0.008	0.984

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	2.221	2.732	0.212	1.275	2.356	2.324	-0.014	0.979	2.577	2.664	0.036	1.153
Science Credits Accumulated from 9th-11th	30.540	32.862	0.271	1.286	30.948	30.967	0.002	0.984	31.891	32.348	0.055	1.189
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	0.047	1.433	-	-	0.024	1.196	-	-	0.008	1.056
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.279	0.171	-0.165	0.553	0.238	0.228	-0.015	0.924	0.151	0.177	0.048	1.092
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.145	0.089	-0.128	0.609	0.113	0.108	-0.011	1.027	0.070	0.090	0.056	1.331

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.127	0.059	-0.141	0.349	0.093	0.091	-0.005	0.989	0.036	0.062	0.079	1.444
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.082	0.041	-0.124	0.522	0.051	0.065	0.044	1.324	0.027	0.041	0.059	1.736
Highest ERW PSAT Score by the End of 11th	447.033	452.022	0.073	1.066	448.017	449.538	0.022	1.040	452.355	451.360	-0.014	0.880
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.066	0.038	-0.130	0.583	0.053	0.050	-0.014	0.945	0.029	0.039	0.057	1.337
Highest Math PSAT Score by the End of 11th	443.763	457.853	0.219	1.086	445.763	447.264	0.024	1.046	457.054	455.478	-0.024	0.927

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.061	0.034	-0.123	0.583	0.049	0.044	-0.021	0.913	0.028	0.036	0.047	1.283
Took the SAT or ACT before 12th	0.430	0.551	0.244	1.008	0.471	0.469	-0.004	0.999	0.586	0.539	-0.095	1.020
Participation in the AVID Program in 11th	0.066	0.058	-0.035	0.880	0.064	0.063	-0.007	0.974	0.055	0.057	0.011	1.037
Took a College or Career Seminar Course in 11th	0.172	0.179	0.019	1.031	0.184	0.191	0.016	1.026	0.188	0.175	-0.036	0.938
Ever Attended STEM-Focused School from 9th- 12th	0.109	0.163	0.157	1.399	0.116	0.123	0.022	1.053	0.149	0.151	0.005	1.005

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Took a Precalculus Course by the End of 11th	0.465	0.507	0.084	1.003	0.467	0.456	-0.022	0.996	0.508	0.503	-0.011	0.996
Took an IDS Course by the End of 11th	-	-	-0.003	0.977	-	-	-0.023	0.847	-	-	0.026	1.199
Took a Statistics Course by the End of 11th	0.061	0.038	-0.106	0.635	0.058	0.040	-0.082	0.705	0.027	0.040	0.073	1.461
Took Other Advanced Math by the End of 11th	-	-	-0.020	0.761	-	-	-0.069	0.201	-	-	0.045	2.432
Indicator of Student Group 1	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Indicator of Student Group 2	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 3	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 4	0.449	0.432	-0.035	0.990	0.451	0.487	0.071	1.009	0.447	0.433	-0.028	0.989
Indicator of Student Group 5	0.551	0.568	0.035	0.990	0.549	0.513	-0.071	1.009	0.553	0.567	0.028	0.989
Indicator of Student Group 6	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	8.214	9.882	0.286	1.005	8.442	8.369	-0.013	0.848	10.504	9.644	-0.139	0.753
Cumulative Overall Weighted GPA at the End of 11th (Squared)	10.568	10.959	0.133	0.912	10.627	10.852	0.076	0.873	11.038	10.956	-0.028	0.963
Standardized ELA SBAC Score in 11th (Squared)	0.571	0.639	0.089	1.180	0.592	0.577	-0.020	0.973	0.705	0.639	-0.080	0.858
Standardized Math SBAC Score in 11th (Squared)	0.537	0.608	0.095	1.135	0.504	0.499	-0.008	0.860	0.586	0.576	-0.012	0.876
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	10.024	13.964	0.211	1.839	10.812	10.554	-0.016	1.076	12.139	13.462	0.069	1.488

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	996.850	1,162.457	0.261	1.724	1,020.638	1,020.806	0.000	1.068	1,080.346	1,122.019	0.067	1.344
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.627	0.333	-0.123	1.055	0.522	0.482	-0.014	2.970	0.316	0.353	0.018	2.756
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.258	0.152	-0.114	0.818	0.198	0.202	0.004	1.454	0.112	0.151	0.055	1.832
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.357	0.123	-0.121	0.669	0.253	0.250	-0.001	2.511	0.089	0.132	0.029	3.339
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.148	0.076	-0.106	0.773	0.087	0.116	0.047	1.607	0.040	0.070	0.069	2.295

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	204,331.525	209,119.518	0.076	1.086	205,335.776	206,886.697	0.025	1.041	210,048.323	208,518.307	-0.023	0.848
Highest Math PSAT Score by the End of 11th (Squared)	200,897.545	213,949.230	0.224	1.143	202,633.136	204,155.772	0.027	1.040	213,354.065	211,608.738	-0.029	0.944
Work Effort GPA in 11th	2.605	2.632	0.102	0.928	2.610	2.632	0.082	0.962	2.644	2.631	-0.048	1.041
Cooperation GPA in 11th	2.733	2.745	0.060	0.915	2.738	2.758	0.098	0.852	2.751	2.746	-0.023	1.032
Attendance Rate in 11th	0.972	0.978	0.205	0.806	0.974	0.976	0.074	1.128	0.979	0.977	-0.041	1.394

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Ever Suspended from 9th-11th	-	-	-0.009	0.896	-	-	-0.005	0.950	-	-	-0.068	0.501
Educational Expectations in 11th: Unsure	0.057	0.057	0.003	1.010	0.056	0.050	-0.024	0.909	0.038	0.057	0.093	1.488
Educational Expectations in 11th: HS or Less	-	-	-0.009	0.913	-	-	0.000	1.000	-	-	0.029	1.363
Educational Expectations in 11th: Associate Degree or Certificate	-	-	-0.057	0.656	-	-	-0.047	0.661	-	-	0.058	1.700
Educational Expectations in 11th: Bachelor's Degree or Higher	0.637	0.679	0.089	0.941	0.633	0.646	0.027	0.984	0.633	0.670	0.077	0.948

See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Educational Expectations in 11th: Missing	0.275	0.241	-0.079	0.915	0.284	0.282	-0.005	0.995	0.313	0.248	-0.146	0.863
Growth Mindset in 11th	0.114	0.139	0.031	1.210	0.117	0.131	0.018	1.009	0.131	0.136	0.006	1.146
Missing Dummy: Growth Mindset in 11th	0.262	0.227	-0.080	0.908	0.269	0.271	0.004	1.004	0.287	0.233	-0.123	0.870
Academic Self-Efficacy in 11th	-0.020	0.136	0.192	1.037	-0.001	-0.017	-0.019	1.011	0.032	0.115	0.103	1.032
Missing Dummy: Academic Self-Efficacy in 11th	0.260	0.228	-0.074	0.914	0.267	0.269	0.006	1.006	0.287	0.233	-0.124	0.869

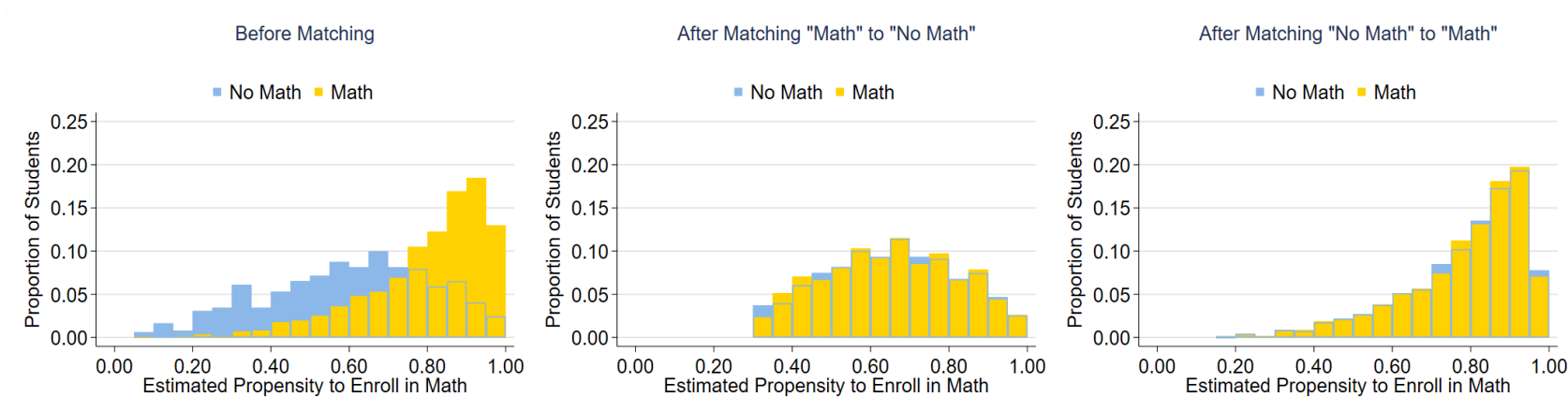
See the note on the first page of the table.

Table C17 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=512)	Math (N=1,570)	SMD	VR	No Math (N=450)	Math (N=851)	SMD	VR	No Math (N=481)	Math (N=1,444)	SMD	VR
Indicator of 2016-17 Cohort	0.492	0.488	-0.009	0.998	0.480	0.453	-0.053	0.993	0.440	0.481	0.082	1.009

See the note on the first page of the table.

Figure C18. CSUN Analysis Distributions of Estimated Propensities of Taking Math over No Math in Groups 4 and 5 Before and After Matching for Students who Took a Math Course in the First Two Years, 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 C18. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Age (in Months)	195.103	194.893	-0.040	0.802	195.001	194.761	-0.047	0.810	194.587	194.877	0.061	1.125
Gender: Female	0.646	0.549	-0.198	1.081	0.636	0.605	-0.065	1.033	0.563	0.562	-0.003	0.996
Race/Ethnicity: Asian	0.045	0.050	0.025	1.110	0.051	0.060	0.037	1.153	0.047	0.050	0.013	1.054
Race/Ethnicity: African American	0.047	0.034	-0.066	0.731	0.047	0.034	-0.067	0.730	0.024	0.034	0.057	1.371

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Race/Ethnicity: Latinx	0.747	0.807	0.144	0.823	0.776	0.771	-0.012	1.016	0.831	0.802	-0.074	1.125
Race/Ethnicity: Filipinx	-	-	0.097	1.719	0.026	0.025	-0.006	0.964	0.033	0.041	0.040	1.213
Race/Ethnicity: White	0.132	0.063	-0.235	0.513	0.093	0.103	0.033	1.093	0.060	0.066	0.025	1.091
Race/Ethnicity: Other	-	-	0.008	1.105	-	-	0.011	1.132	-	-	0.034	1.552
Ever Subsidized Meal Eligible from 9th-11th	0.906	0.938	0.120	0.680	0.916	0.915	-0.005	1.015	0.952	0.936	-0.069	1.302

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.127	0.262	-	-	-0.033	0.722	-	-	0.034	1.739
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.244	0.264	0.045	1.050	0.261	0.252	-0.021	0.976	0.241	0.264	0.054	1.059
Parents'/Guardians' Educational Attainment: HS Graduate	0.220	0.219	-0.003	0.994	0.219	0.196	-0.056	0.922	0.232	0.219	-0.031	0.955
Parents'/Guardians' Educational Attainment: Some College	0.143	0.122	-0.061	0.874	0.135	0.139	0.011	1.023	0.096	0.124	0.090	1.248
Parents'/Guardians' Educational Attainment: College Graduate	0.110	0.101	-0.028	0.930	0.105	0.120	0.047	1.123	0.113	0.101	-0.038	0.904

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.035	0.034	-0.004	0.977	0.035	0.034	-0.003	0.987	0.039	0.035	-0.021	0.899
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.248	0.260	0.028	1.030	0.245	0.259	0.032	1.037	0.280	0.257	-0.052	0.943
Nonresident School Enrollment in 11th	0.326	0.329	0.006	1.003	0.322	0.317	-0.010	0.992	0.339	0.321	-0.039	0.968
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.037	0.714	-	-	0.030	1.262	-	-	0.017	1.183
Number of School Moves from 9th- 11th	0.088	0.065	-0.080	0.663	0.085	0.074	-0.040	0.718	0.067	0.068	0.003	0.822

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.045	0.047	0.012	1.053	0.042	0.040	-0.009	0.957	0.040	0.045	0.024	1.113
English Learner Status in 11th: English Only	0.255	0.212	-0.101	0.878	0.245	0.249	0.011	1.013	0.225	0.216	-0.021	0.968
English Learner Status in 11th: Initial Fluent English Proficient	0.208	0.192	-0.039	0.942	0.200	0.208	0.018	1.027	0.195	0.195	0.000	0.995
English Learner Status in 11th: Limited English Proficient	0.033	0.022	-0.063	0.691	0.028	0.027	-0.009	0.951	-	-	0.093	2.089
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.505	0.574	0.138	0.977	0.527	0.516	-0.021	1.002	0.569	0.566	-0.006	0.997

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Gifted and Talented Program Participation in 11th	0.173	0.179	0.016	1.027	0.172	0.170	-0.006	0.989	0.193	0.174	-0.049	0.919
Math 11th Grade Weighted GPA	2.652	2.967	0.307	0.955	2.697	2.700	0.003	1.031	2.984	2.940	-0.043	0.931
Cumulative Overall Weighted GPA at the End of 11th	3.203	3.276	0.159	0.903	3.213	3.241	0.060	0.929	3.266	3.276	0.022	1.052
Standardized ELA SBAC Score in 11th	0.304	0.406	0.147	0.965	0.329	0.338	0.013	1.006	0.434	0.398	-0.052	0.973
Standardized Math SBAC Score in 11th	0.119	0.397	0.400	0.837	0.177	0.225	0.069	1.007	0.347	0.372	0.038	0.980

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	2.208	2.691	0.200	1.255	2.340	2.321	-0.009	0.947	2.547	2.621	0.030	1.114
Science Credits Accumulated from 9th-11th	30.513	32.895	0.278	1.273	30.948	30.875	-0.009	0.985	32.208	32.540	0.039	1.175
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	0.046	1.413	-	-	0.014	1.112	-	-	0.004	1.028
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.289	0.175	-0.173	0.546	0.245	0.245	0.000	1.075	0.150	0.178	0.049	1.033
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.147	0.088	-0.134	0.589	0.119	0.142	0.049	1.203	0.065	0.088	0.066	1.438

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.132	0.060	-0.149	0.336	0.096	0.103	0.015	1.171	0.046	0.062	0.045	1.110
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.081	0.042	-0.120	0.538	0.054	0.078	0.073	1.472	0.029	0.041	0.049	1.570
Highest ERW PSAT Score by the End of 11th	446.345	451.277	0.073	1.031	446.859	449.166	0.034	1.033	448.046	450.895	0.040	0.904
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.067	0.038	-0.132	0.581	0.054	0.067	0.055	1.226	0.026	0.039	0.072	1.466
Highest Math PSAT Score by the End of 11th	443.050	457.213	0.220	1.060	444.159	447.080	0.045	1.014	453.914	455.154	0.019	0.945

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.061	0.035	-0.125	0.580	0.049	0.058	0.041	1.179	0.024	0.035	0.066	1.444
Took the SAT or ACT before 12th	0.432	0.558	0.255	1.004	0.476	0.468	-0.015	0.998	0.598	0.547	-0.102	1.026
Participation in the AVID Program in 11th	0.065	0.053	-0.050	0.829	0.063	0.068	0.021	1.075	0.047	0.054	0.030	1.126
Took a College or Career Seminar Course in 11th	0.173	0.181	0.020	1.033	0.189	0.164	-0.066	0.893	0.196	0.178	-0.045	0.926
Ever Attended STEM-Focused School from 9th- 12th	0.108	0.167	0.172	1.444	0.114	0.117	0.009	1.021	0.172	0.158	-0.038	0.930

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Took a Precalculus Course by the End of 11th	0.454	0.502	0.096	1.007	0.457	0.477	0.040	1.005	0.500	0.496	-0.009	0.996
Took an IDS Course by the End of 11th	-	-	-0.005	0.963	-	-	-0.024	0.847	-	-	0.042	1.359
Took a Statistics Course by the End of 11th	0.061	0.039	-0.104	0.645	0.058	0.033	-0.123	0.575	0.032	0.041	0.050	1.277
Took Other Advanced Math by the End of 11th	-	-	-0.019	0.775	-	-	0.000	1.000	-	-	0.048	2.316
Indicator of Student Group 1	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Indicator of Student Group 2	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 3	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 4	0.458	0.435	-0.047	0.989	0.459	0.468	0.018	1.002	0.451	0.438	-0.027	0.990
Indicator of Student Group 5	0.542	0.565	0.047	0.989	0.541	0.532	-0.018	1.002	0.549	0.562	0.027	0.990
Indicator of Student Group 6	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	8.111	9.834	0.297	1.008	8.345	8.395	0.009	0.857	9.997	9.665	-0.054	0.785
Cumulative Overall Weighted GPA at the End of 11th (Squared)	10.478	10.925	0.154	0.932	10.544	10.707	0.055	0.935	10.852	10.927	0.026	1.026
Standardized ELA SBAC Score in 11th (Squared)	0.575	0.631	0.073	1.154	0.593	0.602	0.012	0.998	0.675	0.634	-0.050	0.876
Standardized Math SBAC Score in 11th (Squared)	0.541	0.599	0.077	1.102	0.498	0.520	0.033	1.012	0.560	0.571	0.015	1.055
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	10.019	13.709	0.197	1.795	10.814	10.443	-0.023	0.977	12.064	13.108	0.055	1.427

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	995.340	1,164.108	0.266	1.700	1,020.716	1,015.274	-0.010	1.046	1,104.532	1,138.115	0.052	1.339
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.652	0.341	-0.127	1.066	0.543	0.579	0.011	3.760	0.335	0.356	0.010	2.558
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.261	0.149	-0.121	0.782	0.207	0.253	0.045	1.619	0.099	0.144	0.067	1.983
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.373	0.123	-0.126	0.671	0.263	0.309	0.017	3.190	0.115	0.130	0.010	2.820
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.147	0.077	-0.102	0.813	0.091	0.136	0.068	1.788	0.044	0.069	0.058	2.017

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	203,762.803	208,334.866	0.073	1.044	204,273.881	206,494.355	0.035	1.033	205,933.368	208,015.863	0.032	0.886
Highest Math PSAT Score by the End of 11th (Squared)	200,303.271	213,302.017	0.224	1.114	201,362.877	204,024.853	0.047	1.000	210,354.560	211,261.727	0.015	0.960
Work Effort GPA in 11th	2.597	2.629	0.122	0.938	2.601	2.620	0.070	1.027	2.632	2.629	-0.011	1.060
Cooperation GPA in 11th	2.728	2.745	0.079	0.911	2.732	2.751	0.091	0.925	2.744	2.746	0.008	1.023
Attendance Rate in 11th	0.972	0.978	0.213	0.806	0.974	0.976	0.068	1.208	0.978	0.977	-0.006	1.370

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.016	1.215	-	-	0.048	1.658	-	-	-0.061	0.539
Educational Expectations in 11th: Unsure	0.057	0.053	-0.016	0.940	0.054	0.047	-0.030	0.884	0.032	0.053	0.103	1.602
Educational Expectations in 11th: HS or Less	-	-	-0.014	0.864	-	-	0.004	1.039	-	-	0.034	1.466
Educational Expectations in 11th: Associate Degree or Certificate	-	-	-0.056	0.669	-	-	-0.037	0.753	-	-	0.027	1.240
Educational Expectations in 11th: Bachelor's Degree or Higher	0.642	0.685	0.091	0.937	0.639	0.639	0.001	0.999	0.628	0.679	0.108	0.928

See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Educational Expectations in 11th: Missing	0.269	0.238	-0.071	0.922	0.277	0.288	0.023	1.022	0.321	0.242	-0.174	0.839
Growth Mindset in 11th	0.111	0.145	0.041	1.182	0.115	0.097	-0.023	0.984	0.129	0.140	0.014	1.154
Missing Dummy: Growth Mindset in 11th	0.255	0.225	-0.070	0.917	0.261	0.274	0.028	1.030	0.291	0.229	-0.142	0.851
Academic Self-Efficacy in 11th	-0.022	0.129	0.186	1.046	0.001	0.001	0.000	1.043	0.003	0.110	0.131	1.012
Missing Dummy: Academic Self-Efficacy in 11th	0.253	0.225	-0.065	0.921	0.259	0.272	0.031	1.033	0.291	0.228	-0.143	0.850

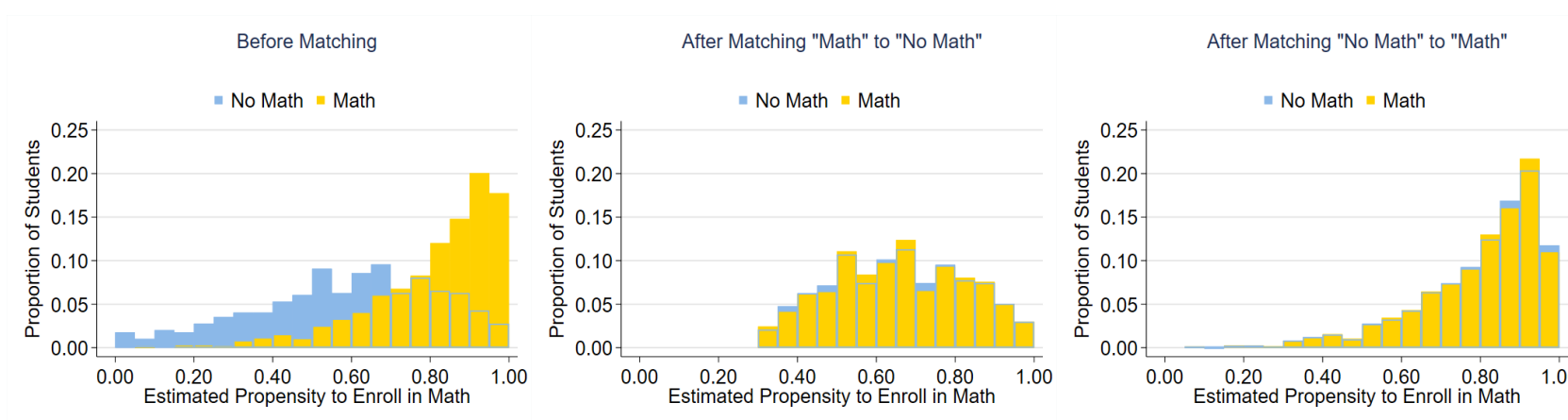
See the note on the first page of the table.

Table C18 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=491)	Math (N=1,478)	SMD	VR	No Math (N=429)	Math (N=843)	SMD	VR	No Math (N=459)	Math (N=1,382)	SMD	VR
Indicator of 2016-17 Cohort	0.475	0.472	-0.005	0.998	0.466	0.454	-0.025	0.996	0.442	0.469	0.053	1.005

See the note on the first page of the table.

Figure C19. CSUN Analysis Distributions of Estimated Propensities of Taking Math over No Math in Groups 4 and 5 Before and After Matching for Students with Non-Missing College-Level Math GPAs, 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. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Age (in Months)	194.699	194.761	0.013	1.026	194.441	194.408	-0.007	1.212	194.349	194.682	0.074	1.149
Gender: Female	0.657	0.538	-0.246	1.102	0.655	0.658	0.006	0.996	0.592	0.556	-0.072	1.016
Race/Ethnicity: Asian	0.048	0.055	0.032	1.137	0.054	0.066	0.053	1.217	0.043	0.055	0.055	1.251
Race/Ethnicity: African American	0.038	0.031	-0.037	0.826	0.036	0.039	0.016	1.080	-	-	0.015	1.077

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Race/Ethnicity: Latinx	0.730	0.795	0.151	0.827	0.777	0.771	-0.013	1.017	0.822	0.793	-0.072	1.112
Race/Ethnicity: Filipinx	-	-	0.148	2.370	-	-	-0.028	0.803	0.035	0.039	0.017	1.082
Race/Ethnicity: White	0.159	0.068	-0.287	0.477	0.107	0.103	-0.014	0.965	0.062	0.072	0.040	1.141
Race/Ethnicity: Other	-	-	0.005	1.051	-	-	-0.027	0.735	-	-	0.008	1.079
Ever Subsidized Meal Eligible from 9th-11th	0.897	0.932	0.128	0.680	0.911	0.916	0.019	0.945	0.935	0.931	-0.015	1.049

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.148	0.200	-	-	0.089	3.374	-	-	0.025	1.526
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.234	0.258	0.055	1.065	0.268	0.258	-0.022	0.977	0.242	0.261	0.044	1.045
Parents'/Guardians' Educational Attainment: HS Graduate	0.224	0.216	-0.021	0.971	0.208	0.200	-0.021	0.970	0.215	0.218	0.007	1.004
Parents'/Guardians' Educational Attainment: Some College	0.146	0.121	-0.074	0.851	0.137	0.142	0.014	1.029	0.108	0.124	0.051	1.123
Parents'/Guardians' Educational Attainment: College Graduate	0.108	0.108	0.000	0.997	0.101	0.111	0.031	1.082	0.099	0.107	0.027	1.066

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.043	0.036	-0.036	0.841	0.045	0.034	-0.055	0.768	0.036	0.037	0.006	1.025
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.244	0.262	0.040	1.045	0.241	0.255	0.033	1.039	0.301	0.253	-0.106	0.893
Nonresident School Enrollment in 11th	0.355	0.338	-0.036	0.975	0.339	0.328	-0.024	0.983	0.382	0.337	-0.094	0.940
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.050	0.634	-	-	0.082	1.879	-	-	0.003	1.028
Number of School Moves from 9th-11th	0.074	0.062	-0.046	0.736	0.065	0.058	-0.028	0.825	0.057	0.063	0.023	0.842

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.043	0.048	0.024	1.107	0.039	0.033	-0.029	0.866	0.039	0.047	0.036	1.168
English Learner Status in 11th: English Only	0.257	0.209	-0.113	0.865	0.241	0.238	-0.007	0.991	0.266	0.214	-0.122	0.855
English Learner Status in 11th: Initial Fluent English Proficient	0.207	0.201	-0.013	0.979	0.208	0.228	0.048	1.067	0.198	0.201	0.005	1.002
English Learner Status in 11th: Limited English Proficient	-	-	-0.036	0.793	-	-	0.053	1.469	-	-	0.031	1.267
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.511	0.570	0.117	0.979	0.536	0.512	-0.048	1.004	0.522	0.568	0.092	0.977

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Gifted and Talented Program Participation in 11th	0.196	0.196	-0.002	0.995	0.202	0.186	-0.041	0.939	0.186	0.193	0.017	1.020
Math 11th Grade Weighted GPA	2.706	3.026	0.311	0.948	2.772	2.785	0.012	1.032	3.095	2.998	-0.094	0.957
Cumulative Overall Weighted GPA at the End of 11th	3.259	3.326	0.149	0.864	3.283	3.301	0.041	0.995	3.336	3.327	-0.020	1.013
Standardized ELA SBAC Score in 11th	0.394	0.459	0.097	0.993	0.429	0.419	-0.015	0.944	0.501	0.454	-0.073	1.027
Standardized Math SBAC Score in 11th	0.225	0.477	0.381	0.849	0.277	0.295	0.028	0.988	0.433	0.452	0.029	1.018

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
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Number of Semesters of AP Classes Taken from 9th-11th	2.224	2.778	0.229	1.284	2.425	2.333	-0.040	0.964	2.697	2.689	-0.003	1.006
Science Credits Accumulated from 9th-11th	30.395	32.833	0.293	1.237	31.009	30.839	-0.022	0.930	32.320	32.484	0.020	1.152
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	0.022	1.167	-	-	0.041	1.352	-	-	-0.031	0.797
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.257	0.154	-0.165	0.400	0.173	0.175	0.004	1.053	0.131	0.149	0.037	0.975
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.139	0.073	-0.163	0.492	0.083	0.089	0.017	1.102	0.071	0.073	0.006	1.122

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

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A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.113	0.047	-0.147	0.170	0.045	0.040	-0.016	0.832	0.021	0.043	0.105	1.821
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.076	0.029	-0.152	0.352	0.027	0.036	0.042	1.365	0.029	0.029	-0.001	1.305
Highest ERW PSAT Score by the End of 11th	452.789	455.202	0.035	1.020	455.206	453.365	-0.027	1.010	454.478	455.154	0.010	0.928
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.055	0.034	-0.103	0.630	0.039	0.044	0.027	1.132	-	-	0.056	1.350
Highest Math PSAT Score by the End of 11th	447.995	461.464	0.209	1.065	449.586	449.313	-0.004	1.005	456.805	459.622	0.043	0.956

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.053	0.031	-0.109	0.599	0.036	0.042	0.034	1.175	-	-	0.046	1.292
Took the SAT or ACT before 12th	0.446	0.562	0.233	0.995	0.494	0.487	-0.013	0.999	0.583	0.551	-0.063	1.011
Participation in the AVID Program in 11th	0.065	0.049	-0.069	0.765	0.060	0.064	0.017	1.065	0.040	0.051	0.050	1.236
Took a College or Career Seminar Course in 11th	0.161	0.166	0.014	1.023	0.170	0.172	0.006	1.011	0.169	0.155	-0.037	0.928
Ever Attended STEM-Focused School from 9th- 12th	0.106	0.164	0.171	1.446	0.107	0.108	0.004	1.009	0.183	0.153	-0.080	0.861

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Took a Precalculus Course by the End of 11th	0.491	0.532	0.082	0.994	0.491	0.496	0.011	1.000	0.521	0.532	0.022	0.991
Took an IDS Course by the End of 11th	-	-	-0.085	0.542	-	-	0.008	1.048	-	-	0.024	1.234
Took a Statistics Course by the End of 11th	0.055	0.038	-0.082	0.700	0.057	0.037	-0.093	0.666	0.048	0.041	-0.030	0.869
Took Other Advanced Math by the End of 11th	-	-	-0.036	0.632	-	-	-0.016	0.801	-	-	0.051	2.426
Indicator of Student Group 1	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Indicator of Student Group 2	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 3	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 4	0.421	0.411	-0.019	0.992	0.423	0.437	0.029	1.008	0.418	0.407	-0.022	0.986
Indicator of Student Group 5	0.579	0.589	0.019	0.992	0.577	0.563	-0.029	1.008	0.582	0.593	0.022	0.986
Indicator of Student Group 6	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	8.407	10.188	0.302	0.985	8.770	8.877	0.018	0.897	10.652	10.023	-0.101	0.779
Cumulative Overall Weighted GPA at the End of 11th (Squared)	10.835	11.242	0.141	0.886	10.976	11.093	0.041	0.955	11.309	11.254	-0.019	0.977
Standardized ELA SBAC Score in 11th (Squared)	0.592	0.645	0.068	1.144	0.611	0.579	-0.044	0.772	0.672	0.640	-0.039	0.937
Standardized Math SBAC Score in 11th (Squared)	0.524	0.631	0.143	1.232	0.507	0.513	0.009	0.884	0.580	0.606	0.035	1.097
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	10.036	14.263	0.222	1.927	11.223	10.599	-0.037	1.029	13.506	13.545	0.002	1.222

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	985.610	1,154.550	0.280	1.587	1,022.103	1,007.369	-0.028	0.940	1,107.811	1,128.477	0.034	1.243
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.625	0.247	-0.190	0.224	0.304	0.319	0.011	1.570	0.248	0.249	0.001	1.102
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.234	0.111	-0.165	0.472	0.125	0.138	0.021	1.146	0.100	0.113	0.022	1.384
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.360	0.061	-0.182	0.033	0.074	0.062	-0.023	0.647	0.031	0.059	0.070	1.430
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.141	0.049	-0.159	0.312	0.045	0.061	0.039	1.385	0.038	0.050	0.032	1.904

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	209,628.441	211,918.996	0.036	1.024	211,868.612	210,245.658	-0.026	0.981	211,622.615	211,902.906	0.004	0.909
Highest Math PSAT Score by the End of 11th (Squared)	204,696.661	217,213.873	0.215	1.123	206,226.615	206,004.356	-0.004	0.987	212,968.854	215,388.201	0.041	0.980
Work Effort GPA in 11th	2.626	2.652	0.104	0.942	2.631	2.659	0.111	0.989	2.675	2.653	-0.088	1.189
Cooperation GPA in 11th	2.750	2.764	0.066	0.920	2.757	2.780	0.117	0.951	2.777	2.764	-0.068	1.170
Attendance Rate in 11th	0.973	0.980	0.234	0.851	0.974	0.977	0.109	1.093	0.980	0.979	-0.025	1.357

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.027	1.416	-	-	0.041	1.594	-	-	0.079	3.954
Educational Expectations in 11th: Unsure	0.058	0.056	-0.006	0.975	0.057	0.048	-0.040	0.850	0.040	0.056	0.076	1.374
Educational Expectations in 11th: HS or Less	-	-	-0.037	0.696	-	-	0.000	1.000	-	-	-0.004	0.959
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.000	0.998	-	-	-0.061	0.564	-	-	0.066	1.802
Educational Expectations in 11th: Bachelor's Degree or Higher	0.652	0.693	0.086	0.937	0.655	0.649	-0.011	1.007	0.642	0.690	0.101	0.925

See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Educational Expectations in 11th: Missing	0.262	0.227	-0.082	0.905	0.262	0.283	0.047	1.049	0.299	0.228	-0.162	0.835
Growth Mindset in 11th	0.124	0.164	0.050	1.092	0.141	0.141	0.000	0.863	0.201	0.151	-0.063	1.127
Missing Dummy: Growth Mindset in 11th	0.249	0.217	-0.076	0.907	0.247	0.270	0.053	1.060	0.281	0.217	-0.147	0.837
Academic Self-Efficacy in 11th	-0.023	0.134	0.192	1.023	-0.009	-0.008	0.001	0.960	0.071	0.106	0.043	1.028
Missing Dummy: Academic Self-Efficacy in 11th	0.247	0.217	-0.070	0.913	0.244	0.268	0.056	1.064	0.280	0.216	-0.147	0.836

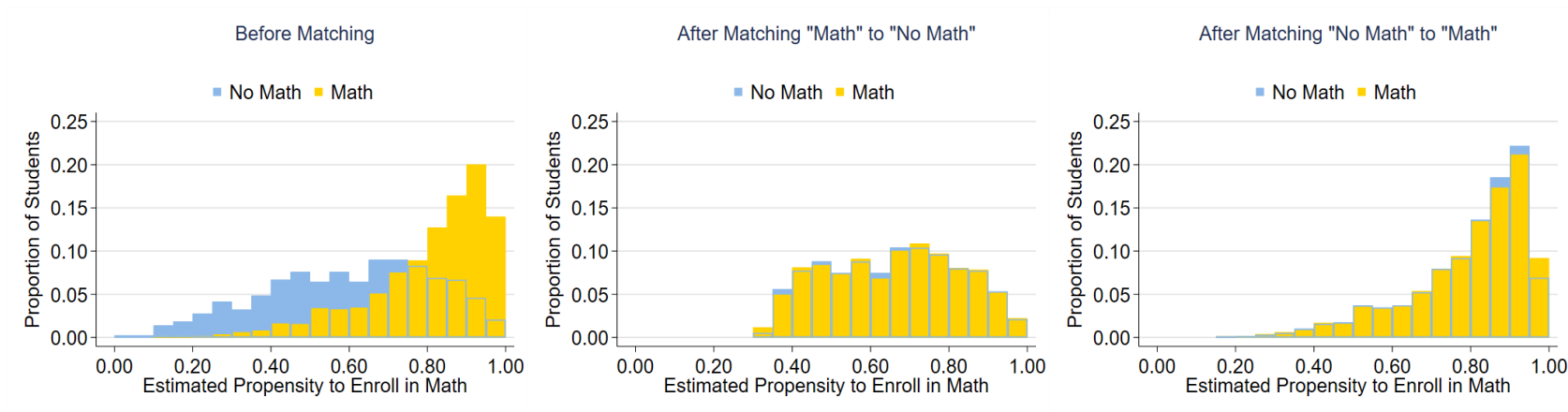
See the note on the first page of the table.

Table C19 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=397)	Math (N=1,257)	SMD	VR	No Math (N=336)	Math (N=659)	SMD	VR	No Math (N=367)	Math (N=1,161)	SMD	VR
Indicator of 2016-17 Cohort	0.491	0.485	-0.012	0.998	0.476	0.462	-0.029	0.996	0.448	0.483	0.070	1.003

See the note on the first page of the table.

Figure C20. CSUN Analysis Distributions of Estimated Propensities of Taking Math over No Math in Groups 4 and 5 Before and After Matching for Students with Non-Missing Non-Math STEM GPAs, 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. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Age (in Months)	194.865	194.850	-0.003	0.903	194.812	194.840	0.005	0.874	194.208	194.846	0.132	1.076
Gender: Female	0.661	0.543	-0.244	1.106	0.640	0.642	0.004	0.997	0.561	0.555	-0.012	0.997
Race/Ethnicity: Asian	0.055	0.053	-0.010	0.960	0.061	0.074	0.051	1.192	0.062	0.054	-0.037	0.864
Race/Ethnicity: African American	0.051	0.033	-0.088	0.665	0.051	0.033	-0.091	0.654	-	-	0.052	1.330

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Race/Ethnicity: Latinx	0.707	0.794	0.201	0.789	0.747	0.745	-0.004	1.004	0.829	0.790	-0.100	1.165
Race/Ethnicity: Filipinx	0.028	0.041	0.071	1.443	-	-	-0.037	0.805	-	-	0.106	1.783
Race/Ethnicity: White	0.152	0.071	-0.261	0.509	0.104	0.116	0.039	1.102	0.056	0.072	0.068	1.269
Race/Ethnicity: Other	-	-	0.022	1.274	-	-	0.006	1.066	-	-	0.046	1.758
Ever Subsidized Meal Eligible from 9th-11th	0.899	0.933	0.124	0.685	0.904	0.903	-0.004	1.010	0.945	0.932	-0.056	1.222

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.138	0.252	-	-	0.034	1.345	-	-	0.025	1.448
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.230	0.250	0.047	1.057	0.251	0.207	-0.103	0.875	0.234	0.254	0.048	1.053
Parents'/Guardians' Educational Attainment: HS Graduate	0.230	0.216	-0.033	0.955	0.219	0.214	-0.012	0.984	0.224	0.218	-0.015	0.974
Parents'/Guardians' Educational Attainment: Some College	0.143	0.124	-0.054	0.888	0.139	0.139	0.000	1.000	0.100	0.124	0.074	1.194
Parents'/Guardians' Educational Attainment: College Graduate	0.134	0.108	-0.080	0.827	0.120	0.139	0.056	1.131	0.109	0.110	0.001	0.997

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.037	0.034	-0.016	0.920	0.037	0.032	-0.029	0.862	0.037	0.034	-0.013	0.930
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.226	0.267	0.096	1.119	0.235	0.269	0.080	1.095	0.295	0.260	-0.079	0.919
Nonresident School Enrollment in 11th	0.355	0.350	-0.011	0.992	0.339	0.333	-0.012	0.991	0.354	0.341	-0.027	0.978
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.044	0.687	-	-	0.012	1.098	-	-	0.003	1.021
Number of School Moves from 9th-11th	0.075	0.061	-0.054	0.675	0.070	0.064	-0.023	0.759	0.067	0.064	-0.012	0.685

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.044	0.044	0.002	1.007	0.040	0.035	-0.028	0.871	0.035	0.043	0.038	1.190
English Learner Status in 11th: English Only	0.267	0.225	-0.099	0.888	0.256	0.265	0.021	1.023	0.231	0.225	-0.016	0.975
English Learner Status in 11th: Initial Fluent English Proficient	0.212	0.197	-0.038	0.944	0.203	0.236	0.081	1.116	0.216	0.198	-0.043	0.934
English Learner Status in 11th: Limited English Proficient	-	-	-0.032	0.801	-	-	0.028	1.228	-	-	0.100	2.510
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.498	0.560	0.126	0.984	0.525	0.479	-0.093	1.001	0.545	0.558	0.026	0.989

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Gifted and Talented Program Participation in 11th	0.184	0.197	0.031	1.049	0.184	0.209	0.062	1.099	0.219	0.190	-0.072	0.895
Math 11th Grade Weighted GPA	2.720	3.025	0.295	0.924	2.773	2.782	0.009	1.008	3.061	3.004	-0.056	0.965
Cumulative Overall Weighted GPA at the End of 11th	3.257	3.310	0.119	0.898	3.271	3.296	0.056	0.901	3.293	3.311	0.043	1.052
Standardized ELA SBAC Score in 11th	0.349	0.440	0.135	1.005	0.376	0.354	-0.032	0.985	0.504	0.430	-0.111	1.039
Standardized Math SBAC Score in 11th	0.169	0.443	0.405	0.870	0.228	0.265	0.055	1.025	0.427	0.418	-0.014	1.062

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	2.244	2.805	0.233	1.317	2.408	2.349	-0.026	0.926	2.602	2.747	0.059	1.196
Science Credits Accumulated from 9th-11th	30.476	32.633	0.253	1.217	30.925	30.697	-0.029	0.912	32.395	32.369	-0.003	1.148
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	0.017	1.137	-	-	-0.012	0.916	-	-	-0.033	0.791
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.244	0.155	-0.143	0.534	0.195	0.180	-0.025	0.750	0.174	0.154	-0.034	0.727
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.145	0.076	-0.162	0.492	0.088	0.086	-0.006	0.972	0.077	0.078	0.002	1.119

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.108	0.053	-0.119	0.367	0.075	0.061	-0.033	0.637	0.058	0.054	-0.012	0.709
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.081	0.033	-0.153	0.390	0.032	0.040	0.032	1.345	0.034	0.034	0.000	1.176
Highest ERW PSAT Score by the End of 11th	449.546	454.666	0.075	1.076	450.563	450.187	-0.006	1.036	450.636	453.899	0.046	0.924
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.058	0.037	-0.098	0.652	0.051	0.035	-0.076	0.706	-	-	0.090	1.643
Highest Math PSAT Score by the End of 11th	445.651	460.233	0.226	1.067	447.752	448.605	0.013	1.024	458.910	457.896	-0.016	0.968

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.053	0.033	-0.098	0.637	0.045	0.033	-0.066	0.727	-	-	0.083	1.622
Took the SAT or ACT before 12th	0.435	0.562	0.255	1.000	0.483	0.495	0.025	1.001	0.589	0.555	-0.069	1.015
Participation in the AVID Program in 11th	0.060	0.056	-0.017	0.937	0.061	0.055	-0.025	0.910	0.053	0.055	0.011	1.039
Took a College or Career Seminar Course in 11th	0.166	0.177	0.029	1.050	0.176	0.171	-0.014	0.976	0.210	0.173	-0.095	0.856
Ever Attended STEM-Focused School from 9th- 12th	0.113	0.166	0.155	1.383	0.115	0.119	0.015	1.036	0.155	0.159	0.010	1.013

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Took a Precalculus Course by the End of 11th	0.491	0.524	0.066	0.997	0.493	0.515	0.044	0.999	0.517	0.517	0.000	0.995
Took an IDS Course by the End of 11th	-	-	-0.041	0.722	-	-	-0.029	0.803	-	-	-0.001	0.984
Took a Statistics Course by the End of 11th	0.067	0.037	-0.136	0.568	0.061	0.041	-0.092	0.684	0.028	0.039	0.063	1.388
Took Other Advanced Math by the End of 11th	-	-	0.008	1.116	-	-	0.027	1.597	-	-	0.056	2.974
Indicator of Student Group 1	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Indicator of Student Group 2	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 3	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 4	0.419	0.421	0.004	1.000	0.424	0.425	0.001	1.000	0.440	0.426	-0.029	0.987
Indicator of Student Group 5	0.581	0.579	-0.004	1.000	0.576	0.575	-0.001	1.000	0.560	0.574	0.029	0.987
Indicator of Student Group 6	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	8.506	10.174	0.283	0.988	8.791	8.850	0.010	0.932	10.421	10.045	-0.061	0.813
Cumulative Overall Weighted GPA at the End of 11th (Squared)	10.818	11.149	0.113	0.905	10.909	11.052	0.049	0.888	11.024	11.157	0.047	1.019
Standardized ELA SBAC Score in 11th (Squared)	0.572	0.647	0.098	1.207	0.590	0.568	-0.029	0.957	0.694	0.643	-0.060	0.830
Standardized Math SBAC Score in 11th (Squared)	0.521	0.626	0.141	1.265	0.489	0.518	0.045	0.957	0.570	0.589	0.026	0.920
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	10.031	14.456	0.235	1.989	10.977	10.316	-0.042	0.937	12.109	13.961	0.095	1.491

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	993.979	1,144.363	0.240	1.625	1,018.632	999.144	-0.036	0.957	1,116.068	1,124.653	0.013	1.258
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.571	0.297	-0.113	1.112	0.424	0.322	-0.048	1.376	0.415	0.305	-0.049	1.830
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.265	0.126	-0.156	0.588	0.147	0.142	-0.006	1.235	0.117	0.131	0.020	1.721
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.325	0.118	-0.105	0.760	0.208	0.133	-0.045	0.971	0.171	0.122	-0.029	1.730
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.145	0.055	-0.149	0.413	0.053	0.072	0.039	1.557	0.049	0.058	0.021	1.647

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	206,558.072	211,535.425	0.079	1.095	207,512.210	207,337.266	-0.003	1.026	208,262.724	210,847.940	0.039	0.906
Highest Math PSAT Score by the End of 11th (Squared)	202,636.056	216,123.461	0.231	1.127	204,504.872	205,364.880	0.015	1.012	214,911.036	213,865.776	-0.018	0.960
Work Effort GPA in 11th	2.625	2.648	0.087	0.930	2.627	2.638	0.044	0.979	2.651	2.649	-0.010	1.048
Cooperation GPA in 11th	2.747	2.756	0.043	0.955	2.750	2.762	0.060	0.915	2.758	2.759	0.006	1.029
Attendance Rate in 11th	0.973	0.979	0.201	0.880	0.975	0.977	0.071	1.156	0.979	0.979	-0.020	1.381

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Ever Suspended from 9th-11th	-	-	-0.020	0.799	-	-	-0.016	0.851	-	-	-0.034	0.691
Educational Expectations in 11th: Unsure	0.046	0.057	0.048	1.215	0.048	0.037	-0.053	0.786	0.040	0.054	0.069	1.339
Educational Expectations in 11th: HS or Less	-	-	-0.035	0.704	-	-	0.022	1.196	-	-	0.035	1.515
Educational Expectations in 11th: Associate Degree or Certificate	-	-	-0.005	0.958	-	-	-0.024	0.802	-	-	0.038	1.368
Educational Expectations in 11th: Bachelor's Degree or Higher	0.650	0.680	0.065	0.954	0.645	0.647	0.004	0.997	0.612	0.676	0.135	0.917

See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Educational Expectations in 11th: Missing	0.276	0.239	-0.085	0.909	0.280	0.289	0.019	1.018	0.331	0.244	-0.192	0.829
Growth Mindset in 11th	0.122	0.155	0.041	1.175	0.124	0.152	0.037	0.938	0.174	0.155	-0.023	1.092
Missing Dummy: Growth Mindset in 11th	0.263	0.225	-0.087	0.900	0.264	0.270	0.014	1.015	0.310	0.230	-0.182	0.822
Academic Self-Efficacy in 11th	-0.004	0.147	0.186	1.054	0.008	0.014	0.007	1.029	0.020	0.140	0.144	0.954
Missing Dummy: Academic Self-Efficacy in 11th	0.260	0.226	-0.080	0.907	0.261	0.270	0.019	1.020	0.309	0.229	-0.182	0.822

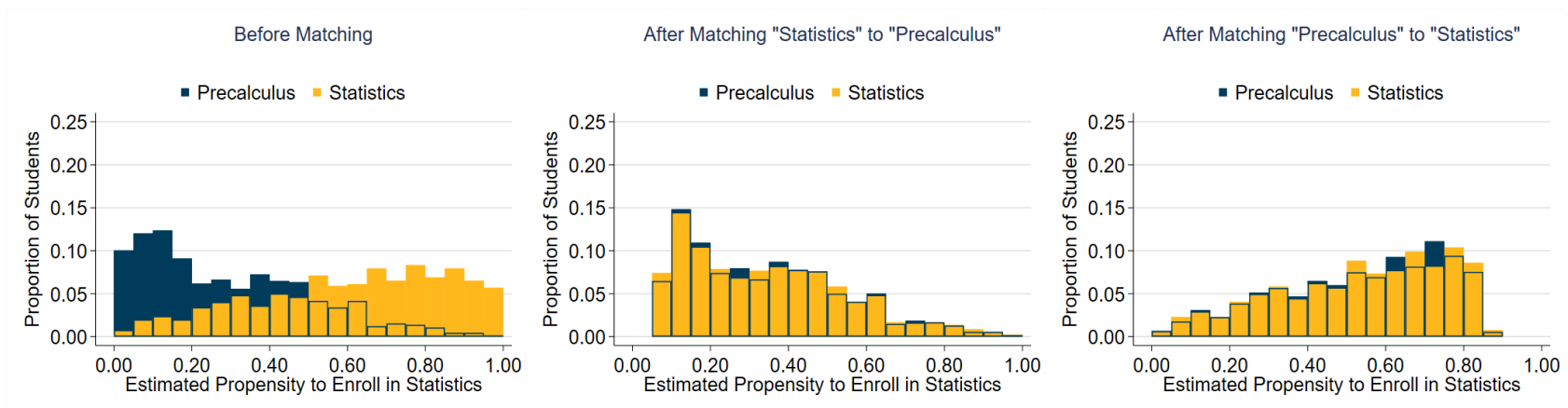
See the note on the first page of the table.

Table C20 Continued. CSUN Analysis Matching Diagnostics for Math vs. No Math in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Math" to "No Math"				After Matching "No Math" to "Math"			
	No Math (N=434)	Math (N=1,358)	SMD	VR	No Math (N=375)	Math (N=746)	SMD	VR	No Math (N=412)	Math (N=1,285)	SMD	VR
Indicator of 2016-17 Cohort	0.495	0.488	-0.014	0.998	0.477	0.467	-0.021	0.997	0.480	0.482	0.004	0.995

See the note on the first page of the table.

Figure C21. Community College 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 C21. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Age (in Months)	195.218	194.988	-0.043	0.898	194.997	195.068	0.012	1.723	194.789	195.046	0.050	1.155
Gender: Female	0.514	0.494	-0.040	1.001	0.507	0.498	-0.018	1.005	0.481	0.489	0.015	0.998
Race/Ethnicity: Asian	0.037	0.030	-0.036	0.829	0.028	0.039	0.060	1.377	0.037	0.033	-0.022	0.891
Race/Ethnicity: African American	0.099	0.104	0.016	1.044	0.113	0.125	0.038	1.098	0.121	0.116	-0.014	0.964

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 C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Race/Ethnicity: Latinx	0.753	0.758	0.012	0.987	0.752	0.772	0.047	0.948	0.780	0.754	-0.060	1.075
Race/Ethnicity: Filipinx	0.032	0.047	0.074	1.422	-	-	-0.078	0.643	-	-	0.088	1.636
Race/Ethnicity: White	0.069	0.051	-0.078	0.747	0.065	0.041	-0.106	0.653	0.037	0.051	0.067	1.346
Race/Ethnicity: Other	-	-	0.009	1.097	-	-	-0.097	0.152	-	-	0.071	2.975
Ever Subsidized Meal Eligible from 9th-11th	0.924	0.902	-0.078	1.260	0.922	0.924	0.007	0.982	0.925	0.919	-0.021	1.064

See the note on the first page of the table.

Table C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.050	0.708	-	-	-0.029	0.824	-	-	0.013	1.106
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.239	0.246	0.016	1.020	0.244	0.228	-0.038	0.958	0.239	0.235	-0.008	0.987
Parents'/Guardians' Educational Attainment: HS Graduate	0.202	0.222	0.047	1.070	0.204	0.181	-0.056	0.920	0.189	0.215	0.064	1.097
Parents'/Guardians' Educational Attainment: Some College	0.131	0.142	0.032	1.071	0.137	0.122	-0.045	0.909	0.153	0.152	-0.004	0.989
Parents'/Guardians' Educational Attainment: College Graduate	0.082	0.108	0.089	1.281	0.074	0.081	0.026	1.091	0.072	0.086	0.052	1.175

See the note on the first page of the table.

Table C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.035	0.028	-0.040	0.808	0.035	0.039	0.020	1.106	0.024	0.035	0.065	1.437
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.310	0.254	-0.125	0.886	0.306	0.349	0.091	1.075	0.322	0.276	-0.101	0.912
Nonresident School Enrollment in 11th	0.316	0.394	0.163	1.105	0.354	0.371	0.035	1.025	0.388	0.347	-0.086	0.951
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.001	0.988	-	-	-0.082	0.253	-	-	0.033	1.420
Number of School Moves from 9th- 11th	0.065	0.059	-0.025	0.863	0.056	0.053	-0.011	0.811	0.047	0.050	0.014	1.007

See the note on the first page of the table.

Table C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.083	0.055	-0.112	0.679	0.078	0.080	0.008	1.031	0.066	0.051	-0.065	0.779
English Learner Status in 11th: English Only	0.295	0.311	0.035	1.031	0.302	0.299	-0.006	0.999	0.292	0.316	0.053	1.043
English Learner Status in 11th: Initial Fluent English Proficient	0.139	0.146	0.021	1.045	0.139	0.146	0.021	1.049	0.132	0.142	0.028	1.058
English Learner Status in 11th: Limited English Proficient	0.045	0.024	-0.112	0.557	0.037	0.038	0.006	1.033	-	-	-0.062	0.710
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.522	0.518	-0.007	1.001	0.522	0.517	-0.011	1.005	0.540	0.516	-0.047	1.002

See the note on the first page of the table.

Table C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Gifted and Talented Program Participation in 11th	0.113	0.134	0.065	1.163	0.124	0.158	0.097	1.228	0.121	0.132	0.033	1.075
Math 11th Grade Weighted GPA	2.732	2.471	-0.325	1.054	2.677	2.682	0.006	0.989	2.594	2.546	-0.061	1.197
Cumulative Overall Weighted GPA at the End of 11th	2.925	2.761	-0.308	1.133	2.905	2.919	0.028	1.030	2.795	2.810	0.029	1.084
Standardized ELA SBAC Score in 11th	0.125	0.163	0.051	1.087	0.135	0.192	0.077	0.978	0.133	0.152	0.025	0.971
Standardized Math SBAC Score in 11th	0.133	0.010	-0.179	1.113	0.117	0.132	0.022	1.064	-0.005	0.037	0.059	0.949

See the note on the first page of the table.

Table C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	1.782	1.706	-0.034	1.147	1.794	1.978	0.082	1.161	1.855	1.691	-0.072	0.888
Science Credits Accumulated from 9th-11th	31.517	31.844	0.037	1.015	31.840	31.153	-0.079	0.880	31.895	31.572	-0.037	1.079
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	0.035	0.030	-0.028	0.864	0.033	0.038	0.026	1.144	0.025	0.030	0.034	1.214
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.571	0.732	0.141	1.389	0.567	0.603	0.038	0.836	0.623	0.653	0.028	1.011
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.213	0.307	0.147	1.426	0.213	0.185	-0.050	0.809	0.201	0.281	0.130	1.337

See the note on the first page of the table.

Table C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
A-G "D" or better Semesters Off- Track at the End of 11th (A-B)	0.182	0.199	0.029	0.879	0.154	0.145	-0.018	0.935	0.162	0.165	0.005	1.056
A-G "D" or better Semesters Off- Track at the End of 11th (D-G)	0.076	0.114	0.101	1.258	0.078	0.060	-0.055	0.711	0.060	0.101	0.117	1.591
Highest ERW PSAT Score by the End of 11th	432.629	434.838	0.033	1.234	434.409	436.653	0.033	1.148	431.604	434.695	0.045	1.108
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.088	0.035	-0.224	0.416	0.063	0.069	0.022	1.087	0.046	0.035	-0.051	0.784
Highest Math PSAT Score by the End of 11th	436.917	429.772	-0.118	0.968	435.920	435.604	-0.005	0.990	426.327	431.264	0.078	0.913

See the note on the first page of the table.

Table C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.077	0.033	-0.197	0.442	0.057	0.069	0.046	1.185	0.044	0.035	-0.042	0.818
Took the SAT or ACT before 12th	0.335	0.311	-0.051	0.962	0.322	0.308	-0.031	0.980	0.336	0.294	-0.090	0.927
Participation in the AVID Program in 11th	0.025	0.043	0.100	1.698	0.024	0.032	0.047	1.318	0.042	0.030	-0.060	0.738
Took a College or Career Seminar Course in 11th	0.167	0.157	-0.028	0.951	0.157	0.136	-0.061	0.889	0.136	0.132	-0.013	0.969
Ever Attended STEM-Focused School from 9th- 12th	0.196	0.197	0.003	1.005	0.209	0.211	0.004	1.010	0.215	0.200	-0.036	0.946

See the note on the first page of the table.

Table C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	8.087	6.763	-0.308	0.924	7.788	7.805	0.004	1.020	7.275	7.141	-0.032	1.130
Cumulative Overall Weighted GPA at the End of 11th (Squared)	8.824	7.926	-0.292	1.031	8.697	8.787	0.030	1.046	8.072	8.180	0.036	1.082
Standardized ELA SBAC Score in 11th (Squared)	0.544	0.601	0.073	1.414	0.557	0.561	0.006	1.348	0.598	0.589	-0.012	1.326
Standardized Math SBAC Score in 11th (Squared)	0.465	0.498	0.050	1.214	0.466	0.497	0.047	1.194	0.511	0.488	-0.035	1.068
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	7.767	8.175	0.025	1.781	7.861	9.277	0.088	1.609	8.965	7.781	-0.073	1.074

See the note on the first page of the table.

Table C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	1,072.603	1,094.471	0.033	1.053	1,094.482	1,041.184	-0.084	0.886	1,090.423	1,075.921	-0.023	1.205
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.407	2.037	0.126	2.095	1.322	1.197	-0.039	0.667	1.476	1.529	0.014	0.953
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.383	0.575	0.125	1.795	0.380	0.304	-0.063	0.782	0.365	0.514	0.107	1.294
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.414	0.374	-0.019	0.440	0.250	0.232	-0.017	0.886	0.261	0.276	0.012	0.901
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.131	0.171	0.055	0.865	0.133	0.094	-0.060	0.499	0.099	0.162	0.096	1.332

See the note on the first page of the table.

Table C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	191,231.228	194,097.094	0.047	1.298	193,025.446	195,595.543	0.042	1.179	190,658.923	193,822.172	0.052	1.128
Highest Math PSAT Score by the End of 11th (Squared)	194,640.500	188,325.183	-0.122	0.926	193,894.895	193,564.378	-0.006	1.000	185,950.264	189,831.180	0.073	0.940
Work Effort GPA in 11th	2.473	2.411	-0.190	1.140	2.450	2.474	0.074	1.046	2.414	2.418	0.012	1.118
Cooperation GPA in 11th	2.620	2.584	-0.132	1.127	2.599	2.621	0.080	1.004	2.579	2.582	0.009	1.072
Attendance Rate in 11th	0.970	0.970	0.007	1.043	0.969	0.969	0.006	1.007	0.972	0.970	-0.083	1.386

See the note on the first page of the table.

Table C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.080	2.287	-	-	-0.018	0.805	-	-	0.033	1.420
Educational Expectations in 11th: Unsure	0.086	0.089	0.011	1.032	0.078	0.087	0.032	1.108	0.067	0.073	0.024	1.080
Educational Expectations in 11th: HS or Less	-	-	0.064	1.567	-	-	-0.048	0.687	-	-	0.030	1.241
Educational Expectations in 11th: Associate Degree or Certificate	0.057	0.033	-0.119	0.585	0.044	0.033	-0.057	0.762	0.028	0.033	0.029	1.172
Educational Expectations in 11th: Bachelor's Degree or Higher	0.532	0.565	0.066	0.988	0.539	0.528	-0.021	1.007	0.559	0.567	0.016	0.993

See the note on the first page of the table.

Table C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Educational Expectations in 11th: Missing	0.309	0.289	-0.044	0.963	0.320	0.339	0.040	1.034	0.330	0.306	-0.050	0.959
Growth Mindset in 11th	0.051	0.056	0.007	1.017	0.066	0.112	0.063	0.896	0.096	0.078	-0.023	1.123
Missing Dummy: Growth Mindset in 11th	0.295	0.274	-0.045	0.958	0.306	0.320	0.030	1.029	0.303	0.289	-0.032	0.969
Academic Self- Efficacy in 11th	0.080	-0.100	-0.226	0.979	0.027	0.033	0.008	0.751	-0.025	-0.028	-0.004	0.940
Missing Dummy: Academic Self- Efficacy in 11th	0.293	0.272	-0.046	0.957	0.304	0.317	0.028	1.028	0.302	0.284	-0.041	0.960

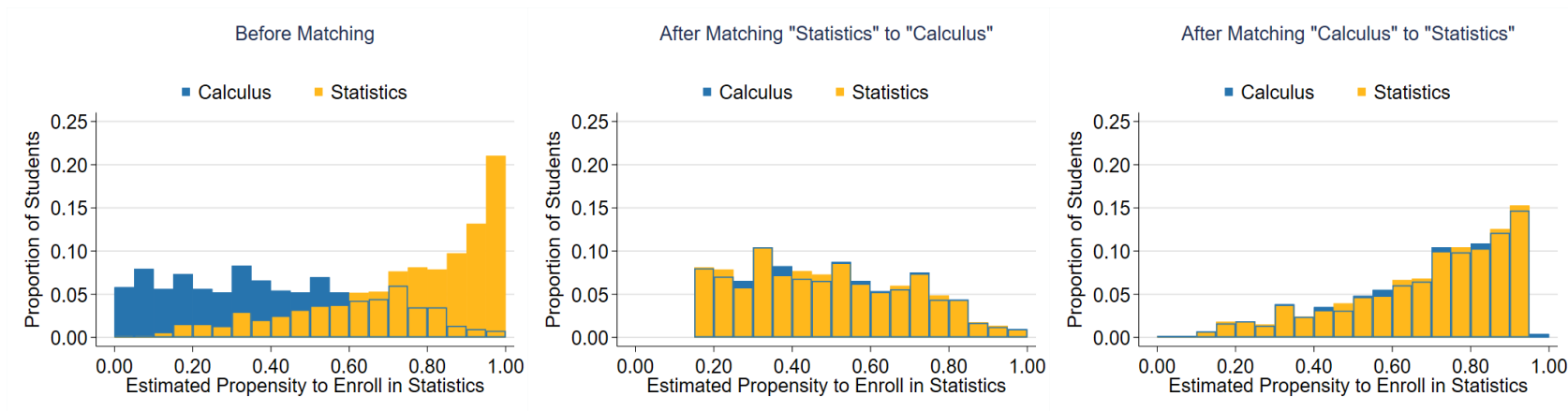
See the note on the first page of the table.

Table C21 Continued. Community College Analysis 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=648)	Statistics (N=492)	SMD	VR	Precalculus (N=540)	Statistics (N=371)	SMD	VR	Precalculus (N=465)	Statistics (N=395)	SMD	VR
Indicator of 2016-17 Cohort	0.539	0.581	0.086	0.980	0.554	0.583	0.058	0.988	0.604	0.595	-0.019	1.004

See the note on the first page of the table.

Figure C22. Community College 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 C22. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
Age (in Months)	195.015	194.416	-0.126	0.754	194.545	194.622	0.018	1.185	194.240	194.416	0.040	1.080
Gender: Female	0.447	0.543	0.193	1.003	0.485	0.500	0.029	1.003	0.515	0.540	0.050	0.986
Race/Ethnicity: Asian	0.087	0.060	-0.104	0.708	0.073	0.072	-0.004	0.989	0.051	0.065	0.058	1.236
Race/Ethnicity: African American	0.068	0.065	-0.012	0.957	0.061	0.063	0.010	1.039	0.072	0.070	-0.008	0.965

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 C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
Race/Ethnicity: Latinx	0.675	0.712	0.080	0.934	0.687	0.676	-0.023	1.020	0.720	0.697	-0.050	1.039
Race/Ethnicity: Filipinx	0.079	0.061	-0.071	0.785	0.085	0.094	0.031	1.094	0.056	0.059	0.013	1.042
Race/Ethnicity: White	0.079	0.094	0.052	1.166	0.083	0.082	-0.004	0.991	0.087	0.098	0.037	1.102
Race/Ethnicity: Other	-	-	-0.034	0.711	-	-	0.013	1.120	-	-	-0.022	0.809
Ever Subsidized Meal Eligible from 9th-11th	0.901	0.917	0.053	0.859	0.910	0.898	-0.043	1.127	0.930	0.915	-0.057	1.188

See the note on the first page of the table.

Table C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.098	0.461	-	-	0.012	1.100	-	-	-0.020	0.828
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.232	0.220	-0.030	0.961	0.226	0.230	0.009	1.014	0.235	0.216	-0.044	0.936
Parents'/Guardians' Educational Attainment: HS Graduate	0.190	0.204	0.037	1.058	0.197	0.179	-0.046	0.931	0.200	0.209	0.022	1.024
Parents'/Guardians' Educational Attainment: Some College	0.130	0.139	0.027	1.058	0.141	0.129	-0.034	0.931	0.155	0.132	-0.066	0.867
Parents'/Guardians' Educational Attainment: College Graduate	0.120	0.130	0.032	1.074	0.119	0.141	0.066	1.160	0.092	0.121	0.093	1.260

See the note on the first page of the table.

Table C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.046	0.039	-0.038	0.841	0.044	0.070	0.115	1.569	0.082	0.042	-0.165	0.533
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.282	0.268	-0.032	0.967	0.274	0.251	-0.053	0.946	0.236	0.280	0.100	1.109
Nonresident School Enrollment in 11th	0.445	0.432	-0.025	0.993	0.454	0.417	-0.074	0.982	0.446	0.439	-0.015	0.989
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.060	1.688	-	-	-0.018	0.843	-	-	0.114	3.369
Number of School Moves from 9th- 11th	0.064	0.062	-0.009	0.893	0.068	0.063	-0.018	0.872	0.092	0.067	-0.079	0.510

See the note on the first page of the table.

Table C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.054	0.020	-0.182	0.382	0.032	0.024	-0.047	0.761	-	-	0.087	2.020
English Learner Status in 11th: English Only	0.267	0.313	0.101	1.097	0.274	0.268	-0.013	0.988	0.277	0.300	0.050	1.039
English Learner Status in 11th: Initial Fluent English Proficient	0.201	0.186	-0.039	0.940	0.206	0.167	-0.102	0.849	0.174	0.188	0.035	1.052
English Learner Status in 11th: Limited English Proficient	-	-	-0.095	0.430	-	-	0.036	1.397	-	-	-0.017	0.828
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.513	0.494	-0.038	1.000	0.510	0.551	0.084	0.991	0.540	0.505	-0.069	0.998

See the note on the first page of the table.

Table C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
Gifted and Talented Program Participation in 11th	0.369	0.304	-0.138	0.908	0.369	0.388	0.040	1.022	0.356	0.331	-0.052	0.959
Math 11th Grade Weighted GPA	3.343	2.582	-0.673	1.665	3.250	3.305	0.054	1.045	2.829	2.899	0.064	0.962
Cumulative Overall Weighted GPA at the End of 11th	3.291	3.086	-0.381	1.093	3.273	3.271	-0.003	1.036	3.152	3.169	0.032	1.009
Standardized ELA SBAC Score in 11th	0.583	0.488	-0.135	0.952	0.592	0.572	-0.028	1.007	0.544	0.511	-0.047	0.939
Standardized Math SBAC Score in 11th	0.898	0.514	-0.557	0.939	0.824	0.773	-0.077	1.110	0.585	0.607	0.034	1.090

See the note on the first page of the table.

Table C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	3.888	3.186	-0.244	0.954	3.783	3.736	-0.016	0.951	3.229	3.426	0.070	1.084
Science Credits Accumulated from 9th-11th	33.954	32.815	-0.123	0.843	33.899	33.840	-0.006	1.006	32.318	33.071	0.084	1.054
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.122	0.273	-	-	-0.018	0.803	-	-	0.040	1.799
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.441	0.536	0.090	1.095	0.417	0.385	-0.033	0.866	0.440	0.454	0.013	0.927
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.126	0.176	0.099	1.275	0.114	0.119	0.011	0.910	0.127	0.145	0.040	1.341

See the note on the first page of the table.

Table C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
A-G "D" or better Semesters Off- Track at the End of 11th (A-B)	0.166	0.175	0.015	0.722	0.153	0.115	-0.063	0.706	0.100	0.138	0.079	1.456
A-G "D" or better Semesters Off- Track at the End of 11th (D-G)	0.060	0.034	-0.089	0.385	0.036	0.029	-0.033	0.814	0.021	0.032	0.056	1.511
Highest ERW PSAT Score by the End of 11th	482.765	472.596	-0.138	0.881	486.868	482.718	-0.057	1.031	480.936	476.214	-0.065	0.902
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.058	0.033	-0.121	0.582	0.036	0.036	0.000	1.002	-	-	0.103	1.828
Highest Math PSAT Score by the End of 11th	494.601	471.657	-0.335	0.822	494.149	490.320	-0.056	1.044	473.292	477.963	0.073	1.005

See the note on the first page of the table.

Table C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.054	0.031	-0.117	0.578	0.034	0.033	-0.005	0.974	-	-	0.109	1.986
Took the SAT or ACT before 12th	0.530	0.447	-0.167	0.991	0.512	0.519	0.014	1.001	0.399	0.477	0.156	1.031
Participation in the AVID Program in 11th	0.029	0.024	-0.034	0.814	0.029	0.028	-0.006	0.969	0.057	0.027	-0.147	0.492
Took a College or Career Seminar Course in 11th	0.139	0.103	-0.110	0.773	0.112	0.110	-0.006	0.986	0.087	0.092	0.020	1.051
Ever Attended STEM-Focused School from 9th- 12th	0.161	0.194	0.087	1.159	0.180	0.170	-0.024	0.961	0.141	0.198	0.153	1.304

See the note on the first page of the table.

Table C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
Took a Precalculus Course by the End of 11th	-	-	-0.331	6.405	-	-	0.044	0.671	-	-	-0.187	8.627
Took an IDS Course by the End of 11th	-	-	0.261	Inf	-	-	N/A	N/A	-	-	N/A	N/A
Took a Statistics Course by the End of 11th	-	-	0.253	10.226	-	-	-0.031	0.602	-	-	0.192	Inf
Took Other Advanced Math by the End of 11th	-	-	-0.023	0.760	-	-	-0.032	0.703	-	-	0.050	2.197
Math 11th Grade Weighted GPA (Squared)	12.136	8.266	-0.602	1.063	11.554	11.954	0.062	1.087	9.212	9.574	0.056	0.978

See the note on the first page of the table.

Table C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th (Squared)	11.106	9.826	-0.381	0.987	10.983	10.983	0.000	1.033	10.215	10.326	0.034	0.991
Standardized ELA SBAC Score in 11th (Squared)	0.845	0.719	-0.140	0.810	0.820	0.800	-0.022	1.026	0.780	0.721	-0.068	0.915
Standardized Math SBAC Score in 11th (Squared)	1.293	0.722	-0.528	0.513	1.103	1.067	-0.034	1.107	0.733	0.797	0.073	1.205
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	23.583	18.230	-0.190	0.934	22.529	21.765	-0.027	1.301	17.935	19.943	0.075	1.366
Science Credits Accumulated from 9th-11th (Squared)	1,245.353	1,154.843	-0.122	0.725	1,242.696	1,239.121	-0.004	0.932	1,121.745	1,175.864	0.079	1.125

See the note on the first page of the table.

Table C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.253	1.448	0.042	0.944	1.189	1.026	-0.038	0.700	1.329	1.268	-0.013	0.705
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.246	0.324	0.058	1.392	0.206	0.190	-0.017	0.578	0.195	0.263	0.062	3.227
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.449	0.335	-0.048	0.257	0.439	0.306	-0.050	0.396	0.192	0.286	0.058	0.888
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.126	0.048	-0.112	0.157	0.061	0.049	-0.027	0.835	0.031	0.047	0.049	1.532
Highest ERW PSAT Score by the End of 11th (Squared)	238,814.747	228,418.350	-0.145	0.841	242,208.646	238,334.617	-0.054	1.049	236,718.305	231,710.135	-0.071	0.905

See the note on the first page of the table.

Table C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	249,778.593	226,693.254	-0.350	0.750	248,728.923	245,150.975	-0.054	1.023	228,070.360	232,566.885	0.074	1.037
Work Effort GPA in 11th	2.595	2.474	-0.363	1.197	2.594	2.600	0.018	0.843	2.512	2.534	0.062	0.757
Cooperation GPA in 11th	2.753	2.648	-0.418	1.288	2.750	2.757	0.032	0.741	2.666	2.684	0.067	0.769
Attendance Rate in 11th	0.975	0.973	-0.038	0.789	0.975	0.976	0.019	0.631	0.973	0.975	0.048	0.797
Ever Suspended from 9th-11th	-	-	-0.027	0.608	-	-	N/A	N/A	-	-	0.040	4.954

See the note on the first page of the table.

Table C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
Educational Expectations in 11th: Unsure	0.070	0.083	0.052	1.179	0.070	0.068	-0.010	0.970	0.051	0.076	0.100	1.429
Educational Expectations in 11th: HS or Less	-	-	0.050	1.569	-	-	-0.026	0.753	-	-	0.069	2.015
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.074	1.717	-	-	0.051	1.420	-	-	0.025	1.190
Educational Expectations in 11th: Bachelor's Degree or Higher	0.632	0.645	0.026	0.984	0.619	0.650	0.063	0.967	0.634	0.643	0.019	0.981
Educational Expectations in 11th: Missing	0.275	0.233	-0.097	0.895	0.284	0.251	-0.075	0.926	0.292	0.248	-0.099	0.895

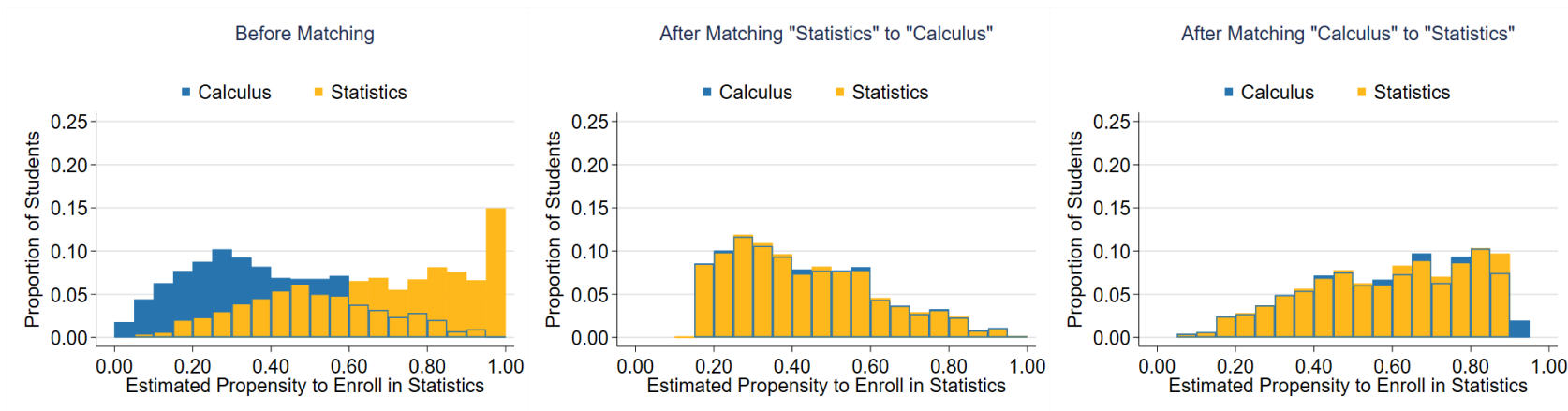
See the note on the first page of the table.

Table C22 Continued. Community College Analysis 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=517)	Statistics (N=851)	SMD	VR	Calculus (N=412)	Statistics (N=486)	SMD	VR	Calculus (N=413)	Statistics (N=661)	SMD	VR
Growth Mindset in 11th	0.181	0.130	-0.064	1.082	0.219	0.223	0.005	1.102	0.199	0.150	-0.061	1.055
Missing Dummy: Growth Mindset in 11th	0.267	0.222	-0.104	0.882	0.272	0.241	-0.070	0.926	0.282	0.238	-0.102	0.886
Academic Self- Efficacy in 11th	0.164	-0.086	-0.296	1.213	0.122	0.145	0.027	1.054	0.041	-0.008	-0.061	1.180
Missing Dummy: Academic Self- Efficacy in 11th	0.265	0.222	-0.100	0.886	0.272	0.242	-0.069	0.928	0.282	0.238	-0.102	0.887
Indicator of 2016-17 Cohort	0.455	0.476	0.043	1.005	0.478	0.511	0.066	1.003	0.547	0.480	-0.135	0.999

See the note on the first page of the table.

Figure C23. Community College Distributions of Estimated Propensities of Taking Statistics 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 C23. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
Age (in Months)	194.994	194.580	-0.088	0.793	194.688	194.726	0.008	1.036	194.523	194.589	0.015	1.004
Gender: Female	0.462	0.548	0.173	0.996	0.488	0.501	0.025	1.002	0.564	0.544	-0.040	1.006
Race/Ethnicity: Asian	0.064	0.058	-0.024	0.914	0.057	0.070	0.054	1.218	0.076	0.063	-0.052	0.835
Race/Ethnicity: African American	0.050	0.068	0.078	1.342	0.052	0.057	0.024	1.101	0.076	0.066	-0.037	0.882

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
Race/Ethnicity: Latinx	0.748	0.712	-0.079	1.086	0.745	0.722	-0.052	1.058	0.677	0.697	0.043	0.963
Race/Ethnicity: Filipinx	0.059	0.062	0.012	1.045	0.061	0.062	0.003	1.014	0.052	0.065	0.057	1.236
Race/Ethnicity: White	0.070	0.092	0.082	1.287	0.076	0.079	0.011	1.037	0.104	0.100	-0.014	0.963
Race/Ethnicity: Other	-	-	-0.027	0.742	-	-	0.006	1.058	-	-	-0.060	0.576
Ever Subsidized Meal Eligible from 9th-11th	0.925	0.901	-0.087	1.293	0.919	0.938	0.074	0.784	0.913	0.903	-0.036	1.106

See the note on the first page of the table.

Table C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.015	0.013	-0.020	0.848	-	-	-0.079	0.498	-	-	-0.013	0.901
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.256	0.219	-0.086	0.899	0.250	0.254	0.009	1.012	0.211	0.216	0.012	1.014
Parents'/Guardians' Educational Attainment: HS Graduate	0.204	0.201	-0.006	0.991	0.206	0.196	-0.026	0.963	0.198	0.202	0.008	1.010
Parents'/Guardians' Educational Attainment: Some College	0.118	0.136	0.053	1.127	0.122	0.119	-0.009	0.980	0.138	0.128	-0.030	0.935
Parents'/Guardians' Educational Attainment: College Graduate	0.097	0.123	0.083	1.232	0.103	0.090	-0.045	0.885	0.115	0.121	0.021	1.048

See the note on the first page of the table.

Table C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.039	0.036	-0.016	0.925	0.039	0.048	0.044	1.218	0.053	0.042	-0.049	0.808
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.286	0.284	-0.004	0.996	0.280	0.293	0.031	1.031	0.285	0.291	0.013	1.010
Nonresident School Enrollment in 11th	0.384	0.433	0.100	1.038	0.403	0.407	0.008	1.005	0.443	0.453	0.022	1.002
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.047	1.495	-	-	-0.056	0.559	-	-	0.073	1.949
Number of School Moves from 9th- 11th	0.068	0.062	-0.023	0.855	0.070	0.065	-0.020	0.887	0.097	0.065	-0.105	0.589

See the note on the first page of the table.

Table C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.050	0.025	-0.130	0.516	0.035	0.034	-0.007	0.964	0.019	0.028	0.057	1.431
English Learner Status in 11th: English Only	0.233	0.319	0.191	1.213	0.254	0.247	-0.016	0.984	0.317	0.315	-0.003	0.996
English Learner Status in 11th: Initial Fluent English Proficient	0.193	0.184	-0.022	0.965	0.193	0.196	0.008	1.013	0.182	0.183	0.001	0.999
English Learner Status in 11th: Limited English Proficient	0.019	0.012	-0.056	0.639	-	-	-0.020	0.843	-	-	0.028	1.317
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.555	0.485	-0.139	1.011	0.540	0.546	0.012	0.999	0.492	0.490	-0.004	0.998

See the note on the first page of the table.

Table C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
Gifted and Talented Program Participation in 11th	0.336	0.297	-0.086	0.934	0.336	0.348	0.024	1.018	0.334	0.321	-0.029	0.977
Math 11th Grade Weighted GPA	3.363	2.608	-0.669	1.686	3.291	3.355	0.067	0.962	2.937	2.931	-0.006	0.993
Cumulative Overall Weighted GPA at the End of 11th	3.273	3.099	-0.322	1.096	3.257	3.247	-0.020	0.989	3.136	3.185	0.094	1.011
Standardized ELA SBAC Score in 11th	0.549	0.471	-0.112	1.077	0.545	0.538	-0.011	0.972	0.524	0.507	-0.025	0.953
Standardized Math SBAC Score in 11th	0.807	0.487	-0.463	1.053	0.746	0.754	0.012	1.021	0.539	0.584	0.065	0.918

See the note on the first page of the table.

Table C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	3.535	3.152	-0.135	1.005	3.496	3.499	0.001	0.963	3.388	3.397	0.003	0.979
Science Credits Accumulated from 9th-11th	33.926	32.809	-0.122	0.855	33.776	33.827	0.005	0.987	33.003	33.171	0.019	1.078
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.091	0.394	-	-	-0.017	0.802	-	-	0.039	1.658
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.435	0.522	0.085	1.140	0.412	0.437	0.025	1.080	0.500	0.448	-0.051	0.884
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.120	0.170	0.102	1.384	0.106	0.121	0.036	1.108	0.152	0.125	-0.060	0.794

See the note on the first page of the table.

Table C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
A-G "D" or better Semesters Off- Track at the End of 11th (A-B)	0.167	0.165	-0.003	0.713	0.142	0.145	0.005	0.989	0.155	0.134	-0.040	0.951
A-G "D" or better Semesters Off- Track at the End of 11th (D-G)	0.051	0.039	-0.042	0.553	0.034	0.027	-0.028	0.828	0.035	0.036	0.002	1.093
Highest ERW PSAT Score by the End of 11th	468.970	468.842	-0.002	0.864	471.388	473.983	0.035	0.974	475.825	473.137	-0.038	1.007
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.058	0.044	-0.063	0.771	0.054	0.053	-0.006	0.978	0.041	0.045	0.018	1.080
Highest Math PSAT Score by the End of 11th	480.446	468.606	-0.168	0.769	479.380	480.395	0.015	0.992	472.649	474.298	0.026	1.064

See the note on the first page of the table.

Table C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.052	0.042	-0.047	0.816	0.049	0.048	-0.005	0.980	0.037	0.042	0.029	1.144
Took the SAT or ACT before 12th	0.494	0.440	-0.109	0.986	0.491	0.485	-0.011	1.001	0.447	0.456	0.018	1.001
Participation in the AVID Program in 11th	0.047	0.030	-0.090	0.646	0.039	0.038	-0.006	0.975	0.036	0.031	-0.028	0.860
Took a College or Career Seminar Course in 11th	0.169	0.141	-0.078	0.862	0.163	0.163	0.000	1.001	0.115	0.151	0.104	1.250
Ever Attended STEM-Focused School from 9th- 12th	0.187	0.201	0.036	1.057	0.194	0.169	-0.064	0.901	0.179	0.215	0.090	1.145

See the note on the first page of the table.

Table C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
Took a Precalculus Course by the End of 11th	-	-	-0.353	8.031	-	-	-0.013	1.125	-	-	-0.078	2.120
Took an IDS Course by the End of 11th	-	-	0.261	Inf	-	-	0.040	Inf	-	-	N/A	N/A
Took a Statistics Course by the End of 11th	-	-	0.276	17.437	-	-	0.015	1.301	-	-	0.124	Inf
Took Other Advanced Math by the End of 11th	-	-	-0.014	0.846	-	-	-0.003	0.968	-	-	0.006	1.068
Math 11th Grade Weighted GPA (Squared)	12.254	8.395	-0.598	1.035	11.787	12.179	0.062	0.983	9.730	9.689	-0.007	0.981

See the note on the first page of the table.

Table C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th (Squared)	10.994	9.910	-0.321	0.997	10.887	10.814	-0.022	0.984	10.108	10.425	0.097	1.037
Standardized ELA SBAC Score in 11th (Squared)	0.779	0.735	-0.050	0.935	0.777	0.755	-0.026	0.950	0.776	0.736	-0.047	1.001
Standardized Math SBAC Score in 11th (Squared)	1.116	0.727	-0.372	0.578	0.992	1.012	0.019	1.030	0.782	0.794	0.012	0.866
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	20.512	17.987	-0.094	1.027	20.286	19.990	-0.011	1.108	19.797	19.702	-0.003	1.150
Science Credits Accumulated from 9th-11th (Squared)	1,241.152	1,153.539	-0.121	0.772	1,228.480	1,230.646	0.003	0.971	1,164.594	1,181.778	0.025	1.044

See the note on the first page of the table.

Table C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.181	1.404	0.048	0.825	1.064	1.154	0.024	0.805	1.324	1.153	-0.040	0.635
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.219	0.313	0.074	1.659	0.171	0.191	0.026	1.164	0.257	0.202	-0.062	0.924
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.449	0.328	-0.047	0.214	0.341	0.338	-0.001	0.532	0.293	0.275	-0.011	0.569
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.103	0.057	-0.074	0.268	0.058	0.048	-0.024	0.842	0.049	0.054	0.012	1.219
Highest ERW PSAT Score by the End of 11th (Squared)	225,858.415	224,933.749	-0.013	0.862	227,671.324	229,976.148	0.033	0.987	231,393.427	228,889.329	-0.037	1.013

See the note on the first page of the table.

Table C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	236,419.339	223,888.325	-0.190	0.750	234,650.784	235,577.745	0.014	0.966	227,363.595	229,189.932	0.030	1.061
Work Effort GPA in 11th	2.573	2.485	-0.267	1.205	2.574	2.579	0.015	0.935	2.524	2.539	0.043	0.873
Cooperation GPA in 11th	2.721	2.653	-0.270	1.160	2.719	2.725	0.022	0.823	2.685	2.686	0.007	0.812
Attendance Rate in 11th	0.975	0.973	-0.034	0.874	0.976	0.974	-0.054	0.942	0.974	0.975	0.031	0.805
Ever Suspended from 9th-11th	-	-	-0.010	0.846	-	-	0.007	1.201	-	-	0.008	1.247

See the note on the first page of the table.

Table C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
Educational Expectations in 11th: Unsure	0.071	0.084	0.049	1.167	0.073	0.067	-0.023	0.926	0.058	0.072	0.055	1.213
Educational Expectations in 11th: HS or Less	-	-	0.082	2.348	-	-	-0.014	0.842	-	-	-0.003	0.970
Educational Expectations in 11th: Associate Degree or Certificate	0.020	0.025	0.033	1.237	0.022	0.018	-0.029	0.817	-	-	0.066	1.618
Educational Expectations in 11th: Bachelor's Degree or Higher	0.642	0.628	-0.029	1.016	0.628	0.656	0.057	0.968	0.644	0.633	-0.022	1.011
Educational Expectations in 11th: Missing	0.261	0.248	-0.028	0.969	0.270	0.254	-0.037	0.962	0.275	0.263	-0.026	0.971

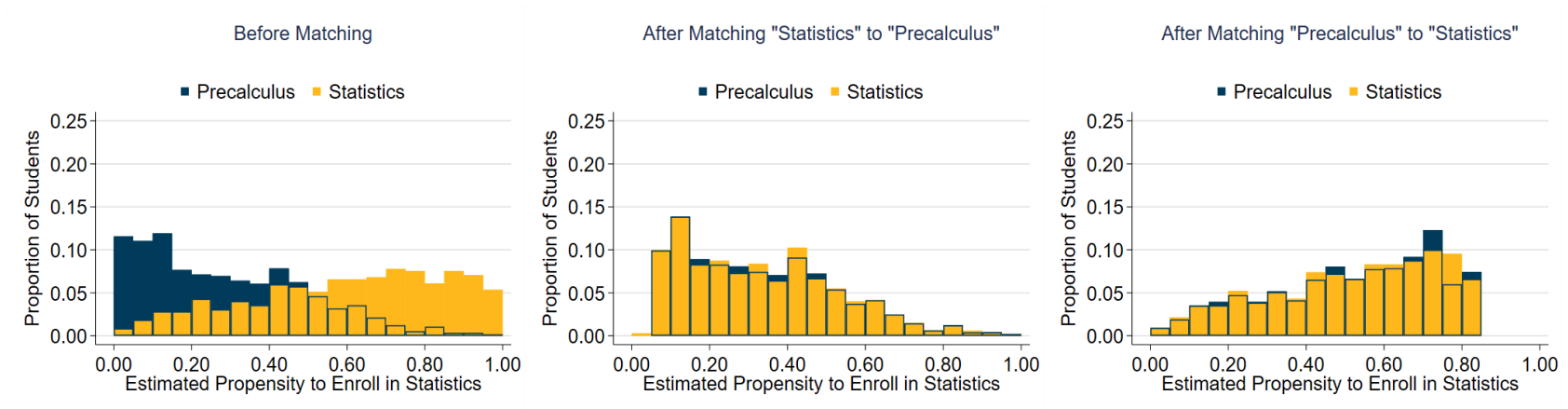
See the note on the first page of the table.

Table C23 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=844)	Statistics (N=998)	SMD	VR	Calculus (N=737)	Statistics (N=687)	SMD	VR	Calculus (N=688)	Statistics (N=783)	SMD	VR
Growth Mindset in 11th	0.221	0.121	-0.126	1.101	0.209	0.228	0.024	1.062	0.132	0.158	0.033	0.957
Missing Dummy: Growth Mindset in 11th	0.252	0.237	-0.035	0.960	0.261	0.247	-0.032	0.966	0.269	0.253	-0.038	0.957
Academic Self- Efficacy in 11th	0.198	-0.059	-0.302	1.141	0.154	0.117	-0.044	1.103	-0.018	0.015	0.041	1.017
Missing Dummy: Academic Self- Efficacy in 11th	0.250	0.237	-0.029	0.966	0.258	0.245	-0.030	0.968	0.268	0.253	-0.035	0.960
Indicator of 2016-17 Cohort	0.474	0.492	0.036	1.002	0.479	0.481	0.003	1.002	0.488	0.497	0.018	0.998

See the note on the first page of the table.

Figure C24. Community College Distributions of Estimated Propensities of Taking Statistics over Precalculus in Group 4 Before and After Matching for Students who Took a Math Course in the First Two Years, 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 C24. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Age (in Months)	195.155	194.957	-0.037	0.880	194.974	194.886	-0.016	1.319	194.482	195.036	0.108	1.150
Gender: Female	0.507	0.487	-0.041	1.000	0.497	0.481	-0.032	1.003	0.495	0.471	-0.049	0.993
Race/Ethnicity: Asian	0.036	0.029	-0.036	0.826	-	-	-0.015	0.921	-	-	0.000	0.996
Race/Ethnicity: African American	0.098	0.090	-0.027	0.928	0.110	0.113	0.009	1.028	0.102	0.102	-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 C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Race/Ethnicity: Latinx	0.753	0.769	0.038	0.955	0.754	0.766	0.029	0.970	0.763	0.766	0.007	0.987
Race/Ethnicity: Filipinx	0.032	0.051	0.096	1.565	-	-	-0.011	0.948	0.042	0.040	-0.010	0.951
Race/Ethnicity: White	0.073	0.054	-0.080	0.750	0.070	0.060	-0.040	0.872	0.061	0.055	-0.025	0.907
Race/Ethnicity: Other	-	-	-0.018	0.822	-	-	-0.020	0.603	-	-	0.095	9.905
Ever Subsidized Meal Eligible from 9th-11th	0.925	0.910	-0.056	1.185	0.921	0.925	0.014	0.961	0.925	0.920	-0.020	1.060

See the note on the first page of the table.

Table C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.059	0.627	-	-	-0.068	0.588	-	-	0.043	1.457
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.237	0.246	0.021	1.027	0.242	0.208	-0.081	0.903	0.228	0.249	0.051	1.060
Parents'/Guardians' Educational Attainment: HS Graduate	0.201	0.229	0.067	1.099	0.211	0.188	-0.058	0.921	0.232	0.222	-0.025	0.964
Parents'/Guardians' Educational Attainment: Some College	0.144	0.141	-0.009	0.983	0.145	0.135	-0.029	0.947	0.197	0.157	-0.105	0.833
Parents'/Guardians' Educational Attainment: College Graduate	0.082	0.107	0.086	1.273	0.079	0.091	0.043	1.143	0.074	0.089	0.054	1.174

See the note on the first page of the table.

Table C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.032	0.027	-0.031	0.841	0.033	0.048	0.077	1.446	-	-	-0.017	0.908
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.304	0.251	-0.120	0.888	0.290	0.330	0.086	1.079	0.235	0.252	0.040	1.044
Nonresident School Enrollment in 11th	0.315	0.401	0.181	1.114	0.342	0.373	0.066	1.045	0.390	0.338	-0.106	0.938
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.003	1.026	-	-	-0.079	0.364	-	-	0.082	2.244
Number of School Moves from 9th-11th	0.063	0.055	-0.036	0.826	0.057	0.063	0.027	0.964	0.035	0.035	0.000	0.965

See the note on the first page of the table.

Table C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	0.082	0.046	-0.146	0.587	0.077	0.071	-0.022	0.935	0.062	0.049	-0.054	0.807
English Learner Status in 11th: English Only	0.301	0.311	0.023	1.020	0.308	0.292	-0.036	0.974	0.312	0.311	-0.003	0.993
English Learner Status in 11th: Initial Fluent English Proficient	0.137	0.151	0.039	1.084	0.141	0.125	-0.046	0.909	0.149	0.145	-0.011	0.974
English Learner Status in 11th: Limited English Proficient	-	-	-0.102	0.581	0.035	0.035	0.000	1.005	-	-	0.004	1.021
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.520	0.513	-0.012	1.001	0.516	0.548	0.065	0.997	0.515	0.520	0.010	0.995

See the note on the first page of the table.

Table C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Gifted and Talented Program Participation in 11th	0.105	0.144	0.117	1.309	0.114	0.161	0.137	1.346	0.151	0.135	-0.046	0.908
Math 11th Grade Weighted GPA	2.740	2.470	-0.337	1.051	2.677	2.766	0.113	0.993	2.613	2.567	-0.055	0.932
Cumulative Overall Weighted GPA at the End of 11th	2.942	2.760	-0.346	1.095	2.915	2.952	0.072	1.076	2.856	2.807	-0.092	1.009
Standardized ELA SBAC Score in 11th	0.131	0.181	0.069	1.061	0.146	0.180	0.049	0.994	0.143	0.143	0.000	0.950
Standardized Math SBAC Score in 11th	0.133	0.040	-0.139	1.061	0.105	0.141	0.055	0.996	0.004	0.046	0.063	1.079

See the note on the first page of the table.

Table C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	1.764	1.651	-0.051	1.124	1.806	1.943	0.060	1.158	2.009	1.730	-0.116	0.879
Science Credits Accumulated from 9th-11th	31.735	32.453	0.080	1.067	31.891	31.939	0.005	0.966	31.766	31.967	0.023	1.060
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.036	0.810	-	-	0.031	1.185	-	-	0.061	1.480
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.559	0.718	0.143	1.258	0.549	0.596	0.048	0.947	0.643	0.646	0.003	1.047
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.212	0.302	0.143	1.466	0.219	0.194	-0.046	0.819	0.234	0.271	0.060	1.205

See the note on the first page of the table.

Table C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.183	0.178	-0.010	0.666	0.157	0.176	0.036	1.010	0.171	0.166	-0.009	1.112
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.071	0.114	0.115	1.337	0.079	0.069	-0.029	0.806	0.090	0.102	0.031	1.420
Highest ERW PSAT Score by the End of 11th	432.830	435.872	0.045	1.301	434.328	435.042	0.011	1.069	438.928	436.240	-0.039	1.026
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	-0.276	0.298	0.066	0.042	-0.108	0.651	-	-	-0.058	0.731
Highest Math PSAT Score by the End of 11th	436.311	429.740	-0.108	0.997	434.863	433.322	-0.024	1.118	433.384	431.151	-0.036	1.072

See the note on the first page of the table.

Table C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.260	0.297	0.058	0.042	-0.074	0.737	-	-	-0.037	0.802
Took the SAT or ACT before 12th	0.326	0.304	-0.046	0.964	0.304	0.339	0.073	1.063	0.307	0.289	-0.039	0.962
Participation in the AVID Program in 11th	0.023	0.049	0.137	2.050	-	-	0.037	1.253	-	-	-0.026	0.870
Took a College or Career Seminar Course in 11th	0.169	0.158	-0.029	0.948	0.164	0.165	0.003	1.011	0.149	0.135	-0.038	0.921
Ever Attended STEM-Focused School from 9th- 12th	0.201	0.200	-0.004	0.995	0.211	0.217	0.015	1.026	0.191	0.200	0.021	1.029

See the note on the first page of the table.

Table C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	8.127	6.757	-0.319	0.906	7.789	8.266	0.108	1.045	7.518	7.240	-0.063	0.916
Cumulative Overall Weighted GPA at the End of 11th (Squared)	8.920	7.905	-0.332	1.001	8.750	8.985	0.077	1.104	8.434	8.161	-0.089	1.017
Standardized ELA SBAC Score in 11th (Squared)	0.530	0.576	0.065	1.336	0.518	0.524	0.009	1.274	0.576	0.550	-0.036	1.113
Standardized Math SBAC Score in 11th (Squared)	0.453	0.463	0.017	1.023	0.436	0.441	0.010	0.813	0.418	0.456	0.066	1.240
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	7.814	8.008	0.012	1.629	8.101	9.351	0.074	1.673	10.158	8.396	-0.097	1.105

See the note on the first page of the table.

Table C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	1,085.481	1,136.747	0.076	1.144	1,096.220	1,096.197	0.000	0.974	1,080.057	1,097.454	0.028	1.102
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.402	1.886	0.102	1.607	1.290	1.288	-0.001	0.871	1.462	1.520	0.016	1.356
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.365	0.560	0.131	2.016	0.385	0.312	-0.062	0.708	0.396	0.486	0.070	1.446
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.443	0.304	-0.067	0.292	0.277	0.285	0.006	0.810	0.252	0.277	0.023	2.275
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.125	0.173	0.066	0.885	0.137	0.109	-0.039	0.557	0.120	0.169	0.074	1.561

See the note on the first page of the table.

Table C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	191,264.240	195,082.582	0.063	1.377	192,721.392	193,604.852	0.015	1.131	197,373.132	195,160.422	-0.035	1.058
Highest Math PSAT Score by the End of 11th (Squared)	194,043.456	188,338.034	-0.111	0.958	192,835.678	191,917.981	-0.017	1.082	191,415.340	189,760.600	-0.032	1.075
Work Effort GPA in 11th	2.477	2.417	-0.185	1.098	2.453	2.494	0.129	1.054	2.460	2.425	-0.108	1.137
Cooperation GPA in 11th	2.624	2.588	-0.133	1.099	2.603	2.637	0.126	0.985	2.606	2.581	-0.090	1.179
Attendance Rate in 11th	0.969	0.970	0.010	1.008	0.969	0.972	0.113	0.739	0.972	0.970	-0.053	1.327

See the note on the first page of the table.

Table C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.097	3.391	-	-	0.006	1.105	-	-	0.013	1.148
Educational Expectations in 11th: Unsure	0.084	0.085	0.005	1.017	0.081	0.085	0.015	1.052	0.071	0.071	-0.002	0.988
Educational Expectations in 11th: HS or Less	-	-	0.057	1.527	-	-	-0.062	0.582	-	-	0.085	2.113
Educational Expectations in 11th: Associate Degree or Certificate	0.057	0.029	-0.137	0.528	-	-	-0.123	0.552	-	-	0.007	1.036
Educational Expectations in 11th: Bachelor's Degree or Higher	0.532	0.577	0.090	0.981	0.536	0.542	0.012	1.003	0.610	0.572	-0.077	1.025

See the note on the first page of the table.

Table C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Educational Expectations in 11th: Missing	0.313	0.287	-0.057	0.952	0.315	0.335	0.044	1.039	0.280	0.308	0.061	1.052
Growth Mindset in 11th	0.043	0.054	0.014	0.975	0.068	0.082	0.020	0.782	0.042	0.078	0.046	0.897
Missing Dummy: Growth Mindset in 11th	0.299	0.275	-0.053	0.952	0.300	0.325	0.053	1.049	0.270	0.292	0.051	1.046
Academic Self-Efficacy in 11th	0.067	-0.128	-0.244	1.001	0.026	0.056	0.040	0.741	-0.070	-0.038	0.039	0.819
Missing Dummy: Academic Self-Efficacy in 11th	0.297	0.273	-0.055	0.950	0.298	0.324	0.055	1.052	0.267	0.286	0.043	1.039

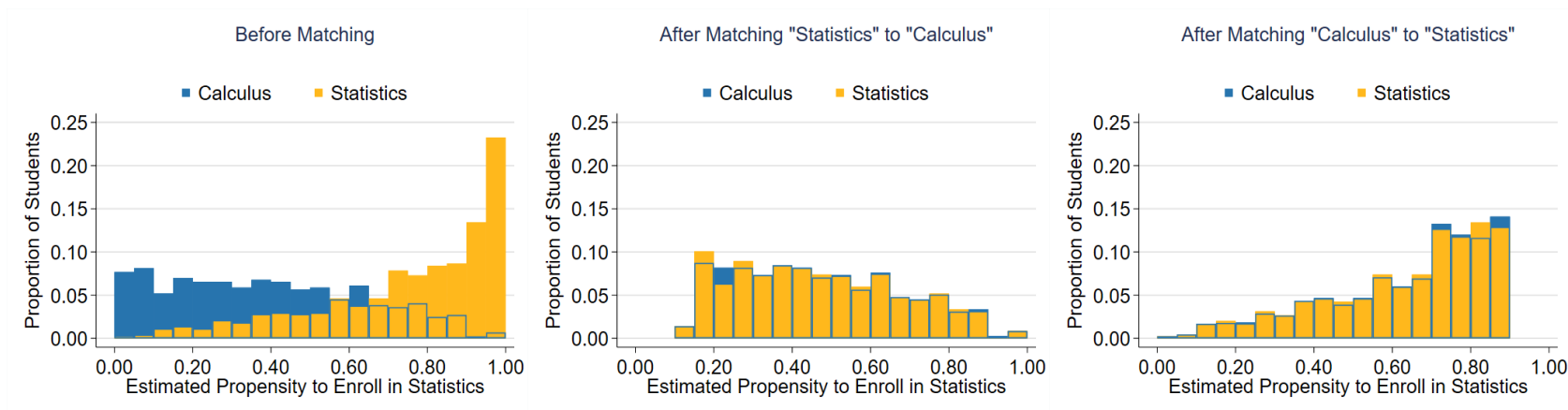
See the note on the first page of the table.

Table C24 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=562)	Statistics (N=411)	SMD	VR	Precalculus (N=483)	Statistics (N=320)	SMD	VR	Precalculus (N=402)	Statistics (N=325)	SMD	VR
Indicator of 2016-17 Cohort	0.548	0.603	0.112	0.967	0.565	0.553	-0.024	1.011	0.631	0.615	-0.032	1.012

See the note on the first page of the table.

Figure C25. Community College Distributions of Estimated Propensities of Taking Statistics over Calculus in Group 5 Before and After Matching for Students who Took a Math Course in the First Two Years, 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 C25. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
Age (in Months)	194.946	194.262	-0.148	0.740	194.469	194.102	-0.089	0.986	194.205	194.283	0.019	1.159
Gender: Female	0.442	0.555	0.226	1.000	0.479	0.474	-0.009	1.001	0.599	0.557	-0.084	1.023
Race/Ethnicity: Asian	0.090	0.063	-0.103	0.718	0.076	0.087	0.039	1.130	0.077	0.069	-0.031	0.900
Race/Ethnicity: African American	0.059	0.066	0.030	1.112	0.054	0.057	0.017	1.072	0.089	0.065	-0.092	0.741

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 C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
Race/Ethnicity: Latinx	0.668	0.703	0.075	0.941	0.679	0.643	-0.076	1.056	0.647	0.685	0.079	0.942
Race/Ethnicity: Filipinx	0.086	0.070	-0.059	0.830	0.093	0.102	0.030	1.089	0.061	0.072	0.041	1.150
Race/Ethnicity: White	0.084	0.088	0.017	1.050	0.085	0.095	0.037	1.116	0.108	0.094	-0.046	0.881
Race/Ethnicity: Other	-	-	-0.035	0.726	-	-	0.014	1.121	-	-	-0.007	0.943
Ever Subsidized Meal Eligible from 9th-11th	0.894	0.917	0.080	0.799	0.901	0.907	0.019	0.951	0.913	0.908	-0.017	1.047

See the note on the first page of the table.

Table C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.129	0.368	-	-	-0.013	0.904	-	-	0.018	1.183
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.237	0.218	-0.044	0.943	0.234	0.215	-0.044	0.945	0.191	0.228	0.090	1.133
Parents'/Guardians' Educational Attainment: HS Graduate	0.174	0.210	0.092	1.155	0.180	0.175	-0.015	0.978	0.209	0.199	-0.023	0.962
Parents'/Guardians' Educational Attainment: Some College	0.133	0.139	0.016	1.034	0.141	0.137	-0.011	0.979	0.131	0.130	-0.004	0.987
Parents'/Guardians' Educational Attainment: College Graduate	0.129	0.125	-0.012	0.972	0.132	0.148	0.044	1.098	0.134	0.130	-0.013	0.968

See the note on the first page of the table.

Table C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.052	0.038	-0.068	0.739	0.048	0.064	0.069	1.310	0.045	0.047	0.011	1.043
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.275	0.270	-0.011	0.988	0.265	0.262	-0.006	0.995	0.290	0.266	-0.053	0.945
Nonresident School Enrollment in 11th	0.438	0.431	-0.013	0.996	0.439	0.414	-0.051	0.987	0.402	0.447	0.092	1.024
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.058	1.694	-	-	-0.005	0.953	-	-	-0.019	0.855
Number of School Moves from 9th-11th	0.067	0.055	-0.048	0.784	0.066	0.064	-0.010	1.169	0.080	0.062	-0.063	0.714

See the note on the first page of the table.

Table C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	0.056	0.020	-0.193	0.361	-	-	-0.020	0.896	-	-	-0.003	0.978
English Learner Status in 11th: English Only	0.257	0.314	0.125	1.126	0.268	0.255	-0.029	0.971	0.329	0.289	-0.087	0.926
English Learner Status in 11th: Initial Fluent English Proficient	0.196	0.181	-0.040	0.937	0.203	0.184	-0.048	0.929	0.180	0.190	0.026	1.040
English Learner Status in 11th: Limited English Proficient	-	-	-0.100	0.418	-	-	-0.035	0.704	-	-	0.031	1.419
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.526	0.497	-0.058	1.002	0.518	0.554	0.071	0.992	0.485	0.512	0.054	0.996

See the note on the first page of the table.

Table C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
Gifted and Talented Program Participation in 11th	0.361	0.290	-0.152	0.891	0.358	0.370	0.026	1.017	0.328	0.329	0.001	0.996
Math 11th Grade Weighted GPA	3.319	2.535	-0.685	1.684	3.233	3.359	0.126	0.976	3.132	3.049	-0.082	1.008
Cumulative Overall Weighted GPA at the End of 11th	3.277	3.062	-0.405	1.116	3.255	3.252	-0.006	1.083	3.187	3.209	0.044	0.849
Standardized ELA SBAC Score in 11th	0.580	0.495	-0.121	0.944	0.586	0.557	-0.041	1.061	0.528	0.561	0.050	1.112
Standardized Math SBAC Score in 11th	0.900	0.526	-0.545	0.964	0.819	0.778	-0.060	1.125	0.678	0.697	0.029	0.891

See the note on the first page of the table.

Table C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	3.774	3.158	-0.217	0.968	3.699	3.712	0.005	0.921	3.609	3.525	-0.030	0.962
Science Credits Accumulated from 9th-11th	33.853	32.703	-0.125	0.803	33.782	33.996	0.022	1.096	32.935	32.898	-0.004	0.936
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.099	0.358	-	-	0.051	1.796	-	-	-0.009	0.906
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.424	0.569	0.135	1.195	0.400	0.388	-0.013	0.843	0.426	0.407	-0.020	0.950
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.124	0.190	0.127	1.453	0.107	0.144	0.084	1.321	0.208	0.116	-0.183	0.539

See the note on the first page of the table.

Table C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.158	0.195	0.060	0.843	0.138	0.109	-0.052	0.616	0.147	0.143	-0.008	1.109
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.063	0.038	-0.084	0.383	0.034	0.033	-0.005	1.004	0.033	0.029	-0.017	0.960
Highest ERW PSAT Score by the End of 11th	481.939	473.133	-0.119	0.850	486.477	483.851	-0.035	1.017	481.718	481.767	0.001	1.056
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.063	0.031	-0.153	0.504	0.037	0.052	0.076	1.411	0.040	0.034	-0.036	0.836
Highest Math PSAT Score by the End of 11th	494.538	471.406	-0.335	0.792	493.439	491.392	-0.029	1.174	478.446	480.334	0.029	1.007

See the note on the first page of the table.

Table C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.059	0.029	-0.143	0.516	0.034	0.045	0.055	1.305	0.037	0.031	-0.032	0.845
Took the SAT or ACT before 12th	0.544	0.447	-0.195	0.996	0.527	0.523	-0.007	1.003	0.475	0.490	0.030	0.998
Participation in the AVID Program in 11th	-	-	-0.021	0.871	-	-	0.065	1.462	-	-	-0.091	0.561
Took a College or Career Seminar Course in 11th	0.135	0.109	-0.080	0.830	0.110	0.096	-0.044	0.892	0.103	0.092	-0.039	0.895
Ever Attended STEM-Focused School from 9th-12th	0.160	0.196	0.094	1.170	0.175	0.167	-0.019	0.969	0.187	0.197	0.026	1.037

See the note on the first page of the table.

Table C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
Took a Precalculus Course by the End of 11th	-	-	-0.324	6.366	-	-	0.020	0.844	-	-	-0.117	2.947
Took an IDS Course by the End of 11th	-	-	0.275	Inf	-	-	N/A	N/A	-	-	N/A	N/A
Took a Statistics Course by the End of 11th	-	-	0.220	7.512	-	-	-0.008	0.903	-	-	0.165	Inf
Took Other Advanced Math by the End of 11th	-	-	-0.015	0.828	-	-	-0.019	0.803	-	-	0.000	0.996
Math 11th Grade Weighted GPA (Squared)	11.988	8.069	-0.610	1.056	11.463	12.268	0.125	1.054	10.847	10.342	-0.079	0.975

See the note on the first page of the table.

Table C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th (Squared)	11.009	9.672	-0.405	1.003	10.862	10.864	0.001	1.083	10.442	10.545	0.032	0.877
Standardized ELA SBAC Score in 11th (Squared)	0.839	0.721	-0.131	0.830	0.823	0.818	-0.006	1.092	0.687	0.771	0.104	1.538
Standardized Math SBAC Score in 11th (Squared)	1.288	0.738	-0.502	0.510	1.104	1.092	-0.011	1.049	0.914	0.893	-0.022	0.973
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	22.441	17.914	-0.166	0.907	21.601	21.057	-0.020	1.183	21.183	20.303	-0.032	1.121
Science Credits Accumulated from 9th-11th (Squared)	1,240.039	1,145.093	-0.128	0.683	1,234.185	1,257.420	0.028	1.048	1,172.905	1,165.148	-0.011	0.935

See the note on the first page of the table.

Table C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.219	1.566	0.073	1.023	1.132	0.968	-0.039	0.600	1.082	1.025	-0.015	0.905
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.237	0.359	0.089	2.018	0.180	0.243	0.068	1.930	0.365	0.188	-0.180	0.629
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.433	0.382	-0.021	0.300	0.403	0.248	-0.062	0.239	0.281	0.309	0.016	0.817
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.135	0.052	-0.115	0.143	0.056	0.056	0.000	1.038	0.044	0.043	-0.005	1.077
Highest ERW PSAT Score by the End of 11th (Squared)	238,163.918	228,872.676	-0.130	0.809	242,189.729	239,724.836	-0.034	1.012	236,764.999	237,095.217	0.005	1.063

See the note on the first page of the table.

Table C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	249,864.918	226,420.272	-0.354	0.716	248,192.796	246,983.782	-0.018	1.126	233,021.325	234,876.323	0.030	1.027
Work Effort GPA in 11th	2.584	2.463	-0.361	1.203	2.589	2.591	0.006	0.834	2.547	2.562	0.045	0.739
Cooperation GPA in 11th	2.747	2.641	-0.420	1.336	2.746	2.751	0.022	0.776	2.697	2.710	0.050	0.683
Attendance Rate in 11th	0.974	0.974	-0.021	0.786	0.976	0.976	0.005	0.797	0.973	0.975	0.066	0.777
Ever Suspended from 9th-11th	-	-	0.011	1.239	-	-	N/A	N/A	-	-	-0.030	0.000

See the note on the first page of the table.

Table C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
Educational Expectations in 11th: Unsure	0.063	0.085	0.085	1.318	0.062	0.062	0.000	1.002	0.080	0.060	-0.075	0.771
Educational Expectations in 11th: HS or Less	-	-	0.047	1.542	-	-	-0.017	0.853	-	-	0.025	1.325
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.076	1.738	-	-	0.101	1.907	-	-	0.029	1.295
Educational Expectations in 11th: Bachelor's Degree or Higher	0.648	0.653	0.010	0.993	0.637	0.628	-0.017	1.012	0.651	0.662	0.023	0.981
Educational Expectations in 11th: Missing	0.266	0.224	-0.098	0.889	0.273	0.268	-0.013	0.989	0.252	0.255	0.007	1.004

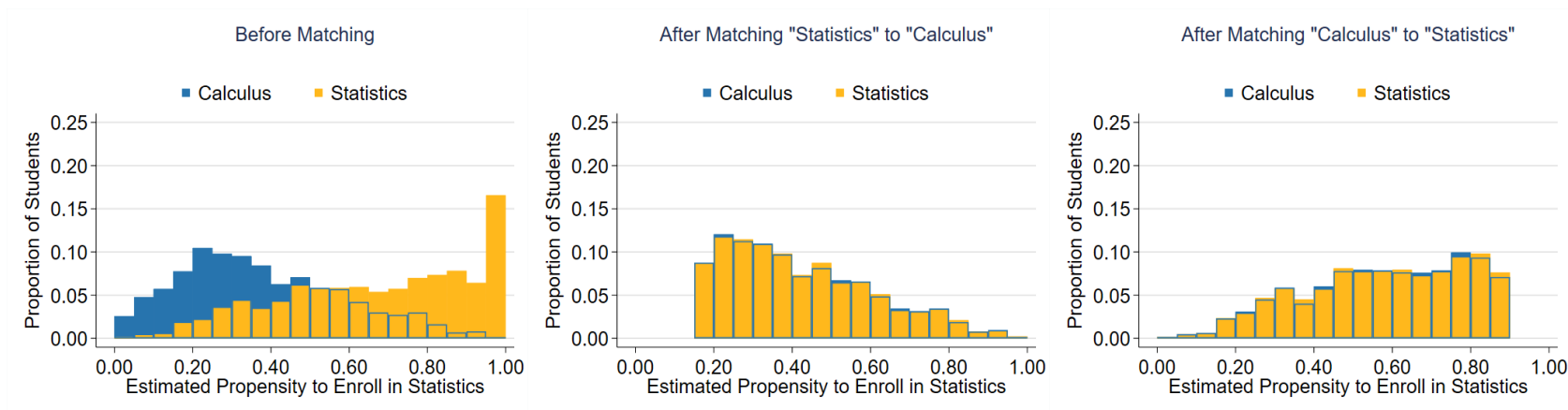
See the note on the first page of the table.

Table C25 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=443)	Statistics (N=714)	SMD	VR	Calculus (N=355)	Statistics (N=392)	SMD	VR	Calculus (N=343)	Statistics (N=447)	SMD	VR
Growth Mindset in 11th	0.187	0.146	-0.051	1.027	0.212	0.145	-0.080	1.186	0.188	0.189	0.002	0.998
Missing Dummy: Growth Mindset in 11th	0.260	0.213	-0.110	0.871	0.262	0.257	-0.010	0.991	0.238	0.244	0.015	1.014
Academic Self-Efficacy in 11th	0.168	-0.101	-0.318	1.259	0.120	0.086	-0.044	0.966	0.064	0.037	-0.034	1.027
Missing Dummy: Academic Self-Efficacy in 11th	0.257	0.213	-0.105	0.876	0.262	0.257	-0.012	0.990	0.237	0.244	0.016	1.015
Indicator of 2016-17 Cohort	0.431	0.471	0.079	1.015	0.462	0.482	0.039	1.007	0.516	0.488	-0.056	0.996

See the note on the first page of the table.

Figure C26. Community College Distributions of Estimated Propensities of Taking Statistics over Calculus in Group 5 Before and After Matching for Students who Took a Math Course in the First Two Years, 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 C26. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
Age (in Months)	194.988	194.414	-0.123	0.778	194.649	194.673	0.005	1.069	194.354	194.398	0.010	0.989
Gender: Female	0.458	0.557	0.198	0.994	0.485	0.518	0.066	1.001	0.588	0.556	-0.064	1.016
Race/Ethnicity: Asian	0.062	0.058	-0.017	0.937	0.058	0.083	0.099	1.402	0.080	0.064	-0.063	0.810
Race/Ethnicity: African American	0.046	0.069	0.097	1.455	0.049	0.051	0.010	1.045	0.080	0.069	-0.043	0.868

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
Race/Ethnicity: Latinx	0.746	0.709	-0.082	1.087	0.742	0.706	-0.080	1.086	0.664	0.695	0.067	0.948
Race/Ethnicity: Filipinx	0.064	0.070	0.025	1.089	0.066	0.060	-0.023	0.921	0.064	0.070	0.026	1.092
Race/Ethnicity: White	0.071	0.085	0.054	1.187	0.075	0.081	0.021	1.070	0.104	0.092	-0.042	0.891
Race/Ethnicity: Other	-	-	-0.028	0.753	-	-	0.069	1.759	-	-	0.022	1.244
Ever Subsidized Meal Eligible from 9th-11th	0.923	0.903	-0.069	1.224	0.919	0.927	0.032	0.906	0.906	0.902	-0.013	1.033

See the note on the first page of the table.

Table C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	0.018	0.013	-0.039	0.730	-	-	-0.015	0.894	-	-	-0.008	0.936
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.260	0.222	-0.088	0.898	0.254	0.266	0.028	1.033	0.204	0.217	0.030	1.041
Parents'/Guardians' Educational Attainment: HS Graduate	0.200	0.210	0.026	1.038	0.202	0.174	-0.072	0.892	0.194	0.202	0.020	1.029
Parents'/Guardians' Educational Attainment: Some College	0.120	0.137	0.051	1.120	0.124	0.130	0.020	1.047	0.146	0.129	-0.048	0.902
Parents'/Guardians' Educational Attainment: College Graduate	0.101	0.117	0.052	1.140	0.105	0.103	-0.005	0.989	0.116	0.120	0.014	1.030

See the note on the first page of the table.

Table C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.043	0.035	-0.044	0.812	0.044	0.061	0.077	1.370	0.053	0.042	-0.053	0.797
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.277	0.280	0.006	1.006	0.272	0.266	-0.014	0.987	0.287	0.290	0.007	1.004
Nonresident School Enrollment in 11th	0.383	0.427	0.089	1.035	0.397	0.393	-0.008	0.998	0.436	0.442	0.013	1.000
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.038	1.389	-	-	-0.012	0.903	-	-	0.036	1.332
Number of School Moves from 9th- 11th	0.068	0.057	-0.042	0.814	0.072	0.071	-0.004	0.917	0.091	0.059	-0.118	0.663

See the note on the first page of the table.

Table C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	0.046	0.025	-0.118	0.542	0.033	0.037	0.022	1.121	0.019	0.028	0.060	1.458
English Learner Status in 11th: English Only	0.224	0.314	0.203	1.238	0.244	0.244	-0.001	1.001	0.337	0.310	-0.057	0.955
English Learner Status in 11th: Initial Fluent English Proficient	0.194	0.186	-0.022	0.965	0.197	0.175	-0.057	0.913	0.168	0.187	0.049	1.083
English Learner Status in 11th: Limited English Proficient	0.019	0.013	-0.049	0.679	-	-	-0.003	0.980	-	-	0.017	1.171
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.562	0.488	-0.150	1.015	0.545	0.567	0.046	0.991	0.484	0.491	0.012	0.998

See the note on the first page of the table.

Table C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
Gifted and Talented Program Participation in 11th	0.334	0.285	-0.107	0.915	0.330	0.334	0.007	1.007	0.325	0.312	-0.028	0.976
Math 11th Grade Weighted GPA	3.331	2.581	-0.660	1.746	3.266	3.367	0.103	0.988	2.970	2.961	-0.008	0.969
Cumulative Overall Weighted GPA at the End of 11th	3.260	3.079	-0.338	1.116	3.241	3.218	-0.045	1.008	3.151	3.181	0.058	0.971
Standardized ELA SBAC Score in 11th	0.540	0.475	-0.094	1.067	0.544	0.518	-0.036	1.018	0.513	0.518	0.007	1.013
Standardized Math SBAC Score in 11th	0.802	0.500	-0.443	1.075	0.742	0.724	-0.027	1.059	0.573	0.618	0.069	1.056

See the note on the first page of the table.

Table C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	3.415	3.114	-0.108	1.034	3.396	3.440	0.016	1.089	3.464	3.332	-0.047	0.944
Science Credits Accumulated from 9th-11th	33.826	32.769	-0.116	0.818	33.745	33.931	0.020	0.979	33.138	33.198	0.007	0.972
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.076	0.472	-	-	0.026	1.319	-	-	0.035	1.491
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.431	0.548	0.112	1.214	0.416	0.460	0.044	1.175	0.441	0.430	-0.012	1.109
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.122	0.172	0.099	1.409	0.103	0.131	0.067	1.253	0.153	0.114	-0.088	0.683

See the note on the first page of the table.

Table C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.164	0.181	0.027	0.782	0.146	0.155	0.015	1.026	0.155	0.132	-0.041	0.820
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.056	0.037	-0.065	0.455	0.033	0.027	-0.027	0.804	0.027	0.031	0.019	1.224
Highest ERW PSAT Score by the End of 11th	467.717	468.298	0.008	0.848	470.746	471.047	0.004	0.987	476.396	473.473	-0.042	0.986
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.064	0.042	-0.098	0.673	0.058	0.053	-0.020	0.925	0.040	0.047	0.030	1.143
Highest Math PSAT Score by the End of 11th	479.250	467.717	-0.164	0.756	478.270	478.198	-0.001	1.021	471.363	474.639	0.051	1.027

See the note on the first page of the table.

Table C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.057	0.041	-0.075	0.728	0.053	0.053	0.000	1.002	0.039	0.045	0.033	1.158
Took the SAT or ACT before 12th	0.493	0.447	-0.093	0.989	0.496	0.504	0.015	1.002	0.479	0.466	-0.027	0.994
Participation in the AVID Program in 11th	0.042	0.028	-0.077	0.675	0.034	0.033	-0.009	0.958	0.023	0.028	0.032	1.207
Took a College or Career Seminar Course in 11th	0.166	0.141	-0.068	0.877	0.160	0.153	-0.018	0.968	0.114	0.150	0.105	1.256
Ever Attended STEM-Focused School from 9th- 12th	0.189	0.203	0.036	1.056	0.197	0.177	-0.052	0.921	0.196	0.213	0.044	1.064

See the note on the first page of the table.

Table C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
Took a Precalculus Course by the End of 11th	-	-	-0.340	7.649	-	-	-0.015	1.143	-	-	-0.036	1.420
Took an IDS Course by the End of 11th	-	-	0.278	Inf	-	-	0.043	Inf	-	-	N/A	N/A
Took a Statistics Course by the End of 11th	-	-	0.244	12.863	-	-	0.025	1.500	-	-	0.112	Inf
Took Other Advanced Math by the End of 11th	-	-	-0.028	0.688	-	-	-0.011	0.882	-	-	-0.029	0.714
Math 11th Grade Weighted GPA (Squared)	12.030	8.298	-0.580	1.079	11.631	12.287	0.102	1.053	9.915	9.831	-0.013	0.976

See the note on the first page of the table.

Table C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th (Squared)	10.894	9.783	-0.335	1.010	10.776	10.625	-0.046	0.991	10.200	10.384	0.057	0.983
Standardized ELA SBAC Score in 11th (Squared)	0.761	0.725	-0.041	0.952	0.778	0.759	-0.022	0.947	0.723	0.735	0.015	1.080
Standardized Math SBAC Score in 11th (Squared)	1.093	0.733	-0.347	0.604	0.976	0.975	-0.002	0.996	0.731	0.807	0.085	1.080
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	19.232	17.524	-0.067	1.067	19.099	20.062	0.035	1.574	20.095	18.760	-0.052	1.083
Science Credits Accumulated from 9th-11th (Squared)	1,235.763	1,148.754	-0.120	0.739	1,227.371	1,237.950	0.014	0.940	1,180.505	1,182.370	0.003	0.908

See the note on the first page of the table.

Table C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.175	1.503	0.068	0.862	1.074	1.268	0.049	0.882	1.006	1.087	0.024	1.247
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.220	0.319	0.078	2.075	0.166	0.211	0.058	1.350	0.262	0.176	-0.101	0.671
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.455	0.368	-0.032	0.230	0.368	0.379	0.005	0.536	0.357	0.291	-0.033	0.517
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.113	0.051	-0.097	0.198	0.055	0.044	-0.027	0.784	0.036	0.044	0.026	1.402
Highest ERW PSAT Score by the End of 11th (Squared)	224,704.748	224,345.565	-0.005	0.842	227,113.385	227,313.178	0.003	0.988	231,917.177	229,085.084	-0.042	0.986

See the note on the first page of the table.

Table C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	235,292.322	223,002.790	-0.187	0.732	233,597.267	233,622.901	0.000	0.978	226,160.210	229,377.211	0.054	1.034
Work Effort GPA in 11th	2.563	2.479	-0.253	1.189	2.564	2.560	-0.011	0.999	2.545	2.543	-0.009	0.930
Cooperation GPA in 11th	2.715	2.649	-0.258	1.162	2.714	2.716	0.008	0.861	2.709	2.691	-0.075	0.986
Attendance Rate in 11th	0.974	0.973	-0.024	0.864	0.976	0.974	-0.047	0.969	0.974	0.975	0.024	1.017
Ever Suspended from 9th-11th	-	-	0.014	1.287	-	-	0.008	1.202	-	-	0.028	2.491

See the note on the first page of the table.

Table C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
Educational Expectations in 11th: Unsure	0.068	0.082	0.052	1.184	0.072	0.055	-0.071	0.776	0.067	0.065	-0.006	0.976
Educational Expectations in 11th: HS or Less	-	-	0.068	2.133	-	-	-0.004	0.952	-	-	-0.009	0.881
Educational Expectations in 11th: Associate Degree or Certificate	0.020	0.026	0.035	1.253	0.020	0.021	0.007	1.047	-	-	0.069	1.647
Educational Expectations in 11th: Bachelor's Degree or Higher	0.652	0.639	-0.027	1.016	0.634	0.665	0.066	0.961	0.656	0.646	-0.021	1.011
Educational Expectations in 11th: Missing	0.254	0.242	-0.029	0.966	0.268	0.253	-0.034	0.965	0.257	0.260	0.006	1.004

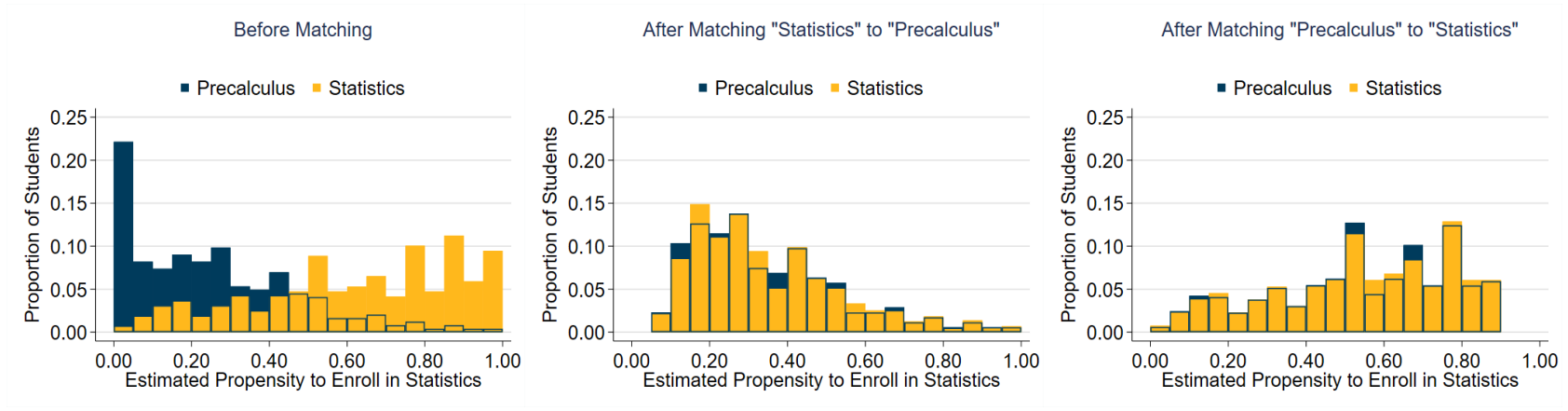
See the note on the first page of the table.

Table C26 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=736)	Statistics (N=857)	SMD	VR	Calculus (N=639)	Statistics (N=592)	SMD	VR	Calculus (N=592)	Statistics (N=642)	SMD	VR
Growth Mindset in 11th	0.218	0.133	-0.106	1.084	0.210	0.234	0.031	1.003	0.126	0.175	0.061	0.945
Missing Dummy: Growth Mindset in 11th	0.245	0.230	-0.035	0.958	0.257	0.246	-0.025	0.973	0.250	0.249	-0.001	0.997
Academic Self-Efficacy in 11th	0.195	-0.076	-0.316	1.147	0.147	0.097	-0.061	0.982	-0.030	0.017	0.057	0.982
Missing Dummy: Academic Self-Efficacy in 11th	0.242	0.230	-0.028	0.965	0.254	0.241	-0.030	0.967	0.249	0.249	0.000	0.997
Indicator of 2016-17 Cohort	0.474	0.478	0.008	1.001	0.476	0.473	-0.006	1.001	0.483	0.491	0.014	0.998

See the note on the first page of the table.

Figure C27. Community College Distributions of Estimated Propensities of Taking Statistics over Precalculus in Group 4 Before and After Matching for Students with Non-Missing College-Level Math GPAs, 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 C27. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Age (in Months)	194.969	194.784	-0.032	0.982	194.873	195.384	0.080	2.249	194.917	194.821	-0.019	1.748
Gender: Female	0.533	0.527	-0.012	1.003	0.511	0.457	-0.108	1.006	0.483	0.515	0.064	0.989
Race/Ethnicity: Asian	-	-	-0.062	0.783	-	-	-0.181	0.340	-	-	0.096	1.541
Race/Ethnicity: African American	-	-	-0.223	0.497	0.086	0.136	0.157	1.509	-	-	-0.056	0.824

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 C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Race/Ethnicity: Latinx	0.668	0.757	0.198	0.830	0.736	0.690	-0.101	1.114	0.723	0.742	0.044	0.944
Race/Ethnicity: Filipinx	-	-	0.174	1.937	-	-	0.078	1.412	-	-	0.006	1.011
Race/Ethnicity: White	-	-	-0.146	0.629	0.092	0.102	0.035	1.114	-	-	-0.091	0.758
Race/Ethnicity: Other	-	-	-0.182	0.000	-	-	N/A	N/A	-	-	N/A	N/A
Ever Subsidized Meal Eligible from 9th-11th	0.898	0.882	-0.051	1.137	0.914	0.889	-0.082	1.267	0.883	0.902	0.059	0.851

See the note on the first page of the table.

Table C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.175	0.211	-	-	0.048	1.510	-	-	0.062	2.461
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.168	0.207	0.100	1.177	0.190	0.160	-0.078	0.885	0.178	0.205	0.066	1.098
Parents'/Guardians' Educational Attainment: HS Graduate	0.193	0.207	0.036	1.058	0.213	0.190	-0.056	0.931	0.206	0.212	0.014	1.010
Parents'/Guardians' Educational Attainment: Some College	0.148	0.183	0.096	1.193	0.155	0.128	-0.079	0.860	0.227	0.189	-0.092	0.866
Parents'/Guardians' Educational Attainment: College Graduate	0.111	0.130	0.060	1.153	0.092	0.102	0.033	1.110	0.092	0.106	0.046	1.119

See the note on the first page of the table.

Table C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	-	-	-0.091	0.689	-	-	0.094	1.401	-	-	-0.137	0.591
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.320	0.231	-0.200	0.818	0.293	0.339	0.098	1.095	0.218	0.242	0.059	1.067
Nonresident School Enrollment in 11th	0.373	0.438	0.132	1.054	0.397	0.429	0.066	1.037	0.490	0.409	-0.162	0.957
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.052	1.436	-	-	-0.158	0.206	-	-	0.032	1.231
Number of School Moves from 9th-11th	0.067	0.041	-0.116	0.516	0.059	0.036	-0.103	0.426	0.022	0.044	0.127	1.424

See the note on the first page of the table.

Table C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	-	-	-0.240	0.402	-	-	-0.097	0.643	-	-	0.177	2.876
English Learner Status in 11th: English Only	0.365	0.325	-0.083	0.949	0.328	0.374	0.097	1.077	0.394	0.341	-0.109	0.931
English Learner Status in 11th: Initial Fluent English Proficient	0.152	0.142	-0.027	0.949	0.161	0.132	-0.083	0.857	0.106	0.129	0.071	1.174
English Learner Status in 11th: Limited English Proficient	-	-	-0.182	0.298	-	-	-0.007	0.973	-	-	0.026	1.232
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.443	0.521	0.156	1.013	0.483	0.467	-0.032	1.009	0.488	0.515	0.053	0.989

See the note on the first page of the table.

Table C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Gifted and Talented Program Participation in 11th	0.148	0.207	0.156	1.308	0.172	0.183	0.028	1.063	0.288	0.197	-0.212	0.763
Math 11th Grade Weighted GPA	2.982	2.684	-0.368	1.118	2.895	2.851	-0.055	1.052	2.832	2.844	0.015	0.961
Cumulative Overall Weighted GPA at the End of 11th	3.151	3.029	-0.248	1.187	3.125	3.139	0.028	0.980	3.124	3.098	-0.052	0.994
Standardized ELA SBAC Score in 11th	0.309	0.336	0.038	1.066	0.320	0.321	0.001	0.885	0.407	0.312	-0.139	1.013
Standardized Math SBAC Score in 11th	0.364	0.267	-0.153	1.287	0.333	0.366	0.055	0.972	0.397	0.266	-0.212	1.040

See the note on the first page of the table.

Table C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	2.138	2.299	0.064	1.270	2.349	2.649	0.115	1.156	2.576	2.383	-0.074	0.949
Science Credits Accumulated from 9th-11th	32.175	31.451	-0.085	0.782	32.380	32.110	-0.030	0.897	31.028	31.176	0.018	1.067
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.136	0.495	-	-	-0.076	0.615	-	-	0.152	3.226
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.402	0.456	0.057	0.983	0.299	0.246	-0.080	0.767	0.348	0.364	0.019	1.005
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.160	0.166	0.011	1.080	0.132	0.105	-0.062	0.727	0.125	0.152	0.055	1.116

See the note on the first page of the table.

Table C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.156	0.089	-0.123	0.245	0.080	0.036	-0.156	0.514	0.059	0.076	0.051	1.165
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.053	0.071	0.056	1.020	0.046	0.028	-0.074	0.380	0.043	0.061	0.062	1.801
Highest ERW PSAT Score by the End of 11th	451.223	449.708	-0.022	1.334	449.980	444.797	-0.076	1.126	459.580	448.641	-0.152	0.938
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	-0.409	0.123	-	-	0.000	1.013	-	-	0.055	1.638
Highest Math PSAT Score by the End of 11th	449.923	436.500	-0.224	1.181	445.266	447.438	0.037	1.099	449.530	440.670	-0.139	0.927

See the note on the first page of the table.

Table C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.397	0.127	-	-	0.000	1.013	-	-	0.055	1.638
Took the SAT or ACT before 12th	0.299	0.266	-0.073	0.934	0.287	0.289	0.004	1.016	0.250	0.273	0.052	1.047
Participation in the AVID Program in 11th	-	-	0.120	2.127	-	-	0.098	1.741	-	-	0.190	4.001
Took a College or Career Seminar Course in 11th	0.148	0.160	0.034	1.069	0.126	0.097	-0.092	0.806	0.094	0.159	0.195	1.553
Ever Attended STEM-Focused School from 9th- 12th	0.242	0.201	-0.098	0.878	0.259	0.287	0.063	1.080	0.212	0.205	-0.018	0.963

See the note on the first page of the table.

Table C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	9.505	7.891	-0.355	0.967	9.002	8.773	-0.050	0.995	8.668	8.718	0.011	0.931
Cumulative Overall Weighted GPA at the End of 11th (Squared)	10.149	9.435	-0.234	1.108	9.992	10.067	0.025	0.976	10.020	9.856	-0.052	0.949
Standardized ELA SBAC Score in 11th (Squared)	0.584	0.633	0.064	1.638	0.580	0.520	-0.084	1.285	0.621	0.564	-0.076	1.241
Standardized Math SBAC Score in 11th (Squared)	0.480	0.518	0.063	1.198	0.476	0.484	0.016	0.961	0.523	0.455	-0.127	0.873
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	10.112	12.310	0.109	1.851	11.811	14.203	0.113	1.630	13.473	12.246	-0.058	1.239

See the note on the first page of the table.

Table C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	1,117.166	1,053.084	-0.102	0.692	1,132.767	1,105.714	-0.039	0.920	1,025.380	1,039.555	0.025	1.140
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.066	1.095	0.007	0.771	0.586	0.436	-0.065	1.024	0.781	0.803	0.007	1.195
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.275	0.296	0.019	1.018	0.247	0.176	-0.071	0.547	0.237	0.273	0.031	0.847
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.500	0.124	-0.151	0.045	0.115	0.056	-0.106	0.989	0.102	0.121	0.028	1.865
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.102	0.107	0.006	0.578	0.092	0.034	-0.101	0.134	0.058	0.106	0.090	1.816

See the note on the first page of the table.

Table C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	207,507.818	207,437.327	-0.001	1.354	206,854.717	202,704.008	-0.066	1.215	216,473.434	206,265.972	-0.154	0.956
Highest Math PSAT Score by the End of 11th (Squared)	205,699.270	194,385.643	-0.218	1.046	201,471.749	203,682.841	0.043	1.098	206,235.499	198,089.195	-0.149	0.890
Work Effort GPA in 11th	2.572	2.554	-0.061	1.149	2.567	2.562	-0.017	0.966	2.580	2.571	-0.031	1.019
Cooperation GPA in 11th	2.711	2.707	-0.014	1.063	2.709	2.715	0.023	1.089	2.724	2.715	-0.039	1.168
Attendance Rate in 11th	0.976	0.973	-0.085	1.253	0.975	0.978	0.099	0.831	0.976	0.975	-0.046	1.967

See the note on the first page of the table.

Table C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.087	2.870	-	-	-0.078	0.203	-	-	0.039	1.643
Educational Expectations in 11th: Unsure	0.061	0.071	0.038	1.145	0.069	0.089	0.073	1.276	-	-	0.032	1.092
Educational Expectations in 11th: HS or Less	-	-	-0.027	0.725	-	-	-0.078	0.203	-	-	-0.077	0.000
Educational Expectations in 11th: Associate Degree or Certificate	-	-	-0.154	0.459	-	-	-0.018	0.923	-	-	-0.029	0.828
Educational Expectations in 11th: Bachelor's Degree or Higher	0.607	0.645	0.079	0.961	0.615	0.549	-0.133	1.059	0.538	0.614	0.153	0.943

See the note on the first page of the table.

Table C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Educational Expectations in 11th: Missing	0.270	0.254	-0.036	0.963	0.276	0.330	0.116	1.120	0.357	0.280	-0.164	0.869
Growth Mindset in 11th	0.175	0.143	-0.044	0.944	0.207	0.161	-0.071	0.675	0.169	0.180	0.016	1.064
Missing Dummy: Growth Mindset in 11th	0.275	0.249	-0.059	0.939	0.270	0.330	0.129	1.135	0.367	0.280	-0.185	0.859
Academic Self-Efficacy in 11th	0.106	-0.070	-0.220	0.855	0.052	0.044	-0.009	0.761	0.061	0.018	-0.054	0.819
Missing Dummy: Academic Self-Efficacy in 11th	0.270	0.249	-0.050	0.948	0.270	0.330	0.129	1.135	0.367	0.280	-0.185	0.859

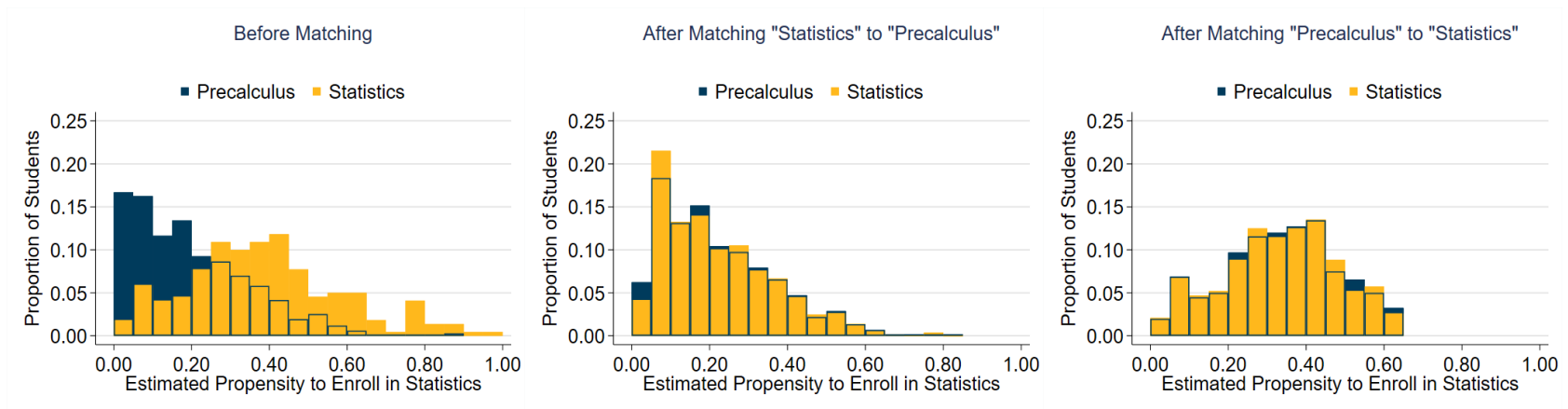
See the note on the first page of the table.

Table C27 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=244)	Statistics (N=169)	SMD	VR	Precalculus (N=174)	Statistics (N=131)	SMD	VR	Precalculus (N=158)	Statistics (N=132)	SMD	VR
Indicator of 2016-17 Cohort	0.643	0.751	0.236	0.816	0.684	0.636	-0.101	1.085	0.775	0.750	-0.059	1.064

See the note on the first page of the table.

Figure C28. Community College Distributions of Estimated Propensities of Taking Statistics over Precalculus in Group 4 Before and After Matching for Students with Non-Missing College-Level Math GPAs, 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 C28. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Age (in Months)	194.809	194.961	0.029	1.130	194.761	194.843	0.016	0.994	194.911	194.853	-0.011	1.235
Gender: Female	0.538	0.523	-0.031	1.007	0.542	0.524	-0.037	1.014	0.492	0.531	0.079	0.997
Race/Ethnicity: Asian	-	-	-0.020	0.910	-	-	-0.060	0.714	-	-	0.038	1.204
Race/Ethnicity: African American	-	-	-0.082	0.726	0.062	0.056	-0.027	0.912	-	-	-0.049	0.831

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Race/Ethnicity: Latinx	0.759	0.786	0.066	0.920	0.768	0.776	0.021	0.982	0.776	0.776	0.001	0.999
Race/Ethnicity: Filipinx	0.051	0.073	0.092	1.406	0.052	0.060	0.034	1.151	0.061	0.068	0.028	1.104
Race/Ethnicity: White	0.075	0.055	-0.081	0.750	0.072	0.080	0.030	1.112	-	-	-0.022	0.923
Race/Ethnicity: Other	-	-	-0.082	0.385	-	-	-0.092	0.320	-	-	0.032	1.665
Ever Subsidized Meal Eligible from 9th-11th	0.905	0.905	0.000	1.004	0.909	0.891	-0.059	1.182	0.896	0.906	0.033	0.915

See the note on the first page of the table.

Table C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.127	0.258	-	-	0.087	1.894	-	-	-0.038	0.628
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.210	0.227	0.041	1.061	0.217	0.183	-0.086	0.887	0.222	0.229	0.018	1.025
Parents'/Guardians' Educational Attainment: HS Graduate	0.222	0.227	0.012	1.020	0.227	0.242	0.035	1.054	0.247	0.219	-0.066	0.920
Parents'/Guardians' Educational Attainment: Some College	0.131	0.155	0.067	1.150	0.141	0.144	0.007	1.024	0.172	0.156	-0.043	0.926
Parents'/Guardians' Educational Attainment: College Graduate	0.091	0.109	0.061	1.180	0.084	0.075	-0.035	0.905	0.085	0.104	0.066	1.202

See the note on the first page of the table.

Table C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	-	-	-0.028	0.879	0.040	0.068	0.121	1.646	-	-	-0.047	0.804
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.304	0.245	-0.131	0.878	0.290	0.289	-0.002	1.007	0.229	0.255	0.062	1.079
Nonresident School Enrollment in 11th	0.304	0.436	0.276	1.166	0.328	0.289	-0.084	0.941	0.411	0.401	-0.021	0.993
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.014	1.110	-	-	-0.005	0.973	-	-	0.015	1.110
Number of School Moves from 9th-11th	0.074	0.038	-0.164	0.472	0.060	0.038	-0.106	0.580	0.031	0.038	0.040	1.180

See the note on the first page of the table.

Table C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	-	-	-0.197	0.483	0.064	0.057	-0.028	0.909	-	-	-0.015	0.942
English Learner Status in 11th: English Only	0.267	0.282	0.034	1.038	0.268	0.284	0.036	1.046	0.293	0.292	-0.004	0.998
English Learner Status in 11th: Initial Fluent English Proficient	0.156	0.164	0.019	1.040	0.153	0.186	0.088	1.179	0.176	0.167	-0.024	0.960
English Learner Status in 11th: Limited English Proficient	-	-	-0.131	0.464	-	-	-0.045	0.771	-	-	-0.047	0.747
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.537	0.536	0.000	1.003	0.549	0.507	-0.084	1.019	0.503	0.521	0.036	0.999

See the note on the first page of the table.

Table C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Gifted and Talented Program Participation in 11th	0.119	0.182	0.175	1.421	0.125	0.163	0.110	1.264	0.162	0.156	-0.015	0.974
Math 11th Grade Weighted GPA	2.880	2.707	-0.216	1.076	2.870	2.894	0.030	0.995	2.771	2.777	0.007	0.955
Cumulative Overall Weighted GPA at the End of 11th	3.080	2.990	-0.175	0.997	3.091	3.061	-0.057	1.044	3.026	3.028	0.005	0.955
Standardized ELA SBAC Score in 11th	0.283	0.288	0.007	1.201	0.294	0.333	0.056	1.216	0.310	0.282	-0.040	1.042
Standardized Math SBAC Score in 11th	0.297	0.217	-0.123	1.274	0.292	0.279	-0.022	0.920	0.242	0.209	-0.053	1.121

See the note on the first page of the table.

Table C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	1.963	2.208	0.103	1.288	2.027	2.242	0.098	0.908	2.375	2.191	-0.074	0.945
Science Credits Accumulated from 9th-11th	32.637	32.337	-0.032	0.970	32.603	32.455	-0.016	0.940	32.373	32.209	-0.017	0.965
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.115	0.539	-	-	0.008	1.050	-	-	0.042	1.309
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.483	0.418	-0.069	0.801	0.411	0.381	-0.036	0.688	0.398	0.359	-0.047	0.909
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.204	0.141	-0.118	0.628	0.172	0.179	0.013	1.133	0.156	0.151	-0.009	0.920

See the note on the first page of the table.

Table C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.176	0.077	-0.199	0.284	0.111	0.063	-0.130	0.468	0.085	0.073	-0.038	1.020
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.082	0.059	-0.067	0.555	0.064	0.076	0.034	1.202	0.068	0.062	-0.018	0.874
Highest ERW PSAT Score by the End of 11th	439.622	443.254	0.053	1.248	440.046	442.612	0.037	1.189	443.507	439.094	-0.063	0.979
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	-0.310	0.189	-	-	-0.026	0.885	-	-	-0.032	0.794
Highest Math PSAT Score by the End of 11th	440.513	433.581	-0.114	0.945	438.659	443.150	0.073	0.983	433.366	432.488	-0.014	0.919

See the note on the first page of the table.

Table C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.284	0.207	-	-	-0.026	0.885	-	-	-0.032	0.794
Took the SAT or ACT before 12th	0.343	0.273	-0.152	0.883	0.342	0.300	-0.090	0.942	0.286	0.292	0.013	1.013
Participation in the AVID Program in 11th	-	-	0.019	1.097	-	-	0.038	1.195	-	-	-0.030	0.876
Took a College or Career Seminar Course in 11th	0.177	0.195	0.046	1.081	0.177	0.190	0.034	1.067	0.191	0.208	0.043	1.069
Ever Attended STEM-Focused School from 9th- 12th	0.197	0.205	0.020	1.033	0.205	0.164	-0.107	0.847	0.209	0.203	-0.015	0.979

See the note on the first page of the table.

Table C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	8.905	7.987	-0.205	0.964	8.859	8.985	0.028	0.947	8.362	8.363	0.000	0.916
Cumulative Overall Weighted GPA at the End of 11th (Squared)	9.755	9.206	-0.177	0.971	9.819	9.646	-0.054	1.064	9.418	9.420	0.001	0.984
Standardized ELA SBAC Score in 11th (Squared)	0.534	0.626	0.121	1.551	0.523	0.637	0.148	1.704	0.552	0.554	0.003	1.408
Standardized Math SBAC Score in 11th (Squared)	0.458	0.518	0.090	1.195	0.438	0.400	-0.071	0.749	0.416	0.444	0.050	0.981
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	8.747	11.155	0.133	1.906	9.176	9.589	0.026	1.047	12.004	10.808	-0.060	1.106

See the note on the first page of the table.

Table C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	1,153.042	1,130.689	-0.031	1.073	1,148.843	1,133.311	-0.022	0.998	1,140.493	1,126.570	-0.018	1.069
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.198	0.945	-0.073	0.811	0.949	0.677	-0.106	0.632	0.848	0.755	-0.035	1.659
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.395	0.241	-0.116	0.373	0.316	0.354	0.028	0.974	0.277	0.255	-0.019	0.602
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.411	0.114	-0.168	0.084	0.195	0.089	-0.125	0.286	0.115	0.115	0.000	1.952
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.156	0.086	-0.093	0.275	0.114	0.137	0.033	1.055	0.108	0.094	-0.025	0.818

See the note on the first page of the table.

Table C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	197,412.094	201,629.147	0.068	1.288	197,978.099	201,015.978	0.048	1.227	201,603.372	197,600.585	-0.063	1.003
Highest Math PSAT Score by the End of 11th (Squared)	197,864.133	191,582.321	-0.121	0.909	196,182.174	200,044.576	0.075	0.907	191,747.232	190,664.639	-0.021	0.938
Work Effort GPA in 11th	2.546	2.548	0.007	1.042	2.557	2.570	0.045	1.177	2.576	2.559	-0.060	1.271
Cooperation GPA in 11th	2.689	2.701	0.053	1.016	2.701	2.700	-0.003	1.484	2.716	2.708	-0.034	1.246
Attendance Rate in 11th	0.972	0.974	0.038	0.690	0.973	0.967	-0.151	1.685	0.972	0.974	0.066	0.812

See the note on the first page of the table.

Table C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.056	2.030	-	-	-0.058	0.337	-	-	-0.059	0.503
Educational Expectations in 11th: Unsure	0.088	0.086	-0.006	0.987	0.089	0.110	0.069	1.216	0.097	0.094	-0.011	0.970
Educational Expectations in 11th: HS or Less	-	-	-0.041	0.683	-	-	-0.048	0.634	-	-	-0.020	0.836
Educational Expectations in 11th: Associate Degree or Certificate	-	-	-0.179	0.372	-	-	-0.066	0.711	-	-	0.017	1.153
Educational Expectations in 11th: Bachelor's Degree or Higher	0.590	0.659	0.142	0.932	0.601	0.564	-0.075	1.035	0.619	0.651	0.067	0.964

See the note on the first page of the table.

Table C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Educational Expectations in 11th: Missing	0.258	0.227	-0.071	0.921	0.258	0.291	0.074	1.088	0.258	0.229	-0.067	0.924
Growth Mindset in 11th	0.150	0.096	-0.067	1.216	0.147	0.230	0.109	0.885	0.166	0.088	-0.099	1.194
Missing Dummy: Growth Mindset in 11th	0.256	0.214	-0.101	0.884	0.251	0.288	0.084	1.101	0.248	0.224	-0.056	0.934
Academic Self-Efficacy in 11th	0.137	-0.056	-0.231	1.001	0.131	0.211	0.098	0.978	0.031	-0.015	-0.053	0.836
Missing Dummy: Academic Self-Efficacy in 11th	0.253	0.218	-0.083	0.905	0.251	0.288	0.084	1.101	0.248	0.224	-0.056	0.934

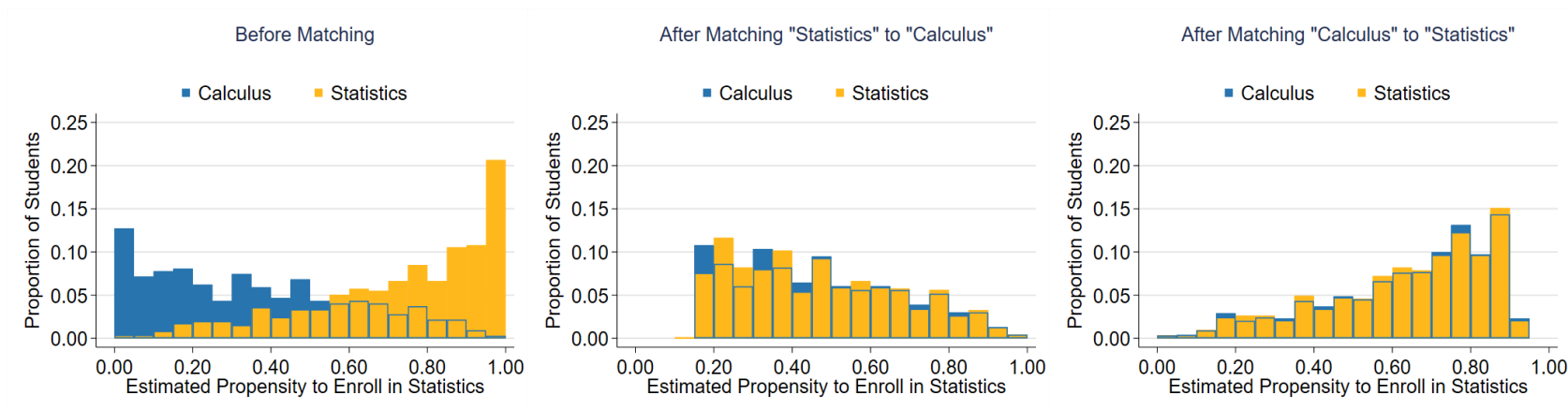
See the note on the first page of the table.

Table C28 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=671)	Statistics (N=220)	SMD	VR	Precalculus (N=594)	Statistics (N=211)	SMD	VR	Precalculus (N=387)	Statistics (N=192)	SMD	VR
Indicator of 2016-17 Cohort	0.590	0.727	0.292	0.823	0.613	0.620	0.015	1.002	0.699	0.703	0.009	0.993

See the note on the first page of the table.

Figure C29. Community College Distributions of Estimated Propensities of Taking Statistics over Calculus in Group 5 Before and After Matching for Students with Non-Missing College-Level Math GPAs, 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 C29. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
Age (in Months)	194.827	193.937	-0.198	0.731	194.278	194.107	-0.041	0.995	194.117	194.031	-0.021	1.067
Gender: Female	0.413	0.601	0.382	0.988	0.470	0.425	-0.090	0.984	0.608	0.584	-0.050	1.013
Race/Ethnicity: Asian	0.109	0.080	-0.097	0.761	0.086	0.093	0.024	1.076	0.081	0.082	0.002	1.001
Race/Ethnicity: African American	0.053	0.053	0.000	0.998	-	-	0.046	1.236	0.058	0.056	-0.010	0.957

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 C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
Race/Ethnicity: Latinx	0.612	0.651	0.082	0.955	0.629	0.616	-0.027	1.017	0.655	0.649	-0.012	1.002
Race/Ethnicity: Filipinx	0.112	0.089	-0.074	0.820	0.121	0.116	-0.013	0.972	0.090	0.085	-0.016	0.948
Race/Ethnicity: White	0.102	0.115	0.039	1.103	0.108	0.122	0.043	1.114	0.101	0.111	0.035	1.087
Race/Ethnicity: Other	-	-	-0.009	0.923	-	-	-0.125	0.254	-	-	0.011	1.079
Ever Subsidized Meal Eligible from 9th-11th	0.870	0.894	0.077	0.831	0.888	0.870	-0.055	1.142	0.901	0.885	-0.050	1.128

See the note on the first page of the table.

Table C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.156	0.302	-	-	0.063	1.794	-	-	0.000	0.994
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.211	0.193	-0.046	0.933	0.220	0.196	-0.059	0.921	0.173	0.203	0.077	1.124
Parents'/Guardians' Educational Attainment: HS Graduate	0.158	0.213	0.141	1.258	0.168	0.163	-0.014	0.979	0.218	0.203	-0.035	0.945
Parents'/Guardians' Educational Attainment: Some College	0.152	0.135	-0.048	0.906	0.155	0.146	-0.026	0.953	0.133	0.131	-0.006	0.981
Parents'/Guardians' Educational Attainment: College Graduate	0.152	0.149	-0.009	0.982	0.151	0.175	0.065	1.131	0.154	0.148	-0.019	0.957

See the note on the first page of the table.

Table C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.047	0.044	-0.014	0.938	-	-	0.078	1.380	-	-	-0.085	0.679
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.280	0.266	-0.030	0.969	0.263	0.260	-0.006	0.997	0.268	0.279	0.024	1.019
Nonresident School Enrollment in 11th	0.475	0.484	0.018	1.001	0.470	0.440	-0.060	0.992	0.462	0.475	0.028	0.997
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.093	2.188	-	-	0.007	1.069	-	-	-0.094	0.504
Number of School Moves from 9th-11th	0.071	0.058	-0.048	0.795	0.073	0.091	0.060	1.592	0.089	0.059	-0.100	0.576

See the note on the first page of the table.

Table C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	-	-	-0.195	0.384	-	-	0.011	1.068	-	-	0.079	1.811
English Learner Status in 11th: English Only	0.273	0.342	0.149	1.132	0.272	0.297	0.057	1.060	0.325	0.315	-0.021	0.978
English Learner Status in 11th: Initial Fluent English Proficient	0.214	0.188	-0.065	0.906	0.216	0.208	-0.019	0.977	0.144	0.177	0.091	1.177
English Learner Status in 11th: Limited English Proficient	-	-	-0.151	0.215	-	-	-0.054	0.504	-	-	0.026	1.417
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.491	0.466	-0.050	0.995	0.504	0.491	-0.028	1.003	0.527	0.502	-0.051	0.997

See the note on the first page of the table.

Table C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
Gifted and Talented Program Participation in 11th	0.404	0.314	-0.187	0.894	0.409	0.450	0.082	1.027	0.367	0.357	-0.020	0.982
Math 11th Grade Weighted GPA	3.431	2.771	-0.596	1.614	3.364	3.363	-0.001	1.021	3.179	3.145	-0.033	0.921
Cumulative Overall Weighted GPA at the End of 11th	3.362	3.220	-0.283	1.043	3.347	3.342	-0.010	1.225	3.294	3.304	0.021	1.001
Standardized ELA SBAC Score in 11th	0.627	0.614	-0.020	0.803	0.635	0.676	0.063	0.965	0.654	0.615	-0.063	0.963
Standardized Math SBAC Score in 11th	1.033	0.697	-0.562	0.873	0.939	0.966	0.046	1.080	0.815	0.793	-0.040	1.025

See the note on the first page of the table.

Table C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	4.068	3.611	-0.158	1.025	4.035	3.922	-0.041	0.897	3.910	3.814	-0.034	0.975
Science Credits Accumulated from 9th-11th	33.456	32.687	-0.088	0.769	32.969	33.122	0.016	0.938	32.675	32.685	0.001	1.094
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.105	0.373	-	-	-0.029	0.603	-	-	0.059	4.956
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.385	0.397	0.013	0.785	0.310	0.294	-0.022	0.995	0.277	0.292	0.020	1.132
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.118	0.112	-0.012	0.778	0.073	0.080	0.019	1.096	0.077	0.092	0.040	1.321

See the note on the first page of the table.

Table C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.158	0.112	-0.081	0.409	0.095	0.105	0.025	1.062	0.095	0.092	-0.008	1.354
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.078	0.028	-0.158	0.218	0.022	0.019	-0.015	0.978	0.006	0.033	0.166	6.206
Highest ERW PSAT Score by the End of 11th	491.262	486.833	-0.063	0.746	494.195	498.938	0.070	1.045	495.392	489.798	-0.087	1.079
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.062	0.030	-0.154	0.496	-	-	-0.040	0.830	-	-	0.056	1.353
Highest Math PSAT Score by the End of 11th	507.005	481.631	-0.379	0.828	503.074	503.651	0.009	1.122	488.388	487.516	-0.014	0.962

See the note on the first page of the table.

Table C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.059	0.028	-0.155	0.482	-	-	-0.057	0.744	-	-	0.051	1.331
Took the SAT or ACT before 12th	0.531	0.463	-0.136	0.998	0.509	0.493	-0.031	1.004	0.471	0.479	0.015	0.995
Participation in the AVID Program in 11th	-	-	0.048	1.467	-	-	0.054	1.528	-	-	-0.166	0.402
Took a College or Career Seminar Course in 11th	0.112	0.094	-0.058	0.857	0.099	0.066	-0.119	0.696	0.067	0.085	0.068	1.236
Ever Attended STEM-Focused School from 9th-12th	0.171	0.195	0.062	1.107	0.181	0.147	-0.091	0.851	0.172	0.200	0.071	1.114

See the note on the first page of the table.

Table C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
Took a Precalculus Course by the End of 11th	-	-	-0.189	3.395	-	-	-0.009	1.103	-	-	-0.109	3.936
Took an IDS Course by the End of 11th	-	-	0.152	Inf	-	-	N/A	N/A	-	-	N/A	N/A
Took a Statistics Course by the End of 11th	-	-	0.211	9.336	-	-	0.024	1.402	-	-	0.141	Inf
Took Other Advanced Math by the End of 11th	-	-	-0.092	0.248	-	-	-0.014	0.803	-	-	0.000	0.994
Math 11th Grade Weighted GPA (Squared)	12.706	9.189	-0.536	1.070	12.301	12.313	0.002	1.009	11.231	10.933	-0.045	0.884

See the note on the first page of the table.

Table C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th (Squared)	11.546	10.626	-0.289	0.968	11.425	11.439	0.004	1.164	11.070	11.138	0.022	1.002
Standardized ELA SBAC Score in 11th (Squared)	0.868	0.759	-0.121	0.859	0.831	0.868	0.039	1.279	0.813	0.751	-0.075	1.201
Standardized Math SBAC Score in 11th (Squared)	1.449	0.819	-0.563	0.471	1.220	1.297	0.068	1.263	0.967	0.941	-0.028	1.088
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	24.816	21.518	-0.112	0.970	24.322	22.565	-0.063	1.020	23.554	22.648	-0.031	1.012
Science Credits Accumulated from 9th-11th (Squared)	1,206.465	1,135.472	-0.100	0.618	1,175.777	1,180.100	0.006	0.783	1,138.053	1,145.837	0.011	1.024

See the note on the first page of the table.

Table C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.118	0.920	-0.049	0.390	0.664	0.649	-0.007	0.942	0.540	0.613	0.037	1.348
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.242	0.190	-0.048	0.599	0.125	0.137	0.017	1.470	0.123	0.164	0.053	2.090
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.481	0.200	-0.113	0.074	0.181	0.193	0.011	0.565	0.133	0.177	0.049	1.192
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.171	0.037	-0.165	0.074	0.030	0.029	-0.003	1.122	0.007	0.046	0.147	8.099
Highest ERW PSAT Score by the End of 11th (Squared)	247,010.195	241,239.344	-0.083	0.727	248,668.282	253,560.922	0.073	1.069	249,361.420	244,190.641	-0.081	1.060

See the note on the first page of the table.

Table C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	261,948.760	236,023.033	-0.393	0.723	257,282.896	258,358.549	0.017	1.067	242,678.206	241,695.635	-0.016	0.976
Work Effort GPA in 11th	2.616	2.572	-0.140	1.150	2.641	2.630	-0.035	1.150	2.632	2.632	-0.001	1.040
Cooperation GPA in 11th	2.778	2.721	-0.255	1.263	2.780	2.774	-0.030	1.123	2.770	2.755	-0.074	1.104
Attendance Rate in 11th	0.977	0.979	0.064	0.439	0.978	0.976	-0.060	0.732	0.980	0.979	-0.045	0.767
Ever Suspended from 9th-11th	-	-	N/A	N/A	-	-	N/A	N/A	-	-	N/A	N/A

See the note on the first page of the table.

Table C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
Educational Expectations in 11th: Unsure	0.068	0.080	0.046	1.159	0.073	0.087	0.051	1.175	0.077	0.062	-0.058	0.816
Educational Expectations in 11th: HS or Less	-	-	0.117	4.380	-	-	-0.047	0.402	-	-	0.059	4.956
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.060	1.710	-	-	0.035	1.332	-	-	0.008	1.104
Educational Expectations in 11th: Bachelor's Degree or Higher	0.649	0.674	0.053	0.963	0.629	0.628	-0.004	1.005	0.663	0.672	0.019	0.981
Educational Expectations in 11th: Missing	0.270	0.216	-0.127	0.857	0.280	0.266	-0.031	0.972	0.253	0.256	0.006	1.001

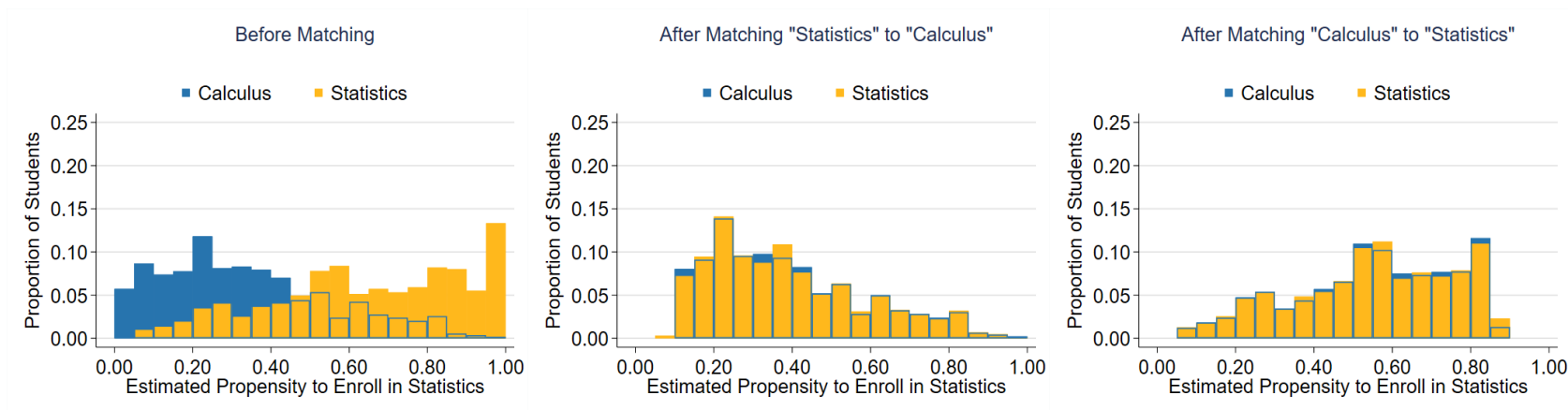
See the note on the first page of the table.

Table C29 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=322)	Statistics (N=436)	SMD	VR	Calculus (N=232)	Statistics (N=269)	SMD	VR	Calculus (N=231)	Statistics (N=305)	SMD	VR
Growth Mindset in 11th	0.174	0.194	0.024	0.934	0.245	0.232	-0.017	1.077	0.187	0.177	-0.013	0.891
Missing Dummy: Growth Mindset in 11th	0.267	0.206	-0.143	0.836	0.272	0.261	-0.023	0.979	0.245	0.246	0.003	0.997
Academic Self-Efficacy in 11th	0.153	-0.050	-0.251	1.081	0.114	0.236	0.159	0.895	0.132	0.059	-0.094	0.945
Missing Dummy: Academic Self-Efficacy in 11th	0.264	0.209	-0.130	0.849	0.272	0.261	-0.023	0.979	0.244	0.246	0.005	0.999
Indicator of 2016-17 Cohort	0.444	0.525	0.163	1.009	0.496	0.566	0.140	0.986	0.572	0.531	-0.083	1.011

See the note on the first page of the table.

Figure C30. Community College Distributions of Estimated Propensities of Taking Statistics over Calculus in Group 5 Before and After Matching for Students with Non-Missing College-Level Math GPAs, 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 C30. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
Age (in Months)	194.933	194.271	-0.140	0.746	194.572	194.399	-0.040	0.994	194.262	194.346	0.020	1.066
Gender: Female	0.454	0.592	0.280	0.974	0.488	0.508	0.041	1.004	0.583	0.573	-0.022	1.005
Race/Ethnicity: Asian	0.074	0.074	0.002	1.006	0.069	0.089	0.074	1.264	0.070	0.076	0.023	1.077
Race/Ethnicity: African American	0.041	0.055	0.069	1.340	0.043	0.039	-0.020	0.917	0.058	0.053	-0.020	0.923

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
Race/Ethnicity: Latinx	0.707	0.653	-0.114	1.093	0.698	0.659	-0.084	1.070	0.647	0.654	0.014	0.989
Race/Ethnicity: Filipinx	0.083	0.097	0.049	1.152	0.085	0.088	0.011	1.036	0.087	0.087	0.000	0.998
Race/Ethnicity: White	0.085	0.110	0.086	1.265	0.093	0.106	0.043	1.127	0.122	0.120	-0.008	0.980
Race/Ethnicity: Other	-	-	-0.015	0.862	-	-	0.058	1.634	-	-	-0.049	0.647
Ever Subsidized Meal Eligible from 9th-11th	0.904	0.884	-0.066	1.184	0.900	0.908	0.028	0.929	0.918	0.893	-0.085	1.266

See the note on the first page of the table.

Table C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.071	0.568	-	-	-0.081	0.481	-	-	0.034	1.381
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.244	0.198	-0.110	0.862	0.236	0.242	0.013	1.020	0.189	0.196	0.018	1.026
Parents'/Guardians' Educational Attainment: HS Graduate	0.197	0.208	0.025	1.038	0.200	0.204	0.011	1.020	0.197	0.209	0.029	1.042
Parents'/Guardians' Educational Attainment: Some College	0.131	0.137	0.018	1.040	0.134	0.116	-0.056	0.883	0.126	0.132	0.018	1.039
Parents'/Guardians' Educational Attainment: College Graduate	0.113	0.139	0.080	1.199	0.117	0.128	0.034	1.086	0.144	0.140	-0.010	0.977

See the note on the first page of the table.

Table C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.042	0.044	0.007	1.031	0.043	0.056	0.058	1.277	0.044	0.041	-0.015	0.931
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.273	0.274	0.003	1.003	0.269	0.254	-0.034	0.966	0.301	0.282	-0.040	0.962
Nonresident School Enrollment in 11th	0.406	0.470	0.130	1.033	0.421	0.440	0.039	1.015	0.501	0.473	-0.056	0.995
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.062	1.609	-	-	0.000	1.003	-	-	0.015	1.106
Number of School Moves from 9th-11th	0.074	0.057	-0.064	0.758	0.081	0.058	-0.082	0.761	0.053	0.062	0.037	1.181

See the note on the first page of the table.

Table C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	0.050	0.025	-0.132	0.510	0.037	0.035	-0.012	0.947	-	-	0.000	0.998
English Learner Status in 11th: English Only	0.231	0.349	0.262	1.280	0.252	0.251	-0.002	1.001	0.330	0.316	-0.032	0.974
English Learner Status in 11th: Initial Fluent English Proficient	0.207	0.179	-0.070	0.897	0.213	0.201	-0.029	0.962	0.169	0.186	0.043	1.072
English Learner Status in 11th: Limited English Proficient	-	-	-0.127	0.232	-	-	-0.030	0.704	-	-	0.032	1.660
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.546	0.469	-0.155	1.005	0.527	0.542	0.030	0.999	0.497	0.494	-0.007	0.998

See the note on the first page of the table.

Table C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
Gifted and Talented Program Participation in 11th	0.378	0.316	-0.130	0.919	0.377	0.420	0.088	1.041	0.383	0.349	-0.071	0.959
Math 11th Grade Weighted GPA	3.431	2.794	-0.578	1.676	3.378	3.435	0.059	0.987	3.216	3.133	-0.082	1.020
Cumulative Overall Weighted GPA at the End of 11th	3.354	3.241	-0.226	1.045	3.351	3.318	-0.067	1.119	3.330	3.313	-0.036	1.039
Standardized ELA SBAC Score in 11th	0.596	0.604	0.013	0.931	0.624	0.620	-0.006	0.997	0.637	0.608	-0.047	0.971
Standardized Math SBAC Score in 11th	0.936	0.670	-0.439	0.982	0.880	0.874	-0.011	0.947	0.758	0.764	0.010	0.962

See the note on the first page of the table.

Table C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	3.639	3.582	-0.020	1.081	3.608	3.631	0.008	1.001	4.014	3.711	-0.105	0.946
Science Credits Accumulated from 9th-11th	33.583	32.860	-0.083	0.764	33.544	33.338	-0.023	0.951	33.075	33.133	0.007	0.937
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.104	0.348	-	-	0.066	1.994	-	-	0.071	2.978
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.382	0.385	0.003	0.917	0.334	0.381	0.056	1.324	0.312	0.326	0.018	0.994
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.098	0.099	0.003	0.932	0.074	0.094	0.056	1.277	0.078	0.081	0.009	1.053

See the note on the first page of the table.

Table C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.149	0.110	-0.074	0.497	0.104	0.159	0.109	1.620	0.112	0.089	-0.060	1.064
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.057	0.025	-0.119	0.272	0.033	0.034	0.005	1.108	0.021	0.025	0.023	1.160
Highest ERW PSAT Score by the End of 11th	474.366	482.429	0.112	0.727	479.638	485.513	0.081	1.023	488.855	482.507	-0.095	1.023
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.065	0.030	-0.161	0.489	0.054	0.057	0.011	1.049	0.041	0.041	-0.003	0.986
Highest Math PSAT Score by the End of 11th	488.924	478.550	-0.149	0.746	488.684	492.322	0.053	0.945	483.137	482.796	-0.005	1.057

See the note on the first page of the table.

Table C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.057	0.029	-0.142	0.515	0.048	0.057	0.041	1.184	0.037	0.038	0.005	1.024
Took the SAT or ACT before 12th	0.491	0.478	-0.025	0.998	0.497	0.498	0.003	1.003	0.535	0.499	-0.073	1.003
Participation in the AVID Program in 11th	0.035	0.027	-0.048	0.767	0.033	0.035	0.012	1.068	-	-	-0.019	0.894
Took a College or Career Seminar Course in 11th	0.140	0.110	-0.090	0.815	0.128	0.108	-0.060	0.869	0.101	0.127	0.082	1.217
Ever Attended STEM-Focused School from 9th-12th	0.190	0.200	0.025	1.040	0.200	0.183	-0.042	0.939	0.184	0.214	0.074	1.116

See the note on the first page of the table.

Table C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
Took a Precalculus Course by the End of 11th	-	-	-0.240	5.150	-	-	-0.075	2.492	-	-	-0.063	2.483
Took an IDS Course by the End of 11th	-	-	0.164	Inf	-	-	N/A	N/A	-	-	N/A	N/A
Took a Statistics Course by the End of 11th	-	-	0.245	17.980	-	-	0.009	1.204	-	-	0.101	Inf
Took Other Advanced Math by the End of 11th	-	-	-0.081	0.260	-	-	0.084	3.790	-	-	-0.010	0.832
Math 11th Grade Weighted GPA (Squared)	12.673	9.323	-0.514	1.098	12.339	12.713	0.058	0.991	11.360	10.850	-0.078	0.950

See the note on the first page of the table.

Table C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th (Squared)	11.493	10.757	-0.229	0.980	11.469	11.272	-0.060	1.089	11.313	11.208	-0.034	1.031
Standardized ELA SBAC Score in 11th (Squared)	0.780	0.761	-0.022	0.979	0.805	0.797	-0.009	1.041	0.802	0.754	-0.056	1.016
Standardized Math SBAC Score in 11th (Squared)	1.244	0.811	-0.407	0.550	1.118	1.088	-0.029	0.992	0.898	0.895	-0.003	0.982
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	20.842	21.047	0.008	1.157	20.679	20.827	0.005	1.283	24.636	21.852	-0.096	0.895
Science Credits Accumulated from 9th-11th (Squared)	1,213.614	1,145.364	-0.099	0.682	1,210.894	1,192.607	-0.025	0.887	1,172.956	1,172.051	-0.001	0.823

See the note on the first page of the table.

Table C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.969	0.903	-0.019	0.535	0.716	0.943	0.085	1.390	0.691	0.697	0.003	0.884
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.179	0.168	-0.012	0.802	0.117	0.151	0.052	1.345	0.125	0.132	0.011	1.308
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.397	0.198	-0.093	0.110	0.204	0.337	0.093	0.828	0.160	0.165	0.006	1.136
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.120	0.032	-0.133	0.097	0.054	0.060	0.013	1.175	0.031	0.036	0.017	1.126
Highest ERW PSAT Score by the End of 11th (Squared)	231,004.695	237,089.078	0.087	0.750	235,280.051	241,050.777	0.081	1.069	243,352.384	237,296.352	-0.092	0.999

See the note on the first page of the table.

Table C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	244,619.637	233,166.387	-0.172	0.713	243,694.601	246,980.534	0.050	0.934	237,363.049	237,268.583	-0.002	1.015
Work Effort GPA in 11th	2.607	2.581	-0.080	1.138	2.623	2.617	-0.023	1.126	2.648	2.622	-0.087	1.097
Cooperation GPA in 11th	2.754	2.724	-0.127	1.098	2.761	2.764	0.013	0.869	2.778	2.752	-0.120	1.155
Attendance Rate in 11th	0.976	0.978	0.071	0.473	0.977	0.977	-0.031	0.575	0.978	0.978	0.014	0.572
Ever Suspended from 9th-11th	-	-	0.062	Inf	-	-	N/A	N/A	-	-	N/A	N/A

See the note on the first page of the table.

Table C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
Educational Expectations in 11th: Unsure	0.074	0.076	0.009	1.030	0.076	0.053	-0.094	0.717	0.068	0.069	0.002	1.005
Educational Expectations in 11th: HS or Less	-	-	0.118	6.135	-	-	-0.021	0.603	-	-	-0.063	0.478
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.047	1.411	-	-	-0.021	0.855	-	-	0.111	2.340
Educational Expectations in 11th: Bachelor's Degree or Higher	0.661	0.665	0.009	0.994	0.653	0.682	0.062	0.960	0.683	0.641	-0.088	1.060
Educational Expectations in 11th: Missing	0.249	0.227	-0.053	0.937	0.252	0.249	-0.006	0.997	0.227	0.260	0.075	1.091

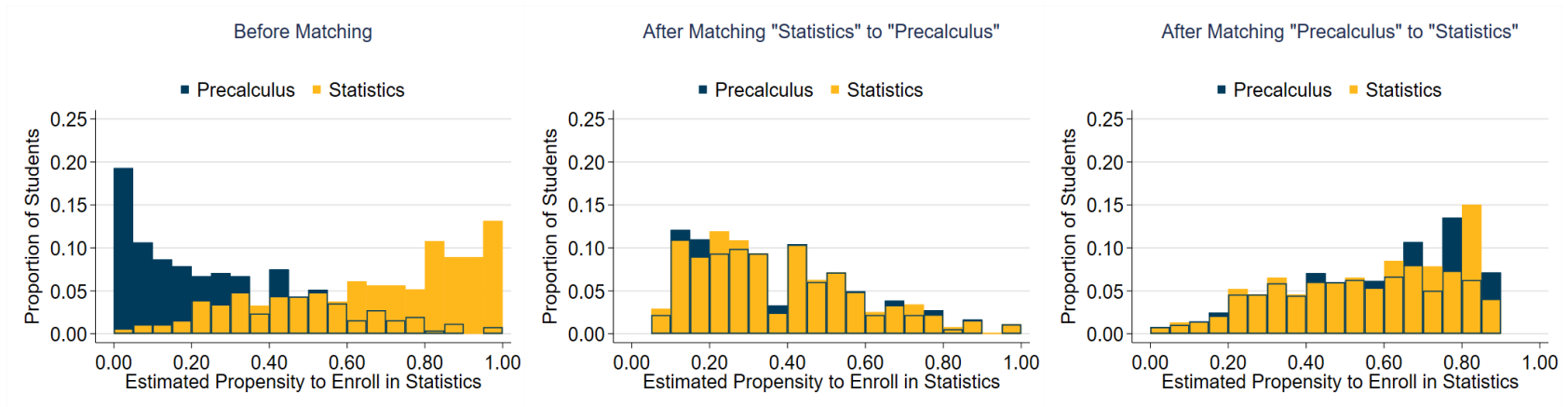
See the note on the first page of the table.

Table C30 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=542)	Statistics (N=525)	SMD	VR	Calculus (N=461)	Statistics (N=378)	SMD	VR	Calculus (N=421)	Statistics (N=393)	SMD	VR
Growth Mindset in 11th	0.226	0.195	-0.040	1.021	0.235	0.191	-0.055	1.082	0.221	0.210	-0.014	0.870
Missing Dummy: Growth Mindset in 11th	0.244	0.217	-0.063	0.923	0.241	0.241	0.000	1.003	0.221	0.249	0.066	1.084
Academic Self-Efficacy in 11th	0.226	-0.033	-0.309	1.020	0.180	0.153	-0.033	0.845	0.042	0.060	0.022	0.873
Missing Dummy: Academic Self-Efficacy in 11th	0.240	0.219	-0.049	0.938	0.241	0.241	0.000	1.003	0.221	0.249	0.066	1.084
Indicator of 2016-17 Cohort	0.494	0.514	0.040	0.999	0.499	0.529	0.060	1.000	0.495	0.511	0.033	0.997

See the note on the first page of the table.

Figure C31. Community College Distributions of Estimated Propensities of Taking Statistics over Precalculus in Group 4 Before and After Matching for Students with Non-Missing Non-Math STEM GPAs, 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 C31. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Age (in Months)	195.105	194.854	-0.046	0.752	194.716	194.113	-0.121	1.111	194.941	195.014	0.015	1.303
Gender: Female	0.535	0.474	-0.122	1.003	0.516	0.465	-0.103	1.008	0.474	0.529	0.111	0.987
Race/Ethnicity: Asian	0.051	0.056	0.023	1.096	-	-	-0.049	0.814	-	-	0.137	1.772
Race/Ethnicity: African American	0.091	0.089	-0.005	0.987	-	-	-0.085	0.760	0.080	0.092	0.041	1.116

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 C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Race/Ethnicity: Latinx	0.717	0.737	0.046	0.955	0.736	0.807	0.169	0.811	0.798	0.732	-0.155	1.202
Race/Ethnicity: Filipinx	0.047	0.052	0.020	1.089	-	-	0.008	1.048	-	-	-0.052	0.783
Race/Ethnicity: White	0.083	0.052	-0.124	0.646	-	-	-0.128	0.628	-	-	0.118	1.665
Race/Ethnicity: Other	-	-	0.020	1.191	-	-	-0.127	0.102	-	-	0.118	4.886
Ever Subsidized Meal Eligible from 9th-11th	0.917	0.864	-0.172	1.552	0.896	0.919	0.079	0.809	0.909	0.889	-0.067	1.181

See the note on the first page of the table.

Table C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.043	0.720	-	-	-0.043	0.774	-	-	0.040	1.340
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.220	0.254	0.078	1.102	0.242	0.263	0.048	1.069	0.314	0.242	-0.161	0.840
Parents'/Guardians' Educational Attainment: HS Graduate	0.177	0.183	0.015	1.027	0.176	0.195	0.048	1.094	0.157	0.176	0.051	1.083
Parents'/Guardians' Educational Attainment: Some College	0.150	0.155	0.015	1.030	0.165	0.159	-0.015	0.985	0.165	0.170	0.012	1.009
Parents'/Guardians' Educational Attainment: College Graduate	0.087	0.136	0.158	1.488	0.082	0.103	0.069	1.232	0.091	0.118	0.087	1.241

See the note on the first page of the table.

Table C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	-	-	-0.048	0.804	-	-	-0.030	0.897	-	-	0.108	1.644
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.319	0.235	-0.189	0.828	0.280	0.233	-0.109	0.896	0.241	0.242	0.001	0.989
Nonresident School Enrollment in 11th	0.386	0.413	0.056	1.024	0.396	0.404	0.017	1.019	0.301	0.386	0.178	1.112
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.014	0.897	-	-	0.061	1.538	-	-	-0.023	0.849
Number of School Moves from 9th-11th	0.065	0.035	-0.145	0.492	0.042	0.018	-0.176	0.188	0.026	0.039	0.082	1.691

See the note on the first page of the table.

Table C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	-	-	-0.186	0.523	0.066	0.094	0.104	1.404	-	-	-0.037	0.847
English Learner Status in 11th: English Only	0.315	0.347	0.069	1.052	0.302	0.305	0.007	1.018	0.302	0.301	-0.003	0.985
English Learner Status in 11th: Initial Fluent English Proficient	0.157	0.131	-0.074	0.861	0.159	0.166	0.018	1.047	0.151	0.170	0.051	1.086
English Learner Status in 11th: Limited English Proficient	-	-	-0.213	0.225	-	-	-0.197	0.124	-	-	-0.022	0.825
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.484	0.512	0.055	1.001	0.511	0.525	0.028	1.010	0.531	0.516	-0.030	0.990

See the note on the first page of the table.

Table C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Gifted and Talented Program Participation in 11th	0.146	0.178	0.089	1.179	0.148	0.171	0.062	1.136	0.186	0.176	-0.025	0.947
Math 11th Grade Weighted GPA	2.864	2.551	-0.379	1.023	2.775	2.833	0.070	1.008	2.627	2.710	0.100	0.977
Cumulative Overall Weighted GPA at the End of 11th	3.047	2.846	-0.368	1.275	3.006	3.048	0.082	1.096	2.892	2.913	0.039	1.165
Standardized ELA SBAC Score in 11th	0.288	0.324	0.051	1.151	0.310	0.422	0.160	1.003	0.352	0.321	-0.044	0.894
Standardized Math SBAC Score in 11th	0.268	0.150	-0.181	1.191	0.217	0.314	0.155	1.035	0.166	0.169	0.004	0.751

See the note on the first page of the table.

Table C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	2.193	1.975	-0.088	1.298	2.252	2.637	0.152	1.037	2.447	2.141	-0.119	0.911
Science Credits Accumulated from 9th-11th	32.282	30.958	-0.155	0.824	31.911	30.760	-0.147	0.820	30.716	31.244	0.069	1.368
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.146	0.472	-	-	0.029	1.174	-	-	0.000	0.988
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.441	0.704	0.232	2.048	0.445	0.378	-0.079	0.801	0.543	0.549	0.007	0.843
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.134	0.333	0.325	2.439	0.148	0.108	-0.090	0.713	0.166	0.209	0.076	1.216

See the note on the first page of the table.

Table C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
A-G "D" or better Semesters Off- Track at the End of 11th (A-B)	0.177	0.174	-0.006	0.828	0.132	0.092	-0.097	0.564	0.091	0.124	0.093	1.194
A-G "D" or better Semesters Off- Track at the End of 11th (D-G)	0.051	0.141	0.230	2.147	0.060	0.032	-0.103	0.379	0.051	0.059	0.029	1.050
Highest ERW PSAT Score by the End of 11th	446.230	450.244	0.056	1.251	447.981	456.718	0.122	1.039	443.754	447.756	0.053	0.901
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	-0.266	0.333	-	-	-0.076	0.693	-	-	0.014	1.063
Highest Math PSAT Score by the End of 11th	444.707	437.397	-0.118	1.065	443.209	453.718	0.169	0.908	443.134	439.191	-0.060	1.062

See the note on the first page of the table.

Table C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.212	0.396	-	-	-0.076	0.693	-	-	0.014	1.063
Took the SAT or ACT before 12th	0.315	0.310	-0.011	0.992	0.291	0.246	-0.102	0.909	0.337	0.288	-0.105	0.906
Participation in the AVID Program in 11th	-	-	0.211	2.972	-	-	0.022	1.160	-	-	0.077	1.573
Took a College or Career Seminar Course in 11th	0.142	0.122	-0.058	0.882	0.121	0.085	-0.119	0.738	0.080	0.098	0.062	1.181
Ever Attended STEM-Focused School from 9th- 12th	0.248	0.207	-0.099	0.879	0.253	0.214	-0.090	0.902	0.199	0.235	0.088	1.116

See the note on the first page of the table.

Table C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	8.879	7.197	-0.368	0.887	8.384	8.710	0.069	1.019	7.589	8.029	0.095	0.942
Cumulative Overall Weighted GPA at the End of 11th (Squared)	9.542	8.432	-0.345	1.116	9.289	9.565	0.088	1.087	8.619	8.784	0.053	1.156
Standardized ELA SBAC Score in 11th (Squared)	0.553	0.646	0.122	1.593	0.588	0.665	0.099	1.571	0.643	0.573	-0.093	0.923
Standardized Math SBAC Score in 11th (Squared)	0.454	0.478	0.040	0.958	0.430	0.490	0.113	0.879	0.603	0.466	-0.202	0.427
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	10.106	10.775	0.035	1.717	11.345	13.383	0.109	1.096	12.803	10.872	-0.103	1.071

See the note on the first page of the table.

Table C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	1,121.728	1,023.951	-0.158	0.625	1,084.927	1,000.158	-0.156	0.657	992.072	1,043.439	0.099	1.404
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.039	2.225	0.211	4.004	0.995	0.773	-0.080	0.716	1.290	1.150	-0.043	0.524
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.236	0.643	0.267	3.299	0.258	0.178	-0.078	0.686	0.310	0.392	0.059	1.192
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.398	0.333	-0.030	0.452	0.231	0.127	-0.102	0.216	0.120	0.150	0.048	0.565
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.098	0.225	0.164	1.327	0.115	0.043	-0.119	0.172	0.067	0.072	0.013	0.915

See the note on the first page of the table.

Table C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	203,655.493	208,388.379	0.071	1.374	205,661.171	213,696.240	0.120	1.147	202,886.225	205,932.161	0.044	0.948
Highest Math PSAT Score by the End of 11th (Squared)	201,442.128	195,228.738	-0.116	1.002	200,485.687	209,493.438	0.163	0.953	200,413.426	197,239.767	-0.057	1.029
Work Effort GPA in 11th	2.542	2.452	-0.279	1.320	2.530	2.548	0.060	0.856	2.456	2.486	0.091	1.043
Cooperation GPA in 11th	2.685	2.631	-0.205	1.271	2.682	2.685	0.013	1.062	2.624	2.652	0.103	0.985
Attendance Rate in 11th	0.972	0.972	0.004	1.075	0.974	0.974	-0.008	0.808	0.971	0.971	-0.014	1.310

See the note on the first page of the table.

Table C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.140	4.702	-	-	-0.076	0.203	-	-	0.017	1.233
Educational Expectations in 11th: Unsure	0.075	0.080	0.019	1.062	0.077	0.092	0.055	1.194	0.080	0.085	0.019	1.046
Educational Expectations in 11th: HS or Less	-	-	0.016	1.192	-	-	-0.105	0.000	-	-	N/A	N/A
Educational Expectations in 11th: Associate Degree or Certificate	-	-	-0.177	0.380	-	-	-0.028	0.854	-	-	-0.046	0.766
Educational Expectations in 11th: Bachelor's Degree or Higher	0.598	0.610	0.024	0.990	0.593	0.673	0.165	0.923	0.573	0.627	0.110	0.944

See the note on the first page of the table.

Table C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Educational Expectations in 11th: Missing	0.268	0.282	0.031	1.033	0.297	0.212	-0.195	0.809	0.313	0.261	-0.114	0.887
Growth Mindset in 11th	0.094	0.083	-0.015	1.055	0.080	0.197	0.154	0.817	0.170	0.129	-0.054	1.103
Missing Dummy: Growth Mindset in 11th	0.264	0.282	0.040	1.043	0.291	0.214	-0.178	0.824	0.337	0.268	-0.149	0.868
Academic Self-Efficacy in 11th	0.018	-0.066	-0.098	1.024	-0.005	-0.032	-0.031	0.768	-0.003	-0.036	-0.040	1.085
Missing Dummy: Academic Self-Efficacy in 11th	0.260	0.282	0.049	1.053	0.291	0.214	-0.178	0.824	0.337	0.268	-0.149	0.868

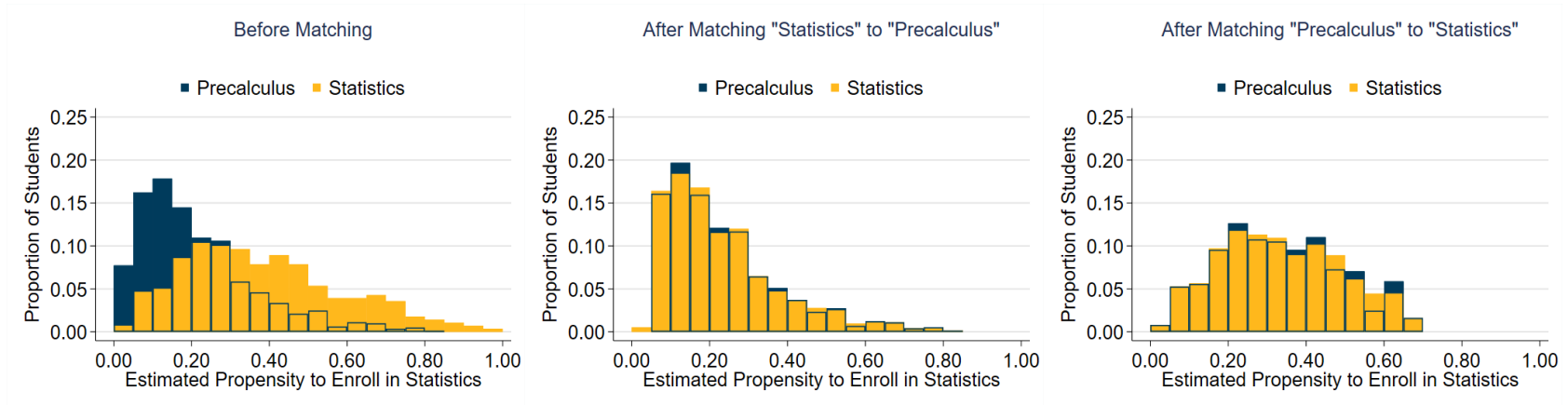
See the note on the first page of the table.

Table C31 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=254)	Statistics (N=213)	SMD	VR	Precalculus (N=182)	Statistics (N=147)	SMD	VR	Precalculus (N=162)	Statistics (N=153)	SMD	VR
Indicator of 2016-17 Cohort	0.642	0.615	-0.055	1.031	0.676	0.715	0.084	0.942	0.600	0.654	0.109	0.932

See the note on the first page of the table.

Figure C32. Community College Distributions of Estimated Propensities of Taking Statistics over Precalculus in Group 4 Before and After Matching for Students with Non-Missing Non-Math STEM GPAs, 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 C32. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Age (in Months)	194.996	195.028	0.006	0.903	194.968	194.525	-0.089	0.969	194.967	194.900	-0.014	1.037
Gender: Female	0.519	0.464	-0.109	0.999	0.510	0.473	-0.074	1.004	0.479	0.478	-0.004	1.000
Race/Ethnicity: Asian	0.031	0.043	0.062	1.361	-	-	-0.075	0.645	-	-	0.011	1.056
Race/Ethnicity: African American	0.059	0.079	0.079	1.315	0.061	0.043	-0.081	0.723	0.090	0.061	-0.111	0.696

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Race/Ethnicity: Latinx	0.792	0.768	-0.058	1.084	0.787	0.788	0.002	1.004	0.747	0.781	0.081	0.904
Race/Ethnicity: Filipinx	0.045	0.046	0.007	1.035	0.045	0.079	0.139	1.689	0.045	0.053	0.038	1.173
Race/Ethnicity: White	0.062	0.054	-0.038	0.869	0.063	0.064	0.004	1.023	0.069	0.057	-0.050	0.835
Race/Ethnicity: Other	-	-	-0.005	0.957	-	-	-0.061	0.506	-	-	-0.033	0.717
Ever Subsidized Meal Eligible from 9th-11th	0.924	0.882	-0.141	1.483	0.919	0.921	0.009	0.978	0.897	0.899	0.005	0.988

See the note on the first page of the table.

Table C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	0.033	1.300	-	-	0.081	1.754	-	-	0.013	1.110
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.241	0.239	-0.003	0.998	0.242	0.256	0.031	1.044	0.236	0.259	0.054	1.067
Parents'/Guardians' Educational Attainment: HS Graduate	0.208	0.214	0.015	1.024	0.213	0.226	0.032	1.051	0.219	0.206	-0.030	0.960
Parents'/Guardians' Educational Attainment: Some College	0.128	0.129	0.000	1.003	0.132	0.100	-0.101	0.789	0.130	0.130	0.000	1.001
Parents'/Guardians' Educational Attainment: College Graduate	0.081	0.129	0.155	1.508	0.084	0.123	0.128	1.412	0.122	0.109	-0.040	0.908

See the note on the first page of the table.

Table C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	-	-	0.051	1.303	-	-	0.024	1.137	-	-	-0.024	0.898
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.312	0.250	-0.137	0.876	0.296	0.258	-0.085	0.924	0.249	0.255	0.015	1.018
Nonresident School Enrollment in 11th	0.305	0.396	0.191	1.130	0.325	0.332	0.015	1.018	0.336	0.356	0.043	1.029
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.016	1.146	-	-	-0.041	0.687	-	-	-0.057	0.673
Number of School Moves from 9th-11th	0.077	0.043	-0.141	0.442	0.063	0.074	0.044	1.013	0.046	0.049	0.014	0.862

See the note on the first page of the table.

Table C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	0.077	0.054	-0.096	0.712	0.076	0.059	-0.065	0.804	0.037	0.057	0.092	1.492
English Learner Status in 11th: English Only	0.243	0.311	0.151	1.167	0.250	0.226	-0.056	0.939	0.312	0.287	-0.054	0.954
English Learner Status in 11th: Initial Fluent English Proficient	0.146	0.154	0.022	1.046	0.149	0.157	0.024	1.055	0.157	0.150	-0.020	0.963
English Learner Status in 11th: Limited English Proficient	-	-	-0.152	0.380	0.028	0.042	0.077	1.498	-	-	-0.047	0.719
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.572	0.521	-0.102	1.022	0.574	0.575	0.002	1.006	0.508	0.547	0.077	0.992

See the note on the first page of the table.

Table C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Gifted and Talented Program Participation in 11th	0.122	0.171	0.139	1.327	0.128	0.122	-0.018	0.966	0.189	0.166	-0.059	0.905
Math 11th Grade Weighted GPA	2.808	2.550	-0.320	1.072	2.782	2.763	-0.024	1.005	2.666	2.641	-0.032	0.979
Cumulative Overall Weighted GPA at the End of 11th	3.021	2.806	-0.393	1.162	2.997	2.981	-0.030	1.011	2.894	2.864	-0.057	1.057
Standardized ELA SBAC Score in 11th	0.223	0.263	0.057	1.182	0.236	0.220	-0.023	1.110	0.273	0.271	-0.003	0.994
Standardized Math SBAC Score in 11th	0.180	0.108	-0.109	1.264	0.171	0.117	-0.085	1.121	0.168	0.133	-0.052	1.020

See the note on the first page of the table.

Table C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	1.877	1.890	0.005	1.318	1.895	1.928	0.016	0.901	2.013	1.826	-0.080	0.852
Science Credits Accumulated from 9th-11th	32.356	31.430	-0.102	0.859	32.124	32.316	0.021	1.134	32.204	31.606	-0.070	1.066
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.056	0.749	-	-	-0.084	0.641	-	-	0.095	1.919
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.493	0.686	0.170	1.624	0.492	0.521	0.029	0.917	0.559	0.571	0.011	0.805
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.191	0.318	0.199	1.545	0.208	0.227	0.032	1.077	0.249	0.291	0.064	1.019

See the note on the first page of the table.

Table C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.166	0.179	0.023	1.044	0.150	0.166	0.031	0.901	0.154	0.146	-0.016	0.867
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.074	0.139	0.159	1.521	0.080	0.079	-0.003	0.861	0.091	0.130	0.093	1.355
Highest ERW PSAT Score by the End of 11th	431.549	444.119	0.181	1.258	433.745	428.721	-0.077	0.948	445.088	439.163	-0.083	0.949
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	-0.138	0.559	0.055	0.055	0.000	1.006	-	-	0.009	1.042
Highest Math PSAT Score by the End of 11th	434.235	435.223	0.016	0.892	435.406	434.086	-0.023	0.781	437.014	435.759	-0.021	1.044

See the note on the first page of the table.

Table C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.092	0.666	0.055	0.055	0.000	1.006	-	-	0.009	1.042
Took the SAT or ACT before 12th	0.375	0.300	-0.160	0.898	0.365	0.330	-0.073	0.960	0.294	0.300	0.012	1.011
Participation in the AVID Program in 11th	0.040	0.050	0.049	1.243	-	-	-0.043	0.812	0.046	0.053	0.033	1.148
Took a College or Career Seminar Course in 11th	0.198	0.179	-0.050	0.925	0.186	0.210	0.061	1.105	0.180	0.186	0.017	1.029
Ever Attended STEM-Focused School from 9th- 12th	0.180	0.171	-0.021	0.966	0.176	0.147	-0.079	0.870	0.181	0.150	-0.083	0.861

See the note on the first page of the table.

Table C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	8.508	7.171	-0.304	0.924	8.369	8.263	-0.024	0.961	7.750	7.601	-0.034	0.939
Cumulative Overall Weighted GPA at the End of 11th (Squared)	9.405	8.194	-0.377	1.037	9.253	9.160	-0.030	0.983	8.649	8.490	-0.051	1.033
Standardized ELA SBAC Score in 11th (Squared)	0.515	0.618	0.138	1.449	0.519	0.560	0.055	1.291	0.578	0.574	-0.006	1.079
Standardized Math SBAC Score in 11th (Squared)	0.417	0.496	0.127	1.292	0.412	0.440	0.046	1.245	0.464	0.462	-0.003	1.035
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	8.107	9.596	0.088	1.923	8.323	7.955	-0.026	0.919	9.935	8.341	-0.098	0.824

See the note on the first page of the table.

Table C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	1,134.611	1,063.009	-0.109	0.711	1,111.301	1,133.718	0.033	1.085	1,106.997	1,073.430	-0.056	1.042
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.231	2.071	0.160	2.948	1.230	1.171	-0.016	0.784	1.583	1.348	-0.056	0.521
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.358	0.596	0.148	1.585	0.392	0.425	0.022	1.064	0.511	0.543	0.017	0.753
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.333	0.350	0.010	0.816	0.298	0.275	-0.016	0.409	0.308	0.267	-0.025	0.490
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.141	0.225	0.094	1.051	0.154	0.133	-0.025	0.655	0.151	0.211	0.073	1.544

See the note on the first page of the table.

Table C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	190,488.054	202,578.719	0.191	1.407	192,466.803	187,881.548	-0.079	0.977	203,303.163	197,794.499	-0.085	0.996
Highest Math PSAT Score by the End of 11th (Squared)	192,571.225	192,990.246	0.008	0.934	193,288.274	191,311.247	-0.040	0.790	194,423.300	193,477.606	-0.019	1.033
Work Effort GPA in 11th	2.519	2.442	-0.235	1.269	2.515	2.524	0.026	1.097	2.476	2.475	-0.006	1.025
Cooperation GPA in 11th	2.662	2.613	-0.192	1.302	2.661	2.660	-0.004	1.296	2.636	2.631	-0.018	1.116
Attendance Rate in 11th	0.970	0.972	0.033	0.750	0.971	0.971	0.014	0.803	0.972	0.972	0.017	0.917

See the note on the first page of the table.

Table C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.066	1.901	-	-	0.003	1.046	-	-	0.023	1.248
Educational Expectations in 11th: Unsure	0.080	0.100	0.071	1.228	0.081	0.080	-0.006	0.989	0.095	0.097	0.008	1.024
Educational Expectations in 11th: HS or Less	-	-	-0.006	0.958	-	-	0.000	1.006	-	-	-0.021	0.836
Educational Expectations in 11th: Associate Degree or Certificate	-	-	-0.176	0.338	-	-	0.013	1.081	-	-	0.006	1.052
Educational Expectations in 11th: Bachelor's Degree or Higher	0.621	0.611	-0.021	1.012	0.627	0.660	0.068	0.966	0.627	0.636	0.018	0.991

See the note on the first page of the table.

Table C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Educational Expectations in 11th: Missing	0.241	0.261	0.046	1.057	0.248	0.214	-0.078	0.910	0.249	0.239	-0.023	0.974
Growth Mindset in 11th	0.124	0.072	-0.063	1.099	0.129	0.217	0.109	1.058	0.101	0.113	0.015	1.027
Missing Dummy: Growth Mindset in 11th	0.237	0.254	0.039	1.049	0.243	0.207	-0.087	0.897	0.241	0.235	-0.015	0.982
Academic Self-Efficacy in 11th	0.105	-0.048	-0.179	1.055	0.082	0.019	-0.073	1.066	-0.056	-0.018	0.044	0.923
Missing Dummy: Academic Self-Efficacy in 11th	0.236	0.257	0.050	1.063	0.242	0.209	-0.080	0.906	0.242	0.239	-0.008	0.991

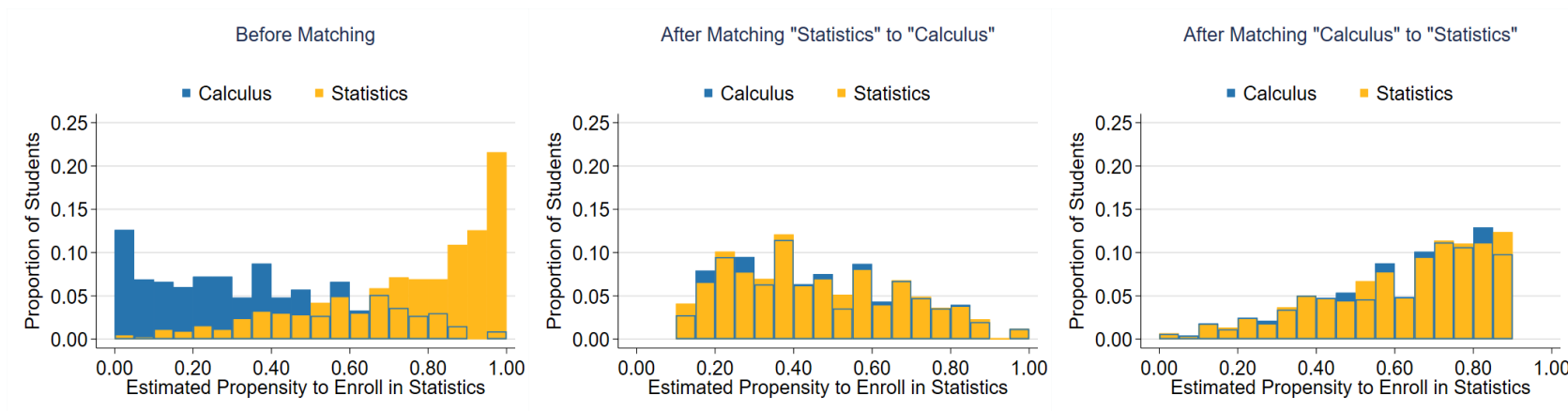
See the note on the first page of the table.

Table C32 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus"				After Matching "Precalculus" to "Statistics"			
	Precalculus (N=802)	Statistics (N=280)	SMD	VR	Precalculus (N=727)	Statistics (N=267)	SMD	VR	Precalculus (N=482)	Statistics (N=247)	SMD	VR
Indicator of 2016-17 Cohort	0.526	0.596	0.142	0.968	0.543	0.526	-0.035	1.011	0.598	0.595	-0.006	1.003

See the note on the first page of the table.

Figure C33. Community College Distributions of Estimated Propensities of Taking Statistics over Calculus in Group 5 Before and After Matching for Students with Non-Missing Non-Math STEM GPAs, 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 C33. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
Age (in Months)	194.943	193.984	-0.213	0.737	194.580	194.610	0.007	1.040	194.225	194.167	-0.014	0.951
Gender: Female	0.420	0.564	0.290	1.008	0.474	0.484	0.019	1.005	0.561	0.535	-0.052	1.005
Race/Ethnicity: Asian	0.117	0.073	-0.149	0.657	0.095	0.075	-0.071	0.812	0.074	0.084	0.037	1.118
Race/Ethnicity: African American	0.054	0.059	0.020	1.080	0.051	0.056	0.021	1.091	0.074	0.067	-0.029	0.903

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 C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
Race/Ethnicity: Latinx	0.628	0.673	0.095	0.941	0.644	0.660	0.033	0.983	0.676	0.639	-0.078	1.048
Race/Ethnicity: Filipinx	0.093	0.080	-0.048	0.868	0.095	0.093	-0.005	0.989	0.074	0.080	0.025	1.077
Race/Ethnicity: White	0.096	0.109	0.043	1.117	0.103	0.113	0.033	1.091	0.096	0.120	0.079	1.216
Race/Ethnicity: Other	-	-	-0.060	0.526	-	-	-0.113	0.203	-	-	0.037	1.487
Ever Subsidized Meal Eligible from 9th-11th	0.883	0.912	0.096	0.776	0.897	0.905	0.026	0.935	0.909	0.893	-0.054	1.150

See the note on the first page of the table.

Table C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.104	0.472	-	-	0.074	1.789	-	-	0.029	1.353
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.216	0.216	-0.001	0.998	0.225	0.203	-0.054	0.931	0.235	0.197	-0.091	0.877
Parents'/Guardians' Educational Attainment: HS Graduate	0.174	0.201	0.069	1.117	0.178	0.197	0.048	1.085	0.180	0.197	0.045	1.069
Parents'/Guardians' Educational Attainment: Some College	0.135	0.134	-0.003	0.993	0.138	0.104	-0.107	0.782	0.120	0.130	0.030	1.065
Parents'/Guardians' Educational Attainment: College Graduate	0.150	0.157	0.020	1.037	0.154	0.161	0.019	1.041	0.163	0.157	-0.015	0.968

See the note on the first page of the table.

Table C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.039	0.046	0.035	1.172	-	-	0.104	1.548	0.073	0.054	-0.080	0.744
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.285	0.245	-0.091	0.907	0.265	0.273	0.018	1.022	0.230	0.264	0.080	1.093
Nonresident School Enrollment in 11th	0.459	0.468	0.016	1.001	0.474	0.455	-0.040	0.998	0.437	0.465	0.055	1.006
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.056	1.558	-	-	0.076	1.687	-	-	-0.082	0.502
Number of School Moves from 9th-11th	0.068	0.050	-0.072	0.672	0.075	0.064	-0.041	0.773	0.063	0.060	-0.013	0.937

See the note on the first page of the table.

Table C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	-	-	-0.229	0.269	-	-	0.066	1.416	-	-	-0.032	0.810
English Learner Status in 11th: English Only	0.270	0.317	0.102	1.096	0.277	0.272	-0.011	0.993	0.331	0.314	-0.035	0.969
English Learner Status in 11th: Initial Fluent English Proficient	0.216	0.195	-0.053	0.925	0.225	0.196	-0.072	0.906	0.153	0.187	0.091	1.167
English Learner Status in 11th: Limited English Proficient	-	-	-0.111	0.282	-	-	0.085	2.187	-	-	-0.037	0.665
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.498	0.484	-0.028	0.998	0.490	0.515	0.049	1.003	0.506	0.492	-0.029	0.995

See the note on the first page of the table.

Table C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
Gifted and Talented Program Participation in 11th	0.399	0.308	-0.191	0.888	0.391	0.425	0.067	1.029	0.363	0.348	-0.032	0.975
Math 11th Grade Weighted GPA	3.419	2.694	-0.650	1.743	3.336	3.294	-0.043	1.030	3.111	3.212	0.100	0.895
Cumulative Overall Weighted GPA at the End of 11th	3.369	3.182	-0.364	1.153	3.346	3.336	-0.023	0.929	3.257	3.307	0.107	1.076
Standardized ELA SBAC Score in 11th	0.632	0.598	-0.053	0.844	0.638	0.578	-0.090	0.864	0.562	0.616	0.086	0.920
Standardized Math SBAC Score in 11th	1.008	0.616	-0.625	0.871	0.903	0.873	-0.049	1.097	0.729	0.750	0.035	0.901

See the note on the first page of the table.

Table C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	4.108	3.409	-0.245	0.921	4.064	4.114	0.017	1.142	3.760	3.750	-0.004	0.975
Science Credits Accumulated from 9th-11th	33.999	32.259	-0.192	0.772	33.829	33.633	-0.021	1.105	32.992	32.868	-0.013	0.916
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.151	0.203	-	-	0.033	1.602	-	-	-0.043	0.624
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.402	0.453	0.050	0.871	0.344	0.296	-0.058	0.831	0.368	0.344	-0.026	0.974
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.096	0.140	0.095	1.220	0.071	0.095	0.062	1.402	0.120	0.070	-0.123	0.535

See the note on the first page of the table.

Table C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.159	0.134	-0.043	0.482	0.103	0.089	-0.034	0.857	0.121	0.100	-0.046	0.943
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.057	0.031	-0.084	0.390	0.020	0.019	-0.004	1.027	0.017	0.017	0.000	0.952
Highest ERW PSAT Score by the End of 11th	487.737	482.767	-0.069	0.728	492.129	489.558	-0.036	0.910	486.506	484.961	-0.023	1.067
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.060	0.031	-0.137	0.539	-	-	-0.090	0.631	-	-	0.047	1.298
Highest Math PSAT Score by the End of 11th	504.822	477.232	-0.410	0.846	501.195	498.148	-0.046	1.002	486.449	486.231	-0.003	1.082

See the note on the first page of the table.

Table C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.057	0.029	-0.136	0.529	-	-	-0.085	0.632	-	-	0.041	1.270
Took the SAT or ACT before 12th	0.580	0.476	-0.209	1.023	0.542	0.554	0.025	0.999	0.526	0.508	-0.036	0.997
Participation in the AVID Program in 11th	-	-	0.000	0.996	-	-	-0.010	0.948	-	-	-0.009	0.934
Took a College or Career Seminar Course in 11th	0.102	0.103	0.002	1.004	0.091	0.083	-0.028	0.924	0.082	0.090	0.029	1.082
Ever Attended STEM-Focused School from 9th-12th	0.162	0.191	0.075	1.135	0.166	0.194	0.074	1.136	0.187	0.177	-0.026	0.953

See the note on the first page of the table.

Table C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
Took a Precalculus Course by the End of 11th	-	-	-0.308	9.556	-	-	0.019	0.804	-	-	-0.046	1.412
Took an IDS Course by the End of 11th	-	-	0.185	Inf	-	-	N/A	N/A	-	-	N/A	N/A
Took a Statistics Course by the End of 11th	-	-	0.247	12.117	-	-	-0.028	0.603	-	-	0.142	Inf
Took Other Advanced Math by the End of 11th	-	-	0.048	2.086	-	-	0.000	1.004	-	-	-0.037	0.713
Math 11th Grade Weighted GPA (Squared)	12.594	8.835	-0.580	1.111	12.036	11.785	-0.040	1.010	10.743	11.273	0.083	0.948

See the note on the first page of the table.

Table C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th (Squared)	11.594	10.408	-0.364	1.049	11.424	11.336	-0.029	0.894	10.822	11.174	0.114	1.052
Standardized ELA SBAC Score in 11th (Squared)	0.866	0.751	-0.127	0.823	0.872	0.735	-0.154	0.845	0.723	0.756	0.040	1.126
Standardized Math SBAC Score in 11th (Squared)	1.437	0.746	-0.620	0.414	1.181	1.162	-0.017	1.257	0.893	0.890	-0.003	0.962
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	25.307	19.399	-0.207	0.836	24.271	25.750	0.047	1.739	22.377	22.135	-0.009	1.246
Science Credits Accumulated from 9th-11th (Squared)	1,248.685	1,112.286	-0.187	0.634	1,230.752	1,226.259	-0.006	1.116	1,176.328	1,161.239	-0.021	0.920

See the note on the first page of the table.

Table C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.249	1.153	-0.022	0.494	0.881	0.719	-0.050	0.865	0.919	0.886	-0.009	0.903
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.204	0.258	0.045	1.120	0.126	0.179	0.065	1.860	0.223	0.117	-0.131	0.635
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.483	0.239	-0.098	0.104	0.198	0.168	-0.026	0.749	0.216	0.201	-0.012	0.707
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.135	0.052	-0.104	0.161	0.036	0.036	0.002	1.083	0.031	0.030	-0.004	0.917
Highest ERW PSAT Score by the End of 11th (Squared)	243,870.819	237,422.352	-0.091	0.707	247,387.136	244,379.163	-0.043	0.911	240,839.938	239,640.607	-0.019	1.066

See the note on the first page of the table.

Table C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	259,728.530	231,884.311	-0.420	0.737	255,584.461	252,529.678	-0.047	0.994	240,595.261	240,729.538	0.002	1.027
Work Effort GPA in 11th	2.617	2.543	-0.227	1.151	2.628	2.628	-0.001	0.783	2.583	2.627	0.146	0.720
Cooperation GPA in 11th	2.776	2.702	-0.309	1.267	2.777	2.778	0.003	0.828	2.729	2.752	0.097	0.701
Attendance Rate in 11th	0.977	0.976	-0.009	0.618	0.976	0.975	-0.046	0.750	0.978	0.978	0.014	0.667
Ever Suspended from 9th-11th	-	-	N/A	N/A	-	-	N/A	N/A	-	-	N/A	N/A

See the note on the first page of the table.

Table C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
Educational Expectations in 11th: Unsure	0.075	0.088	0.047	1.155	0.075	0.068	-0.028	0.916	0.077	0.074	-0.013	0.955
Educational Expectations in 11th: HS or Less	-	-	0.101	2.760	-	-	0.012	1.203	-	-	0.116	7.395
Educational Expectations in 11th: Associate Degree or Certificate	-	-	-0.044	0.701	-	-	0.000	1.004	-	-	0.000	0.995
Educational Expectations in 11th: Bachelor's Degree or Higher	0.640	0.637	-0.005	1.002	0.601	0.621	0.042	0.985	0.607	0.642	0.073	0.958
Educational Expectations in 11th: Missing	0.261	0.245	-0.037	0.958	0.296	0.282	-0.031	0.975	0.302	0.261	-0.091	0.910

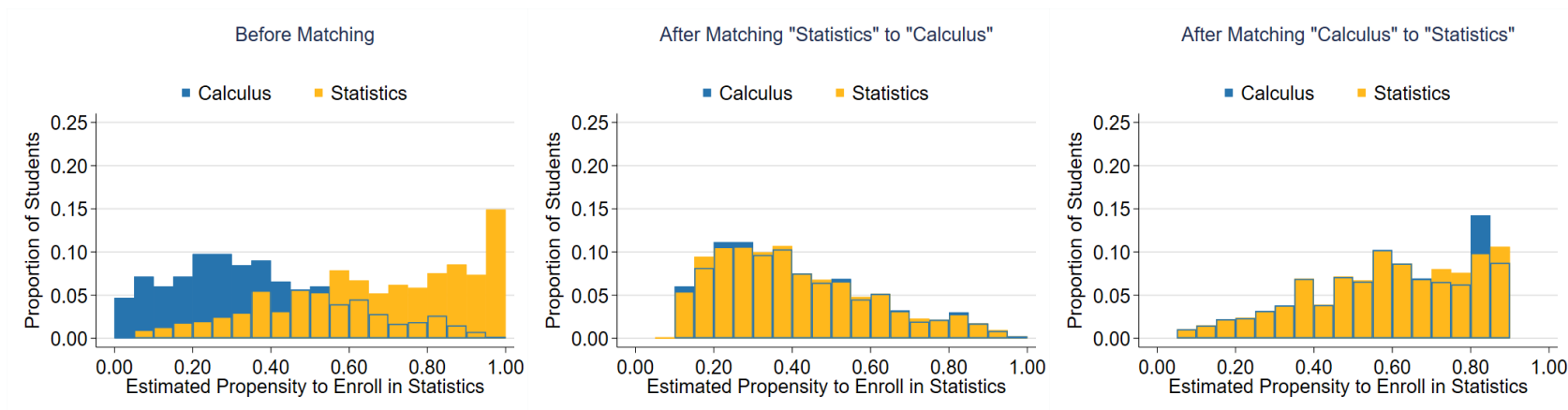
See the note on the first page of the table.

Table C33 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School Fixed Effects

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=333)	Statistics (N=477)	SMD	VR	Calculus (N=253)	Statistics (N=275)	SMD	VR	Calculus (N=253)	Statistics (N=299)	SMD	VR
Growth Mindset in 11th	0.171	0.171	-0.001	0.934	0.208	0.192	-0.020	0.946	0.196	0.188	-0.010	0.982
Missing Dummy: Growth Mindset in 11th	0.252	0.233	-0.046	0.946	0.281	0.269	-0.026	0.977	0.292	0.247	-0.100	0.896
Academic Self-Efficacy in 11th	0.145	-0.063	-0.252	1.171	0.100	0.186	0.112	0.907	-0.028	0.056	0.107	0.967
Missing Dummy: Academic Self-Efficacy in 11th	0.249	0.235	-0.034	0.959	0.281	0.269	-0.026	0.977	0.291	0.247	-0.098	0.898
Indicator of 2016-17 Cohort	0.417	0.509	0.185	1.027	0.470	0.514	0.087	1.006	0.531	0.518	-0.025	0.997

See the note on the first page of the table.

Figure C34. Community College Distributions of Estimated Propensities of Taking Statistics over Calculus in Group 5 Before and After Matching for Students with Non-Missing Non-Math STEM GPAs, 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 C34. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
Age (in Months)	194.869	194.180	-0.149	0.765	194.677	194.472	-0.046	0.881	193.995	194.217	0.051	0.874
Gender: Female	0.439	0.568	0.260	0.996	0.470	0.436	-0.069	0.990	0.575	0.556	-0.038	1.007
Race/Ethnicity: Asian	0.090	0.072	-0.066	0.815	0.082	0.080	-0.006	0.984	0.079	0.074	-0.021	0.932
Race/Ethnicity: African American	0.047	0.054	0.031	1.135	0.054	0.049	-0.021	0.920	0.065	0.054	-0.046	0.840

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
Race/Ethnicity: Latinx	0.698	0.682	-0.035	1.029	0.693	0.661	-0.068	1.056	0.673	0.680	0.015	0.986
Race/Ethnicity: Filipinx	0.069	0.080	0.042	1.144	0.073	0.074	0.003	1.014	0.062	0.080	0.069	1.256
Race/Ethnicity: White	0.084	0.107	0.077	1.238	0.088	0.125	0.121	1.370	0.113	0.106	-0.021	0.946
Race/Ethnicity: Other	-	-	-0.069	0.449	-	-	0.000	1.003	-	-	-0.020	0.788
Ever Subsidized Meal Eligible from 9th-11th	0.910	0.896	-0.047	1.135	0.912	0.915	0.011	0.972	0.922	0.894	-0.097	1.315

See the note on the first page of the table.

Table C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.043	0.698	-	-	-0.038	0.720	-	-	0.057	1.907
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.248	0.211	-0.087	0.893	0.240	0.233	-0.017	0.982	0.183	0.206	0.057	1.088
Parents'/Guardians' Educational Attainment: HS Graduate	0.193	0.206	0.032	1.049	0.200	0.173	-0.067	0.900	0.210	0.201	-0.022	0.965
Parents'/Guardians' Educational Attainment: Some College	0.126	0.134	0.025	1.056	0.129	0.117	-0.037	0.922	0.145	0.128	-0.049	0.898
Parents'/Guardians' Educational Attainment: College Graduate	0.116	0.149	0.097	1.234	0.118	0.131	0.040	1.099	0.145	0.139	-0.019	0.959

See the note on the first page of the table.

Table C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.036	0.047	0.057	1.300	0.036	0.035	-0.009	0.958	0.071	0.054	-0.071	0.769
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.281	0.253	-0.064	0.934	0.277	0.311	0.074	1.073	0.245	0.273	0.062	1.067
Nonresident School Enrollment in 11th	0.409	0.457	0.097	1.026	0.416	0.409	-0.015	0.998	0.453	0.457	0.007	0.998
Missing Dummy: Nonresident School Enrollment in 11th	-	-	0.059	1.625	-	-	-0.012	0.904	-	-	0.007	1.048
Number of School Moves from 9th-11th	0.068	0.051	-0.070	0.715	0.073	0.094	0.074	1.150	0.057	0.053	-0.019	0.903

See the note on the first page of the table.

Table C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	-	-	-0.155	0.399	0.030	0.040	0.056	1.333	-	-	-0.062	0.676
English Learner Status in 11th: English Only	0.240	0.323	0.185	1.199	0.258	0.261	0.008	1.012	0.329	0.316	-0.027	0.977
English Learner Status in 11th: Initial Fluent English Proficient	0.205	0.189	-0.038	0.943	0.202	0.200	-0.005	0.995	0.189	0.195	0.015	1.021
English Learner Status in 11th: Limited English Proficient	-	-	-0.065	0.513	-	-	-0.036	0.654	-	-	0.058	2.482
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.542	0.481	-0.123	1.005	0.532	0.534	0.003	1.003	0.480	0.483	0.005	0.997

See the note on the first page of the table.

Table C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
Gifted and Talented Program Participation in 11th	0.371	0.296	-0.159	0.893	0.361	0.376	0.032	1.021	0.350	0.320	-0.063	0.954
Math 11th Grade Weighted GPA	3.415	2.711	-0.634	1.713	3.351	3.423	0.074	1.055	3.107	3.023	-0.082	1.059
Cumulative Overall Weighted GPA at the End of 11th	3.368	3.184	-0.356	1.189	3.351	3.317	-0.070	1.041	3.259	3.269	0.021	1.170
Standardized ELA SBAC Score in 11th	0.596	0.569	-0.039	0.976	0.602	0.576	-0.040	0.930	0.629	0.598	-0.049	1.053
Standardized Math SBAC Score in 11th	0.902	0.570	-0.505	0.965	0.831	0.819	-0.019	0.930	0.649	0.660	0.018	1.100

See the note on the first page of the table.

Table C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	3.708	3.401	-0.108	0.960	3.679	3.519	-0.058	0.846	3.896	3.624	-0.095	0.975
Science Credits Accumulated from 9th-11th	33.988	32.448	-0.173	0.791	33.762	34.492	0.077	1.079	33.488	32.882	-0.067	0.899
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.114	0.301	-	-	0.087	2.386	-	-	-0.090	0.408
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.358	0.449	0.095	1.187	0.318	0.378	0.071	1.122	0.308	0.357	0.061	1.434
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.081	0.136	0.127	1.504	0.071	0.098	0.072	1.469	0.129	0.104	-0.058	0.857

See the note on the first page of the table.

Table C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.141	0.129	-0.022	0.592	0.099	0.125	0.060	1.075	0.103	0.093	-0.024	1.110
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.043	0.032	-0.042	0.543	0.028	0.024	-0.016	0.918	0.016	0.032	0.084	1.867
Highest ERW PSAT Score by the End of 11th	475.084	477.592	0.035	0.743	478.719	476.188	-0.036	0.941	485.006	480.629	-0.067	1.127
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.056	0.039	-0.084	0.697	0.054	0.052	-0.006	0.980	0.038	0.037	-0.005	0.975
Highest Math PSAT Score by the End of 11th	489.512	473.976	-0.224	0.764	487.454	491.843	0.064	0.963	482.787	478.892	-0.061	1.150

See the note on the first page of the table.

Table C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.051	0.037	-0.067	0.738	0.047	0.043	-0.019	0.925	0.036	0.035	-0.007	0.962
Took the SAT or ACT before 12th	0.522	0.481	-0.082	1.000	0.521	0.542	0.041	0.998	0.502	0.498	-0.009	0.997
Participation in the AVID Program in 11th	0.039	0.028	-0.060	0.731	-	-	-0.048	0.771	0.029	0.030	0.010	1.055
Took a College or Career Seminar Course in 11th	0.126	0.132	0.020	1.045	0.120	0.126	0.017	1.043	0.087	0.136	0.157	1.478
Ever Attended STEM-Focused School from 9th-12th	0.184	0.193	0.022	1.036	0.189	0.189	0.001	1.005	0.187	0.188	0.004	1.004

See the note on the first page of the table.

Table C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
Took a Precalculus Course by the End of 11th	-	-	-0.343	11.683	-	-	-0.066	1.993	-	-	-0.093	2.964
Took an IDS Course by the End of 11th	-	-	0.234	Inf	-	-	N/A	N/A	-	-	N/A	N/A
Took a Statistics Course by the End of 11th	-	-	0.256	18.949	-	-	-0.048	0.201	-	-	0.093	Inf
Took Other Advanced Math by the End of 11th	-	-	0.041	1.780	-	-	0.089	2.886	-	-	0.054	1.985
Math 11th Grade Weighted GPA (Squared)	12.565	8.902	-0.565	1.076	12.139	12.671	0.082	1.080	10.666	10.217	-0.069	0.969

See the note on the first page of the table.

Table C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
Cumulative Overall Weighted GPA at the End of 11th (Squared)	11.588	10.428	-0.353	1.060	11.466	11.244	-0.069	0.995	10.841	10.946	0.034	1.129
Standardized ELA SBAC Score in 11th (Squared)	0.809	0.767	-0.047	0.947	0.820	0.756	-0.073	0.985	0.795	0.779	-0.019	1.050
Standardized Math SBAC Score in 11th (Squared)	1.253	0.749	-0.459	0.492	1.081	1.033	-0.044	1.124	0.795	0.849	0.058	1.054
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	21.975	19.464	-0.092	0.939	21.712	19.277	-0.097	0.757	23.441	21.212	-0.081	1.072
Science Credits Accumulated from 9th-11th (Squared)	1,243.818	1,122.975	-0.172	0.686	1,225.693	1,282.078	0.073	1.096	1,207.473	1,158.801	-0.068	0.841

See the note on the first page of the table.

Table C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.966	1.196	0.057	0.866	0.781	0.903	0.040	0.562	0.628	0.894	0.092	1.806
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.156	0.243	0.083	1.437	0.118	0.175	0.074	2.081	0.216	0.182	-0.038	1.230
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.362	0.219	-0.071	0.139	0.202	0.221	0.016	0.335	0.156	0.171	0.017	1.788
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.096	0.052	-0.066	0.237	0.049	0.045	-0.010	0.952	0.029	0.054	0.067	1.708
Highest ERW PSAT Score by the End of 11th (Squared)	231,664.398	232,521.767	0.012	0.758	234,327.475	231,593.908	-0.040	0.935	239,186.043	235,475.910	-0.058	1.114

See the note on the first page of the table.

Table C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	245,070.536	228,819.114	-0.244	0.708	242,365.046	246,471.212	0.062	0.955	236,851.152	233,684.827	-0.052	1.124
Work Effort GPA in 11th	2.616	2.545	-0.221	1.200	2.623	2.622	-0.003	0.966	2.618	2.599	-0.064	1.165
Cooperation GPA in 11th	2.755	2.697	-0.231	1.158	2.757	2.755	-0.012	0.882	2.757	2.733	-0.110	1.237
Attendance Rate in 11th	0.977	0.976	-0.009	0.706	0.978	0.977	-0.033	0.821	0.979	0.977	-0.047	1.173
Ever Suspended from 9th-11th	-	-	0.082	Inf	-	-	N/A	N/A	-	-	N/A	N/A

See the note on the first page of the table.

Table C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
Educational Expectations in 11th: Unsure	0.073	0.085	0.045	1.152	0.073	0.069	-0.015	0.954	0.076	0.076	-0.002	0.992
Educational Expectations in 11th: HS or Less	-	-	0.105	3.536	-	-	-0.029	0.603	-	-	0.010	1.107
Educational Expectations in 11th: Associate Degree or Certificate	-	-	-0.054	0.692	-	-	-0.027	0.853	-	-	0.041	1.339
Educational Expectations in 11th: Bachelor's Degree or Higher	0.651	0.637	-0.030	1.018	0.635	0.658	0.048	0.974	0.648	0.639	-0.019	1.008
Educational Expectations in 11th: Missing	0.248	0.248	0.001	1.000	0.260	0.247	-0.030	0.970	0.252	0.255	0.007	1.005

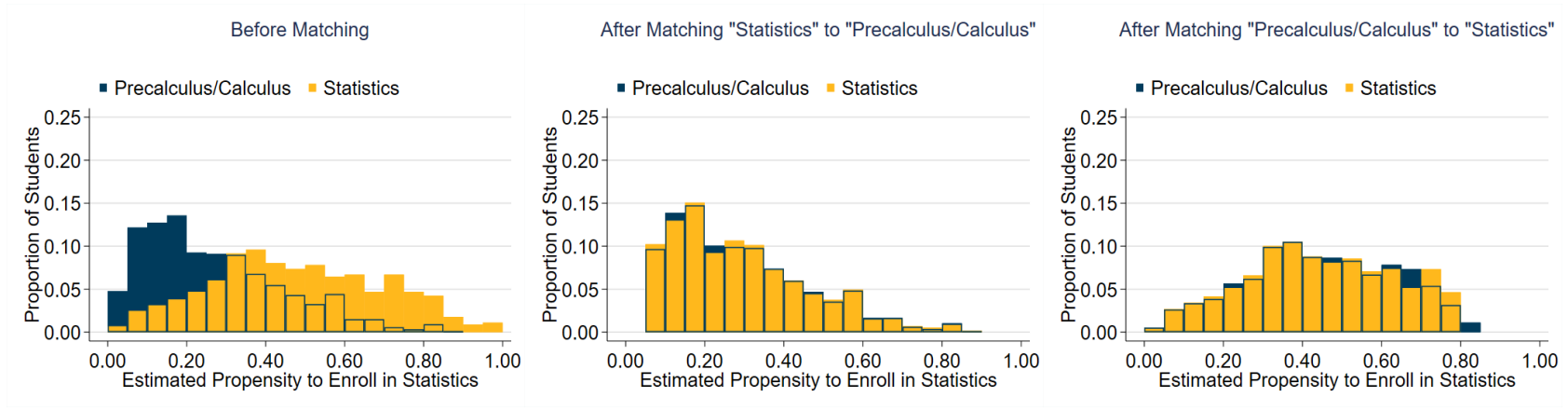
See the note on the first page of the table.

Table C34 Continued. Community College Analysis Matching Diagnostics for Statistics vs. Calculus in Group 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Calculus"				After Matching "Calculus" to "Statistics"			
	Calculus (N=533)	Statistics (N=597)	SMD	VR	Calculus (N=466)	Statistics (N=404)	SMD	VR	Calculus (N=430)	Statistics (N=462)	SMD	VR
Growth Mindset in 11th	0.210	0.168	-0.052	0.996	0.233	0.250	0.023	1.012	0.185	0.197	0.015	0.929
Missing Dummy: Growth Mindset in 11th	0.238	0.231	-0.017	0.979	0.247	0.241	-0.014	0.987	0.241	0.240	-0.002	0.994
Academic Self-Efficacy in 11th	0.220	-0.033	-0.300	1.042	0.177	0.129	-0.059	0.827	-0.042	0.038	0.096	0.882
Missing Dummy: Academic Self-Efficacy in 11th	0.236	0.233	-0.008	0.989	0.247	0.241	-0.014	0.987	0.241	0.240	-0.002	0.994
Indicator of 2016-17 Cohort	0.477	0.494	0.035	1.002	0.481	0.454	-0.053	0.996	0.464	0.496	0.064	1.002

See the note on the first page of the table.

Figure C35. CSUN Analysis Distributions of Estimated Propensities of Taking Statistics over Precalculus/Calculus in Groups 4 and 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 C35. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Age (in Months)	194.855	194.891	0.008	0.710	194.757	194.555	-0.043	0.772	194.162	194.829	0.148	0.903
Gender: Female	0.491	0.598	0.216	0.963	0.515	0.498	-0.035	1.005	0.597	0.579	-0.036	1.012
Race/Ethnicity: Asian	0.049	0.060	0.049	1.214	0.046	0.054	0.038	1.178	0.068	0.061	-0.026	0.909
Race/Ethnicity: African American	0.027	0.065	0.182	2.315	0.029	0.027	-0.012	0.936	0.041	0.054	0.060	1.292

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Race/Ethnicity: Latinx	0.813	0.739	-0.178	1.270	0.810	0.831	0.053	0.919	0.778	0.743	-0.080	1.102
Race/Ethnicity: Filipinx	0.044	0.045	0.001	1.005	0.045	0.030	-0.079	0.676	0.033	0.049	0.079	1.447
Race/Ethnicity: White	0.060	0.080	0.081	1.319	0.062	0.055	-0.032	0.889	0.073	0.083	0.037	1.122
Race/Ethnicity: Other	-	-	0.044	1.585	-	-	-0.055	0.471	-	-	0.027	1.328
Ever Subsidized Meal Eligible from 9th-11th	0.950	0.906	-0.169	1.781	0.945	0.949	0.018	0.934	0.918	0.914	-0.012	1.036

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	0.015	1.272	-	-	0.004	1.071	-	-	-0.042	0.590
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.263	0.225	-0.088	0.902	0.258	0.282	0.054	1.063	0.260	0.232	-0.065	0.925
Parents'/Guardians' Educational Attainment: HS Graduate	0.211	0.225	0.036	1.052	0.214	0.234	0.048	1.070	0.218	0.222	0.011	1.014
Parents'/Guardians' Educational Attainment: Some College	0.112	0.161	0.141	1.355	0.116	0.103	-0.040	0.909	0.174	0.161	-0.034	0.940
Parents'/Guardians' Educational Attainment: College Graduate	0.092	0.121	0.091	1.265	0.097	0.099	0.009	1.028	0.107	0.112	0.019	1.047

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.041	0.033	-0.039	0.825	0.034	0.032	-0.013	0.940	0.024	0.034	0.061	1.412
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.281	0.234	-0.106	0.890	0.281	0.249	-0.072	0.930	0.217	0.237	0.047	1.062
Nonresident School Enrollment in 11th	0.305	0.411	0.221	1.142	0.319	0.325	0.012	1.014	0.390	0.389	-0.003	0.998
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.041	0.639	-	-	0.053	1.900	-	-	0.012	1.151
Number of School Moves from 9th- 11th	0.061	0.056	-0.019	0.850	0.059	0.071	0.046	1.155	0.053	0.057	0.015	0.942

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.050	0.036	-0.072	0.722	0.047	0.036	-0.056	0.775	0.033	0.037	0.018	1.096
English Learner Status in 11th: English Only	0.186	0.295	0.256	1.374	0.197	0.221	0.058	1.092	0.301	0.286	-0.032	0.970
English Learner Status in 11th: Initial Fluent English Proficient	0.178	0.223	0.114	1.187	0.183	0.142	-0.110	0.820	0.212	0.220	0.019	1.025
English Learner Status in 11th: Limited English Proficient	-	-	-0.048	0.709	-	-	0.011	1.089	-	-	0.003	1.024
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.614	0.467	-0.299	1.051	0.602	0.617	0.032	0.990	0.473	0.479	0.013	1.000

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Gifted and Talented Program Participation in 11th	0.171	0.223	0.132	1.226	0.173	0.173	0.001	1.006	0.221	0.213	-0.019	0.973
Math 11th Grade Weighted GPA	3.135	2.869	-0.264	1.069	3.107	3.091	-0.016	1.023	2.969	2.920	-0.050	1.074
Cumulative Overall Weighted GPA at the End of 11th	3.322	3.245	-0.173	1.037	3.318	3.287	-0.070	1.031	3.257	3.265	0.019	0.987
Standardized ELA SBAC Score in 11th	0.404	0.461	0.081	1.262	0.415	0.449	0.052	1.026	0.529	0.474	-0.080	1.023
Standardized Math SBAC Score in 11th	0.480	0.336	-0.213	1.134	0.458	0.424	-0.051	1.097	0.395	0.371	-0.036	1.024

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	2.723	2.998	0.107	1.098	2.757	2.687	-0.028	1.003	3.070	3.007	-0.024	1.035
Science Credits Accumulated from 9th-11th	33.201	32.083	-0.124	0.852	32.977	32.341	-0.072	0.861	32.210	32.284	0.009	1.026
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	0.002	1.019	-	-	-0.058	0.634	-	-	-0.036	0.779
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.180	0.188	0.013	0.867	0.179	0.165	-0.025	0.833	0.193	0.186	-0.012	0.872
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.081	0.098	0.045	1.211	0.081	0.106	0.063	1.104	0.083	0.086	0.008	1.017

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
A-G "D" or better Semesters Off- Track at the End of 11th (A-B)	0.067	0.056	-0.030	0.664	0.066	0.061	-0.014	0.721	0.067	0.056	-0.032	0.846
A-G "D" or better Semesters Off- Track at the End of 11th (D-G)	0.041	0.040	-0.003	1.120	0.039	0.061	0.074	1.236	0.036	0.029	-0.028	0.686
Highest ERW PSAT Score by the End of 11th	449.464	461.995	0.179	1.081	451.220	449.880	-0.019	1.127	462.812	459.532	-0.047	0.902
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.042	0.027	-0.084	0.647	0.036	0.034	-0.010	0.956	-	-	0.056	1.433
Highest Math PSAT Score by the End of 11th	460.345	462.684	0.035	1.099	460.358	459.297	-0.016	1.048	464.067	461.793	-0.034	0.980

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.095	0.589	-	-	-0.048	0.761	-	-	0.039	1.315
Took the SAT or ACT before 12th	0.553	0.578	0.050	0.988	0.564	0.561	-0.006	1.006	0.564	0.579	0.031	0.990
Participation in the AVID Program in 11th	0.073	0.047	-0.108	0.665	0.061	0.050	-0.050	0.826	0.037	0.039	0.010	1.049
Took a College or Career Seminar Course in 11th	0.166	0.172	0.015	1.029	0.176	0.163	-0.033	0.947	0.184	0.178	-0.015	0.974
Ever Attended STEM-Focused School from 9th- 12th	0.187	0.138	-0.132	0.785	0.184	0.173	-0.031	0.954	0.151	0.149	-0.004	0.991

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Took a Precalculus Course by the End of 11th	0.476	0.598	0.247	0.965	0.505	0.467	-0.076	1.000	0.543	0.589	0.092	0.974
Took an IDS Course by the End of 11th	-	-	0.166	4.048	-	-	-0.025	0.738	-	-	-0.022	0.869
Took a Statistics Course by the End of 11th	0.025	0.038	0.077	1.525	-	-	-0.026	0.855	0.066	0.037	-0.133	0.573
Took Other Advanced Math by the End of 11th	-	-	0.045	1.904	-	-	0.004	1.071	-	-	-0.016	0.834
Indicator of Student Group 1	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Indicator of Student Group 2	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 3	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 4	0.489	0.328	-0.331	0.883	0.457	0.501	0.088	1.012	0.356	0.345	-0.024	0.984
Indicator of Student Group 5	0.511	0.672	0.331	0.883	0.543	0.499	-0.088	1.012	0.644	0.655	0.024	0.984
Indicator of Student Group 6	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	10.805	9.278	-0.265	0.963	10.650	10.572	-0.013	1.103	9.735	9.516	-0.039	1.075
Cumulative Overall Weighted GPA at the End of 11th (Squared)	11.231	10.733	-0.173	0.989	11.198	11.000	-0.069	1.021	10.801	10.851	0.018	1.004
Standardized ELA SBAC Score in 11th (Squared)	0.593	0.753	0.196	1.285	0.604	0.643	0.052	0.920	0.748	0.705	-0.050	0.779
Standardized Math SBAC Score in 11th (Squared)	0.657	0.597	-0.079	0.877	0.638	0.648	0.012	1.056	0.602	0.595	-0.010	0.907
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	13.690	15.873	0.099	1.547	13.957	13.567	-0.019	1.092	16.232	16.101	-0.006	1.354

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	1,189.581	1,103.568	-0.121	0.892	1,171.070	1,117.582	-0.077	0.880	1,110.740	1,117.527	0.010	1.190
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.384	0.339	-0.018	0.235	0.388	0.322	-0.027	0.211	0.395	0.347	-0.025	0.465
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.146	0.179	0.034	1.435	0.150	0.169	0.022	0.763	0.136	0.139	0.004	0.950
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.158	0.105	-0.031	0.167	0.163	0.118	-0.026	0.143	0.131	0.110	-0.016	0.393
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.076	0.085	0.012	2.234	0.075	0.094	0.033	1.006	0.064	0.044	-0.046	0.525

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	206,705.905	218,499.888	0.180	1.122	208,358.544	207,731.234	-0.010	1.073	219,392.070	215,862.947	-0.053	0.854
Highest Math PSAT Score by the End of 11th (Squared)	216,067.739	218,633.189	0.043	1.072	216,151.682	215,358.465	-0.013	1.052	219,951.004	217,757.535	-0.036	0.950
Work Effort GPA in 11th	2.648	2.609	-0.144	1.241	2.646	2.632	-0.051	1.110	2.634	2.619	-0.054	1.231
Cooperation GPA in 11th	2.758	2.732	-0.120	1.108	2.758	2.744	-0.068	1.008	2.745	2.741	-0.019	0.992
Attendance Rate in 11th	0.979	0.977	-0.089	1.139	0.979	0.977	-0.066	0.968	0.977	0.977	0.024	1.096

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.036	1.524	-	-	0.000	1.004	-	-	0.015	1.173
Educational Expectations in 11th: Unsure	0.049	0.065	0.067	1.298	0.051	0.060	0.039	1.169	0.051	0.061	0.042	1.177
Educational Expectations in 11th: HS or Less	-	-	0.050	1.629	-	-	-0.028	0.705	-	-	0.028	1.310
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.003	1.028	0.015	0.031	0.103	1.994	-	-	0.000	0.999
Educational Expectations in 11th: Bachelor's Degree or Higher	0.674	0.665	-0.018	1.014	0.682	0.669	-0.027	1.025	0.683	0.680	-0.006	1.004

See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Educational Expectations in 11th: Missing	0.254	0.241	-0.029	0.967	0.244	0.235	-0.022	0.978	0.240	0.230	-0.023	0.970
Growth Mindset in 11th	0.136	0.089	-0.056	1.050	0.137	0.184	0.057	0.892	0.114	0.118	0.004	1.009
Missing Dummy: Growth Mindset in 11th	0.247	0.217	-0.072	0.914	0.234	0.220	-0.033	0.962	0.216	0.218	0.004	1.004
Academic Self- Efficacy in 11th	0.212	0.025	-0.227	1.103	0.194	0.206	0.015	0.978	0.027	0.062	0.042	0.906
Missing Dummy: Academic Self- Efficacy in 11th	0.247	0.219	-0.066	0.920	0.235	0.222	-0.033	0.963	0.220	0.220	0.000	0.999

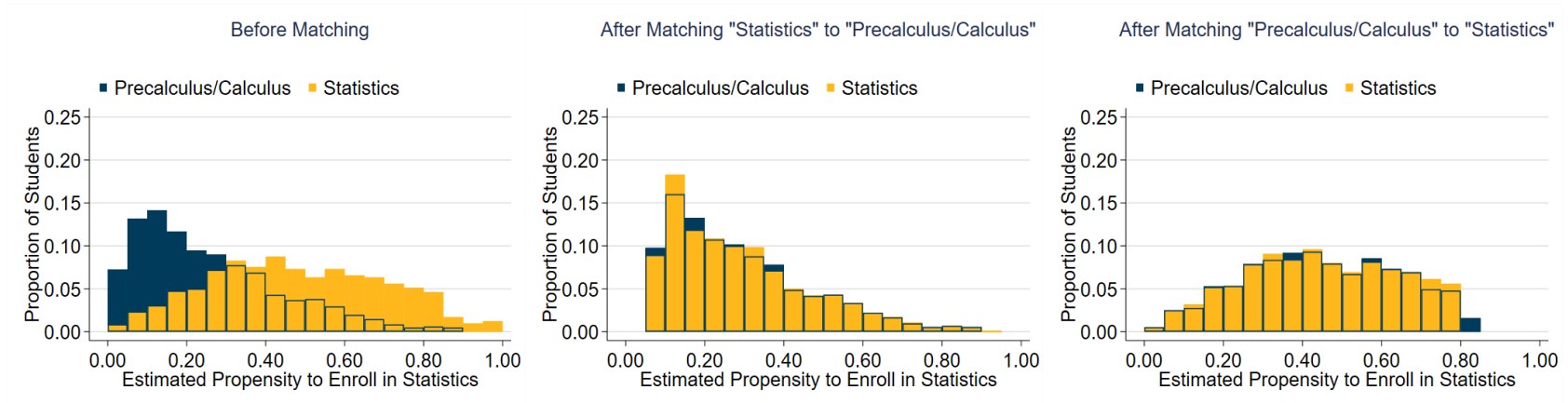
See the note on the first page of the table.

Table C35 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=855)	Statistics (N=448)	SMD	VR	Precalculus/ Calculus (N=786)	Statistics (N=410)	SMD	VR	Precalculus/ Calculus (N=556)	Statistics (N=409)	SMD	VR
Indicator of 2016-17 Cohort	0.497	0.458	-0.079	0.994	0.486	0.479	-0.015	1.003	0.489	0.450	-0.078	0.989

See the note on the first page of the table.

Figure C36. CSUN Analysis Distributions of Estimated Propensities of Taking Statistics over Precalculus/Calculus in Groups 4 and 5 Before and After Matching for Students who Took a Math Course in the First Two Years, 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 C36. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
Age (in Months)	194.871	194.883	0.002	0.741	194.786	194.634	-0.032	0.808	194.412	194.815	0.087	0.829
Gender: Female	0.492	0.594	0.205	0.966	0.527	0.508	-0.039	1.008	0.560	0.579	0.038	0.988
Race/Ethnicity: Asian	0.049	0.063	0.061	1.268	0.046	0.065	0.082	1.386	0.066	0.061	-0.020	0.929
Race/Ethnicity: African American	0.025	0.061	0.180	2.384	-	-	0.003	1.025	0.048	0.048	-0.001	0.996

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
Race/Ethnicity: Latinx	0.817	0.735	-0.197	1.303	0.809	0.809	-0.001	1.006	0.752	0.744	-0.020	1.021
Race/Ethnicity: Filipinx	0.046	0.046	0.003	1.016	0.047	0.042	-0.026	0.898	0.047	0.051	0.017	1.071
Race/Ethnicity: White	0.058	0.083	0.097	1.395	0.063	0.052	-0.047	0.841	0.077	0.085	0.031	1.098
Race/Ethnicity: Other	-	-	0.063	1.969	-	-	-0.037	0.605	-	-	0.016	1.173
Ever Subsidized Meal Eligible from 9th-11th	0.952	0.908	-0.175	1.840	0.946	0.950	0.020	0.927	0.918	0.912	-0.020	1.060

See the note on the first page of the table.

Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	0.018	1.319	-	-	-0.004	0.938	-	-	-0.007	0.908
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.264	0.231	-0.077	0.915	0.259	0.297	0.085	1.093	0.248	0.237	-0.024	0.970
Parents'/Guardians' Educational Attainment: HS Graduate	0.212	0.229	0.041	1.059	0.213	0.215	0.005	1.012	0.221	0.224	0.008	1.010
Parents'/Guardians' Educational Attainment: Some College	0.108	0.161	0.154	1.398	0.114	0.093	-0.070	0.836	0.167	0.163	-0.012	0.977
Parents'/Guardians' Educational Attainment: College Graduate	0.093	0.119	0.083	1.241	0.102	0.099	-0.008	0.983	0.108	0.115	0.021	1.052

See the note on the first page of the table.

Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.039	0.032	-0.042	0.811	0.033	0.031	-0.014	0.932	0.023	0.032	0.052	1.350
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.283	0.229	-0.124	0.871	0.278	0.264	-0.030	0.974	0.233	0.229	-0.009	0.987
Nonresident School Enrollment in 11th	0.304	0.399	0.200	1.135	0.324	0.317	-0.014	0.994	0.384	0.371	-0.027	0.985
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.040	0.663	-	-	0.108	3.031	-	-	0.026	1.359
Number of School Moves from 9th- 11th	0.063	0.059	-0.014	0.861	0.061	0.067	0.025	0.989	0.057	0.056	-0.004	0.802

See the note on the first page of the table.

Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.050	0.039	-0.056	0.782	0.045	0.048	0.015	1.071	0.035	0.040	0.025	1.129
English Learner Status in 11th: English Only	0.177	0.282	0.252	1.392	0.194	0.213	0.048	1.080	0.282	0.277	-0.009	0.989
English Learner Status in 11th: Initial Fluent English Proficient	0.180	0.226	0.116	1.190	0.188	0.141	-0.127	0.797	0.226	0.224	-0.004	0.994
English Learner Status in 11th: Limited English Proficient	-	-	-0.045	0.734	-	-	0.082	1.721	-	-	0.004	1.033
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.620	0.474	-0.295	1.060	0.601	0.616	0.031	0.991	0.477	0.483	0.011	1.000

See the note on the first page of the table.

Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/Calculus (N=513)	Statistics (N=375)	SMD	VR
Gifted and Talented Program Participation in 11th	0.164	0.221	0.147	1.261	0.165	0.138	-0.073	0.872	0.209	0.203	-0.015	0.978
Math 11th Grade Weighted GPA	3.118	2.879	-0.238	1.035	3.070	3.042	-0.027	1.045	2.972	2.909	-0.064	1.038
Cumulative Overall Weighted GPA at the End of 11th	3.315	3.243	-0.162	1.059	3.306	3.303	-0.005	1.030	3.271	3.255	-0.039	1.107
Standardized ELA SBAC Score in 11th	0.395	0.455	0.086	1.267	0.403	0.424	0.032	1.006	0.489	0.447	-0.059	1.008
Standardized Math SBAC Score in 11th	0.471	0.323	-0.219	1.123	0.439	0.449	0.016	1.026	0.363	0.341	-0.033	1.063

See the note on the first page of the table.

Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	2.686	2.966	0.109	1.086	2.747	2.617	-0.051	1.030	3.113	2.971	-0.053	0.955
Science Credits Accumulated from 9th-11th	33.319	32.161	-0.129	0.825	33.064	32.768	-0.033	0.881	32.318	32.385	0.008	1.048
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	0.017	1.129	-	-	-0.045	0.700	-	-	0.033	1.289
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.182	0.202	0.034	0.920	0.185	0.177	-0.015	0.854	0.165	0.200	0.066	1.531
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.081	0.095	0.036	1.094	0.081	0.132	0.125	1.386	0.075	0.077	0.008	0.971

See the note on the first page of the table.

Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.064	0.061	-0.009	0.746	0.063	0.077	0.037	0.917	0.050	0.061	0.037	1.766
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.041	0.041	0.003	1.205	0.039	0.076	0.124	1.440	0.032	0.029	-0.012	0.816
Highest ERW PSAT Score by the End of 11th	448.857	460.812	0.173	1.070	450.387	446.957	-0.049	1.117	461.380	458.889	-0.035	0.905
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.042	0.029	-0.068	0.708	0.033	0.035	0.006	1.038	-	-	-0.013	0.927
Highest Math PSAT Score by the End of 11th	459.455	461.296	0.028	1.089	458.694	461.310	0.039	1.142	463.491	461.291	-0.032	1.014

See the note on the first page of the table.

Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/Calculus (N=513)	Statistics (N=375)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.079	0.648	-	-	-0.022	0.890	-	-	-0.014	0.910
Took the SAT or ACT before 12th	0.558	0.589	0.061	0.983	0.573	0.583	0.019	0.999	0.601	0.589	-0.023	1.008
Participation in the AVID Program in 11th	0.074	0.032	-0.189	0.449	0.054	0.046	-0.037	0.863	0.026	0.032	0.038	1.240
Took a College or Career Seminar Course in 11th	0.165	0.178	0.034	1.062	0.177	0.176	-0.003	1.000	0.170	0.179	0.024	1.041
Ever Attended STEM-Focused School from 9th-12th	0.193	0.141	-0.140	0.779	0.185	0.161	-0.065	0.898	0.154	0.149	-0.014	0.972

See the note on the first page of the table.

Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
Took a Precalculus Course by the End of 11th	0.470	0.594	0.250	0.970	0.503	0.493	-0.021	1.005	0.551	0.581	0.061	0.983
Took an IDS Course by the End of 11th	-	-	0.188	5.017	-	-	0.007	1.085	-	-	-0.005	0.967
Took a Statistics Course by the End of 11th	0.026	0.041	0.086	1.578	0.029	0.039	0.055	1.336	0.059	0.040	-0.089	0.687
Took Other Advanced Math by the End of 11th	-	-	0.049	1.973	-	-	0.004	1.072	-	-	-0.048	0.621
Indicator of Student Group 1	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/Calculus (N=513)	Statistics (N=375)	SMD	VR
Indicator of Student Group 2	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 3	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 4	0.494	0.326	-0.347	0.880	0.456	0.456	-0.001	1.005	0.352	0.347	-0.010	0.992
Indicator of Student Group 5	0.506	0.674	0.347	0.880	0.544	0.544	0.001	1.005	0.648	0.653	0.010	0.992
Indicator of Student Group 6	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	10.709	9.311	-0.243	0.961	10.439	10.308	-0.022	1.111	9.781	9.446	-0.059	1.034
Cumulative Overall Weighted GPA at the End of 11th (Squared)	11.179	10.719	-0.161	1.025	11.116	11.106	-0.003	1.051	10.876	10.785	-0.033	1.120
Standardized ELA SBAC Score in 11th (Squared)	0.584	0.748	0.202	1.259	0.598	0.615	0.023	0.912	0.736	0.702	-0.040	0.793
Standardized Math SBAC Score in 11th (Squared)	0.647	0.582	-0.085	0.852	0.608	0.625	0.024	1.060	0.573	0.586	0.018	0.958
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	13.514	15.628	0.096	1.537	14.022	13.484	-0.026	1.168	16.956	15.769	-0.050	1.194

See the note on the first page of the table.

Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	1,198.846	1,107.357	-0.128	0.867	1,176.674	1,146.799	-0.043	0.914	1,115.195	1,122.982	0.012	1.258
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.389	0.367	-0.009	0.245	0.406	0.347	-0.023	0.193	0.246	0.376	0.100	3.336
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.148	0.163	0.017	1.232	0.145	0.208	0.076	0.843	0.117	0.115	-0.005	0.904
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.153	0.114	-0.022	0.177	0.160	0.149	-0.006	0.146	0.068	0.120	0.067	5.802
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.075	0.090	0.020	2.446	0.075	0.112	0.064	0.924	0.055	0.045	-0.025	0.720

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Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	206,061.428	217,249.999	0.174	1.107	207,469.037	204,905.582	-0.040	1.067	218,078.564	215,297.444	-0.042	0.869
Highest Math PSAT Score by the End of 11th (Squared)	215,220.471	217,277.296	0.034	1.052	214,590.811	217,569.812	0.048	1.179	219,388.065	217,425.053	-0.032	0.959
Work Effort GPA in 11th	2.643	2.608	-0.129	1.253	2.639	2.623	-0.060	1.182	2.630	2.616	-0.051	1.179
Cooperation GPA in 11th	2.755	2.733	-0.103	1.112	2.755	2.738	-0.080	1.099	2.753	2.739	-0.067	1.030
Attendance Rate in 11th	0.979	0.977	-0.067	1.101	0.979	0.979	0.001	0.838	0.978	0.977	-0.041	1.176

See the note on the first page of the table.

Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.040	1.579	-	-	0.000	1.005	-	-	-0.015	0.870
Educational Expectations in 11th: Unsure	0.047	0.058	0.052	1.236	0.046	0.043	-0.013	0.947	0.036	0.056	0.094	1.511
Educational Expectations in 11th: HS or Less	-	-	0.035	1.410	-	-	-0.026	0.739	-	-	0.009	1.084
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.008	1.065	0.017	0.030	0.088	1.785	-	-	-0.028	0.813
Educational Expectations in 11th: Bachelor's Degree or Higher	0.675	0.674	-0.003	1.003	0.686	0.701	0.033	0.978	0.699	0.683	-0.035	1.028

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Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
Educational Expectations in 11th: Missing	0.253	0.238	-0.035	0.961	0.243	0.219	-0.056	0.936	0.233	0.232	-0.002	0.996
Growth Mindset in 11th	0.142	0.086	-0.067	1.115	0.141	0.143	0.002	0.978	0.131	0.124	-0.009	0.960
Missing Dummy: Growth Mindset in 11th	0.246	0.212	-0.082	0.901	0.232	0.212	-0.047	0.944	0.213	0.216	0.007	1.008
Academic Self- Efficacy in 11th	0.205	0.007	-0.242	1.084	0.168	0.150	-0.022	1.035	0.021	0.040	0.023	0.883
Missing Dummy: Academic Self- Efficacy in 11th	0.245	0.214	-0.073	0.911	0.232	0.212	-0.047	0.944	0.213	0.216	0.007	1.008

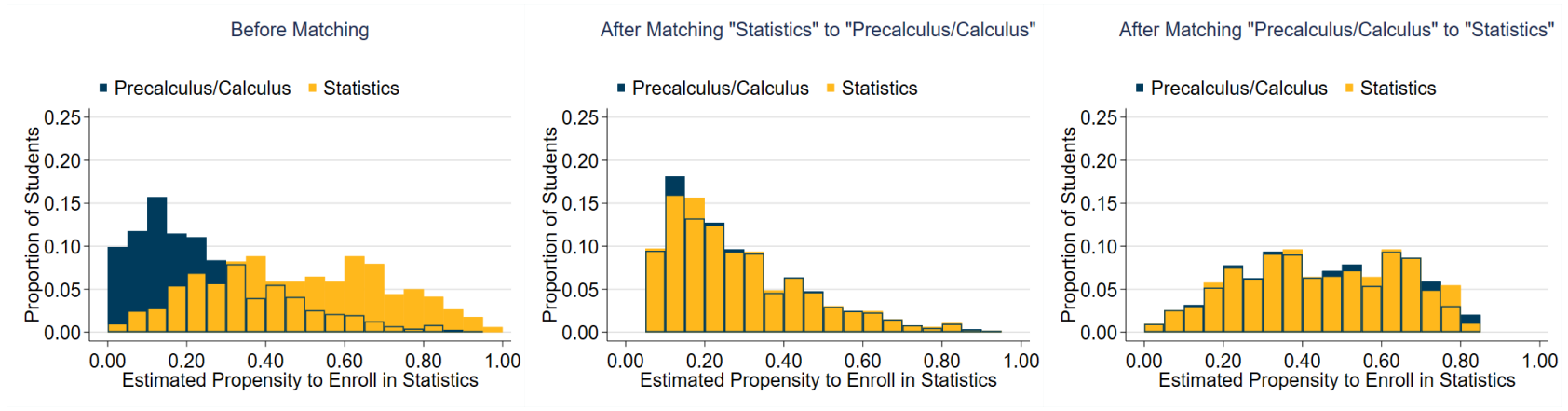
See the note on the first page of the table.

Table C36 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=813)	Statistics (N=411)	SMD	VR	Precalculus/ Calculus (N=717)	Statistics (N=374)	SMD	VR	Precalculus/ Calculus (N=513)	Statistics (N=375)	SMD	VR
Indicator of 2016-17 Cohort	0.481	0.438	-0.086	0.987	0.467	0.431	-0.073	0.990	0.452	0.432	-0.041	0.989

See the note on the first page of the table.

Figure C37. CSUN Analysis Distributions of Estimated Propensities of Taking Statistics over Precalculus/Calculus in Groups 4 and 5 Before and After Matching for Students with Non-Missing College-Level Math GPAs, 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 C37. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/Calculus (N=464)	Statistics (N=312)	SMD	VR
Age (in Months)	194.733	194.837	0.022	0.725	194.672	194.616	-0.012	0.797	194.263	194.766	0.111	0.800
Gender: Female	0.484	0.594	0.223	0.967	0.521	0.499	-0.044	1.008	0.560	0.580	0.040	0.987
Race/Ethnicity: Asian	0.052	0.074	0.087	1.376	0.049	0.046	-0.012	0.955	0.074	0.071	-0.012	0.960
Race/Ethnicity: African American	0.023	0.056	0.172	2.389	-	-	-0.058	0.685	0.032	0.042	0.052	1.291

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/ Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/ Calculus (N=464)	Statistics (N=312)	SMD	VR
Race/Ethnicity: Latinx	0.808	0.715	-0.219	1.314	0.799	0.821	0.057	0.920	0.765	0.728	-0.086	1.102
Race/Ethnicity: Filipinx	0.048	0.053	0.022	1.097	0.051	0.051	0.001	1.012	0.047	0.058	0.046	1.201
Race/Ethnicity: White	0.062	0.088	0.099	1.381	0.067	0.061	-0.023	0.928	0.077	0.090	0.047	1.151
Race/Ethnicity: Other	-	-	0.074	2.067	-	-	-0.082	0.283	-	-	0.081	2.477
Ever Subsidized Meal Eligible from 9th-11th	0.948	0.897	-0.190	1.865	0.940	0.955	0.069	0.763	0.921	0.904	-0.062	1.197

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/ Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/ Calculus (N=464)	Statistics (N=312)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	0.046	2.076	-	-	0.011	1.207	-	-	-0.042	0.626
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.257	0.229	-0.065	0.926	0.257	0.289	0.073	1.084	0.295	0.237	-0.131	0.869
Parents'/Guardians' Educational Attainment: HS Graduate	0.207	0.229	0.055	1.081	0.204	0.191	-0.033	0.957	0.230	0.228	-0.006	0.991
Parents'/Guardians' Educational Attainment: Some College	0.107	0.156	0.143	1.374	0.114	0.087	-0.092	0.786	0.164	0.160	-0.011	0.978
Parents'/Guardians' Educational Attainment: College Graduate	0.099	0.124	0.078	1.216	0.106	0.079	-0.095	0.769	0.099	0.115	0.052	1.140

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/ Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/ Calculus (N=464)	Statistics (N=312)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	-	-	-0.077	0.682	-	-	-0.006	0.977	-	-	-0.033	0.837
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.286	0.232	-0.122	0.875	0.286	0.323	0.080	1.077	0.177	0.231	0.134	1.218
Nonresident School Enrollment in 11th	0.310	0.438	0.268	1.153	0.335	0.296	-0.085	0.941	0.401	0.401	-0.001	0.998
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.045	0.597	-	-	0.092	2.491	-	-	0.046	1.990
Number of School Moves from 9th- 11th	0.060	0.062	0.007	0.903	0.058	0.063	0.020	0.891	0.060	0.065	0.020	1.044

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/ Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/ Calculus (N=464)	Statistics (N=312)	SMD	VR
Missing Dummy: Number of School Moves from 9th- 11th	0.047	0.044	-0.012	0.949	-	-	-0.014	0.939	0.045	0.048	0.015	1.066
English Learner Status in 11th: English Only	0.184	0.268	0.201	1.308	0.194	0.208	0.033	1.057	0.229	0.266	0.086	1.104
English Learner Status in 11th: Initial Fluent English Proficient	0.185	0.235	0.123	1.194	0.199	0.166	-0.087	0.872	0.247	0.234	-0.031	0.961
English Learner Status in 11th: Limited English Proficient	-	-	-0.039	0.748	-	-	0.102	1.941	-	-	0.016	1.132
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.611	0.482	-0.260	1.052	0.590	0.595	0.010	1.003	0.509	0.484	-0.051	0.998

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/ Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/ Calculus (N=464)	Statistics (N=312)	SMD	VR
Gifted and Talented Program Participation in 11th	0.173	0.256	0.204	1.336	0.180	0.152	-0.074	0.881	0.246	0.231	-0.035	0.956
Math 11th Grade Weighted GPA	3.164	2.931	-0.233	1.041	3.103	3.058	-0.046	0.934	2.975	2.951	-0.025	1.096
Cumulative Overall Weighted GPA at the End of 11th	3.360	3.299	-0.143	1.037	3.353	3.324	-0.068	1.071	3.309	3.306	-0.007	0.988
Standardized ELA SBAC Score in 11th	0.431	0.533	0.153	1.168	0.444	0.503	0.092	0.936	0.558	0.512	-0.066	0.966
Standardized Math SBAC Score in 11th	0.536	0.427	-0.170	1.102	0.505	0.488	-0.028	0.957	0.459	0.447	-0.018	1.074

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/Calculus (N=464)	Statistics (N=312)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	2.731	3.109	0.146	1.164	2.787	2.744	-0.017	0.938	3.076	3.087	0.004	0.984
Science Credits Accumulated from 9th-11th	33.152	31.961	-0.139	0.781	32.769	32.823	0.006	1.034	32.214	32.089	-0.016	0.985
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	0.027	1.210	-	-	-0.026	0.826	-	-	0.027	1.200
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.153	0.176	0.047	1.294	0.152	0.142	-0.021	0.849	0.124	0.176	0.107	1.549
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.065	0.085	0.062	1.014	0.065	0.078	0.037	1.305	0.081	0.083	0.006	0.978

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/Calculus (N=464)	Statistics (N=312)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.047	0.044	-0.010	1.122	0.041	0.054	0.048	1.659	0.028	0.045	0.071	1.700
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.030	0.029	-0.001	0.899	0.029	0.042	0.050	1.441	0.030	0.032	0.009	1.036
Highest ERW PSAT Score by the End of 11th	452.198	466.331	0.206	1.049	453.849	454.659	0.012	1.099	464.985	463.613	-0.020	1.029
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	-0.085	0.626	-	-	0.021	1.127	-	-	-0.087	0.612
Highest Math PSAT Score by the End of 11th	462.563	466.632	0.062	1.099	462.333	462.028	-0.005	0.981	469.885	466.556	-0.051	1.189

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/Calculus (N=464)	Statistics (N=312)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.082	0.616	-	-	-0.030	0.836	-	-	-0.051	0.719
Took the SAT or ACT before 12th	0.570	0.571	0.001	1.001	0.578	0.599	0.042	0.991	0.534	0.577	0.086	0.979
Participation in the AVID Program in 11th	-	-	-0.196	0.408	0.044	0.051	0.031	1.148	-	-	-0.008	0.957
Took a College or Career Seminar Course in 11th	0.143	0.176	0.092	1.189	0.158	0.159	0.000	1.007	0.175	0.173	-0.004	0.992
Ever Attended STEM-Focused School from 9th-12th	0.188	0.144	-0.118	0.809	0.180	0.155	-0.066	0.894	0.151	0.151	-0.002	0.995

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/Calculus (N=464)	Statistics (N=312)	SMD	VR
Took a Precalculus Course by the End of 11th	0.492	0.632	0.285	0.932	0.529	0.503	-0.052	1.010	0.596	0.619	0.047	0.978
Took an IDS Course by the End of 11th	-	-	0.148	4.780	-	-	-0.010	0.873	-	-	0.091	2.472
Took a Statistics Course by the End of 11th	0.028	0.041	0.070	1.438	0.033	0.041	0.045	1.257	0.056	0.038	-0.081	0.703
Took Other Advanced Math by the End of 11th	-	-	0.023	1.386	-	-	0.063	2.135	-	-	-0.096	0.388
Indicator of Student Group 1	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/Calculus (N=464)	Statistics (N=312)	SMD	VR
Indicator of Student Group 2	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 3	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 4	0.471	0.300	-0.357	0.844	0.428	0.441	0.026	1.013	0.326	0.321	-0.011	0.990
Indicator of Student Group 5	0.529	0.700	0.357	0.844	0.572	0.559	-0.026	1.013	0.674	0.679	0.011	0.990
Indicator of Student Group 6	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/ Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/ Calculus (N=464)	Statistics (N=312)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	11.000	9.615	-0.239	0.957	10.646	10.293	-0.061	0.978	9.755	9.699	-0.010	1.060
Cumulative Overall Weighted GPA at the End of 11th (Squared)	11.467	11.066	-0.143	1.011	11.421	11.239	-0.065	1.073	11.131	11.109	-0.008	1.005
Standardized ELA SBAC Score in 11th (Squared)	0.596	0.762	0.205	1.185	0.619	0.646	0.036	0.772	0.792	0.728	-0.071	0.703
Standardized Math SBAC Score in 11th (Squared)	0.677	0.611	-0.086	0.829	0.645	0.608	-0.050	0.789	0.613	0.633	0.027	0.976
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	13.658	16.872	0.140	1.747	14.194	13.516	-0.034	1.003	16.847	16.809	-0.002	1.215

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/ Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/ Calculus (N=464)	Statistics (N=312)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	1,181.322	1,085.697	-0.147	0.731	1,146.306	1,151.862	0.008	1.156	1,102.330	1,093.468	-0.015	1.078
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.240	0.312	0.055	1.236	0.250	0.212	-0.035	0.425	0.200	0.317	0.102	2.846
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.110	0.115	0.007	0.662	0.105	0.136	0.050	1.430	0.117	0.115	-0.003	0.922
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.061	0.068	0.014	2.188	0.057	0.094	0.074	2.332	0.041	0.071	0.062	2.875
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.052	0.047	-0.013	0.814	0.052	0.075	0.048	1.456	0.049	0.051	0.005	1.009

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/Calculus (N=464)	Statistics (N=312)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	209,088.418	222,290.980	0.204	1.092	210,659.599	211,828.258	0.018	1.047	220,802.157	219,670.285	-0.017	1.003
Highest Math PSAT Score by the End of 11th (Squared)	218,103.515	222,288.700	0.069	1.050	217,956.520	217,567.698	-0.007	0.948	224,687.451	222,312.568	-0.039	1.069
Work Effort GPA in 11th	2.665	2.633	-0.122	1.203	2.660	2.652	-0.031	1.071	2.631	2.638	0.026	1.086
Cooperation GPA in 11th	2.771	2.757	-0.070	1.029	2.771	2.767	-0.021	0.922	2.750	2.760	0.050	0.882
Attendance Rate in 11th	0.980	0.980	-0.004	0.778	0.980	0.980	-0.024	0.740	0.980	0.980	0.026	0.747

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/ Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/ Calculus (N=464)	Statistics (N=312)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.037	1.557	-	-	-0.026	0.672	-	-	-0.006	0.937
Educational Expectations in 11th: Unsure	0.048	0.068	0.084	1.380	0.049	0.044	-0.025	0.904	0.053	0.067	0.060	1.248
Educational Expectations in 11th: HS or Less	-	-	0.033	1.384	-	-	-0.036	0.646	-	-	0.000	0.998
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.005	1.041	-	-	0.099	1.855	-	-	-0.116	0.478
Educational Expectations in 11th: Bachelor's Degree or Higher	0.686	0.676	-0.020	1.018	0.694	0.708	0.031	0.980	0.710	0.679	-0.065	1.055

See the note on the first page of the table.

Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/ Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/ Calculus (N=464)	Statistics (N=312)	SMD	VR
Educational Expectations in 11th: Missing	0.240	0.226	-0.033	0.961	0.230	0.209	-0.052	0.938	0.190	0.224	0.084	1.127
Growth Mindset in 11th	0.155	0.107	-0.057	1.153	0.149	0.204	0.068	0.999	0.144	0.157	0.015	0.981
Missing Dummy: Growth Mindset in 11th	0.233	0.212	-0.052	0.934	0.224	0.206	-0.044	0.946	0.179	0.215	0.090	1.146
Academic Self- Efficacy in 11th	0.217	-0.013	-0.281	1.052	0.167	0.109	-0.073	0.930	-0.007	0.021	0.034	0.843
Missing Dummy: Academic Self- Efficacy in 11th	0.232	0.215	-0.041	0.948	0.224	0.206	-0.044	0.946	0.179	0.215	0.090	1.146

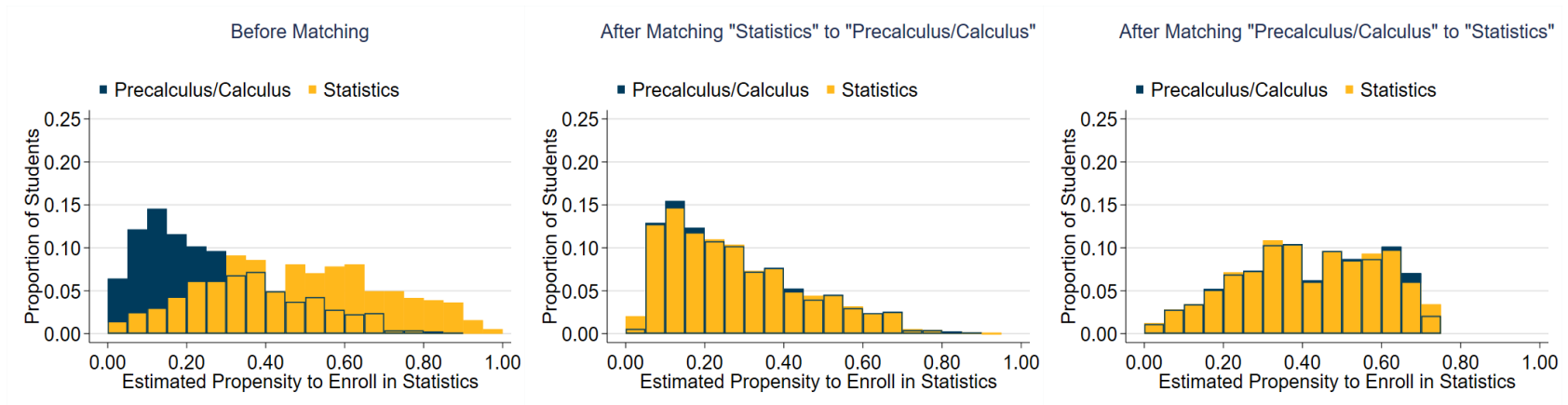
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Table C37 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing College-Level Math GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=707)	Statistics (N=340)	SMD	VR	Precalculus/Calculus (N=612)	Statistics (N=311)	SMD	VR	Precalculus/Calculus (N=464)	Statistics (N=312)	SMD	VR
Indicator of 2016-17 Cohort	0.487	0.468	-0.038	0.998	0.482	0.425	-0.114	0.985	0.500	0.465	-0.069	0.993

See the note on the first page of the table.

Figure C38. CSUN Analysis Distributions of Estimated Propensities of Taking Statistics over Precalculus/Calculus in Groups 4 and 5 Before and After Matching for Students with Non-Missing Non-Math STEM GPAs, 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 C38. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/ Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/ Calculus (N=512)	Statistics (N=322)	SMD	VR
Age (in Months)	194.788	194.910	0.026	0.723	194.698	194.563	-0.029	0.741	194.874	194.709	-0.034	0.690
Gender: Female	0.484	0.607	0.248	0.957	0.506	0.510	0.009	1.005	0.528	0.562	0.069	0.987
Race/Ethnicity: Asian	0.052	0.068	0.066	1.282	0.050	0.065	0.065	1.289	0.055	0.068	0.057	1.231
Race/Ethnicity: African American	0.023	0.060	0.188	2.545	-	-	-0.054	0.692	0.030	0.037	0.041	1.240

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/Calculus (N=512)	Statistics (N=322)	SMD	VR
Race/Ethnicity: Latinx	0.804	0.727	-0.183	1.262	0.803	0.799	-0.010	1.021	0.764	0.739	-0.057	1.068
Race/Ethnicity: Filipinx	0.048	0.044	-0.018	0.927	0.048	0.056	0.034	1.156	0.052	0.053	0.003	1.011
Race/Ethnicity: White	0.065	0.089	0.087	1.323	0.067	0.059	-0.033	0.893	0.087	0.093	0.021	1.060
Race/Ethnicity: Other	-	-	0.049	1.621	-	-	-0.037	0.639	-	-	-0.030	0.752
Ever Subsidized Meal Eligible from 9th-11th	0.948	0.898	-0.187	1.853	0.945	0.951	0.028	0.898	0.917	0.916	-0.003	1.010

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/Calculus (N=512)	Statistics (N=322)	SMD	VR
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	0.018	1.302	-	-	-0.041	0.470	-	-	-0.035	0.668
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.259	0.211	-0.113	0.869	0.255	0.257	0.005	1.011	0.227	0.227	0.000	1.000
Parents'/Guardians' Educational Attainment: HS Graduate	0.205	0.227	0.052	1.075	0.208	0.197	-0.029	0.963	0.239	0.214	-0.058	0.927
Parents'/Guardians' Educational Attainment: Some College	0.108	0.164	0.164	1.425	0.110	0.097	-0.045	0.893	0.172	0.158	-0.038	0.934
Parents'/Guardians' Educational Attainment: College Graduate	0.097	0.125	0.088	1.246	0.101	0.086	-0.049	0.878	0.109	0.109	-0.001	0.997

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/ Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/ Calculus (N=512)	Statistics (N=322)	SMD	VR
Parents'/Guardians' Educational Attainment: Graduate School	0.043	0.029	-0.076	0.682	0.035	0.039	0.019	1.106	-	-	0.034	1.212
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.288	0.245	-0.098	0.903	0.290	0.324	0.073	1.069	0.228	0.261	0.077	1.095
Nonresident School Enrollment in 11th	0.320	0.435	0.238	1.131	0.333	0.350	0.036	1.030	0.370	0.382	0.025	1.012
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.030	0.735	-	-	0.111	2.579	-	-	0.000	1.000
Number of School Moves from 9th- 11th	0.057	0.063	0.023	1.007	0.056	0.056	0.001	0.917	0.066	0.058	-0.031	0.762

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/Calculus (N=512)	Statistics (N=322)	SMD	VR
Missing Dummy: Number of School Moves from 9th-11th	0.044	0.036	-0.038	0.836	-	-	-0.085	0.647	0.032	0.037	0.027	1.147
English Learner Status in 11th: English Only	0.195	0.279	0.198	1.284	0.203	0.229	0.064	1.099	0.267	0.261	-0.014	0.985
English Learner Status in 11th: Initial Fluent English Proficient	0.184	0.234	0.124	1.197	0.186	0.161	-0.063	0.901	0.216	0.224	0.019	1.026
English Learner Status in 11th: Limited English Proficient	-	-	-0.078	0.527	-	-	0.098	2.050	-	-	-0.026	0.802
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.601	0.477	-0.252	1.042	0.599	0.583	-0.032	1.018	0.502	0.503	0.002	1.000

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/Calculus (N=512)	Statistics (N=322)	SMD	VR
Gifted and Talented Program Participation in 11th	0.184	0.234	0.124	1.197	0.186	0.184	-0.004	1.000	0.202	0.214	0.030	1.043
Math 11th Grade Weighted GPA	3.179	2.905	-0.273	1.093	3.154	3.171	0.017	1.005	3.053	2.972	-0.083	1.159
Cumulative Overall Weighted GPA at the End of 11th	3.349	3.270	-0.181	1.044	3.344	3.361	0.038	1.075	3.307	3.296	-0.024	1.004
Standardized ELA SBAC Score in 11th	0.425	0.492	0.099	1.191	0.434	0.476	0.065	1.014	0.533	0.485	-0.070	0.987
Standardized Math SBAC Score in 11th	0.515	0.369	-0.220	1.127	0.497	0.481	-0.023	1.107	0.455	0.431	-0.036	0.977

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/Calculus (N=512)	Statistics (N=322)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th	2.768	3.099	0.128	1.131	2.784	2.827	0.017	1.067	3.077	3.052	-0.009	0.978
Science Credits Accumulated from 9th-11th	32.928	31.896	-0.117	0.926	32.758	32.357	-0.046	0.933	32.079	31.938	-0.016	0.827
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.003	0.978	-	-	-0.065	0.552	-	-	-0.005	0.962
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.156	0.177	0.039	0.849	0.154	0.139	-0.031	0.748	0.169	0.171	0.004	1.018
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.071	0.078	0.022	0.916	0.069	0.063	-0.018	0.844	0.086	0.078	-0.024	0.852

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/Calculus (N=512)	Statistics (N=322)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.057	0.052	-0.015	0.702	0.055	0.063	0.020	0.835	0.063	0.053	-0.029	0.927
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.036	0.021	-0.070	0.482	0.034	0.025	-0.043	0.474	0.032	0.025	-0.037	0.794
Highest ERW PSAT Score by the End of 11th	451.620	465.295	0.195	1.090	452.462	453.020	0.008	1.128	465.416	461.948	-0.049	0.885
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	-0.085	0.641	-	-	-0.093	0.590	-	-	-0.047	0.750
Highest Math PSAT Score by the End of 11th	461.732	465.844	0.063	1.060	461.817	463.767	0.029	1.129	466.838	465.827	-0.015	1.063

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/Calculus (N=512)	Statistics (N=322)	SMD	VR
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	-0.098	0.568	-	-	-0.133	0.402	-	-	-0.010	0.927
Took the SAT or ACT before 12th	0.569	0.570	0.002	1.001	0.569	0.562	-0.014	1.009	0.579	0.571	-0.016	1.004
Participation in the AVID Program in 11th	0.069	0.044	-0.108	0.657	0.064	0.051	-0.056	0.811	0.029	0.040	0.065	1.395
Took a College or Career Seminar Course in 11th	0.156	0.180	0.063	1.121	0.163	0.166	0.008	1.020	0.164	0.180	0.043	1.077
Ever Attended STEM-Focused School from 9th-12th	0.191	0.141	-0.135	0.784	0.188	0.170	-0.047	0.929	0.139	0.152	0.036	1.075

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/ Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/ Calculus (N=512)	Statistics (N=322)	SMD	VR
Took a Precalculus Course by the End of 11th	0.484	0.628	0.292	0.937	0.507	0.495	-0.025	1.006	0.594	0.606	0.024	0.990
Took an IDS Course by the End of 11th	-	-	0.064	1.943	-	-	-0.022	0.766	-	-	0.006	1.052
Took a Statistics Course by the End of 11th	0.025	0.034	0.050	1.326	0.027	0.044	0.095	1.632	-	-	0.036	1.214
Took Other Advanced Math by the End of 11th	-	-	0.050	1.948	-	-	-0.004	0.939	-	-	-0.015	0.834
Indicator of Student Group 1	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/ Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/ Calculus (N=512)	Statistics (N=322)	SMD	VR
Indicator of Student Group 2	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 3	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A
Indicator of Student Group 4	0.480	0.318	-0.336	0.870	0.455	0.452	-0.006	1.004	0.359	0.342	-0.036	0.977
Indicator of Student Group 5	0.520	0.682	0.336	0.870	0.545	0.548	0.006	1.004	0.641	0.658	0.036	0.977
Indicator of Student Group 6	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A	0.000	0.000	N/A	N/A

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/ Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/ Calculus (N=512)	Statistics (N=322)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	11.065	9.485	-0.272	0.991	10.917	11.024	0.018	1.108	10.202	9.856	-0.061	1.115
Cumulative Overall Weighted GPA at the End of 11th (Squared)	11.405	10.888	-0.181	1.006	11.367	11.493	0.043	1.093	11.124	11.055	-0.024	1.014
Standardized ELA SBAC Score in 11th (Squared)	0.602	0.743	0.173	1.226	0.606	0.648	0.057	0.848	0.751	0.697	-0.063	0.799
Standardized Math SBAC Score in 11th (Squared)	0.676	0.599	-0.099	0.828	0.651	0.677	0.033	1.052	0.647	0.616	-0.041	0.845
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	13.946	16.700	0.122	1.656	14.038	14.661	0.030	1.276	16.740	16.432	-0.013	1.318

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/ Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/ Calculus (N=512)	Statistics (N=322)	SMD	VR
Science Credits Accumulated from 9th-11th (Squared)	1,164.635	1,091.684	-0.104	1.032	1,151.198	1,119.486	-0.047	0.930	1,108.754	1,086.030	-0.035	0.813
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.337	0.297	-0.017	0.163	0.333	0.249	-0.034	0.125	0.296	0.301	0.003	0.363
A-G "C" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.129	0.120	-0.012	0.611	0.129	0.108	-0.026	0.687	0.150	0.127	-0.029	0.767
A-G "D" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	0.148	0.104	-0.024	0.168	0.149	0.125	-0.013	0.129	0.125	0.115	-0.007	0.399
A-G "D" or better Semesters Off- Track at the End of 11th (D-G) (Squared)	0.065	0.031	-0.078	0.326	0.062	0.029	-0.080	0.201	0.047	0.037	-0.027	0.704

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/Calculus (N=512)	Statistics (N=322)	SMD	VR
Highest ERW PSAT Score by the End of 11th (Squared)	208,646.438	221,599.587	0.196	1.146	209,389.104	210,459.805	0.016	1.104	221,998.879	218,167.481	-0.057	0.839
Highest Math PSAT Score by the End of 11th (Squared)	217,358.710	221,415.612	0.068	1.043	217,435.904	219,751.462	0.038	1.137	222,105.525	221,425.107	-0.011	1.028
Work Effort GPA in 11th	2.661	2.629	-0.123	1.234	2.660	2.677	0.068	0.989	2.639	2.641	0.008	1.160
Cooperation GPA in 11th	2.766	2.747	-0.091	1.065	2.766	2.774	0.043	0.934	2.754	2.753	-0.004	0.934
Attendance Rate in 11th	0.980	0.979	-0.055	0.859	0.980	0.980	-0.005	0.781	0.979	0.979	0.028	0.751

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/ Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/ Calculus (N=512)	Statistics (N=322)	SMD	VR
Ever Suspended from 9th-11th	-	-	0.057	1.946	-	-	0.012	1.206	-	-	0.043	1.531
Educational Expectations in 11th: Unsure	0.047	0.068	0.091	1.421	0.047	0.048	0.008	1.040	0.068	0.056	-0.051	0.829
Educational Expectations in 11th: HS or Less	-	-	0.049	1.621	-	-	-0.009	0.906	-	-	0.000	1.000
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.007	1.052	-	-	0.036	1.277	-	-	-0.044	0.766
Educational Expectations in 11th: Bachelor's Degree or Higher	0.681	0.656	-0.053	1.040	0.687	0.688	0.002	1.004	0.670	0.674	0.008	0.994

See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/Calculus (N=512)	Statistics (N=322)	SMD	VR
Educational Expectations in 11th: Missing	0.247	0.245	-0.004	0.996	0.239	0.233	-0.016	0.986	0.217	0.233	0.037	1.050
Growth Mindset in 11th	0.155	0.093	-0.073	1.064	0.157	0.190	0.040	0.861	0.194	0.141	-0.063	1.073
Missing Dummy: Growth Mindset in 11th	0.240	0.219	-0.051	0.938	0.229	0.223	-0.016	0.985	0.201	0.220	0.049	1.071
Academic Self-Efficacy in 11th	0.226	0.017	-0.255	0.996	0.208	0.193	-0.019	0.854	0.111	0.082	-0.035	0.771
Missing Dummy: Academic Self-Efficacy in 11th	0.240	0.221	-0.044	0.946	0.231	0.224	-0.016	0.985	0.202	0.224	0.052	1.075

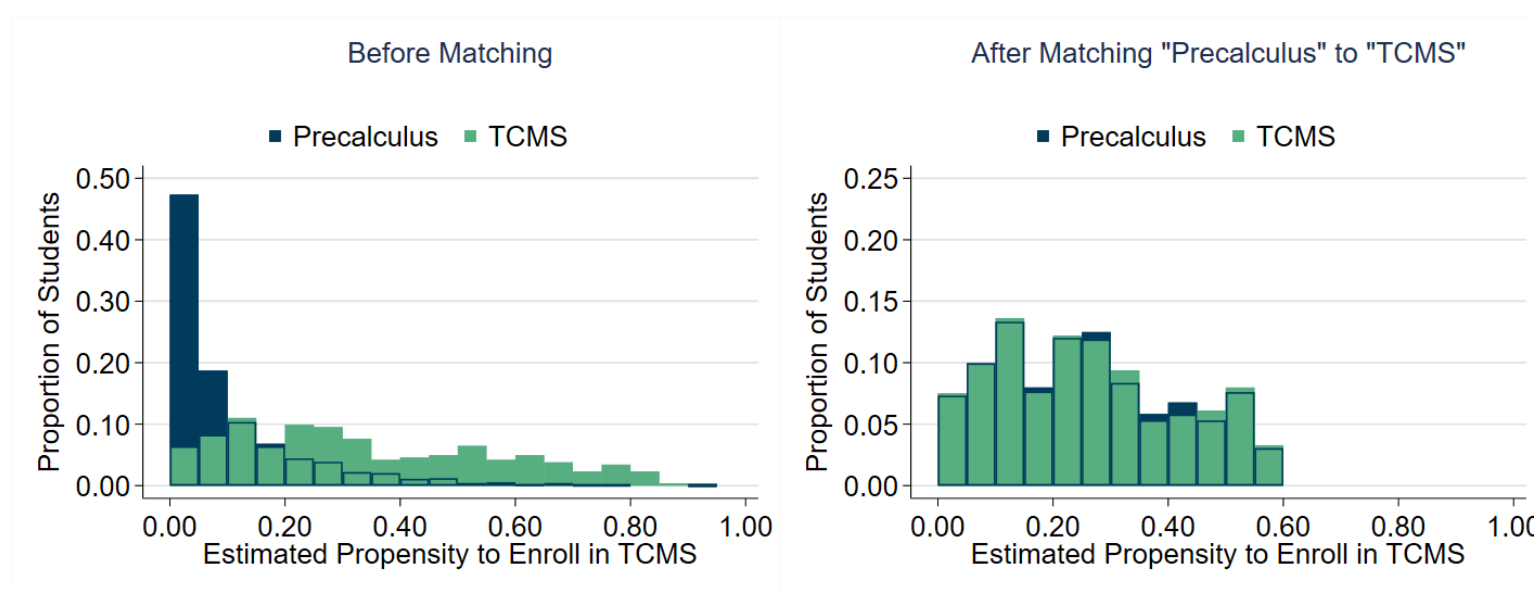
See the note on the first page of the table.

Table C38 Continued. CSUN Analysis Matching Diagnostics for Statistics vs. Precalculus/Calculus in Groups 4 and 5 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "Precalculus/Calculus"				After Matching "Precalculus/Calculus" to "Statistics"			
	Precalculus/ Calculus (N=750)	Statistics (N=384)	SMD	VR	Precalculus/ Calculus (N=706)	Statistics (N=345)	SMD	VR	Precalculus/ Calculus (N=512)	Statistics (N=322)	SMD	VR
Indicator of 2016-17 Cohort	0.491	0.471	-0.039	0.998	0.487	0.488	0.002	1.006	0.465	0.469	0.009	1.001

See the note on the first page of the table.

Figure C39. Community College 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 C39. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,621)	TCMS (N=263)	SMD	VR	Precalculus (N=541)	TCMS (N=213)	SMD	VR
Age (in Months)	195.126	194.968	-0.029	1.040	194.963	194.912	-0.010	1.376
Gender: Female	0.490	0.548	0.114	0.994	0.542	0.531	-0.023	1.005
Race/Ethnicity: Asian	-	-	-0.088	0.507	-	-	0.000	1.002
Race/Ethnicity: African American	0.077	0.068	-0.033	0.899	0.043	0.056	0.060	1.289
Race/Ethnicity: Latinx	0.809	0.844	0.092	0.856	0.856	0.845	-0.032	1.067
Race/Ethnicity: Filipinx	-	-	-0.076	0.626	-	-	-0.030	0.794

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C39 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,621)	TCMS (N=263)	SMD	VR	Precalculus (N=541)	TCMS (N=213)	SMD	VR
Race/Ethnicity: White	0.051	0.046	-0.023	0.910	0.055	0.056	0.005	1.020
Race/Ethnicity: Other	-	-	0.021	1.234	-	-	0.008	1.072
Ever Subsidized Meal Eligible from 9th-11th	0.939	0.943	0.017	0.941	0.949	0.944	-0.025	1.106
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.073	0.499	-	-	-0.036	0.718
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.249	0.304	0.124	1.137	0.316	0.277	-0.085	0.928
Parents'/Guardians' Educational Attainment: HS Graduate	0.218	0.240	0.052	1.073	0.235	0.249	0.032	1.041
Parents'/Guardians' Educational Attainment: Some College	0.112	0.144	0.096	1.244	0.141	0.150	0.026	1.055

See the note on the first page of the table.

Table C39 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,621)	TCMS (N=263)	SMD	VR	Precalculus (N=541)	TCMS (N=213)	SMD	VR
Parents'/Guardians' Educational Attainment: College Graduate	0.070	0.053	-0.069	0.780	0.063	0.052	-0.048	0.834
Parents'/Guardians' Educational Attainment: Graduate School	-	-	-0.101	0.513	-	-	0.029	1.247
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.321	0.243	-0.174	0.847	0.230	0.254	0.055	1.071
Nonresident School Enrollment in 11th	0.263	0.259	-0.011	0.991	0.238	0.258	0.047	1.058
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.085	0.346	-	-	0.014	1.251
Number of School Moves from 9th- 11th	0.078	0.091	0.044	1.036	0.095	0.101	0.017	0.792
Missing Dummy: Number of School Moves from 9th- 11th	0.081	0.076	-0.020	0.942	0.064	0.080	0.059	1.220

See the note on the first page of the table.

Table C39 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,621)	TCMS (N=263)	SMD	VR	Precalculus (N=541)	TCMS (N=213)	SMD	VR
English Learner Status in 11th: English Only	0.248	0.274	0.059	1.069	0.251	0.263	0.027	1.032
English Learner Status in 11th: Initial Fluent English Proficient	0.138	0.114	-0.071	0.854	0.130	0.122	-0.024	0.950
English Learner Status in 11th: Limited English Proficient	0.048	0.053	0.026	1.117	-	-	0.029	1.149
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.567	0.559	-0.016	1.007	0.582	0.573	-0.020	1.008
Gifted and Talented Program Participation in 11th	0.102	0.087	-0.049	0.876	0.097	0.085	-0.042	0.888
Math 11th Grade Weighted GPA	2.694	2.367	-0.430	0.894	2.430	2.425	-0.007	1.199
Cumulative Overall Weighted GPA at the End of 11th	2.887	2.659	-0.436	0.939	2.746	2.730	-0.032	0.999

See the note on the first page of the table.

Table C39 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,621)	TCMS (N=263)	SMD	VR	Precalculus (N=541)	TCMS (N=213)	SMD	VR
Standardized ELA SBAC Score in 11th	0.104	0.032	-0.105	0.818	0.069	0.047	-0.033	1.125
Standardized Math SBAC Score in 11th	0.070	-0.092	-0.252	0.881	-0.024	-0.031	-0.011	1.017
Number of Semesters of AP Classes Taken from 9th-11th	1.637	0.937	-0.383	0.593	1.035	1.063	0.017	1.080
Science Credits Accumulated from 9th-11th	31.826	31.552	-0.029	1.022	32.042	31.593	-0.049	0.978
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	0.019	1.100	-	-	0.110	1.828
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.638	0.620	-0.017	1.042	0.584	0.596	0.012	0.893
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.258	0.331	0.105	1.278	0.257	0.268	0.016	1.166

See the note on the first page of the table.

Table C39 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,621)	TCMS (N=263)	SMD	VR	Precalculus (N=541)	TCMS (N=213)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.216	0.221	0.007	1.163	0.200	0.211	0.019	1.000
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.096	0.118	0.050	1.458	0.078	0.075	-0.009	0.920
Highest ERW PSAT Score by the End of 11th	424.307	412.243	-0.194	0.919	415.285	415.326	0.001	1.003
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.080	0.057	-0.092	0.731	0.062	0.066	0.013	1.051
Highest Math PSAT Score by the End of 11th	428.565	416.611	-0.203	0.799	419.671	416.993	-0.047	1.149
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.071	0.057	-0.057	0.819	0.062	0.066	0.013	1.051
Took the SAT or ACT before 12th	0.348	0.186	-0.371	0.670	0.217	0.207	-0.026	0.966

See the note on the first page of the table.

Table C39 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,621)	TCMS (N=263)	SMD	VR	Precalculus (N=541)	TCMS (N=213)	SMD	VR
Participation in the AVID Program in 11th	-	-	-0.083	0.671	-	-	0.000	1.002
Took a College or Career Seminar Course in 11th	0.215	0.209	-0.014	0.984	0.186	0.211	0.063	1.102
Ever Attended STEM-Focused School from 9th-12th	0.169	0.213	0.112	1.197	0.193	0.192	-0.001	1.000
Math 11th Grade Weighted GPA (Squared)	7.869	6.147	-0.423	0.780	6.383	6.452	0.018	1.222
Cumulative Overall Weighted GPA at the End of 11th (Squared)	8.615	7.334	-0.433	0.828	7.794	7.705	-0.031	0.997
Standardized ELA SBAC Score in 11th (Squared)	0.534	0.427	-0.153	0.875	0.422	0.471	0.073	1.413
Standardized Math SBAC Score in 11th (Squared)	0.442	0.392	-0.082	0.914	0.352	0.358	0.011	1.284

See the note on the first page of the table.

Table C39 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,621)	TCMS (N=263)	SMD	VR	Precalculus (N=541)	TCMS (N=213)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	6.877	3.358	-0.327	0.381	3.659	3.918	0.030	1.067
Science Credits Accumulated from 9th-11th (Squared)	1,099.244	1,083.471	-0.023	0.971	1,112.356	1,081.797	-0.045	0.945
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.653	1.677	0.005	1.041	1.579	1.460	-0.028	0.546
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.491	0.650	0.084	1.494	0.444	0.512	0.042	1.659
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.464	0.532	0.027	1.451	0.432	0.437	0.002	0.662
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.170	0.247	0.068	2.083	0.133	0.122	-0.016	0.764
Highest ERW PSAT Score by the End of 11th (Squared)	184,081.208	173,648.905	-0.195	0.843	176,210.102	176,248.629	0.001	0.988

See the note on the first page of the table.

Table C39 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,621)	TCMS (N=263)	SMD	VR	Precalculus (N=541)	TCMS (N=213)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	187,522.049	176,635.943	-0.222	0.800	179,152.083	177,357.823	-0.039	1.250
Work Effort GPA in 11th	2.451	2.373	-0.247	1.010	2.408	2.401	-0.024	1.100
Cooperation GPA in 11th	2.605	2.542	-0.242	0.986	2.571	2.564	-0.027	1.028
Attendance Rate in 11th	0.969	0.968	-0.032	1.061	0.971	0.968	-0.074	1.325
Ever Suspended from 9th-11th	-	-	0.034	1.422	-	-	-0.051	0.682
Educational Expectations in 11th: Unsure	0.082	0.091	0.033	1.105	0.094	0.085	-0.032	0.912
Educational Expectations in 11th: HS or Less	0.021	0.053	0.171	2.462	0.053	0.052	-0.006	0.976

See the note on the first page of the table.

Table C39 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,621)	TCMS (N=263)	SMD	VR	Precalculus (N=541)	TCMS (N=213)	SMD	VR
Educational Expectations in 11th: Associate Degree or Certificate	0.059	0.095	0.137	1.564	0.074	0.066	-0.031	0.901
Educational Expectations in 11th: Bachelor's Degree or Higher	0.576	0.532	-0.088	1.023	0.540	0.549	0.018	0.998
Educational Expectations in 11th: Missing	0.262	0.228	-0.079	0.913	0.239	0.249	0.022	1.029
Growth Mindset in 11th	0.077	0.064	-0.015	1.069	0.134	0.100	-0.042	1.081
Missing Dummy: Growth Mindset in 11th	0.252	0.213	-0.093	0.891	0.227	0.239	0.029	1.039
Academic Self-Efficacy in 11th	0.100	-0.037	-0.164	1.033	-0.015	-0.022	-0.008	0.955
Missing Dummy: Academic Self-Efficacy in 11th	0.251	0.213	-0.090	0.894	0.228	0.239	0.027	1.036

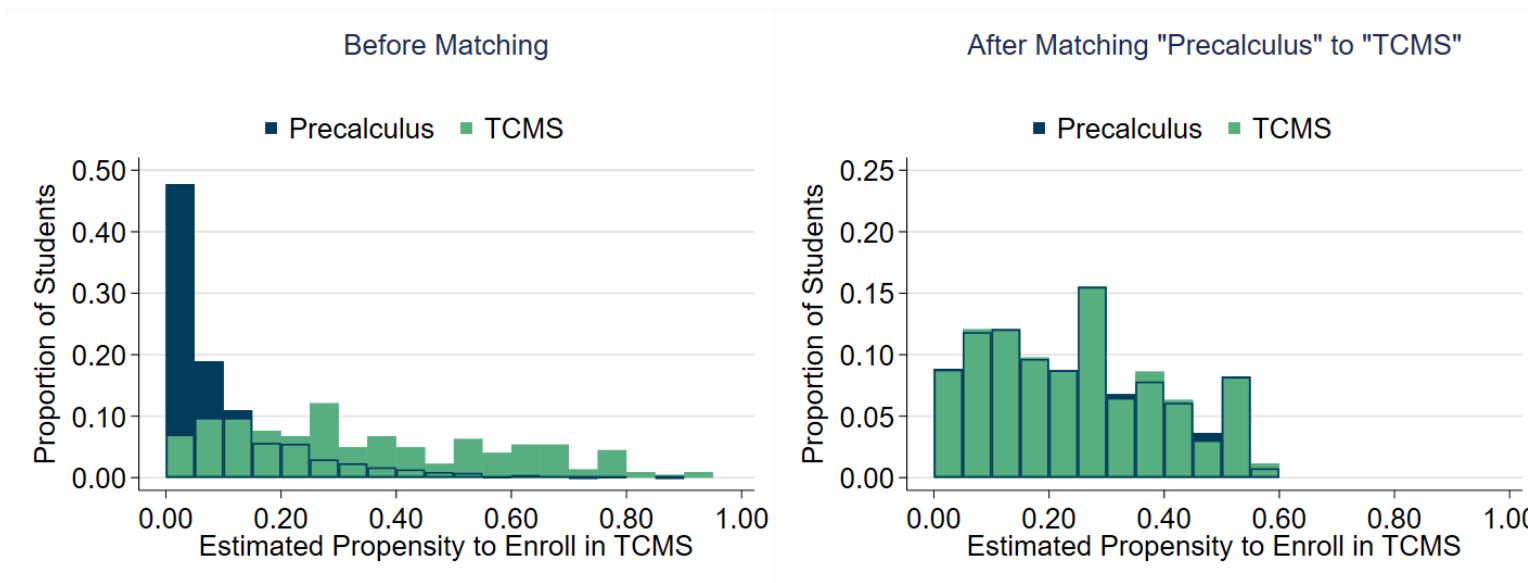
See the note on the first page of the table.

Table C39 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,621)	TCMS (N=263)	SMD	VR	Precalculus (N=541)	TCMS (N=213)	SMD	VR
Indicator of 2016-17 Cohort	0.508	0.798	0.641	0.646	0.752	0.756	0.008	0.992

See the note on the first page of the table.

Figure C40. Community College Distributions of Estimated Propensities of Taking TCMS over Precalculus in Group 4 Before and After Matching for Students who Took a Math Course in the First Two Years, 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 C40. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,414)	TCMS (N=223)	SMD	VR	Precalculus (N=451)	TCMS (N=174)	SMD	VR
Age (in Months)	195.076	194.734	-0.069	0.820	194.442	194.615	0.038	0.962
Gender: Female	0.496	0.556	0.119	0.991	0.531	0.540	0.018	1.000
Race/Ethnicity: Asian	-	-	-0.074	0.584	-	-	0.048	1.495
Race/Ethnicity: African American	0.075	0.054	-0.086	0.737	-	-	-0.044	0.824
Race/Ethnicity: Latinx	0.810	0.861	0.138	0.780	0.881	0.862	-0.055	1.133
Race/Ethnicity: Filipinx	-	-	-0.062	0.699	-	-	-0.025	0.838

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C40 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,414)	TCMS (N=223)	SMD	VR	Precalculus (N=451)	TCMS (N=174)	SMD	VR
Race/Ethnicity: White	-	-	-0.071	0.728	-	-	0.128	1.990
Race/Ethnicity: Other	-	-	0.040	1.463	-	-	0.016	1.132
Ever Subsidized Meal Eligible from 9th-11th	-	-	0.080	0.729	-	-	0.023	0.904
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.106	0.306	-	-	-0.028	0.717
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.250	0.305	0.122	1.134	0.295	0.282	-0.030	0.974
Parents'/Guardians' Educational Attainment: HS Graduate	0.218	0.251	0.079	1.108	0.224	0.264	0.095	1.123
Parents'/Guardians' Educational Attainment: Some College	0.118	0.139	0.062	1.153	0.161	0.144	-0.049	0.911

See the note on the first page of the table.

Table C40 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,414)	TCMS (N=223)	SMD	VR	Precalculus (N=451)	TCMS (N=174)	SMD	VR
Parents'/Guardians' Educational Attainment: College Graduate	-	-	-0.100	0.679	-	-	0.006	1.030
Parents'/Guardians' Educational Attainment: Graduate School	-	-	-0.100	0.497	-	-	-0.030	0.774
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.318	0.247	-0.159	0.860	0.266	0.259	-0.017	0.984
Nonresident School Enrollment in 11th	0.262	0.247	-0.036	0.964	0.236	0.236	-0.002	1.000
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.083	0.377	-	-	-0.051	0.559
Number of School Moves from 9th- 11th	0.076	0.090	0.051	1.098	0.093	0.097	0.012	0.741
Missing Dummy: Number of School Moves from 9th- 11th	0.081	0.067	-0.051	0.850	0.061	0.075	0.056	1.218

See the note on the first page of the table.

Table C40 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,414)	TCMS (N=223)	SMD	VR	Precalculus (N=451)	TCMS (N=174)	SMD	VR
English Learner Status in 11th: English Only	0.250	0.269	0.043	1.052	0.257	0.253	-0.009	0.992
English Learner Status in 11th: Initial Fluent English Proficient	0.137	0.117	-0.062	0.873	0.113	0.132	0.059	1.148
English Learner Status in 11th: Limited English Proficient	-	-	0.009	1.043	-	-	-0.042	0.819
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.565	0.565	0.000	1.004	0.588	0.580	-0.015	1.007
Gifted and Talented Program Participation in 11th	0.103	0.094	-0.028	0.930	0.100	0.092	-0.027	0.930
Math 11th Grade Weighted GPA	2.705	2.382	-0.428	0.885	2.392	2.428	0.050	1.086
Cumulative Overall Weighted GPA at the End of 11th	2.901	2.660	-0.471	0.881	2.738	2.726	-0.025	1.025

See the note on the first page of the table.

Table C40 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,414)	TCMS (N=223)	SMD	VR	Precalculus (N=451)	TCMS (N=174)	SMD	VR
Standardized ELA SBAC Score in 11th	0.115	0.065	-0.074	0.807	0.072	0.077	0.007	1.097
Standardized Math SBAC Score in 11th	0.078	-0.057	-0.211	0.906	-0.031	0.007	0.063	0.978
Number of Semesters of AP Classes Taken from 9th-11th	1.651	0.924	-0.397	0.566	1.027	1.058	0.019	1.063
Science Credits Accumulated from 9th-11th	32.089	31.644	-0.047	1.007	31.833	31.447	-0.042	0.990
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.010	0.950	-	-	0.108	1.843
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.617	0.552	-0.060	0.986	0.480	0.569	0.088	1.036
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.251	0.350	0.140	1.413	0.239	0.293	0.080	1.211

See the note on the first page of the table.

Table C40 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,414)	TCMS (N=223)	SMD	VR	Precalculus (N=451)	TCMS (N=174)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.211	0.179	-0.051	1.014	0.155	0.195	0.074	1.045
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.088	0.121	0.077	1.621	0.089	0.080	-0.022	0.853
Highest ERW PSAT Score by the End of 11th	424.505	412.935	-0.187	0.900	413.572	414.478	0.015	1.057
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.077	0.063	-0.056	0.830	0.049	0.075	0.105	1.475
Highest Math PSAT Score by the End of 11th	428.923	418.293	-0.179	0.825	419.598	417.645	-0.032	0.967
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.068	0.063	-0.021	0.933	0.049	0.075	0.105	1.475
Took the SAT or ACT before 12th	0.346	0.188	-0.361	0.678	0.236	0.213	-0.056	0.931

See the note on the first page of the table.

Table C40 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,414)	TCMS (N=223)	SMD	VR	Precalculus (N=451)	TCMS (N=174)	SMD	VR
Participation in the AVID Program in 11th	-	-	-0.133	0.494	-	-	-0.017	0.914
Took a College or Career Seminar Course in 11th	0.213	0.193	-0.050	0.932	0.183	0.218	0.089	1.145
Ever Attended STEM-Focused School from 9th-12th	0.171	0.220	0.123	1.213	0.166	0.190	0.061	1.110
Math 11th Grade Weighted GPA (Squared)	7.915	6.205	-0.422	0.765	6.222	6.439	0.057	1.126
Cumulative Overall Weighted GPA at the End of 11th (Squared)	8.698	7.320	-0.474	0.768	7.735	7.674	-0.022	1.014
Standardized ELA SBAC Score in 11th (Squared)	0.521	0.412	-0.162	0.915	0.423	0.463	0.059	1.227
Standardized Math SBAC Score in 11th (Squared)	0.439	0.394	-0.074	1.016	0.363	0.353	-0.019	1.402

See the note on the first page of the table.

Table C40 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,414)	TCMS (N=223)	SMD	VR	Precalculus (N=451)	TCMS (N=174)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	7.010	3.271	-0.341	0.368	3.668	3.893	0.025	0.973
Science Credits Accumulated from 9th-11th (Squared)	1,117.942	1,089.852	-0.041	0.885	1,096.258	1,070.759	-0.039	0.938
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.554	1.457	-0.024	1.079	1.234	1.362	0.036	0.734
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.473	0.700	0.118	1.696	0.466	0.580	0.062	1.266
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.439	0.430	-0.004	1.625	0.318	0.345	0.016	0.598
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.151	0.247	0.087	2.498	0.162	0.138	-0.033	0.704
Highest ERW PSAT Score by the End of 11th (Squared)	184,222.030	174,117.300	-0.191	0.823	174,468.528	175,405.481	0.019	1.015

See the note on the first page of the table.

Table C40 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,414)	TCMS (N=223)	SMD	VR	Precalculus (N=451)	TCMS (N=174)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	187,818.557	178,129.221	-0.196	0.833	179,785.376	178,018.272	-0.036	1.060
Work Effort GPA in 11th	2.456	2.370	-0.277	0.955	2.391	2.387	-0.015	1.136
Cooperation GPA in 11th	2.610	2.540	-0.274	0.924	2.560	2.553	-0.030	1.038
Attendance Rate in 11th	0.969	0.969	-0.008	1.001	0.971	0.969	-0.059	1.446
Ever Suspended from 9th-11th	-	-	0.055	1.726	-	-	-0.027	0.794
Educational Expectations in 11th: Unsure	0.081	0.094	0.045	1.146	0.080	0.086	0.022	1.072
Educational Expectations in 11th: HS or Less	0.021	0.058	0.195	2.743	-	-	0.004	1.024

See the note on the first page of the table.

Table C40 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,414)	TCMS (N=223)	SMD	VR	Precalculus (N=451)	TCMS (N=174)	SMD	VR
Educational Expectations in 11th: Associate Degree or Certificate	0.059	0.081	0.083	1.333	0.073	0.069	-0.015	0.952
Educational Expectations in 11th: Bachelor's Degree or Higher	0.573	0.543	-0.061	1.018	0.546	0.580	0.069	0.985
Educational Expectations in 11th: Missing	0.266	0.224	-0.097	0.894	0.267	0.230	-0.086	0.906
Growth Mindset in 11th	0.079	0.058	-0.026	1.140	0.152	0.118	-0.041	1.222
Missing Dummy: Growth Mindset in 11th	0.257	0.206	-0.120	0.861	0.260	0.218	-0.097	0.889
Academic Self-Efficacy in 11th	0.098	-0.031	-0.153	1.094	-0.018	0.003	0.024	1.092
Missing Dummy: Academic Self-Efficacy in 11th	0.255	0.206	-0.116	0.864	0.260	0.218	-0.097	0.889

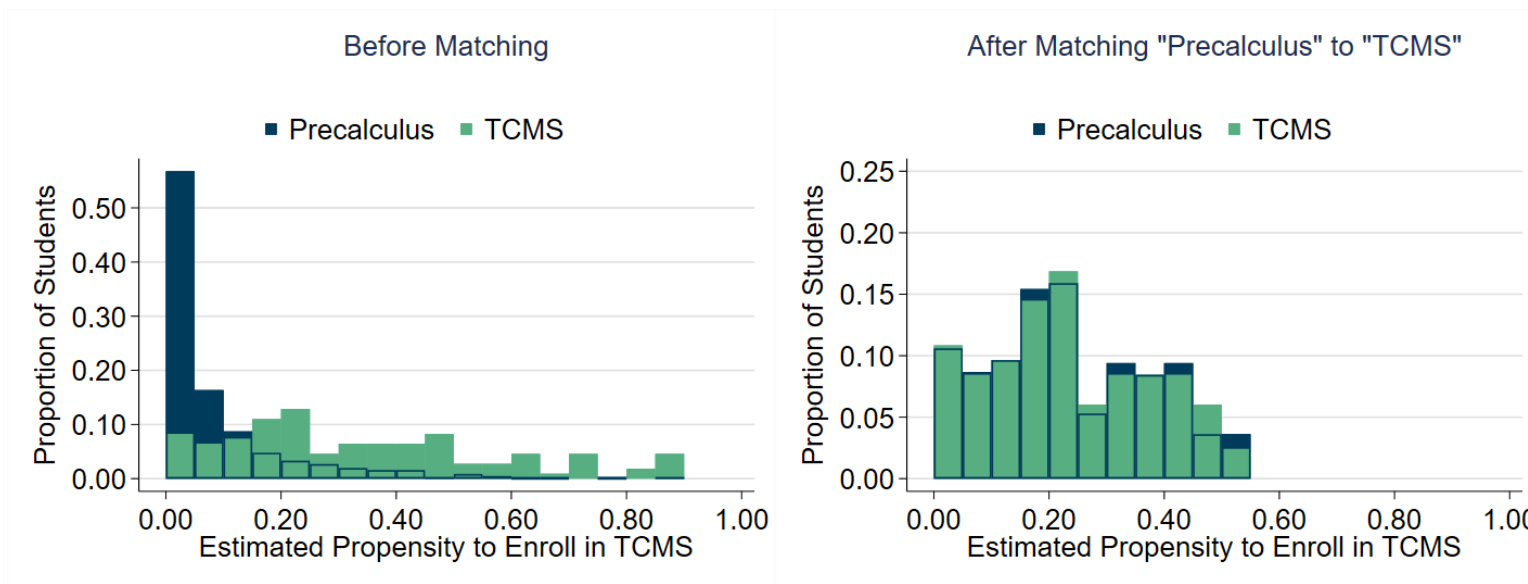
See the note on the first page of the table.

Table C40 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=1,414)	TCMS (N=223)	SMD	VR	Precalculus (N=451)	TCMS (N=174)	SMD	VR
Indicator of 2016-17 Cohort	0.511	0.789	0.609	0.668	0.742	0.730	-0.028	1.033

See the note on the first page of the table.

Figure C41. Community College Distributions of Estimated Propensities of Taking TCMS over Precalculus in Group 4 Before and After Matching for Students with Non-Missing Non-Math STEM GPAs, 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 C41. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=814)	TCMS (N=109)	SMD	VR	Precalculus (N=220)	TCMS (N=83)	SMD	VR
Age (in Months)	195.019	194.319	-0.141	0.778	194.569	194.510	-0.013	1.145
Gender: Female	0.516	0.541	0.051	1.002	0.512	0.530	0.035	1.002
Race/Ethnicity: Asian	-	-	-0.154	0.308	-	-	0.079	2.494
Race/Ethnicity: African American	-	-	0.017	1.071	-	-	0.019	1.091
Race/Ethnicity: Latinx	0.791	0.826	0.088	0.878	0.837	0.831	-0.014	1.030
Race/Ethnicity: Filipinx	-	-	-0.149	0.430	-	-	-0.067	0.689

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C41 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=814)	TCMS (N=109)	SMD	VR	Precalculus (N=220)	TCMS (N=83)	SMD	VR
Race/Ethnicity: White	-	-	0.043	1.167	-	-	0.023	1.086
Race/Ethnicity: Other	-	-	-0.019	0.838	-	-	-0.004	0.973
Ever Subsidized Meal Eligible from 9th-11th	-	-	0.081	0.756	-	-	-0.084	1.367
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.041	0.687	-	-	0.155	Inf
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.238	0.312	0.165	1.192	0.311	0.253	-0.129	0.886
Parents'/Guardians' Educational Attainment: HS Graduate	0.208	0.257	0.117	1.170	0.251	0.241	-0.022	0.979
Parents'/Guardians' Educational Attainment: Some College	0.128	0.165	0.106	1.247	0.180	0.193	0.033	1.060

See the note on the first page of the table.

Table C41 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=814)	TCMS (N=109)	SMD	VR	Precalculus (N=220)	TCMS (N=83)	SMD	VR
Parents'/Guardians' Educational Attainment: College Graduate	-	-	-0.103	0.704	-	-	0.165	2.204
Parents'/Guardians' Educational Attainment: Graduate School	-	-	-0.087	0.587	-	-	0.051	1.425
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.313	0.193	-0.280	0.729	0.215	0.229	0.034	1.051
Nonresident School Enrollment in 11th	0.310	0.284	-0.055	0.960	0.278	0.301	0.050	1.053
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.030	0.755	-	-	0.079	2.494
Number of School Moves from 9th- 11th	0.076	0.101	0.082	1.306	0.072	0.105	0.110	1.697
Missing Dummy: Number of School Moves from 9th- 11th	-	-	-0.056	0.836	-	-	0.042	1.184

See the note on the first page of the table.

Table C41 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=814)	TCMS (N=109)	SMD	VR	Precalculus (N=220)	TCMS (N=83)	SMD	VR
English Learner Status in 11th: English Only	0.242	0.239	-0.008	0.998	0.167	0.229	0.156	1.277
English Learner Status in 11th: Initial Fluent English Proficient	0.146	0.165	0.052	1.113	0.164	0.181	0.043	1.083
English Learner Status in 11th: Limited English Proficient	-	-	0.039	1.204	-	-	-0.124	0.412
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.574	0.550	-0.047	1.020	0.639	0.578	-0.124	1.062
Gifted and Talented Program Participation in 11th	0.123	0.110	-0.040	0.916	-	-	0.031	1.082
Math 11th Grade Weighted GPA	2.809	2.365	-0.581	0.866	2.425	2.455	0.039	1.190
Cumulative Overall Weighted GPA at the End of 11th	3.022	2.723	-0.570	0.981	2.761	2.809	0.092	0.841

See the note on the first page of the table.

Table C41 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=814)	TCMS (N=109)	SMD	VR	Precalculus (N=220)	TCMS (N=83)	SMD	VR
Standardized ELA SBAC Score in 11th	0.230	0.110	-0.179	0.925	0.122	0.131	0.013	0.939
Standardized Math SBAC Score in 11th	0.182	0.029	-0.242	1.091	0.083	0.065	-0.030	0.948
Number of Semesters of AP Classes Taken from 9th-11th	1.893	1.244	-0.324	0.710	1.558	1.367	-0.093	0.715
Science Credits Accumulated from 9th-11th	32.350	31.746	-0.064	1.045	31.587	32.307	0.071	0.868
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	-0.014	0.944	-	-	0.041	1.247
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.490	0.413	-0.080	0.910	0.412	0.398	-0.018	1.091
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.189	0.284	0.158	1.285	0.302	0.229	-0.114	0.840

See the note on the first page of the table.

Table C41 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=814)	TCMS (N=109)	SMD	VR	Precalculus (N=220)	TCMS (N=83)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.163	0.156	-0.012	1.545	0.129	0.133	0.009	0.924
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.072	0.101	0.073	1.239	0.079	0.048	-0.100	0.607
Highest ERW PSAT Score by the End of 11th	432.545	420.109	-0.194	0.890	421.153	419.477	-0.027	1.186
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	-0.042	0.861	-	-	0.064	1.302
Highest Math PSAT Score by the End of 11th	434.750	427.848	-0.110	0.935	425.676	423.690	-0.032	0.973
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	0.004	1.025	-	-	0.064	1.302
Took the SAT or ACT before 12th	0.378	0.183	-0.443	0.642	0.200	0.217	0.041	1.067

See the note on the first page of the table.

Table C41 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=814)	TCMS (N=109)	SMD	VR	Precalculus (N=220)	TCMS (N=83)	SMD	VR
Participation in the AVID Program in 11th	-	-	-0.131	0.467	-	-	0.000	1.005
Took a College or Career Seminar Course in 11th	0.197	0.193	-0.010	0.993	0.263	0.253	-0.023	0.979
Ever Attended STEM-Focused School from 9th-12th	0.179	0.229	0.124	1.210	0.228	0.241	0.030	1.044
Math 11th Grade Weighted GPA (Squared)	8.515	6.130	-0.573	0.711	6.381	6.616	0.060	1.187
Cumulative Overall Weighted GPA at the End of 11th (Squared)	9.411	7.687	-0.567	0.826	7.916	8.135	0.075	0.867
Standardized ELA SBAC Score in 11th (Squared)	0.518	0.439	-0.118	0.933	0.480	0.452	-0.043	0.911
Standardized Math SBAC Score in 11th (Squared)	0.415	0.414	-0.002	0.887	0.365	0.342	-0.051	0.637

See the note on the first page of the table.

Table C41 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=814)	TCMS (N=109)	SMD	VR	Precalculus (N=220)	TCMS (N=83)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	8.255	4.839	-0.282	0.442	7.301	5.336	-0.152	0.420
Science Credits Accumulated from 9th-11th (Squared)	1,133.247	1,097.672	-0.050	1.023	1,107.061	1,138.143	0.039	0.796
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.220	1.055	-0.043	1.120	0.812	0.855	0.019	0.930
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.354	0.486	0.092	1.086	0.533	0.422	-0.074	1.030
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.328	0.486	0.057	3.723	0.220	0.205	-0.014	0.352
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.139	0.174	0.043	0.767	0.122	0.072	-0.086	0.468
Highest ERW PSAT Score by the End of 11th (Squared)	191,427.419	180,315.824	-0.200	0.806	180,763.141	179,967.719	-0.015	1.069

See the note on the first page of the table.

Table C41 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=814)	TCMS (N=109)	SMD	VR	Precalculus (N=220)	TCMS (N=83)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	193,040.814	186,796.525	-0.120	0.912	185,152.612	183,341.980	-0.036	0.893
Work Effort GPA in 11th	2.519	2.418	-0.328	1.045	2.406	2.450	0.136	0.855
Cooperation GPA in 11th	2.664	2.579	-0.331	1.224	2.583	2.616	0.125	0.927
Attendance Rate in 11th	0.970	0.970	-0.009	0.803	0.971	0.971	0.003	0.935
Ever Suspended from 9th-11th	-	-	0.020	1.252	-	-	0.049	1.666
Educational Expectations in 11th: Unsure	-	-	-0.020	0.946	-	-	-0.012	0.963
Educational Expectations in 11th: HS or Less	-	-	0.182	3.037	-	-	-0.187	0.477

See the note on the first page of the table.

Table C41 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=814)	TCMS (N=109)	SMD	VR	Precalculus (N=220)	TCMS (N=83)	SMD	VR
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.056	1.274	-	-	-0.012	0.963
Educational Expectations in 11th: Bachelor's Degree or Higher	0.620	0.596	-0.049	1.030	0.612	0.602	-0.019	1.013
Educational Expectations in 11th: Missing	0.243	0.229	-0.033	0.968	0.182	0.241	0.143	1.233
Growth Mindset in 11th	0.120	0.019	-0.127	0.939	0.103	0.086	-0.022	0.768
Missing Dummy: Growth Mindset in 11th	0.240	0.220	-0.046	0.950	0.170	0.241	0.175	1.301
Academic Self-Efficacy in 11th	0.105	-0.036	-0.172	0.895	-0.027	-0.012	0.017	0.750
Missing Dummy: Academic Self-Efficacy in 11th	0.238	0.220	-0.043	0.953	0.175	0.241	0.162	1.272

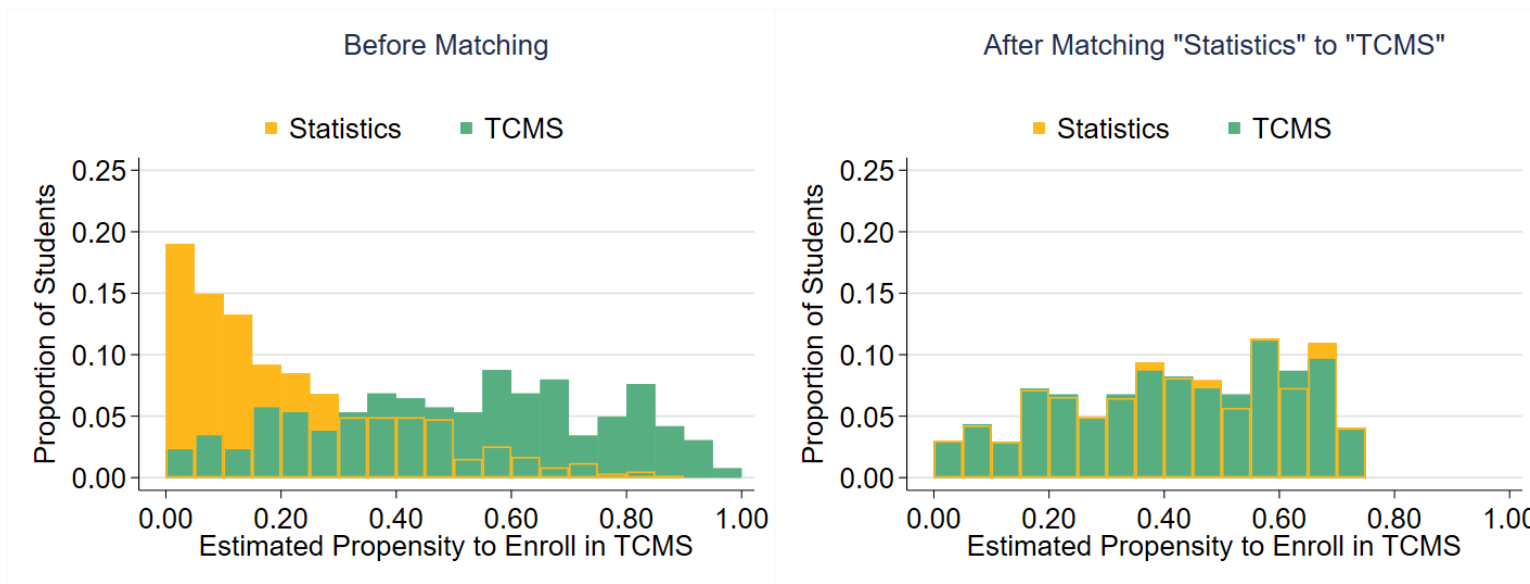
See the note on the first page of the table.

Table C41 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Precalculus in Group 4 for Students with Non-Missing Non-Math STEM GPAs, Using School-Cohort Controls

	Before Matching				After Matching "Precalculus" to "TCMS"			
	Precalculus (N=814)	TCMS (N=109)	SMD	VR	Precalculus (N=220)	TCMS (N=83)	SMD	VR
Indicator of 2016-17 Cohort	0.525	0.826	0.678	0.582	0.776	0.783	0.017	0.982

See the note on the first page of the table.

Figure C42. Community College 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 C42. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=589)	TCMS (N=263)	SMD	VR	Statistics (N=333)	TCMS (N=207)	SMD	VR
Age (in Months)	195.072	194.972	-0.019	1.128	195.209	195.097	-0.021	1.014
Gender: Female	0.486	0.548	0.124	0.994	0.542	0.517	-0.050	1.004
Race/Ethnicity: Asian	-	-	-0.105	0.455	-	-	0.044	1.489
Race/Ethnicity: African American	0.104	0.068	-0.125	0.688	0.083	0.072	-0.040	0.878
Race/Ethnicity: Latinx	0.779	0.844	0.166	0.767	0.809	0.836	0.069	0.887
Race/Ethnicity: Filipinx	-	-	-0.119	0.498	-	-	-0.121	0.449

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C42 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=589)	TCMS (N=263)	SMD	VR	Statistics (N=333)	TCMS (N=207)	SMD	VR
Race/Ethnicity: White	0.044	0.046	0.007	1.034	-	-	-0.036	0.864
Race/Ethnicity: Other	-	-	0.029	1.343	-	-	0.054	1.653
Ever Subsidized Meal Eligible from 9th-11th	0.915	0.943	0.109	0.694	0.926	0.942	0.063	0.799
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.085	0.453	-	-	-0.059	0.591
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.258	0.308	0.111	1.115	0.313	0.300	-0.028	0.974
Parents'/Guardians' Educational Attainment: HS Graduate	0.214	0.236	0.052	1.074	0.255	0.246	-0.020	0.975
Parents'/Guardians' Educational Attainment: Some College	0.136	0.144	0.025	1.055	0.102	0.135	0.102	1.270

See the note on the first page of the table.

Table C42 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=589)	TCMS (N=263)	SMD	VR	Statistics (N=333)	TCMS (N=207)	SMD	VR
Parents'/Guardians' Educational Attainment: College Graduate	0.095	0.053	-0.160	0.587	-	-	-0.041	0.853
Parents'/Guardians' Educational Attainment: Graduate School	-	-	-0.083	0.568	-	-	0.035	1.355
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.270	0.243	-0.061	0.936	0.257	0.251	-0.012	0.984
Nonresident School Enrollment in 11th	0.389	0.259	-0.281	0.808	0.270	0.285	0.032	1.031
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.077	0.376	-	-	-0.066	0.456
Number of School Moves from 9th- 11th	0.057	0.091	0.136	1.774	0.087	0.082	-0.020	1.066
Missing Dummy: Number of School Moves from 9th- 11th	0.063	0.076	0.052	1.196	0.061	0.063	0.007	1.025

See the note on the first page of the table.

Table C42 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=589)	TCMS (N=263)	SMD	VR	Statistics (N=333)	TCMS (N=207)	SMD	VR
English Learner Status in 11th: English Only	0.297	0.274	-0.052	0.954	0.309	0.271	-0.084	0.922
English Learner Status in 11th: Initial Fluent English Proficient	0.148	0.114	-0.100	0.804	0.130	0.130	0.001	1.001
English Learner Status in 11th: Limited English Proficient	0.022	0.053	0.164	2.340	-	-	0.033	1.197
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.533	0.559	0.052	0.993	0.533	0.565	0.064	0.985
Gifted and Talented Program Participation in 11th	0.132	0.087	-0.144	0.696	0.086	0.082	-0.014	0.958
Math 11th Grade Weighted GPA	2.485	2.367	-0.151	0.823	2.387	2.382	-0.007	1.021
Cumulative Overall Weighted GPA at the End of 11th	2.754	2.663	-0.171	0.904	2.724	2.687	-0.073	0.931

See the note on the first page of the table.

Table C42 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=589)	TCMS (N=263)	SMD	VR	Statistics (N=333)	TCMS (N=207)	SMD	VR
Standardized ELA SBAC Score in 11th	0.139	0.037	-0.143	0.739	0.074	0.041	-0.052	1.164
Standardized Math SBAC Score in 11th	0.010	-0.089	-0.149	0.790	-0.140	-0.049	0.149	1.120
Number of Semesters of AP Classes Taken from 9th-11th	1.679	0.952	-0.373	0.498	1.096	1.063	-0.020	1.131
Science Credits Accumulated from 9th-11th	31.859	31.552	-0.034	1.132	32.192	31.578	-0.068	0.988
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	0.013	1.066	-	-	-0.003	0.982
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.722	0.624	-0.084	0.892	0.561	0.575	0.014	0.924
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.312	0.331	0.026	1.106	0.269	0.300	0.047	1.170

See the note on the first page of the table.

Table C42 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=589)	TCMS (N=263)	SMD	VR	Statistics (N=333)	TCMS (N=207)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.197	0.221	0.037	1.434	0.197	0.174	-0.041	0.839
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.119	0.118	-0.002	1.381	0.063	0.087	0.072	1.361
Highest ERW PSAT Score by the End of 11th	433.298	412.395	-0.319	0.757	413.800	414.701	0.014	1.037
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.039	0.057	0.084	1.436	-	-	0.099	1.617
Highest Math PSAT Score by the End of 11th	429.412	416.839	-0.218	0.868	414.063	418.369	0.075	1.142
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.037	0.057	0.093	1.499	-	-	0.099	1.617
Took the SAT or ACT before 12th	0.307	0.186	-0.283	0.714	0.183	0.208	0.061	1.096

See the note on the first page of the table.

Table C42 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=589)	TCMS (N=263)	SMD	VR	Statistics (N=333)	TCMS (N=207)	SMD	VR
Participation in the AVID Program in 11th	-	-	-0.064	0.727	-	-	0.115	1.956
Took a College or Career Seminar Course in 11th	0.177	0.213	0.092	1.155	0.222	0.208	-0.034	0.951
Ever Attended STEM-Focused School from 9th-12th	0.183	0.213	0.074	1.122	0.126	0.164	0.108	1.244
Math 11th Grade Weighted GPA (Squared)	6.835	6.147	-0.171	0.809	6.239	6.228	-0.003	1.060
Cumulative Overall Weighted GPA at the End of 11th (Squared)	7.878	7.359	-0.176	0.857	7.689	7.470	-0.077	0.891
Standardized ELA SBAC Score in 11th (Squared)	0.600	0.429	-0.224	0.650	0.389	0.449	0.087	1.238
Standardized Math SBAC Score in 11th (Squared)	0.488	0.392	-0.149	0.746	0.367	0.393	0.046	1.420

See the note on the first page of the table.

Table C42 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=589)	TCMS (N=263)	SMD	VR	Statistics (N=333)	TCMS (N=207)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	7.876	3.419	-0.324	0.204	3.704	3.968	0.030	1.069
Science Credits Accumulated from 9th-11th (Squared)	1,092.846	1,083.471	-0.014	1.096	1,116.611	1,076.749	-0.060	0.990
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.971	1.681	-0.057	0.676	1.434	1.367	-0.016	0.564
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.587	0.650	0.033	1.383	0.465	0.551	0.052	1.533
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.377	0.532	0.068	3.072	0.382	0.319	-0.040	0.734
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.183	0.247	0.059	2.912	0.098	0.135	0.063	1.368
Highest ERW PSAT Score by the End of 11th (Squared)	192,616.630	173,749.285	-0.327	0.641	175,078.229	175,976.528	0.017	0.969

See the note on the first page of the table.

Table C42 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=589)	TCMS (N=263)	SMD	VR	Statistics (N=333)	TCMS (N=207)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	187,935.503	176,823.016	-0.230	0.842	174,503.775	178,530.767	0.086	1.263
Work Effort GPA in 11th	2.408	2.375	-0.101	0.939	2.377	2.371	-0.021	1.011
Cooperation GPA in 11th	2.578	2.545	-0.125	0.861	2.532	2.550	0.066	0.873
Attendance Rate in 11th	0.970	0.968	-0.062	1.436	0.968	0.967	-0.009	1.729
Ever Suspended from 9th-11th	-	-	-0.020	0.843	-	-	0.064	1.858
Educational Expectations in 11th: Unsure	0.093	0.091	-0.007	0.982	0.079	0.106	0.094	1.304
Educational Expectations in 11th: HS or Less	0.024	0.053	0.153	2.177	-	-	-0.036	0.870

See the note on the first page of the table.

Table C42 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=589)	TCMS (N=263)	SMD	VR	Statistics (N=333)	TCMS (N=207)	SMD	VR
Educational Expectations in 11th: Associate Degree or Certificate	0.032	0.095	0.259	2.761	-	-	-0.028	0.890
Educational Expectations in 11th: Bachelor's Degree or Higher	0.559	0.532	-0.053	1.012	0.507	0.541	0.067	0.991
Educational Expectations in 11th: Missing	0.292	0.228	-0.146	0.854	0.298	0.251	-0.104	0.898
Growth Mindset in 11th	0.030	0.064	0.042	1.050	0.051	0.029	-0.026	1.080
Missing Dummy: Growth Mindset in 11th	0.278	0.213	-0.152	0.836	0.286	0.242	-0.101	0.895
Academic Self-Efficacy in 11th	-0.065	-0.037	0.035	1.093	-0.031	-0.070	-0.046	0.939
Missing Dummy: Academic Self-Efficacy in 11th	0.275	0.213	-0.145	0.842	0.284	0.242	-0.096	0.899

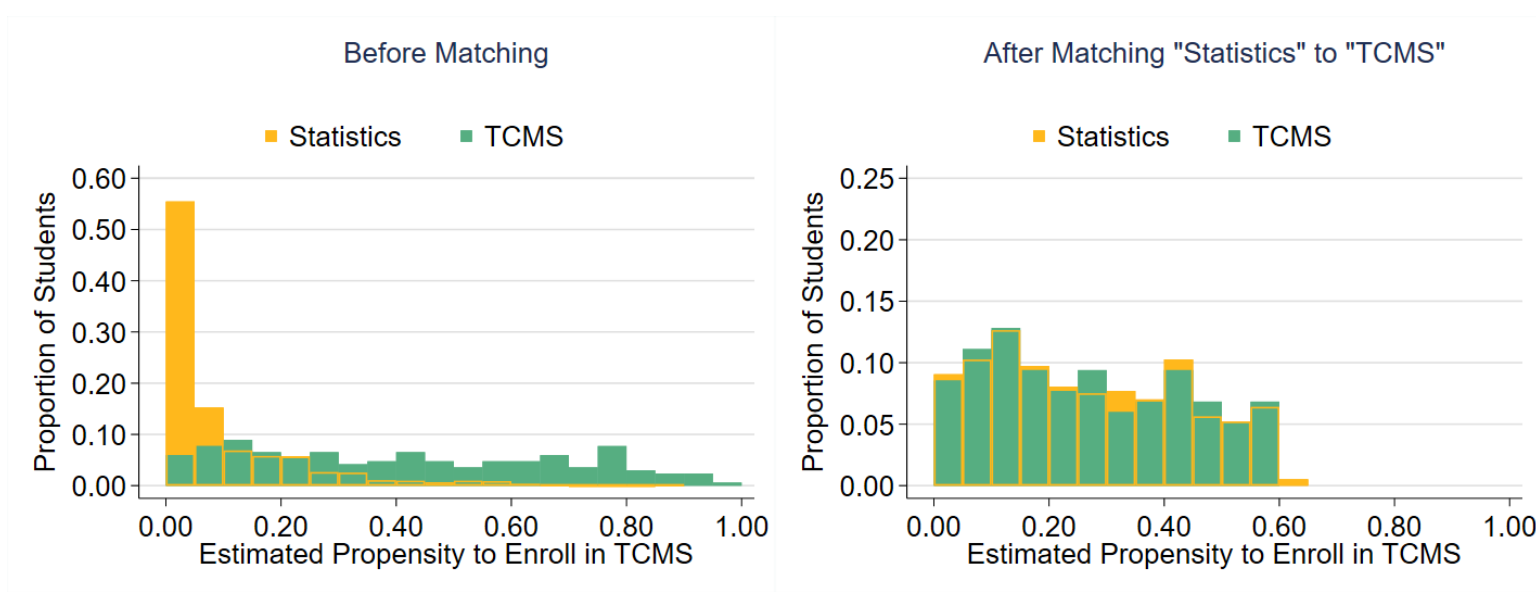
See the note on the first page of the table.

Table C42 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=589)	TCMS (N=263)	SMD	VR	Statistics (N=333)	TCMS (N=207)	SMD	VR
Indicator of 2016-17 Cohort	0.593	0.798	0.459	0.668	0.775	0.763	-0.027	1.032

See the note on the first page of the table.

Figure C43. Community College 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 C43. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,017)	TCMS (N=168)	SMD	VR	Statistics (N=282)	TCMS (N=117)	SMD	VR
Age (in Months)	194.610	195.179	0.117	1.387	195.013	195.234	0.042	1.283
Gender: Female	0.547	0.560	0.026	0.999	0.584	0.573	-0.023	1.011
Race/Ethnicity: Asian	-	-	-0.169	0.434	-	-	-0.061	0.752
Race/Ethnicity: African American	-	-	-0.170	0.472	-	-	-0.009	0.957
Race/Ethnicity: Latinx	0.716	0.881	0.420	0.518	0.810	0.855	0.119	0.810
Race/Ethnicity: Filipinx	-	-	-0.271	0.200	-	-	-0.037	0.776

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C43 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,017)	TCMS (N=168)	SMD	VR	Statistics (N=282)	TCMS (N=117)	SMD	VR
Race/Ethnicity: White	-	-	-0.226	0.421	-	-	-0.117	0.660
Race/Ethnicity: Other	-	-	0.089	2.258	-	-	0.041	1.666
Ever Subsidized Meal Eligible from 9th-11th	-	-	0.223	0.453	-	-	0.055	0.794
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.161	0.000	-	-	N/A	N/A
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.220	0.357	0.305	1.344	0.290	0.333	0.094	1.083
Parents'/Guardians' Educational Attainment: HS Graduate	0.202	0.232	0.074	1.113	0.247	0.231	-0.037	0.958
Parents'/Guardians' Educational Attainment: Some College	0.135	0.155	0.057	1.128	0.149	0.137	-0.034	0.935

See the note on the first page of the table.

Table C43 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,017)	TCMS (N=168)	SMD	VR	Statistics (N=282)	TCMS (N=117)	SMD	VR
Parents'/Guardians' Educational Attainment: College Graduate	-	-	-0.249	0.469	-	-	-0.043	0.879
Parents'/Guardians' Educational Attainment: Graduate School	-	-	0.002	1.014	-	-	0.072	1.524
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.284	0.167	-0.284	0.686	0.204	0.188	-0.040	0.944
Nonresident School Enrollment in 11th	0.437	0.351	-0.175	0.931	0.392	0.410	0.037	1.018
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.094	0.384	-	-	0.131	Inf
Number of School Moves from 9th- 11th	0.062	0.069	0.028	0.983	0.087	0.072	-0.056	0.748
Missing Dummy: Number of School Moves from 9th- 11th	-	-	-0.017	0.904	-	-	-0.068	0.692

See the note on the first page of the table.

Table C43 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,017)	TCMS (N=168)	SMD	VR	Statistics (N=282)	TCMS (N=117)	SMD	VR
English Learner Status in 11th: English Only	0.316	0.232	-0.188	0.829	0.248	0.222	-0.060	0.930
English Learner Status in 11th: Initial Fluent English Proficient	0.187	0.232	0.111	1.179	0.230	0.205	-0.060	0.924
English Learner Status in 11th: Limited English Proficient	-	-	0.050	1.512	-	-	-0.013	0.913
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.486	0.518	0.064	1.005	0.503	0.556	0.104	0.991
Gifted and Talented Program Participation in 11th	0.301	0.214	-0.199	0.804	0.214	0.239	0.061	1.087
Math 11th Grade Weighted GPA	2.626	2.234	-0.326	0.795	2.404	2.324	-0.069	1.015
Cumulative Overall Weighted GPA at the End of 11th	3.105	2.969	-0.252	0.905	3.051	3.016	-0.067	1.020

See the note on the first page of the table.

Table C43 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,017)	TCMS (N=168)	SMD	VR	Statistics (N=282)	TCMS (N=117)	SMD	VR
Standardized ELA SBAC Score in 11th	0.477	0.245	-0.326	0.958	0.404	0.377	-0.038	0.841
Standardized Math SBAC Score in 11th	0.499	0.246	-0.397	0.618	0.347	0.337	-0.017	1.029
Number of Semesters of AP Classes Taken from 9th-11th	3.151	2.061	-0.396	0.890	2.638	2.615	-0.007	0.823
Science Credits Accumulated from 9th-11th	32.778	31.623	-0.139	0.829	31.490	32.222	0.093	1.135
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	0.041	1.515	-	-	-0.186	0.000
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.519	0.381	-0.147	0.563	0.364	0.436	0.086	1.310
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.167	0.190	0.044	1.028	0.178	0.162	-0.030	0.826

See the note on the first page of the table.

Table C43 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,017)	TCMS (N=168)	SMD	VR	Statistics (N=282)	TCMS (N=117)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.166	0.113	-0.111	0.536	0.111	0.111	0.000	1.069
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.038	0.083	0.150	2.284	0.063	0.051	-0.040	0.889
Highest ERW PSAT Score by the End of 11th	469.149	440.166	-0.417	0.871	453.968	451.851	-0.031	0.868
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	0.038	1.180	-	-	-0.077	0.729
Highest Math PSAT Score by the End of 11th	469.672	448.650	-0.327	0.891	456.032	452.105	-0.062	1.120
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	0.048	1.231	-	-	-0.077	0.729
Took the SAT or ACT before 12th	0.442	0.244	-0.427	0.752	0.293	0.308	0.033	1.032

See the note on the first page of the table.

Table C43 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,017)	TCMS (N=168)	SMD	VR	Statistics (N=282)	TCMS (N=117)	SMD	VR
Participation in the AVID Program in 11th	-	-	0.083	1.496	-	-	0.149	2.000
Took a College or Career Seminar Course in 11th	0.146	0.196	0.135	1.276	0.215	0.188	-0.067	0.907
Ever Attended STEM-Focused School from 9th-12th	0.199	0.196	-0.006	0.997	0.157	0.214	0.145	1.272
Took a Precalculus Course by the End of 11th	0.918	0.738	-0.491	2.592	0.891	0.872	-0.058	1.151
Took an IDS Course by the End of 11th	-	-	-0.052	0.744	-	-	0.028	1.249
Took a Statistics Course by the End of 11th	0.042	0.232	0.573	4.424	0.091	0.103	0.040	1.121
Took Other Advanced Math by the End of 11th	-	-	-0.012	0.870	-	-	0.041	1.666

See the note on the first page of the table.

Table C43 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,017)	TCMS (N=168)	SMD	VR	Statistics (N=282)	TCMS (N=117)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	8.502	6.264	-0.367	0.723	7.105	6.741	-0.065	1.074
Cumulative Overall Weighted GPA at the End of 11th (Squared)	9.943	9.090	-0.263	0.860	9.576	9.368	-0.066	0.993
Standardized ELA SBAC Score in 11th (Squared)	0.747	0.555	-0.240	0.678	0.727	0.615	-0.132	0.721
Standardized Math SBAC Score in 11th (Squared)	0.746	0.367	-0.513	0.291	0.420	0.421	0.002	0.989
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	17.923	11.329	-0.260	0.778	16.522	14.684	-0.062	0.641
Science Credits Accumulated from 9th-11th (Squared)	1,150.410	1,062.712	-0.146	0.617	1,048.862	1,102.991	0.100	1.062
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.392	0.774	-0.176	0.306	0.726	0.966	0.092	1.393

See the note on the first page of the table.

Table C43 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,017)	TCMS (N=168)	SMD	VR	Statistics (N=282)	TCMS (N=117)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.307	0.321	0.012	0.621	0.342	0.282	-0.048	0.639
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.327	0.173	-0.129	0.212	0.169	0.179	0.013	0.830
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.056	0.131	0.141	2.524	0.097	0.085	-0.022	0.970
Highest ERW PSAT Score by the End of 11th (Squared)	225,254.858	198,210.936	-0.421	0.756	211,092.982	208,501.031	-0.040	0.808
Highest Math PSAT Score by the End of 11th (Squared)	224,964.132	205,163.285	-0.336	0.819	211,711.693	208,583.627	-0.054	1.071
Work Effort GPA in 11th	2.488	2.451	-0.109	0.875	2.494	2.454	-0.123	1.208
Cooperation GPA in 11th	2.655	2.624	-0.116	0.987	2.650	2.617	-0.127	1.151

See the note on the first page of the table.

Table C43 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,017)	TCMS (N=168)	SMD	VR	Statistics (N=282)	TCMS (N=117)	SMD	VR
Attendance Rate in 11th	0.974	0.967	-0.170	2.055	0.969	0.970	0.019	0.897
Ever Suspended from 9th-11th	-	-	-0.077	0.000	-	-	N/A	N/A
Educational Expectations in 11th: Unsure	0.084	0.119	0.118	1.376	0.132	0.128	-0.013	0.975
Educational Expectations in 11th: HS or Less	-	-	-0.017	0.871	-	-	-0.131	0.000
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.123	1.901	-	-	0.113	1.730
Educational Expectations in 11th: Bachelor's Degree or Higher	0.631	0.607	-0.050	1.030	0.601	0.573	-0.057	1.024
Educational Expectations in 11th: Missing	0.247	0.214	-0.077	0.910	0.229	0.248	0.044	1.059

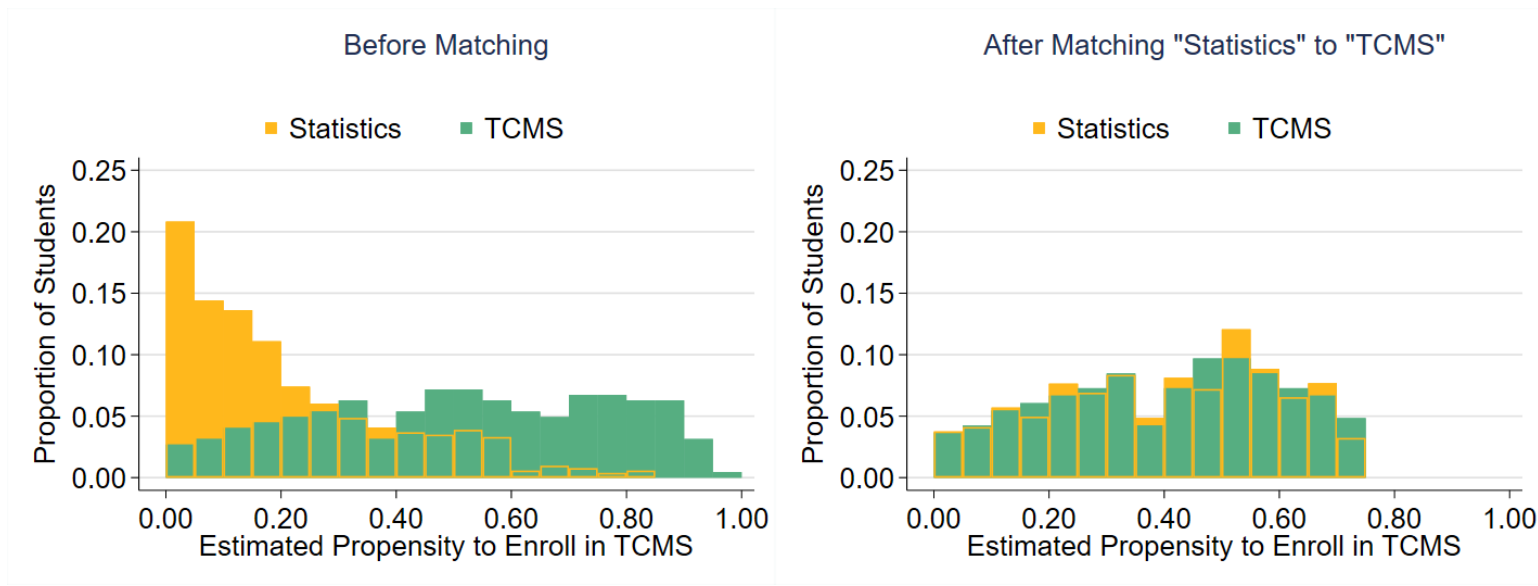
See the note on the first page of the table.

Table C43 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=1,017)	TCMS (N=168)	SMD	VR	Statistics (N=282)	TCMS (N=117)	SMD	VR
Growth Mindset in 11th	0.127	0.145	0.021	1.208	0.104	0.124	0.023	1.094
Missing Dummy: Growth Mindset in 11th	0.236	0.208	-0.066	0.919	0.215	0.239	0.057	1.080
Academic Self-Efficacy in 11th	-0.051	-0.074	-0.026	1.013	-0.153	-0.080	0.081	0.734
Missing Dummy: Academic Self-Efficacy in 11th	0.236	0.208	-0.066	0.919	0.215	0.239	0.057	1.080
Indicator of 2016-17 Cohort	0.488	0.798	0.682	0.649	0.800	0.778	-0.054	1.084

See the note on the first page of the table.

Figure C44. Community College Distributions of Estimated Propensities of Taking TCMS over Statistics in Group 4 Before and After Matching for Students who Took a Math Course in the First Two Years, 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 C44. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=514)	TCMS (N=223)	SMD	VR	Statistics (N=290)	TCMS (N=165)	SMD	VR
Age (in Months)	195.028	194.738	-0.059	0.880	194.876	194.883	0.002	0.838
Gender: Female	0.479	0.556	0.155	0.992	0.499	0.503	0.009	0.999
Race/Ethnicity: Asian	-	-	-0.074	0.584	-	-	0.049	1.489
Race/Ethnicity: African American	0.078	0.054	-0.097	0.711	-	-	0.078	1.372
Race/Ethnicity: Latinx	0.805	0.861	0.149	0.766	0.885	0.842	-0.124	1.304
Race/Ethnicity: Filipinx	-	-	-0.115	0.536	-	-	-0.050	0.719

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C44 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=514)	TCMS (N=223)	SMD	VR	Statistics (N=290)	TCMS (N=165)	SMD	VR
Race/Ethnicity: White	-	-	-0.045	0.811	-	-	0.122	1.858
Race/Ethnicity: Other	-	-	0.078	2.293	-	-	0.036	1.422
Ever Subsidized Meal Eligible from 9th-11th	-	-	0.123	0.627	-	-	0.073	0.753
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.080	0.388	-	-	0.000	0.999
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.267	0.309	0.095	1.096	0.335	0.297	-0.082	0.936
Parents'/Guardians' Educational Attainment: HS Graduate	0.226	0.247	0.049	1.066	0.225	0.261	0.083	1.105
Parents'/Guardians' Educational Attainment: Some College	0.132	0.139	0.020	1.045	0.131	0.133	0.006	1.011

See the note on the first page of the table.

Table C44 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=514)	TCMS (N=223)	SMD	VR	Statistics (N=290)	TCMS (N=165)	SMD	VR
Parents'/Guardians' Educational Attainment: College Graduate	-	-	-0.192	0.507	-	-	-0.009	0.964
Parents'/Guardians' Educational Attainment: Graduate School	-	-	-0.074	0.584	-	-	0.023	1.245
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.259	0.247	-0.028	0.971	0.242	0.242	0.001	1.000
Nonresident School Enrollment in 11th	0.377	0.247	-0.285	0.793	0.231	0.267	0.082	1.100
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.080	0.388	-	-	-0.074	0.457
Number of School Moves from 9th- 11th	0.050	0.090	0.163	2.011	0.067	0.076	0.038	1.358
Missing Dummy: Number of School Moves from 9th- 11th	0.049	0.067	0.080	1.359	0.060	0.067	0.028	1.105

See the note on the first page of the table.

Table C44 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=514)	TCMS (N=223)	SMD	VR	Statistics (N=290)	TCMS (N=165)	SMD	VR
English Learner Status in 11th: English Only	0.276	0.269	-0.016	0.986	0.244	0.261	0.039	1.044
English Learner Status in 11th: Initial Fluent English Proficient	0.154	0.117	-0.109	0.794	0.167	0.133	-0.094	0.829
English Learner Status in 11th: Limited English Proficient	-	-	0.151	2.245	-	-	0.116	2.231
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.549	0.565	0.033	0.995	0.576	0.576	0.000	0.999
Gifted and Talented Program Participation in 11th	0.134	0.094	-0.126	0.736	0.117	0.085	-0.107	0.750
Math 11th Grade Weighted GPA	2.490	2.382	-0.139	0.804	2.358	2.406	0.065	1.149
Cumulative Overall Weighted GPA at the End of 11th	2.748	2.665	-0.160	0.848	2.681	2.683	0.004	0.962

See the note on the first page of the table.

Table C44 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=514)	TCMS (N=223)	SMD	VR	Statistics (N=290)	TCMS (N=165)	SMD	VR
Standardized ELA SBAC Score in 11th	0.152	0.071	-0.119	0.766	0.119	0.046	-0.109	1.002
Standardized Math SBAC Score in 11th	0.032	-0.054	-0.132	0.863	-0.064	-0.019	0.072	1.067
Number of Semesters of AP Classes Taken from 9th-11th	1.676	0.942	-0.379	0.490	1.118	1.042	-0.046	1.060
Science Credits Accumulated from 9th-11th	32.385	31.644	-0.080	1.103	32.670	31.502	-0.128	0.837
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	0.002	1.011	-	-	0.034	1.191
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.720	0.556	-0.143	0.786	0.594	0.570	-0.023	0.924
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.307	0.350	0.058	1.232	0.283	0.333	0.074	1.295

See the note on the first page of the table.

Table C44 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=514)	TCMS (N=223)	SMD	VR	Statistics (N=290)	TCMS (N=165)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.200	0.179	-0.034	1.138	0.135	0.188	0.095	1.926
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.121	0.121	0.001	1.321	0.081	0.109	0.075	1.500
Highest ERW PSAT Score by the End of 11th	433.590	413.114	-0.313	0.721	416.487	415.927	-0.009	1.016
Missing Dummy: Highest ERW PSAT Score by the End of 11th	0.031	0.063	0.150	1.956	-	-	0.098	1.553
Highest Math PSAT Score by the End of 11th	429.745	418.563	-0.194	0.912	412.285	420.019	0.122	0.723
Missing Dummy: Highest Math PSAT Score by the End of 11th	0.029	0.063	0.161	2.082	-	-	0.098	1.553
Took the SAT or ACT before 12th	0.294	0.188	-0.248	0.739	0.181	0.218	0.094	1.151

See the note on the first page of the table.

Table C44 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=514)	TCMS (N=223)	SMD	VR	Statistics (N=290)	TCMS (N=165)	SMD	VR
Participation in the AVID Program in 11th	-	-	-0.133	0.494	-	-	0.037	1.241
Took a College or Career Seminar Course in 11th	0.158	0.197	0.104	1.196	0.181	0.182	0.003	1.004
Ever Attended STEM-Focused School from 9th-12th	0.185	0.220	0.087	1.141	0.146	0.164	0.047	1.093
Math 11th Grade Weighted GPA (Squared)	6.859	6.205	-0.163	0.798	6.061	6.367	0.082	1.267
Cumulative Overall Weighted GPA at the End of 11th (Squared)	7.847	7.350	-0.171	0.797	7.438	7.439	0.001	0.942
Standardized ELA SBAC Score in 11th (Squared)	0.560	0.415	-0.206	0.775	0.457	0.446	-0.016	1.303
Standardized Math SBAC Score in 11th (Squared)	0.457	0.395	-0.102	1.010	0.371	0.393	0.038	1.625

See the note on the first page of the table.

Table C44 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=514)	TCMS (N=223)	SMD	VR	Statistics (N=290)	TCMS (N=165)	SMD	VR
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	7.834	3.342	-0.333	0.219	3.909	3.907	0.000	0.808
Science Credits Accumulated from 9th-11th (Squared)	1,129.202	1,089.852	-0.059	0.976	1,157.812	1,068.223	-0.130	0.700
A-G "C" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	1.988	1.462	-0.104	0.533	1.575	1.455	-0.026	0.626
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.564	0.700	0.070	1.620	0.476	0.624	0.090	2.132
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.391	0.430	0.017	2.647	0.229	0.442	0.097	6.789
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.191	0.247	0.052	2.632	0.120	0.182	0.089	1.531
Highest ERW PSAT Score by the End of 11th (Squared)	192,964.331	174,235.686	-0.324	0.602	177,367.506	176,968.710	-0.007	0.913

See the note on the first page of the table.

Table C44 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=514)	TCMS (N=223)	SMD	VR	Statistics (N=290)	TCMS (N=165)	SMD	VR
Highest Math PSAT Score by the End of 11th (Squared)	188,148.352	178,349.849	-0.202	0.887	174,631.630	179,786.254	0.101	0.892
Work Effort GPA in 11th	2.417	2.373	-0.139	0.902	2.368	2.374	0.018	0.910
Cooperation GPA in 11th	2.588	2.543	-0.172	0.835	2.568	2.552	-0.060	0.919
Attendance Rate in 11th	0.970	0.969	-0.047	1.508	0.971	0.968	-0.087	1.844
Ever Suspended from 9th-11th	-	-	0.016	1.153	-	-	0.064	1.985
Educational Expectations in 11th: Unsure	0.093	0.094	0.003	1.010	0.118	0.109	-0.029	0.931
Educational Expectations in 11th: HS or Less	0.023	0.058	0.177	2.414	-	-	0.006	1.023

See the note on the first page of the table.

Table C44 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=514)	TCMS (N=223)	SMD	VR	Statistics (N=290)	TCMS (N=165)	SMD	VR
Educational Expectations in 11th: Associate Degree or Certificate	0.029	0.081	0.227	2.626	-	-	-0.062	0.769
Educational Expectations in 11th: Bachelor's Degree or Higher	0.580	0.543	-0.075	1.021	0.500	0.521	0.043	0.997
Educational Expectations in 11th: Missing	0.274	0.224	-0.116	0.876	0.267	0.267	-0.001	0.997
Growth Mindset in 11th	0.015	0.058	0.051	1.056	0.053	0.008	-0.055	1.076
Missing Dummy: Growth Mindset in 11th	0.261	0.206	-0.129	0.852	0.242	0.255	0.029	1.034
Academic Self-Efficacy in 11th	-0.075	-0.031	0.053	1.100	-0.106	-0.072	0.039	0.986
Missing Dummy: Academic Self-Efficacy in 11th	0.257	0.206	-0.120	0.860	0.245	0.255	0.021	1.023

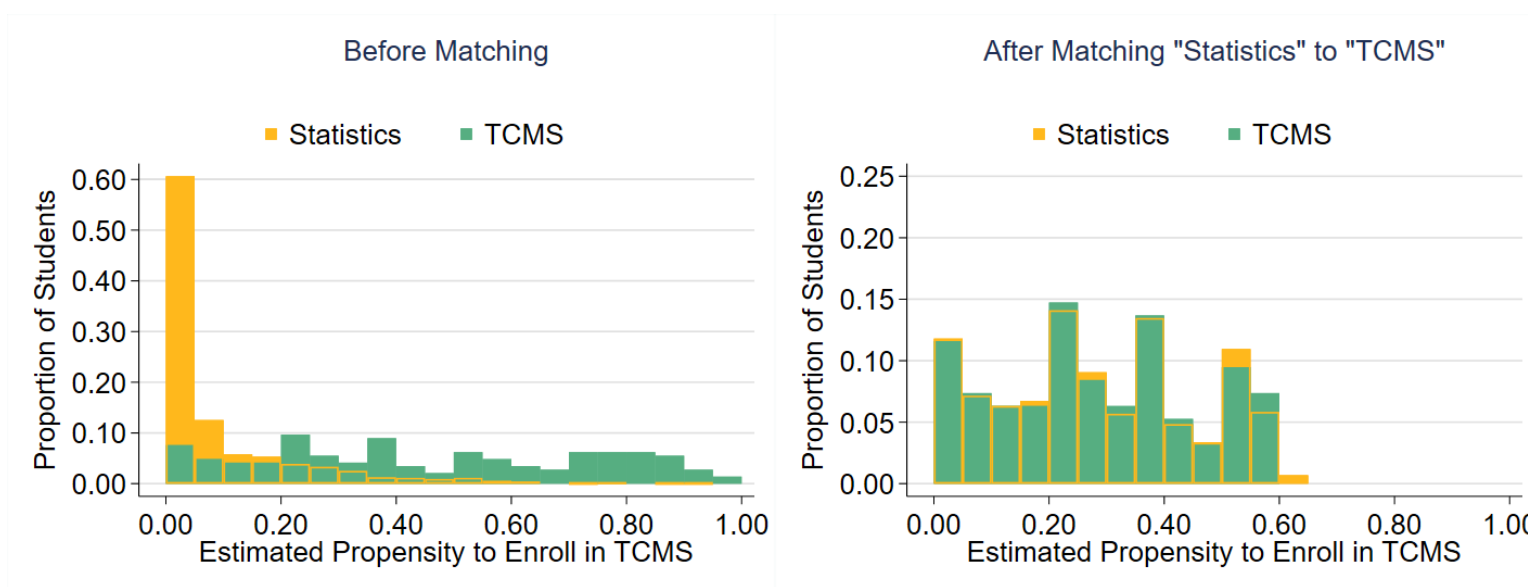
See the note on the first page of the table.

Table C44 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 4 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=514)	TCMS (N=223)	SMD	VR	Statistics (N=290)	TCMS (N=165)	SMD	VR
Indicator of 2016-17 Cohort	0.599	0.789	0.421	0.694	0.775	0.758	-0.041	1.051

See the note on the first page of the table.

Figure C45. Community College Distributions of Estimated Propensities of Taking TCMS over Statistics in Group 5 Before and After Matching for Students who Took a Math Course in the First Two Years, 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 C45. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=871)	TCMS (N=145)	SMD	VR	Statistics (N=218)	TCMS (N=95)	SMD	VR
Age (in Months)	194.433	195.091	0.139	1.400	195.024	194.584	-0.103	0.758
Gender: Female	0.553	0.552	-0.003	1.006	0.545	0.579	0.068	0.987
Race/Ethnicity: Asian	-	-	-0.148	0.499	-	-	-0.023	0.889
Race/Ethnicity: African American	-	-	-0.185	0.434	-	-	0.038	1.246
Race/Ethnicity: Latinx	0.714	0.883	0.429	0.510	0.869	0.874	0.014	0.974
Race/Ethnicity: Filipinx	-	-	-0.388	0.000	-	-	N/A	N/A

Note: These diagnostics correspond to our preferred matching strategy, i.e. "Cluster Matching" on the estimated propensity score, but after replacing school fixed effects with school-level controls 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 C45 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=871)	TCMS (N=145)	SMD	VR	Statistics (N=218)	TCMS (N=95)	SMD	VR
Race/Ethnicity: White	-	-	-0.176	0.520	-	-	0.008	1.036
Race/Ethnicity: Other	-	-	0.106	2.556	-	-	-0.070	0.562
Ever Subsidized Meal Eligible from 9th-11th	-	-	0.186	0.530	-	-	-0.151	2.164
Missing Dummy: Ever Subsidized Meal Eligible from 9th-11th	-	-	-0.160	0.000	-	-	N/A	N/A
Parents'/Guardians' Educational Attainment: Not HS Graduate	0.223	0.352	0.287	1.325	0.321	0.337	0.034	1.029
Parents'/Guardians' Educational Attainment: HS Graduate	0.211	0.255	0.104	1.147	0.272	0.253	-0.045	0.956
Parents'/Guardians' Educational Attainment: Some College	0.134	0.159	0.069	1.154	0.158	0.137	-0.059	0.892

See the note on the first page of the table.

Table C45 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=871)	TCMS (N=145)	SMD	VR	Statistics (N=218)	TCMS (N=95)	SMD	VR
Parents'/Guardians' Educational Attainment: College Graduate	-	-	-0.347	0.263	-	-	-0.010	0.958
Parents'/Guardians' Educational Attainment: Graduate School	-	-	0.000	1.007	-	-	0.104	2.477
Parents'/Guardians' Educational Attainment: Decline to Answer or Missing	0.281	0.172	-0.262	0.710	0.196	0.211	0.035	1.057
Nonresident School Enrollment in 11th	0.429	0.352	-0.159	0.936	0.346	0.368	0.047	1.032
Missing Dummy: Nonresident School Enrollment in 11th	-	-	-0.077	0.469	-	-	0.046	1.666
Number of School Moves from 9th- 11th	0.057	0.065	0.035	1.027	0.080	0.075	-0.018	0.773
Missing Dummy: Number of School Moves from 9th- 11th	-	-	-0.038	0.793	-	-	-0.054	0.631

See the note on the first page of the table.

Table C45 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=871)	TCMS (N=145)	SMD	VR	Statistics (N=218)	TCMS (N=95)	SMD	VR
English Learner Status in 11th: English Only	0.311	0.207	-0.239	0.770	0.187	0.211	0.060	1.099
English Learner Status in 11th: Initial Fluent English Proficient	0.188	0.234	0.113	1.181	0.256	0.211	-0.106	0.877
English Learner Status in 11th: Limited English Proficient	-	-	0.063	1.634	-	-	-0.084	0.507
English Learner Status in 11th: Reclassified to Fluent English Proficient	0.488	0.538	0.100	1.001	0.537	0.568	0.064	0.990
Gifted and Talented Program Participation in 11th	0.287	0.221	-0.153	0.845	0.234	0.242	0.020	1.028
Math 11th Grade Weighted GPA	2.598	2.185	-0.347	0.705	2.272	2.358	0.075	0.842
Cumulative Overall Weighted GPA at the End of 11th	3.085	2.937	-0.275	0.925	3.025	3.024	0.000	1.101

See the note on the first page of the table.

Table C45 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=871)	TCMS (N=145)	SMD	VR	Statistics (N=218)	TCMS (N=95)	SMD	VR
Standardized ELA SBAC Score in 11th	0.480	0.238	-0.337	1.052	0.382	0.386	0.005	0.922
Standardized Math SBAC Score in 11th	0.512	0.266	-0.389	0.624	0.421	0.361	-0.103	1.023
Number of Semesters of AP Classes Taken from 9th-11th	3.113	2.133	-0.359	0.914	2.654	2.737	0.029	1.003
Science Credits Accumulated from 9th-11th	32.739	31.915	-0.099	0.878	32.802	32.579	-0.027	0.947
Missing Dummy: Semesters of AP Classes and Science Credits from 9th-11th	-	-	0.043	1.503	-	-	-0.112	0.000
A-G "C" or better Semesters Off-Track at the End of 11th (A-B)	0.545	0.400	-0.150	0.562	0.345	0.442	0.116	1.443
A-G "C" or better Semesters Off-Track at the End of 11th (D-G)	0.169	0.207	0.070	1.066	0.124	0.147	0.053	1.536

See the note on the first page of the table.

Table C45 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=871)	TCMS (N=145)	SMD	VR	Statistics (N=218)	TCMS (N=95)	SMD	VR
A-G "D" or better Semesters Off-Track at the End of 11th (A-B)	0.183	0.110	-0.144	0.501	0.078	0.105	0.074	1.388
A-G "D" or better Semesters Off-Track at the End of 11th (D-G)	0.037	0.083	0.159	2.399	0.034	0.021	-0.074	0.563
Highest ERW PSAT Score by the End of 11th	468.200	440.809	-0.393	0.943	459.645	452.224	-0.110	1.111
Missing Dummy: Highest ERW PSAT Score by the End of 11th	-	-	0.022	1.108	-	-	0.068	1.415
Highest Math PSAT Score by the End of 11th	468.567	451.412	-0.266	0.953	462.953	453.231	-0.149	1.293
Missing Dummy: Highest Math PSAT Score by the End of 11th	-	-	0.028	1.136	-	-	0.068	1.415
Took the SAT or ACT before 12th	0.450	0.228	-0.483	0.714	0.283	0.295	0.026	1.028

See the note on the first page of the table.

Table C45 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=871)	TCMS (N=145)	SMD	VR	Statistics (N=218)	TCMS (N=95)	SMD	VR
Participation in the AVID Program in 11th	-	-	0.132	1.881	-	-	0.049	1.241
Took a College or Career Seminar Course in 11th	0.146	0.214	0.177	1.357	0.160	0.221	0.156	1.287
Ever Attended STEM-Focused School from 9th-12th	0.201	0.193	-0.020	0.976	0.171	0.211	0.102	1.179
Took a Precalculus Course by the End of 11th	0.922	0.724	-0.535	2.791	0.882	0.874	-0.025	1.062
Took an IDS Course by the End of 11th	-	-	-0.052	0.762	-	-	0.031	1.249
Took a Statistics Course by the End of 11th	0.036	0.241	0.622	5.366	-	-	-0.015	0.962
Took Other Advanced Math by the End of 11th	-	-	0.015	1.207	-	-	0.106	4.975

See the note on the first page of the table.

Table C45 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=871)	TCMS (N=145)	SMD	VR	Statistics (N=218)	TCMS (N=95)	SMD	VR
Math 11th Grade Weighted GPA (Squared)	8.403	5.936	-0.414	0.612	6.575	6.745	0.031	0.942
Cumulative Overall Weighted GPA at the End of 11th (Squared)	9.814	8.901	-0.285	0.867	9.396	9.419	0.007	1.053
Standardized ELA SBAC Score in 11th (Squared)	0.730	0.580	-0.188	0.731	0.672	0.633	-0.048	0.736
Standardized Math SBAC Score in 11th (Squared)	0.751	0.374	-0.505	0.311	0.504	0.463	-0.069	0.984
Number of Semesters of AP Classes Taken from 9th-11th (Squared)	17.478	11.629	-0.235	0.877	14.929	15.368	0.016	1.017
Science Credits Accumulated from 9th-11th (Squared)	1,145.829	1,083.177	-0.104	0.660	1,145.082	1,126.579	-0.031	0.810
A-G "C" or better Semesters Off- Track at the End of 11th (A-B) (Squared)	1.491	0.828	-0.179	0.308	0.686	1.011	0.119	1.586

See the note on the first page of the table.

Table C45 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=871)	TCMS (N=145)	SMD	VR	Statistics (N=218)	TCMS (N=95)	SMD	VR
A-G "C" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.313	0.345	0.024	0.619	0.166	0.253	0.096	3.076
A-G "D" or better Semesters Off-Track at the End of 11th (A-B) (Squared)	0.369	0.179	-0.147	0.207	0.120	0.168	0.070	1.200
A-G "D" or better Semesters Off-Track at the End of 11th (D-G) (Squared)	0.051	0.124	0.149	2.749	0.038	0.021	-0.083	0.335
Highest ERW PSAT Score by the End of 11th (Squared)	224,213.958	199,004.338	-0.392	0.833	215,552.438	209,244.385	-0.101	1.042
Highest Math PSAT Score by the End of 11th (Squared)	223,820.395	207,812.125	-0.272	0.890	218,012.771	210,167.868	-0.132	1.203
Work Effort GPA in 11th	2.482	2.450	-0.096	0.922	2.462	2.474	0.037	1.189
Cooperation GPA in 11th	2.651	2.626	-0.094	1.002	2.620	2.634	0.054	0.982

See the note on the first page of the table.

Table C45 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=871)	TCMS (N=145)	SMD	VR	Statistics (N=218)	TCMS (N=95)	SMD	VR
Attendance Rate in 11th	0.974	0.970	-0.091	1.803	0.971	0.971	-0.013	1.567
Ever Suspended from 9th-11th	-	-	-0.083	0.000	-	-	N/A	N/A
Educational Expectations in 11th: Unsure	0.082	0.117	0.119	1.390	-	-	-0.084	0.822
Educational Expectations in 11th: HS or Less	-	-	0.021	1.206	-	-	-0.065	0.000
Educational Expectations in 11th: Associate Degree or Certificate	-	-	0.090	1.620	-	-	-0.125	0.649
Educational Expectations in 11th: Bachelor's Degree or Higher	0.641	0.648	0.016	0.996	0.630	0.674	0.092	0.946
Educational Expectations in 11th: Missing	0.241	0.179	-0.152	0.809	0.151	0.168	0.046	1.094

See the note on the first page of the table.

Table C45 Continued. Community College Analysis Matching Diagnostics for TCMS vs. Statistics in Group 5 for Students who Took a Math Course in the First Two Years, Using School-Cohort Controls

	Before Matching				After Matching "Statistics" to "TCMS"			
	Statistics (N=871)	TCMS (N=145)	SMD	VR	Statistics (N=218)	TCMS (N=95)	SMD	VR
Growth Mindset in 11th	0.137	0.150	0.015	1.253	0.228	0.141	-0.101	1.254
Missing Dummy: Growth Mindset in 11th	0.230	0.172	-0.143	0.811	0.143	0.158	0.042	1.089
Academic Self-Efficacy in 11th	-0.068	-0.097	-0.033	1.061	-0.063	-0.121	-0.063	0.789
Missing Dummy: Academic Self-Efficacy in 11th	0.230	0.172	-0.143	0.811	0.143	0.158	0.042	1.089
Indicator of 2016-17 Cohort	0.475	0.786	0.679	0.678	0.754	0.779	0.059	0.931

See the note on the first page of the table.

Table C46. Estimated Effects of Taking Math (Compared to No Math) on Credits Earned in Community College

	School Fixed Effects								School-Cohort Controls							
	N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned		N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned	
	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	624	438	4.648***	(1.277)	0.405**	(0.135)	0.476*	(0.242)	680	723	2.307	(1.195)	0.218*	(0.104)	0.146	(0.223)
CM+OLS	488	364	3.987**	(1.486)	0.308*	(0.126)	0.603*	(0.283)	624	639	2.205*	(1.101)	0.155	(0.085)	0.297	(0.201)
w/ CCP			3.831**	(1.323)	0.344**	(0.116)	0.610*	(0.255)			2.045*	(1.041)	0.152	(0.087)	0.309	(0.214)
OLS	624	438	3.513**	(1.351)	0.285*	(0.134)	0.518*	(0.229)	680	723	1.935	(1.059)	0.179*	(0.090)	0.288	(0.177)
w/ CCP			3.455**	(1.299)	0.321*	(0.134)	0.619*	(0.244)			1.826	(1.020)	0.182	(0.096)	0.345	(0.188)
SM+OLS	-	-	-	-	-	-	-	-	445	496	1.123	(1.195)	0.144	(0.093)	0.116	(0.181)
w/ CCP			-	-	-	-	-	-			1.156	(1.151)	0.160	(0.095)	0.236	(0.183)
KBAL+OLS	624	438	4.069**	(1.530)	0.204	(0.133)	0.604*	(0.254)	680	723	2.257*	(1.089)	0.185	(0.096)	0.268	(0.189)
w/ CCP			3.766**	(1.448)	0.236	(0.137)	0.623*	(0.263)			1.734	(1.043)	0.138	(0.103)	0.272	(0.200)
KM+OLS	-	-	-	-	-	-	-	-	680	723	2.061	(1.085)	0.194	(0.101)	0.306	(0.194)
w/ CCP			-	-	-	-	-	-			1.589	(1.063)	0.152	(0.105)	0.282	(0.202)
RE	-	-	-	-	-	-	-	-	680	723	2.126	(1.087)	0.203*	(0.093)	0.320	(0.181)
w/ CCP			-	-	-	-	-	-			1.886	(1.032)	0.207*	(0.097)	0.373	(0.191)
Group 4: Math A-G Complete with a "C"																
Unadjust	1,530	1,966	3.623***	(0.859)	0.982***	(0.133)	0.996***	(0.191)	1,557	2,631	2.618**	(0.866)	0.786***	(0.121)	0.871***	(0.176)
CM+OLS	1,411	1,697	1.361	(0.828)	0.575***	(0.123)	0.504*	(0.203)	1,422	2,460	1.537*	(0.688)	0.563***	(0.098)	0.668***	(0.152)
w/ CCP			1.407	(0.742)	0.569***	(0.122)	0.503**	(0.177)			1.146	(0.624)	0.552***	(0.091)	0.610***	(0.139)
OLS	1,530	1,966	1.301	(0.748)	0.569***	(0.118)	0.469*	(0.190)	1,557	2,631	1.092	(0.674)	0.503***	(0.097)	0.470**	(0.150)
w/ CCP			1.233	(0.696)	0.550***	(0.110)	0.459**	(0.174)			0.857	(0.612)	0.499***	(0.095)	0.433**	(0.141)
SM+OLS	980	1,078	1.053	(0.893)	0.509**	(0.155)	0.276	(0.230)	1,095	1,750	1.378	(0.781)	0.544***	(0.107)	0.507**	(0.182)
w/ CCP			1.526	(0.783)	0.508***	(0.154)	0.317	(0.216)			0.792	(0.686)	0.514***	(0.107)	0.411*	(0.173)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 Continued. Estimated Effects of Taking Math (Compared to No Math) on Credits Earned in Community College

	School Fixed Effects								School-Cohort Controls							
	N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned		N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned	
	No Math	Math	b	se	b	se	b	se	No Math	Math	b	se	b	se	b	se
Group 4: Math A-G Complete with a "C"																
KBAL+OLS	1,530	1,966	1.395	(0.859)	0.592***	(0.132)	0.503*	(0.212)	1,557	2,631	1.651*	(0.764)	0.553***	(0.110)	0.590***	(0.153)
w/ CCP			1.549*	(0.774)	0.589***	(0.121)	0.500**	(0.191)			1.392*	(0.645)	0.562***	(0.103)	0.532***	(0.145)
KM+OLS	1,530	1,966	1.831*	(0.832)	0.593***	(0.126)	0.587**	(0.205)	1,557	2,631	1.788*	(0.714)	0.570***	(0.098)	0.604***	(0.150)
w/ CCP			1.905**	(0.713)	0.573***	(0.112)	0.600***	(0.172)			1.432*	(0.616)	0.564***	(0.092)	0.551***	(0.138)
RE	-	-	-	-	-	-	-	-	1,557	2,631	1.343*	(0.668)	0.528***	(0.099)	0.487**	(0.156)
w/ CCP			-	-	-	-	-	-			1.045	(0.621)	0.520***	(0.096)	0.447**	(0.145)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	1,130	1,906	0.648	(0.948)	1.066***	(0.212)	0.871**	(0.288)	1,192	2,479	-0.079	(0.992)	0.853***	(0.206)	0.596*	(0.275)
CM+OLS	1,050	1,680	0.653	(0.672)	0.633***	(0.184)	0.260	(0.257)	1,145	2,338	0.463	(0.734)	0.503**	(0.160)	0.260	(0.248)
w/ CCP			0.329	(0.583)	0.604**	(0.186)	0.233	(0.263)			-0.020	(0.611)	0.413*	(0.162)	0.226	(0.237)
OLS	1,130	1,906	0.497	(0.624)	0.484**	(0.151)	0.259	(0.222)	1,192	2,479	0.139	(0.644)	0.446***	(0.125)	0.308	(0.197)
w/ CCP			0.209	(0.614)	0.462**	(0.150)	0.262	(0.224)			-0.042	(0.522)	0.387**	(0.124)	0.260	(0.190)
SM+OLS	562	826	-1.188	(0.891)	0.619**	(0.233)	0.221	(0.347)	727	1,249	1.338	(0.838)	0.669***	(0.171)	0.383	(0.268)
w/ CCP			-1.259	(0.914)	0.578*	(0.245)	0.270	(0.354)			0.623	(0.839)	0.511**	(0.177)	0.278	(0.268)
KBAL+OLS	1,130	1,906	0.761	(0.642)	0.575**	(0.194)	0.351	(0.276)	1,192	2,479	0.586	(0.761)	0.505**	(0.173)	0.285	(0.258)
w/ CCP			0.192	(0.621)	0.533**	(0.198)	0.288	(0.280)			0.297	(0.631)	0.436*	(0.183)	0.216	(0.248)
KM+OLS	1,130	1,906	0.979	(0.677)	0.618***	(0.167)	0.506*	(0.242)	1,192	2,479	0.377	(0.683)	0.549***	(0.142)	0.327	(0.222)
w/ CCP			0.471	(0.627)	0.579***	(0.168)	0.432	(0.245)			0.014	(0.555)	0.481***	(0.142)	0.272	(0.208)
RE	-	-	-	-	-	-	-	-	1,192	2,479	0.397	(0.587)	0.473***	(0.128)	0.319	(0.196)
w/ CCP			-	-	-	-	-	-			0.040	(0.526)	0.407**	(0.127)	0.275	(0.193)

See the note on the first page of the table.

Table C47. Estimated Effects of Taking Math (Compared to No Math) on Starting in College-Level Math in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Started in College-Level Math		N		Started in College-Level Math	
	No Math	Math	b	se	No Math	Math	b	se
Group 3: Math A-G Complete with a "D"								
Unadjust	494	372	0.035	(0.021)	532	603	0.014	(0.018)
CM+OLS	368	317	0.003	(0.022)	504	549	0.008	(0.020)
w/ CCP			-0.001	(0.022)			0.012	(0.020)
OLS	494	372	0.000	(0.022)	532	603	0.004	(0.018)
w/ CCP			-0.000	(0.023)			0.004	(0.019)
SM+OLS	-	-	-	-	323	393	-0.005	(0.023)
w/ CCP			-	-			-0.002	(0.023)
KBAL+OLS	494	372	0.012	(0.020)	532	603	0.001	(0.017)
w/ CCP			0.010	(0.021)			0.004	(0.018)
KM+OLS	-	-	-	-	532	603	-0.002	(0.019)
w/ CCP			-	-			-0.001	(0.019)
RE	-	-	-	-	532	603	0.004	(0.018)
w/ CCP			-	-			0.004	(0.019)
Group 4: Math A-G Complete with a "C"								
Unadjust	1,288	1,669	0.121***	(0.021)	1,313	2,324	0.089***	(0.022)
CM+OLS	1,178	1,434	0.057**	(0.022)	1,188	2,183	0.062***	(0.016)
w/ CCP			0.058**	(0.021)			0.069***	(0.015)
OLS	1,288	1,669	0.053**	(0.017)	1,313	2,324	0.051***	(0.014)
w/ CCP			0.056***	(0.017)			0.059***	(0.014)
SM+OLS	796	861	0.059*	(0.025)	879	1,484	0.059**	(0.020)
w/ CCP			0.058*	(0.024)			0.068***	(0.018)
KBAL+OLS	1,288	1,669	0.058**	(0.019)	1,313	2,324	0.052**	(0.017)
w/ CCP			0.057**	(0.019)			0.055***	(0.015)
KM+OLS	1,288	1,669	0.055**	(0.019)	1,313	2,324	0.053***	(0.016)
w/ CCP			0.054**	(0.019)			0.061***	(0.015)
RE	-	-	-	-	1,313	2,324	0.056***	(0.015)
w/ CCP			-	-			0.060***	(0.014)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	980	1,677	0.139***	(0.033)	1,032	2,205	0.105**	(0.034)
CM+OLS	891	1,468	0.065*	(0.025)	995	2,042	0.069***	(0.020)
w/ CCP			0.068**	(0.026)			0.064**	(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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 Continued. Estimated Effects of Taking Math (Compared to No Math) on Starting in College-Level Math in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Started in College-Level Math		N		Started in College-Level Math	
	No Math	Math	b	se	No Math	Math	b	se
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
OLS	980	1,677	0.073**	(0.024)	1,032	2,205	0.055*	(0.022)
w/ CCP			0.075**	(0.024)			0.050*	(0.020)
SM+OLS	459	660	0.091**	(0.029)	586	1,052	0.050*	(0.023)
w/ CCP			0.080**	(0.028)			0.055*	(0.021)
KBAL+OLS	980	1,677	0.079***	(0.024)	1,032	2,205	0.068**	(0.023)
w/ CCP			0.079**	(0.025)			0.071***	(0.021)
KM+OLS	980	1,677	0.071**	(0.024)	1,032	2,205	0.057**	(0.021)
w/ CCP			0.073**	(0.024)			0.058**	(0.020)
RE	-	-	-	-	1,032	2,205	0.068**	(0.022)
w/ CCP			-	-			0.061**	(0.020)

See the note on the first page of the table.

Table C48. Estimated Effects of Taking Math (Compared to No Math) on Overall GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Overall GPA		N		Overall GPA	
	No Math	Math	b	se	No Math	Math	b	se
Group 3: Math A-G Complete with a "D"								
Unadjust	626	466	0.079	(0.069)	682	729	0.024	(0.064)
CM+OLS	503	376	0.016	(0.081)	627	648	-0.059	(0.060)
w/ CCP			0.006	(0.075)			-0.087	(0.056)
OLS	626	466	-0.017	(0.074)	682	729	-0.053	(0.062)
w/ CCP			-0.020	(0.070)			-0.066	(0.058)
SM+OLS	-	-	-	-	455	503	-0.057	(0.066)
w/ CCP			-	-			-0.060	(0.065)
KBAL+OLS	626	466	-0.023	(0.081)	682	729	-0.039	(0.064)
w/ CCP			-0.028	(0.077)			-0.079	(0.061)
KM+OLS	-	-	-	-	682	729	-0.052	(0.062)
w/ CCP			-	-			-0.083	(0.060)
RE	-	-	-	-	682	729	-0.053	(0.062)
w/ CCP			-	-			-0.067	(0.058)
Group 4: Math A-G Complete with a "C"								
Unadjust	1,542	1,999	0.166***	(0.042)	1,570	2,673	0.103*	(0.044)
CM+OLS	1,413	1,706	-0.015	(0.039)	1,438	2,499	-0.038	(0.037)
w/ CCP			-0.006	(0.039)			-0.044	(0.034)
OLS	1,542	1,999	-0.040	(0.036)	1,570	2,673	-0.033	(0.034)
w/ CCP			-0.038	(0.036)			-0.041	(0.032)
SM+OLS	989	1,100	-0.020	(0.036)	1,099	1,803	-0.017	(0.040)
w/ CCP			-0.011	(0.037)			-0.040	(0.035)
KBAL+OLS	1,542	1,999	-0.040	(0.038)	1,570	2,673	-0.008	(0.036)
w/ CCP			-0.033	(0.037)			-0.016	(0.032)
KM+OLS	1,542	1,999	-0.021	(0.039)	1,570	2,673	-0.016	(0.034)
w/ CCP			-0.013	(0.038)			-0.026	(0.031)
RE	-	-	-	-	1,570	2,673	-0.032	(0.033)
w/ CCP			-	-			-0.039	(0.032)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	1,148	1,962	0.070	(0.048)	1,212	2,544	0.036	(0.049)
CM+OLS	1,074	1,711	-0.031	(0.034)	1,166	2,391	-0.012	(0.035)
w/ CCP			-0.032	(0.034)			-0.014	(0.032)
OLS	1,148	1,962	-0.039	(0.032)	1,212	2,544	-0.045	(0.030)
w/ CCP			-0.036	(0.033)			-0.041	(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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 Continued. Estimated Effects of Taking Math (Compared to No Math) on Overall GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Overall GPA		N		Overall GPA	
	No Math	Math	b	se	No Math	Math	b	se
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
SM+OLS	568	841	-0.065	(0.053)	755	1,295	-0.056	(0.049)
w/ CCP			-0.068	(0.051)			-0.060	(0.049)
KBAL+OLS	1,148	1,962	-0.016	(0.035)	1,212	2,544	-0.010	(0.035)
w/ CCP			-0.019	(0.036)			-0.013	(0.033)
KM+OLS	1,148	1,962	-0.014	(0.034)	1,212	2,544	-0.013	(0.032)
w/ CCP			-0.018	(0.034)			-0.016	(0.029)
RE	-	-	-	-	1,212	2,544	-0.033	(0.029)
w/ CCP			-	-			-0.032	(0.029)

See the note on the first page of the table.

Table C49. Estimated Effects of Taking Math (Compared to No Math) on College-Level Math GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		College-Level Math GPA		N		College-Level Math GPA	
	No Math	Math	b	se	No Math	Math	b	se
Group 3: Math A-G Complete with a "D"								
Unadjust	73	80	-0.223	(0.206)	99	148	-0.251	(0.167)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
RE	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
Group 4: Math A-G Complete with a "C"								
Unadjust	405	640	0.084	(0.078)	430	1,058	0.038	(0.073)
CM+OLS	352	580	-0.059	(0.091)	393	957	-0.017	(0.072)
w/ CCP			0.004	(0.103)			-0.033	(0.068)
OLS	405	640	-0.115	(0.092)	430	1,058	-0.055	(0.070)
w/ CCP			-0.079	(0.111)			-0.038	(0.079)
SM+OLS	-	-	-	-	231	393	0.032	(0.101)
w/ CCP			-	-			0.026	(0.100)
KBAL+OLS	405	640	-0.101	(0.085)	430	1,058	0.051	(0.079)
w/ CCP			-0.058	(0.100)			0.043	(0.077)
KM+OLS	405	640	-0.115	(0.094)	430	1,058	0.012	(0.072)
w/ CCP			-0.059	(0.108)			0.004	(0.074)
RE	-	-	-	-	430	1,058	-0.059	(0.071)
w/ CCP			-	-			-0.039	(0.080)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	530	980	0.093	(0.084)	569	1,396	0.015	(0.080)
CM+OLS	480	826	0.035	(0.074)	528	1,197	0.050	(0.067)
w/ CCP			0.053	(0.075)			0.054	(0.065)
OLS	530	980	0.002	(0.064)	569	1,396	-0.024	(0.064)
w/ CCP			0.008	(0.065)			-0.027	(0.062)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C49 Continued. Estimated Effects of Taking Math (Compared to No Math) on College-Level Math GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		College-Level Math GPA		N		College-Level Math GPA	
	No Math	Math	b	se	No Math	Math	b	se
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
SM+OLS	183	290	0.022	(0.129)	257	450	0.105	(0.093)
w/ CCP			-0.019	(0.150)			0.104	(0.098)
KBAL+OLS	530	980	0.053	(0.074)	569	1,396	0.090	(0.081)
w/ CCP			0.071	(0.075)			0.080	(0.080)
KM+OLS	530	980	0.082	(0.071)	569	1,396	0.052	(0.069)
w/ CCP			0.104	(0.072)			0.055	(0.070)
RE	-	-	-	-	569	1,396	-0.023	(0.061)
w/ CCP			-	-			-0.022	(0.061)

See the note on the first page of the table.

Table C50. Estimated Effects of Taking Math (Compared to No Math) on Non-Math STEM GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Non-Math STEM GPA		N		Non-Math STEM GPA	
	No Math	Math	b	se	No Math	Math	b	se
Group 3: Math A-G Complete with a "D"								
Unadjust	185	145	-0.126	(0.140)	233	252	-0.090	(0.111)
CM+OLS	-	-	-	-	193	228	-0.078	(0.132)
w/ CCP			-	-			-0.109	(0.142)
OLS	185	145	-0.198	(0.213)	233	252	-0.122	(0.129)
w/ CCP			-0.224	(0.223)			-0.173	(0.137)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	185	145	-0.245	(0.185)	233	252	-0.165	(0.123)
w/ CCP			-0.300	(0.210)			-0.217	(0.132)
KM+OLS	-	-	-	-	233	252	-0.141	(0.124)
w/ CCP			-	-			-0.165	(0.128)
RE	-	-	-	-	233	252	-0.122	(0.129)
w/ CCP			-	-			-0.176	(0.137)
Group 4: Math A-G Complete with a "C"								
Unadjust	628	846	0.120	(0.064)	645	1,301	0.065	(0.063)
CM+OLS	557	700	-0.181*	(0.085)	585	1,164	-0.036	(0.069)
w/ CCP			-0.211*	(0.084)			-0.086	(0.069)
OLS	628	846	-0.213**	(0.079)	645	1,301	-0.101	(0.069)
w/ CCP			-0.236**	(0.080)			-0.135*	(0.068)
SM+OLS	-	-	-	-	347	585	-0.138	(0.090)
w/ CCP			-	-			-0.198*	(0.094)
KBAL+OLS	628	846	-0.180*	(0.074)	645	1,301	-0.070	(0.069)
w/ CCP			-0.202**	(0.077)			-0.094	(0.071)
KM+OLS	628	846	-0.181*	(0.076)	645	1,301	-0.071	(0.067)
w/ CCP			-0.214**	(0.081)			-0.101	(0.068)
RE	-	-	-	-	645	1,301	-0.113	(0.070)
w/ CCP			-	-			-0.141*	(0.069)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	593	1,058	0.028	(0.066)	648	1,492	-0.017	(0.059)
CM+OLS	547	882	-0.033	(0.067)	617	1,347	-0.118	(0.060)
w/ CCP			-0.053	(0.070)			-0.106	(0.060)
OLS	593	1,058	-0.048	(0.067)	648	1,492	-0.106	(0.058)
w/ CCP			-0.059	(0.071)			-0.104	(0.060)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C50 Continued. Estimated Effects of Taking Math (Compared to No Math) on Non-Math STEM GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Non-Math STEM GPA		N		Non-Math STEM GPA	
	No Math	Math	b	se	No Math	Math	b	se
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
SM+OLS	219	307	-0.056	(0.120)	-	-	-	-
w/ CCP			-0.047	(0.135)			-	-
KBAL+OLS	593	1,058	-0.059	(0.078)	648	1,492	-0.105	(0.070)
w/ CCP			-0.077	(0.082)			-0.106	(0.070)
KM+OLS	593	1,058	0.011	(0.070)	648	1,492	-0.087	(0.063)
w/ CCP			-0.003	(0.075)			-0.083	(0.064)
RE	-	-	-	-	648	1,492	-0.087	(0.058)
w/ CCP			-	-			-0.086	(0.060)

See the note on the first page of the table.

Table C51. Estimated Effects of Taking Math (Compared to No Math) on Credits Earned in CSUN for Groups 4 and 5

	N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned	
	No Math	Math	b	se	b	se	b	se
Unadjust	506	1,538	-0.425	(0.936)	0.805***	(0.209)	0.904*	(0.399)
CM+OLS	484	1,436	-0.407	(0.987)	0.634**	(0.222)	0.674	(0.451)
OLS	506	1,538	-0.809	(0.853)	0.369	(0.239)	0.474	(0.372)
SM+OLS	-	-	-	-	-	-	-	-
KBAL+OLS	506	1,538	-1.111	(1.060)	0.392	(0.278)	0.382	(0.499)
KM+OLS	506	1,538	-1.032	(0.867)	0.455	(0.254)	0.411	(0.438)
RE	506	1,538	-0.705	(0.859)	0.404	(0.239)	0.591	(0.369)

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 C52. Estimated Effects of Taking Math (Compared to No Math) on Avoiding Developmental Math in CSUN for Groups 4 and 5

	N		Avoided Developmental Math	
	No Math	Math	b	se
Unadjust	491	1,478	0.181***	(0.038)
CM+OLS	464	1,401	0.128***	(0.027)
OLS	491	1,478	0.107***	(0.027)
SM+OLS	-	-	-	-
KBAL+OLS	491	1,478	0.119***	(0.027)
KM+OLS	491	1,478	0.119***	(0.026)
RE	491	1,478	0.108***	(0.027)

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 C53. Estimated Effects of Taking Math (Compared to No Math) on Overall GPA in CSUN for Groups 4 and 5

	N		Overall GPA	
	No Math	Math	b	se
Unadjust	512	1,570	-0.064	(0.053)
CM+OLS	489	1,465	-0.087	(0.054)
OLS	512	1,570	-0.048	(0.043)
SM+OLS	-	-	-	-
KBAL+OLS	512	1,570	-0.095	(0.050)
KM+OLS	512	1,570	-0.102*	(0.048)
RE	512	1,570	-0.039	(0.043)

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 C54. Estimated Effects of Taking Math (Compared to No Math) on College-Level Math GPA in CSUN for Groups 4 and 5

	N		College-Level Math GPA	
	No Math	Math	b	se
Unadjust	397	1,257	-0.002	(0.086)
CM+OLS	373	1,179	-0.049	(0.078)
OLS	397	1,257	-0.004	(0.073)
SM+OLS	-	-	-	-
KBAL+OLS	397	1,257	-0.044	(0.081)
KM+OLS	397	1,257	-0.040	(0.074)
RE	397	1,257	-0.017	(0.072)

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 C55. Estimated Effects of Taking Math (Compared to No Math) on Non-Math STEM GPA in CSUN for Groups 4 and 5

	N		Non-Math STEM GPA	
	No Math	Math	b	se
Unadjust	434	1,358	-0.139*	(0.064)
CM+OLS	415	1,303	-0.155*	(0.071)
OLS	434	1,358	-0.092	(0.065)
SM+OLS	-	-	-	-
KBAL+OLS	434	1,358	-0.138	(0.074)
KM+OLS	434	1,358	-0.158*	(0.066)
RE	434	1,358	-0.086	(0.065)

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 C56. Estimated Effects of Taking Math (Compared to No Math) on Degree-Applicable Math Credits Earned in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Degree-Applicable Math Credits Earned		N		Degree-Applicable Math Credits Earned	
	No Math	Math	b	se	No Math	Math	b	se
Group 3: Math A-G Complete with a "D"								
Unadjust	615	465	1.056***	(0.299)	682	728	0.726***	(0.220)
CM+OLS	487	379	0.952**	(0.313)	629	647	0.594**	(0.226)
w/ CCP			1.133***	(0.316)			0.704**	(0.240)
OLS	615	465	1.106***	(0.312)	682	728	0.619**	(0.234)
w/ CCP			1.156***	(0.326)			0.709**	(0.246)
SM+OLS	-	-	-	-	455	504	0.302	(0.251)
w/ CCP			-	-			0.417	(0.262)
KBAL+OLS	615	465	1.003**	(0.384)	682	728	0.687**	(0.247)
w/ CCP			1.080**	(0.386)			0.720**	(0.261)
KM+OLS	-	-	-	-	682	728	0.620*	(0.241)
w/ CCP			-	-			0.643*	(0.260)
RE	-	-	-	-	682	728	0.677**	(0.236)
w/ CCP			-	-			0.709**	(0.246)
Group 4: Math A-G Complete with a "C"								
Unadjust	1,541	1,991	1.199***	(0.184)	1,569	2,663	0.995***	(0.178)
CM+OLS	1,421	1,699	0.603**	(0.197)	1,432	2,490	0.666***	(0.179)
w/ CCP			0.678***	(0.194)			0.599***	(0.160)
OLS	1,541	1,991	0.680***	(0.188)	1,569	2,663	0.562***	(0.171)
w/ CCP			0.657***	(0.181)			0.502**	(0.159)
SM+OLS	993	1,094	0.620**	(0.213)	1,091	1,794	0.797***	(0.219)
w/ CCP			0.726**	(0.223)			0.674***	(0.189)
KBAL+OLS	1,541	1,991	0.741**	(0.232)	1,569	2,663	0.702***	(0.195)
w/ CCP			0.792***	(0.222)			0.660***	(0.179)
KM+OLS	1,541	1,991	0.784***	(0.214)	1,569	2,663	0.731***	(0.187)
w/ CCP			0.828***	(0.199)			0.666***	(0.166)
RE	-	-	-	-	1,569	2,663	0.628***	(0.169)
w/ CCP			-	-			0.546***	(0.160)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	1,140	1,936	0.896***	(0.228)	1,203	2,514	0.707**	(0.226)
CM+OLS	1,049	1,695	0.644***	(0.179)	1,157	2,367	0.484*	(0.206)
w/ CCP			0.545**	(0.182)			0.336	(0.190)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C56 Continued. Estimated Effects of Taking Math (Compared to No Math) on Degree-Applicable Math Credits Earned in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Degree-Applicable Math Credits Earned		N		Degree-Applicable Math Credits Earned	
	No Math	Math	b	se	No Math	Math	b	se
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
OLS	1,140	1,936	0.473*	(0.196)	1,203	2,514	0.434*	(0.189)
w/ CCP			0.375	(0.201)			0.365*	(0.177)
SM+OLS	578	853	0.501	(0.286)	744	1,275	0.850***	(0.230)
w/ CCP			0.343	(0.285)			0.637**	(0.208)
KBAL+OLS	1,140	1,936	0.557**	(0.201)	1,203	2,514	0.518*	(0.213)
w/ CCP			0.440*	(0.208)			0.404*	(0.200)
KM+OLS	1,140	1,936	0.571**	(0.191)	1,203	2,514	0.520**	(0.200)
w/ CCP			0.471*	(0.193)			0.418*	(0.182)
RE	-	-	-	-	1,203	2,514	0.435*	(0.178)
w/ CCP			-	-			0.347*	(0.176)

See the note on the first page of the table.

Table C57. Estimated Effects of Taking Math (Compared to No Math) on Starting in Degree-Applicable Math in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Started in Degree-Applicable Math		N		Started in Degree-Applicable Math	
	No Math	Math	b	se	No Math	Math	b	se
Group 3: Math A-G Complete with a "D"								
Unadjust	494	372	0.077	(0.045)	532	603	0.047	(0.038)
CM+OLS	368	317	0.096*	(0.047)	504	549	0.067	(0.036)
w/ CCP			0.097*	(0.048)			0.070*	(0.033)
OLS	494	372	0.072	(0.046)	532	603	0.050	(0.036)
w/ CCP			0.055	(0.047)			0.057	(0.035)
SM+OLS	-	-	-	-	323	393	0.058	(0.047)
w/ CCP			-	-			0.069	(0.039)
KBAL+OLS	494	372	0.064	(0.045)	532	603	0.048	(0.034)
w/ CCP			0.054	(0.047)			0.056	(0.034)
KM+OLS	-	-	-	-	532	603	0.044	(0.034)
w/ CCP			-	-			0.047	(0.033)
RE	-	-	-	-	532	603	0.067	(0.038)
w/ CCP			-	-			0.059	(0.036)
Group 4: Math A-G Complete with a "C"								
Unadjust	1,288	1,669	0.110***	(0.022)	1,313	2,324	0.085***	(0.022)
CM+OLS	1,178	1,434	0.054**	(0.018)	1,188	2,183	0.031	(0.018)
w/ CCP			0.057***	(0.017)			0.034*	(0.017)
OLS	1,288	1,669	0.049**	(0.017)	1,313	2,324	0.032	(0.017)
w/ CCP			0.048**	(0.016)			0.036*	(0.015)
SM+OLS	796	861	0.041	(0.022)	879	1,484	0.015	(0.020)
w/ CCP			0.041	(0.022)			0.025	(0.020)
KBAL+OLS	1,288	1,669	0.055**	(0.018)	1,313	2,324	0.044*	(0.018)
w/ CCP			0.050**	(0.018)			0.041*	(0.017)
KM+OLS	1,288	1,669	0.051**	(0.018)	1,313	2,324	0.030	(0.017)
w/ CCP			0.052**	(0.016)			0.034*	(0.016)
RE	-	-	-	-	1,313	2,324	0.040*	(0.016)
w/ CCP			-	-			0.039*	(0.015)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	980	1,677	0.075**	(0.024)	1,032	2,205	0.058*	(0.024)
CM+OLS	891	1,468	0.032	(0.019)	995	2,042	0.021	(0.018)
w/ CCP			0.024	(0.018)			0.012	(0.015)
OLS	980	1,677	0.037*	(0.017)	1,032	2,205	0.019	(0.016)
w/ CCP			0.035*	(0.016)			0.017	(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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C57 Continued. Estimated Effects of Taking Math (Compared to No Math) on Starting in Degree-Applicable Math in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Started in Degree-Applicable Math		N		Started in Degree-Applicable Math	
	No Math	Math	b	se	No Math	Math	b	se
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
SM+OLS	459	660	0.059**	(0.022)	586	1,052	0.012	(0.021)
w/ CCP			0.058**	(0.022)			-0.003	(0.018)
KBAL+OLS	980	1,677	0.044*	(0.017)	1,032	2,205	0.017	(0.016)
w/ CCP			0.042**	(0.016)			0.013	(0.014)
KM+OLS	980	1,677	0.041*	(0.018)	1,032	2,205	0.017	(0.016)
w/ CCP			0.036*	(0.017)			0.013	(0.014)
RE	-	-	-	-	1,032	2,205	0.026	(0.016)
w/ CCP			-	-			0.021	(0.014)

See the note on the first page of the table.

Table C58. Estimated Effects of Taking Math (Compared to No Math) on Degree-Applicable Math GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Degree-Applicable Math GPA		N		Degree-Applicable Math GPA	
	No Math	Math	b	se	No Math	Math	b	se
Group 3: Math A-G Complete with a "D"								
Unadjust	243	243	-0.068	(0.134)	290	383	-0.023	(0.113)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	243	243	-0.010	(0.125)	290	383	-0.033	(0.105)
w/ CCP			-0.019	(0.134)			-0.017	(0.101)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	243	243	0.000	(0.132)	290	383	-0.022	(0.097)
w/ CCP			0.007	(0.131)			0.011	(0.098)
KM+OLS	-	-	-	-	290	383	-0.035	(0.098)
w/ CCP			-	-			-0.001	(0.093)
RE	-	-	-	-	290	383	-0.007	(0.104)
w/ CCP			-	-			-0.003	(0.104)
Group 4: Math A-G Complete with a "C"								
Unadjust	874	1,216	0.194***	(0.047)	897	1,794	0.130**	(0.044)
CM+OLS	805	1,073	-0.009	(0.068)	825	1,649	-0.006	(0.053)
w/ CCP			-0.001	(0.072)			0.000	(0.053)
OLS	874	1,216	-0.012	(0.054)	897	1,794	0.013	(0.049)
w/ CCP			0.010	(0.063)			0.012	(0.052)
SM+OLS	449	564	-0.013	(0.076)	547	979	-0.035	(0.058)
w/ CCP			0.026	(0.084)			-0.031	(0.060)
KBAL+OLS	874	1,216	-0.009	(0.056)	897	1,794	0.050	(0.054)
w/ CCP			0.020	(0.062)			0.054	(0.054)
KM+OLS	874	1,216	-0.006	(0.060)	897	1,794	0.051	(0.052)
w/ CCP			0.023	(0.065)			0.052	(0.052)
RE	-	-	-	-	897	1,794	0.007	(0.048)
w/ CCP			-	-			0.010	(0.052)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	794	1,364	0.119	(0.074)	835	1,865	0.055	(0.072)
CM+OLS	720	1,192	0.021	(0.071)	797	1,686	0.034	(0.060)
w/ CCP			0.041	(0.067)			0.040	(0.059)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C58 Continued. Estimated Effects of Taking Math (Compared to No Math) on Degree-Applicable Math GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Degree-Applicable Math GPA		N		Degree-Applicable Math GPA	
	No Math	Math	b	se	No Math	Math	b	se
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
OLS	794	1,364	-0.014	(0.059)	835	1,865	-0.024	(0.053)
w/ CCP			-0.005	(0.057)			-0.018	(0.051)
SM+OLS	325	450	-0.055	(0.087)	433	794	0.007	(0.078)
w/ CCP			-0.049	(0.095)			0.000	(0.076)
KBAL+OLS	794	1,364	-0.004	(0.060)	835	1,865	0.012	(0.061)
w/ CCP			0.007	(0.059)			0.009	(0.058)
KM+OLS	794	1,364	0.004	(0.070)	835	1,865	0.026	(0.058)
w/ CCP			0.020	(0.067)			0.027	(0.056)
RE	-	-	-	-	835	1,865	-0.027	(0.053)
w/ CCP			-	-			-0.019	(0.052)

See the note on the first page of the table.

Table C59. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on Credits Earned in Community College

	School Fixed Effects								School-Cohort Controls							
	N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned		N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned	
	Precalc or Calc	Stat	b	se	b	se	b	se	Precalc or Calc	Stat	b	se	b	se	b	se
Group 4: Math A-G Complete with a "C"																
Unadjust	630	486	-0.472	(1.416)	-0.637**	(0.218)	-0.694*	(0.295)	1,577	567	0.078	(1.360)	-0.335	(0.180)	-0.274	(0.249)
CM+OLS	555	422	0.014	(1.515)	-0.413	(0.215)	-0.605	(0.377)	1,504	556	-0.122	(0.938)	-0.255	(0.132)	-0.260	(0.171)
w/ CCP			0.750	(1.399)	-0.400	(0.208)	-0.603	(0.355)			0.127	(0.922)	-0.325**	(0.114)	-0.282	(0.186)
OLS	630	486	0.450	(1.408)	-0.492*	(0.197)	-0.412	(0.303)	1,577	567	0.008	(0.930)	-0.200	(0.118)	-0.180	(0.194)
w/ CCP			0.754	(1.326)	-0.541**	(0.200)	-0.482	(0.303)			0.258	(0.905)	-0.234*	(0.114)	-0.144	(0.197)
SM+OLS	268	236	1.299	(1.793)	0.015	(0.265)	-0.358	(0.459)	723	357	0.266	(1.278)	-0.252	(0.188)	-0.736*	(0.293)
w/ CCP			2.679	(1.941)	-0.073	(0.250)	-0.284	(0.559)			0.492	(1.284)	-0.382*	(0.182)	-0.731*	(0.351)
KBAL+OLS	630	486	-0.208	(1.596)	-0.515**	(0.185)	-0.683*	(0.301)	1,577	567	-0.645	(0.974)	-0.213	(0.126)	-0.404*	(0.197)
w/ CCP			0.286	(1.464)	-0.565**	(0.193)	-0.764*	(0.304)			-0.206	(0.927)	-0.265*	(0.115)	-0.325	(0.198)
KM+OLS	630	486	0.087	(1.342)	-0.452*	(0.185)	-0.564	(0.288)	1,577	567	-0.409	(0.883)	-0.209	(0.114)	-0.336	(0.174)
w/ CCP			0.220	(1.288)	-0.506**	(0.180)	-0.671*	(0.291)			-0.153	(0.872)	-0.272**	(0.104)	-0.320	(0.200)
RE	-	-	-	-	-	-	-	-	1,577	567	0.035	(0.990)	-0.263*	(0.122)	-0.202	(0.195)
w/ CCP			-	-	-	-	-	-			0.243	(0.929)	-0.283*	(0.118)	-0.159	(0.198)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	489	820	1.176	(1.190)	-2.300***	(0.335)	-1.653***	(0.444)	811	980	2.126	(1.267)	-1.612***	(0.292)	-0.939**	(0.346)
CM+OLS	425	660	1.186	(1.356)	-1.652***	(0.464)	-0.370	(0.532)	742	807	1.275	(1.176)	-1.131***	(0.300)	-0.262	(0.338)
w/ CCP			0.289	(1.173)	-1.849***	(0.436)	-0.799	(0.496)			0.805	(1.008)	-1.210***	(0.304)	-0.353	(0.319)
OLS	489	820	2.264	(1.279)	-1.342**	(0.409)	-0.568	(0.504)	811	980	1.311	(1.110)	-1.078***	(0.300)	-0.428	(0.358)
w/ CCP			1.413	(1.195)	-1.496***	(0.411)	-0.934	(0.504)			0.963	(0.941)	-1.163***	(0.300)	-0.550	(0.345)
SM+OLS	287	336	1.603	(1.353)	-1.799***	(0.457)	-1.043	(0.658)	437	383	3.163*	(1.373)	-0.666	(0.347)	0.041	(0.459)
w/ CCP			0.256	(1.427)	-2.235***	(0.442)	-1.656**	(0.637)			2.375	(1.361)	-0.818*	(0.384)	-0.054	(0.440)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C59 Continued. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on Credits Earned in Community College

School Fixed Effects									School-Cohort Controls							
N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned		N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned		
Precalc or Calc	Stat	b	se	b	se	b	se	Precalc or Calc	Stat	b	se	b	se	b	se	
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
KBAL+OLS	489	820	0.368	(1.701)	-1.563***	(0.473)	-0.304	(0.469)	811	980	0.203	(1.249)	-1.150***	(0.292)	-0.443	(0.347)
w/ CCP			-0.354	(1.487)	-1.789***	(0.457)	-0.678	(0.453)			0.300	(1.054)	-1.199***	(0.292)	-0.420	(0.324)
KM+OLS	489	820	1.309	(1.328)	-1.597***	(0.457)	-0.793	(0.518)	811	980	1.486	(1.142)	-1.238***	(0.301)	-0.444	(0.349)
w/ CCP			0.623	(1.195)	-1.781***	(0.454)	-1.172*	(0.492)			1.076	(1.020)	-1.338***	(0.308)	-0.528	(0.337)
RE	-	-	-	-	-	-	-	-	811	980	1.200	(1.034)	-1.125***	(0.301)	-0.438	(0.366)
w/ CCP			-	-	-	-	-	-			1.027	(0.940)	-1.175***	(0.302)	-0.585	(0.352)

See the note on the first page of the table.

Table C60. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on Starting in College-Level Math in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Started in College-Level Math		N		Started in College-Level Math	
	Precalc or Calc	Stat	b	se	Precalc or Calc	Stat	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	562	411	-0.111***	(0.029)	1,401	502	-0.103***	(0.028)
CM+OLS	499	354	-0.091**	(0.033)	1,312	494	-0.061*	(0.025)
w/ CCP			-0.097**	(0.030)			-0.079***	(0.023)
OLS	562	411	-0.074*	(0.031)	1,401	502	-0.075**	(0.023)
w/ CCP			-0.081**	(0.028)			-0.096***	(0.022)
SM+OLS	-	-	-	-	607	298	-0.049	(0.028)
w/ CCP			-	-			-0.059*	(0.029)
KBAL+OLS	562	411	-0.090**	(0.031)	1,401	502	-0.064*	(0.027)
w/ CCP			-0.098***	(0.029)			-0.084***	(0.022)
KM+OLS	562	411	-0.085**	(0.029)	1,401	502	-0.063*	(0.025)
w/ CCP			-0.094***	(0.027)			-0.081***	(0.022)
RE	-	-	-	-	1,401	502	-0.082***	(0.024)
w/ CCP			-	-			-0.099***	(0.022)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	443	714	-0.305***	(0.035)	736	857	-0.281***	(0.030)
CM+OLS	378	469	-0.167***	(0.039)	673	677	-0.158***	(0.030)
w/ CCP			-0.179***	(0.039)			-0.152***	(0.027)
OLS	443	714	-0.173***	(0.035)	736	857	-0.168***	(0.029)
w/ CCP			-0.183***	(0.036)			-0.155***	(0.027)
SM+OLS	-	-	-	-	400	345	-0.169***	(0.037)
w/ CCP			-	-			-0.151***	(0.039)
KBAL+OLS	443	714	-0.156**	(0.049)	736	857	-0.158***	(0.033)
w/ CCP			-0.163***	(0.045)			-0.145***	(0.029)
KM+OLS	443	714	-0.142***	(0.042)	736	857	-0.137***	(0.029)
w/ CCP			-0.155***	(0.041)			-0.128***	(0.026)
RE	-	-	-	-	736	857	-0.161***	(0.029)
w/ CCP			-	-			-0.156***	(0.027)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C61. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on Overall GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N	Overall GPA			N	Overall GPA		
	Precalc or Calc	Stat	b	se	Precalc or Calc	Stat	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	648	492	-0.061	(0.060)	1,605	574	0.003	(0.061)
CM+OLS	561	424	-0.007	(0.065)	1,530	562	0.024	(0.041)
w/ CCP			0.012	(0.063)			0.038	(0.039)
OLS	648	492	0.000	(0.058)	1,605	574	0.025	(0.040)
w/ CCP			0.039	(0.059)			0.038	(0.042)
SM+OLS	302	246	0.050	(0.072)	723	360	-0.022	(0.062)
w/ CCP			0.075	(0.084)			-0.010	(0.057)
KBAL+OLS	648	492	-0.006	(0.064)	1,605	574	0.027	(0.050)
w/ CCP			0.038	(0.063)			0.050	(0.049)
KM+OLS	648	492	-0.005	(0.060)	1,605	574	0.015	(0.041)
w/ CCP			0.021	(0.059)			0.023	(0.040)
RE	-	-	-	-	1,605	574	0.022	(0.041)
w/ CCP			-	-			0.037	(0.043)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	517	851	-0.109*	(0.053)	844	998	-0.006	(0.058)
CM+OLS	447	682	0.051	(0.056)	776	820	0.024	(0.047)
w/ CCP			0.048	(0.054)			0.023	(0.047)
OLS	517	851	0.100	(0.052)	844	998	0.052	(0.046)
w/ CCP			0.093	(0.050)			0.042	(0.044)
SM+OLS	317	364	0.094	(0.067)	479	415	0.137*	(0.061)
w/ CCP			0.061	(0.076)			0.107	(0.062)
KBAL+OLS	517	851	0.024	(0.066)	844	998	0.024	(0.048)
w/ CCP			0.026	(0.063)			0.015	(0.046)
KM+OLS	517	851	0.065	(0.058)	844	998	0.053	(0.050)
w/ CCP			0.054	(0.055)			0.038	(0.049)
RE	-	-	-	-	844	998	0.052	(0.045)
w/ CCP			-	-			0.052	(0.044)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C62. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on College-Level Math GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		College-Level Math GPA		N		College-Level Math GPA	
	Precalc or Calc	Stat	b	se	Precalc or Calc	Stat	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	244	169	-0.160	(0.099)	671	220	0.053	(0.078)
CM+OLS	-	-	-	-	606	211	0.002	(0.093)
w/ CCP			-	-			-0.021	(0.081)
OLS	244	169	-0.148	(0.133)	671	220	-0.010	(0.090)
w/ CCP			-0.153	(0.131)			-0.010	(0.087)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	244	169	-0.107	(0.171)	671	220	0.186	(0.118)
w/ CCP			-0.086	(0.155)			0.146	(0.120)
KM+OLS	-	-	-	-	671	220	0.037	(0.092)
w/ CCP			-	-			0.006	(0.084)
RE	-	-	-	-	671	220	-0.047	(0.089)
w/ CCP			-	-			-0.019	(0.087)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	322	436	0.003	(0.103)	542	525	0.112	(0.091)
CM+OLS	255	321	0.135	(0.126)	485	417	0.086	(0.090)
w/ CCP			0.107	(0.127)			0.052	(0.090)
OLS	322	436	0.193	(0.112)	542	525	0.094	(0.089)
w/ CCP			0.167	(0.113)			0.071	(0.089)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	322	436	0.175	(0.120)	542	525	0.077	(0.095)
w/ CCP			0.154	(0.124)			0.051	(0.093)
KM+OLS	322	436	0.190	(0.122)	542	525	0.111	(0.091)
w/ CCP			0.163	(0.119)			0.082	(0.091)
RE	-	-	-	-	542	525	0.096	(0.090)
w/ CCP			-	-			0.075	(0.090)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C63. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on Non-Math STEM GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N	Non-Math STEM GPA			N	Non-Math STEM GPA		
	Precalc or Calc	Stat	b	se	Precalc or Calc	Stat	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	254	213	0.091	(0.127)	802	280	0.048	(0.097)
CM+OLS	-	-	-	-	743	267	0.013	(0.093)
w/ CCP			-	-			0.021	(0.102)
OLS	254	213	0.265	(0.173)	802	280	0.048	(0.098)
w/ CCP			0.253	(0.186)			0.065	(0.100)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	254	213	0.337	(0.176)	802	280	0.081	(0.100)
w/ CCP			0.327	(0.193)			0.096	(0.102)
KM+OLS	-	-	-	-	802	280	0.051	(0.089)
w/ CCP			-	-			0.056	(0.094)
RE	-	-	-	-	802	280	0.063	(0.100)
w/ CCP			-	-			0.065	(0.100)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	333	477	-0.044	(0.089)	533	597	-0.001	(0.080)
CM+OLS	277	319	0.174	(0.111)	492	483	0.122	(0.076)
w/ CCP			0.120	(0.113)			0.085	(0.075)
OLS	333	477	0.188	(0.109)	533	597	0.144	(0.076)
w/ CCP			0.147	(0.108)			0.118	(0.080)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	333	477	0.228	(0.129)	533	597	0.191*	(0.079)
w/ CCP			0.182	(0.129)			0.162*	(0.080)
KM+OLS	333	477	0.228	(0.117)	533	597	0.184*	(0.078)
w/ CCP			0.143	(0.111)			0.154*	(0.076)
RE	-	-	-	-	533	597	0.146	(0.077)
w/ CCP			-	-			0.122	(0.080)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C64. Estimated Effects of Taking Statistics (Compared to Precalculus or Calculus) on Credits Earned in CSUN for Groups 4 and 5

	N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned	
	Precalc or Calc	Stat	b	se	b	se	b	se
Unadjust	830	443	0.957	(1.287)	-1.441***	(0.285)	-1.102*	(0.497)
CM+OLS	785	424	0.253	(1.071)	-1.092***	(0.289)	-0.971*	(0.399)
OLS	830	443	0.279	(1.141)	-1.023***	(0.282)	-0.920*	(0.391)
SM+OLS	-	-	-	-	-	-	-	-
KBAL+OLS	830	443	0.770	(1.061)	-1.132***	(0.297)	-0.900*	(0.432)
KM+OLS	830	443	0.182	(1.062)	-1.206***	(0.277)	-0.997**	(0.368)
RE	830	443	0.048	(1.177)	-1.033***	(0.282)	-0.983*	(0.411)

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 C65. Estimated Effects of Taking Statistics (Compared to Precalculus or Calculus) on Avoiding Developmental Math in CSUN for Groups 4 and 5

	N		Avoided Developmental Math	
	Precalc or Calc	Stat	b	se
Unadjust	813	411	-0.090*	(0.042)
CM+OLS	731	399	-0.034	(0.029)
OLS	813	411	-0.052	(0.028)
SM+OLS	-	-	-	-
KBAL+OLS	813	411	-0.018	(0.027)
KM+OLS	813	411	-0.037	(0.027)
RE	813	411	-0.048	(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 C66. Estimated Effects of Taking Statistics (Compared to Precalculus or Calculus) on Overall GPA in CSUN for Groups 4 and 5

	N		Overall GPA	
	Precalc or Calc	Stat	b	se
Unadjust	855	448	0.080	(0.066)
CM+OLS	806	436	0.045	(0.056)
OLS	855	448	0.049	(0.053)
SM+OLS	-	-	-	-
KBAL+OLS	855	448	0.049	(0.054)
KM+OLS	855	448	0.040	(0.052)
RE	855	448	0.047	(0.054)

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 C67. Estimated Effects of Taking Statistics (Compared to Precalculus or Calculus) on College-Level Math GPA in CSUN for Groups 4 and 5

	N		College-Level Math GPA	
	Precalc or Calc	Stat	b	se
Unadjust	707	340	0.192*	(0.089)
CM+OLS	632	334	0.136	(0.086)
OLS	707	340	0.170*	(0.084)
SM+OLS	-	-	-	-
KBAL+OLS	707	340	0.142	(0.086)
KM+OLS	707	340	0.160*	(0.080)
RE	707	340	0.143	(0.086)

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 C68. Estimated Effects of Taking Statistics (Compared to Precalculus or Calculus) on Non-Math STEM GPA in CSUN for Groups 4 and 5

	N		Non-Math STEM GPA	
	Precalc or Calc	Stat	b	se
Unadjust	750	384	0.126	(0.072)
CM+OLS	716	358	0.034	(0.078)
OLS	750	384	0.050	(0.071)
SM+OLS	-	-	-	-
KBAL+OLS	750	384	0.064	(0.078)
KM+OLS	750	384	0.042	(0.075)
RE	750	384	0.046	(0.072)

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 C69. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on Degree-Applicable Math Credits Earned in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Degree-Applicable Math Credits Earned		N		Degree-Applicable Math Credits Earned	
	Precalc or Calc	Stat	b	se	Precalc or Calc	Stat	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	644	490	-0.701*	(0.318)	1,600	572	-0.344	(0.307)
CM+OLS	564	427	-0.374	(0.403)	1,521	560	-0.038	(0.240)
w/ CCP			-0.388	(0.362)			0.081	(0.206)
OLS	644	490	-0.496	(0.383)	1,600	572	-0.186	(0.231)
w/ CCP			-0.501	(0.341)			-0.025	(0.208)
SM+OLS	300	245	0.181	(0.477)	724	375	-0.300	(0.305)
w/ CCP			0.347	(0.460)			-0.190	(0.275)
KBAL+OLS	644	490	-0.522	(0.385)	1,600	572	-0.300	(0.238)
w/ CCP			-0.529	(0.337)			-0.095	(0.214)
KM+OLS	644	490	-0.294	(0.336)	1,600	572	-0.223	(0.217)
w/ CCP			-0.328	(0.298)			-0.070	(0.191)
RE	-	-	-	-	1,600	572	-0.248	(0.244)
w/ CCP			-	-			-0.052	(0.211)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	502	843	-1.271**	(0.436)	826	990	-0.732	(0.376)
CM+OLS	427	679	-0.569	(0.509)	757	810	-0.533	(0.384)
w/ CCP			-0.923	(0.527)			-0.635	(0.397)
OLS	502	843	-0.758	(0.512)	826	990	-0.555	(0.409)
w/ CCP			-0.908	(0.521)			-0.674	(0.399)
SM+OLS	301	355	-1.120	(0.652)	459	396	0.161	(0.460)
w/ CCP			-1.359*	(0.598)			0.097	(0.484)
KBAL+OLS	502	843	-0.885	(0.530)	826	990	-0.518	(0.382)
w/ CCP			-1.095*	(0.524)			-0.610	(0.378)
KM+OLS	502	843	-0.851	(0.501)	826	990	-0.570	(0.373)
w/ CCP			-1.079*	(0.512)			-0.665	(0.385)
RE	-	-	-	-	826	990	-0.678	(0.404)
w/ CCP			-	-			-0.713	(0.409)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C70. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on Starting in Degree-Applicable Math in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Started in Degree-Applicable Math		N		Started in Degree-Applicable Math	
	Precalc or Calc	Stat	b	se	Precalc or Calc	Stat	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	562	411	-0.048	(0.037)	1,401	502	-0.063	(0.035)
CM+OLS	499	354	-0.035	(0.034)	1,312	494	-0.053*	(0.026)
w/ CCP			-0.062	(0.035)			-0.064**	(0.024)
OLS	562	411	-0.027	(0.036)	1,401	502	-0.050	(0.028)
w/ CCP			-0.054	(0.037)			-0.055*	(0.024)
SM+OLS	-	-	-	-	607	298	-0.028	(0.033)
w/ CCP			-	-			-0.033	(0.032)
KBAL+OLS	562	411	-0.042	(0.038)	1,401	502	-0.054	(0.031)
w/ CCP			-0.074	(0.039)			-0.065*	(0.029)
KM+OLS	562	411	-0.026	(0.032)	1,401	502	-0.060*	(0.025)
w/ CCP			-0.058	(0.034)			-0.069**	(0.023)
RE	-	-	-	-	1,401	502	-0.050	(0.028)
w/ CCP			-	-			-0.057*	(0.024)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	443	714	-0.128***	(0.025)	736	857	-0.113***	(0.023)
CM+OLS	378	469	-0.067**	(0.024)	673	677	-0.065**	(0.021)
w/ CCP			-0.061*	(0.024)			-0.059**	(0.020)
OLS	443	714	-0.071**	(0.025)	736	857	-0.064**	(0.020)
w/ CCP			-0.068**	(0.025)			-0.059**	(0.020)
SM+OLS	-	-	-	-	400	345	-0.080**	(0.026)
w/ CCP			-	-			-0.077**	(0.027)
KBAL+OLS	443	714	-0.113***	(0.029)	736	857	-0.061**	(0.022)
w/ CCP			-0.099***	(0.028)			-0.055**	(0.021)
KM+OLS	443	714	-0.086**	(0.028)	736	857	-0.061**	(0.022)
w/ CCP			-0.075**	(0.026)			-0.053**	(0.020)
RE	-	-	-	-	736	857	-0.064**	(0.021)
w/ CCP			-	-			-0.059**	(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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C71. Estimated Effects of Taking Statistics (Compared to Precalculus/Calculus) on Degree-Applicable Math GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Degree Applicable Math GPA		N		Degree Applicable Math GPA	
	Precalc or Calc	Stat	b	se	Precalc or Calc	Stat	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	412	308	-0.121	(0.070)	1,097	374	-0.037	(0.066)
CM+OLS	-	-	-	-	1,011	367	-0.016	(0.064)
w/ CCP			-	-			0.012	(0.058)
OLS	412	308	-0.081	(0.099)	1,097	374	-0.030	(0.065)
w/ CCP			-0.055	(0.093)			0.008	(0.063)
SM+OLS	-	-	-	-	343	191	-0.105	(0.112)
w/ CCP			-	-			-0.048	(0.119)
KBAL+OLS	412	308	-0.026	(0.099)	1,097	374	0.076	(0.080)
w/ CCP			0.002	(0.096)			0.094	(0.082)
KM+OLS	412	308	-0.026	(0.100)	1,097	374	0.013	(0.068)
w/ CCP			0.005	(0.095)			0.040	(0.065)
RE	-	-	-	-	1,097	374	-0.050	(0.064)
w/ CCP			-	-			0.001	(0.061)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	385	607	-0.043	(0.092)	637	725	0.055	(0.083)
CM+OLS	337	410	0.242*	(0.109)	589	576	0.128	(0.083)
w/ CCP			0.217*	(0.098)			0.150	(0.079)
OLS	385	607	0.233*	(0.094)	637	725	0.142	(0.078)
w/ CCP			0.238*	(0.094)			0.146	(0.077)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	385	607	0.304**	(0.114)	637	725	0.101	(0.082)
w/ CCP			0.270*	(0.111)			0.129	(0.074)
KM+OLS	385	607	0.242*	(0.101)	637	725	0.119	(0.080)
w/ CCP			0.216*	(0.090)			0.140	(0.077)
RE	-	-	-	-	637	725	0.143	(0.078)
w/ CCP			-	-			0.150	(0.077)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C72. Estimated Effects of Taking TCMS (Compared to Precalculus/Calculus) on Credits Earned in Community College

	School Fixed Effects								School-Cohort Controls							
	N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned		N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned	
	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	258	222	-5.155**	(1.769)	-1.717***	(0.318)	-1.505***	(0.421)	1,592	262	-4.171**	(1.470)	-0.773***	(0.232)	-0.866**	(0.287)
CM+OLS	-	-	-	-	-	-	-	-	541	213	-1.774	(1.783)	-0.316	(0.249)	-0.069	(0.352)
w/ CCP	-	-	-	-	-	-	-	-	-	-	0.138	(2.086)	-0.281	(0.251)	-0.250	(0.341)
OLS	258	222	-2.644	(3.243)	-1.055*	(0.459)	-0.958	(0.640)	1,592	262	-2.003	(1.424)	-0.281	(0.248)	-0.176	(0.309)
w/ CCP	-	-	-1.099	(3.434)	-0.962*	(0.486)	-0.820	(0.634)	-	-	-0.216	(1.507)	-0.258	(0.284)	-0.068	(0.312)
SM+OLS	-	-	-	-	-	-	-	-	319	136	-0.047	(2.108)	-0.242	(0.373)	0.309	(0.389)
w/ CCP	-	-	-	-	-	-	-	-	-	-	1.562	(2.788)	-0.152	(0.388)	0.420	(0.523)
KBAL+OLS	258	222	-3.909	(3.181)	-0.460	(0.334)	-1.305**	(0.452)	1,592	262	-1.820	(1.672)	-0.388	(0.208)	-0.373	(0.386)
w/ CCP	-	-	-2.073	(3.760)	-0.507	(0.522)	-1.121	(0.583)	-	-	0.120	(1.726)	-0.327	(0.226)	-0.302	(0.396)
KM+OLS	258	168	-3.391	(3.397)	-1.059*	(0.438)	-1.158*	(0.556)	1,592	261	-1.698	(1.586)	-0.348	(0.206)	-0.339	(0.309)
w/ CCP	-	-	-1.326	(3.487)	-0.955	(0.514)	-0.969	(0.546)	-	-	0.195	(1.675)	-0.364	(0.221)	-0.501	(0.329)
RE	-	-	-	-	-	-	-	-	1,592	262	-1.558	(1.461)	-0.315	(0.257)	-0.129	(0.322)
w/ CCP	-	-	-	-	-	-	-	-	-	-	-0.216	(1.507)	-0.291	(0.290)	-0.067	(0.319)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	147	120	-1.663	(2.815)	-1.977**	(0.715)	-2.039**	(0.665)	825	167	-4.165*	(2.110)	-2.308***	(0.407)	-2.596***	(0.480)
CM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
w/ CCP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OLS	-	-	-	-	-	-	-	-	825	167	-0.560	(1.936)	-0.616	(0.429)	-0.842	(0.487)
w/ CCP	-	-	-	-	-	-	-	-	-	-	0.427	(1.969)	-0.593	(0.527)	-0.754	(0.570)
SM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
w/ CCP	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C72 Continued. Estimated Effects of Taking TCMS (Compared to Precalculus/Calculus) on Credits Earned in Community College

School Fixed Effects									School-Cohort Controls							
N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned		N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned		
Precalc or Calc	TCMS	b	se	b	se	b	se	Precalc or Calc	TCMS	b	se	b	se	b	se	
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
KBAL+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
w/ CCP																
KM+OLS	-	-	-	-	-	-	-	825	101	0.205	(1.966)	-0.779	(0.406)	-1.042*	(0.481)	
w/ CCP										-0.640	(1.936)	-1.310**	(0.451)	-1.313*	(0.518)	
RE	-	-	-	-	-	-	-	825	167	-0.131	(1.891)	-0.544	(0.452)	-0.838	(0.485)	
w/ CCP										0.414	(1.963)	-0.611	(0.533)	-0.759	(0.569)	

See the note on the first page of the table.

Table C73. Estimated Effects of Taking TCMS (Compared to Precalculus/Calculus) on Starting in College-Level Math in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Started in College-Level Math		N		Started in College-Level Math	
	Precalc or Calc	TCMS	b	se	Precalc or Calc	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	227	186	-0.299***	(0.046)	1,414	223	-0.109**	(0.036)
CM+OLS	-	-	-	-	451	174	-0.040	(0.035)
w/ CCP			-	-			-0.079	(0.040)
OLS	227	186	-0.082	(0.057)	1,414	223	-0.054	(0.029)
w/ CCP			-0.081	(0.060)			-0.116***	(0.030)
SM+OLS	-	-	-	-	256	103	-0.078	(0.046)
w/ CCP			-	-			-0.115	(0.065)
KBAL+OLS	-	-	-	-	1,414	223	-0.050	(0.032)
w/ CCP			-	-			-0.090*	(0.037)
KM+OLS	227	131	-0.074	(0.045)	1,414	221	-0.038	(0.027)
w/ CCP			-0.107*	(0.052)			-0.065*	(0.033)
RE	-	-	-	-	1,414	223	-0.086**	(0.033)
w/ CCP			-	-			-0.120***	(0.031)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	131	120	-0.325***	(0.062)	748	146	-0.261***	(0.051)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	-	-	-	-	748	146	-0.107	(0.060)
w/ CCP			-	-			-0.134*	(0.054)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KM+OLS	-	-	-	-	748	89	-0.109*	(0.055)
w/ CCP			-	-			-0.149**	(0.054)
RE	-	-	-	-	748	146	-0.097	(0.059)
w/ CCP			-	-			-0.134*	(0.054)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C74. Estimated Effects of Taking TCMS (Compared to Precalculus/Calculus) on Overall GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Overall GPA		N		Overall GPA	
	Precalc or Calc	TCMS	b	se	Precalc or Calc	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	264	222	-0.198*	(0.099)	1,621	263	-0.182*	(0.086)
CM+OLS	-	-	-	-	541	213	0.007	(0.086)
w/ CCP			-	-			0.159	(0.104)
OLS	264	222	0.153	(0.146)	1,621	263	-0.024	(0.073)
w/ CCP			0.182	(0.154)			0.064	(0.079)
SM+OLS	-	-	-	-	313	133	0.182	(0.096)
w/ CCP			-	-			0.360*	(0.146)
KBAL+OLS	264	222	-0.002	(0.173)	1,621	263	-0.021	(0.089)
w/ CCP			0.070	(0.189)			0.059	(0.108)
KM+OLS	264	164	0.058	(0.151)	1,621	262	-0.036	(0.080)
w/ CCP			0.094	(0.175)			0.081	(0.097)
RE	-	-	-	-	1,621	263	-0.006	(0.073)
w/ CCP			-	-			0.064	(0.079)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	151	143	-0.333*	(0.152)	860	169	-0.378**	(0.120)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	-	-	-	-	860	169	-0.033	(0.084)
w/ CCP			-	-			0.024	(0.082)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KM+OLS	-	-	-	-	860	102	0.029	(0.077)
w/ CCP			-	-			0.067	(0.088)
RE	-	-	-	-	860	169	-0.015	(0.082)
w/ CCP			-	-			0.020	(0.081)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C75. Estimated Effects of Taking TCMS (Compared to Precalculus/Calculus) on College-Level Math GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		College-Level Math GPA		N		College-Level Math GPA	
	Precalc or Calc	TCMS	b	se	Precalc or Calc	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	130	61	-0.074	(0.231)	679	84	-0.136	(0.193)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	-	-	-	-	679	84	-0.009	(0.161)
w/ CCP			-	-			-0.050	(0.171)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	679	84	0.002	(0.195)
w/ CCP			-	-			0.075	(0.207)
KM+OLS	-	-	-	-	679	81	-0.017	(0.151)
w/ CCP			-	-			-0.018	(0.165)
RE	-	-	-	-	679	84	-0.000	(0.164)
w/ CCP			-	-			-0.048	(0.172)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	86	63	-0.210	(0.276)	551	76	-0.309	(0.177)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
RE	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C76. Estimated Effects of Taking TCMS (Compared to Precalculus/Calculus) on Non-Math STEM GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N	Non-Math STEM GPA			N	Non-Math STEM GPA		
	Precalc or Calc	TCMS	b	se	Precalc or Calc	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	125	86	-0.169	(0.223)	814	109	-0.086	(0.152)
CM+OLS	-	-	-	-	220	83	0.092	(0.152)
w/ CCP			-	-			0.141	(0.170)
OLS	-	-	-	-	814	109	0.035	(0.138)
w/ CCP			-	-			0.182	(0.136)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	814	109	0.050	(0.139)
w/ CCP			-	-			0.237	(0.148)
KM+OLS	-	-	-	-	814	108	0.067	(0.108)
w/ CCP			-	-			0.238*	(0.119)
RE	-	-	-	-	814	109	0.059	(0.140)
w/ CCP			-	-			0.182	(0.136)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	91	65	-0.235	(0.131)	542	82	-0.228	(0.122)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
RE	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C77. Estimated Effects of Taking TCMS (Compared to Precalculus/Calculus) on Degree-Applicable Math Credits Earned in Community College

	School Fixed Effects				School-Cohort Controls			
	N	Degree-Applicable Math Credits Earned		N	Degree-Applicable Math Credits Earned			
	Precalc or Calc	TCMS	b	se	Precalc or Calc	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	264	222	-1.217**	(0.433)	1,616	262	-0.696*	(0.317)
CM+OLS	-	-	-	-	531	212	-0.246	(0.392)
w/ CCP			-	-			0.123	(0.410)
OLS	264	222	-0.889	(0.676)	1,616	262	-0.141	(0.332)
w/ CCP			-0.588	(0.674)			0.330	(0.382)
SM+OLS	-	-	-	-	325	139	-0.263	(0.501)
w/ CCP			-	-			0.630	(0.584)
KBAL+OLS	264	222	-0.088	(0.561)	1,616	262	-0.335	(0.398)
w/ CCP			0.134	(0.654)			0.088	(0.375)
KM+OLS	264	164	-0.827	(0.763)	1,616	261	-0.212	(0.346)
w/ CCP			-0.608	(0.798)			0.023	(0.373)
RE	-	-	-	-	1,616	262	-0.126	(0.354)
w/ CCP			-	-			0.320	(0.384)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	150	143	-1.263	(0.676)	842	169	-1.714***	(0.457)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	-	-	-	-	842	169	-0.310	(0.471)
w/ CCP			-	-			-0.196	(0.540)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KM+OLS	-	-	-	-	842	101	-0.363	(0.389)
w/ CCP			-	-			-0.953*	(0.390)
RE	-	-	-	-	842	169	-0.270	(0.474)
w/ CCP			-	-			-0.267	(0.538)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C78. Estimated Effects of Taking TCMS (Compared to Precalculus/Calculus) on Starting in Degree-Applicable Math in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Started in Degree-Applicable Math		N		Started in Degree-Applicable Math	
	Precalc or Calc	TCMS	b	se	Precalc or Calc	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	227	186	-0.045	(0.035)	1,414	223	0.047	(0.026)
CM+OLS	-	-	-	-	451	174	0.006	(0.038)
w/ CCP			-	-			0.035	(0.039)
OLS	227	186	0.005	(0.054)	1,414	223	0.062*	(0.028)
w/ CCP			0.035	(0.051)			0.029	(0.028)
SM+OLS	-	-	-	-	256	103	0.064	(0.042)
w/ CCP			-	-			0.019	(0.047)
KBAL+OLS	-	-	-	-	1,414	223	0.036	(0.033)
w/ CCP			-	-			0.040	(0.030)
KM+OLS	227	131	-0.022	(0.044)	1,414	221	0.057*	(0.029)
w/ CCP			0.037	(0.050)			0.051	(0.029)
RE	-	-	-	-	1,414	223	0.047	(0.028)
w/ CCP			-	-			0.026	(0.028)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	131	120	-0.088**	(0.029)	748	146	-0.066*	(0.028)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	-	-	-	-	748	146	-0.037	(0.032)
w/ CCP			-	-			-0.034	(0.029)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KM+OLS	-	-	-	-	748	89	-0.051	(0.033)
w/ CCP			-	-			-0.019	(0.032)
RE	-	-	-	-	748	146	-0.037	(0.032)
w/ CCP			-	-			-0.034	(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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C79. Estimated Effects of Taking TCMS (Compared to Precalculus/Calculus) on Degree-Applicable Math GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Degree Applicable Math GPA		N		Degree Applicable Math GPA	
	Precalc or Calc	TCMS	b	se	Precalc or Calc	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	180	132	-0.401**	(0.148)	1,109	170	-0.333**	(0.126)
CM+OLS	-	-	-	-	334	126	-0.008	(0.116)
w/ CCP			-	-			0.036	(0.156)
OLS	-	-	-	-	1,109	170	-0.097	(0.104)
w/ CCP			-	-			-0.045	(0.119)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	1,109	170	-0.151	(0.107)
w/ CCP			-	-			-0.024	(0.119)
KM+OLS	-	-	-	-	1,109	167	-0.068	(0.092)
w/ CCP			-	-			0.008	(0.109)
RE	-	-	-	-	1,109	170	-0.088	(0.106)
w/ CCP			-	-			-0.045	(0.120)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	102	99	-0.230	(0.219)	647	122	-0.342*	(0.156)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
RE	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C80. Estimated Effects of Taking TCMS (Compared to Statistics) on Credits Earned in Community College

	School Fixed Effects								School-Cohort Controls							
	N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned		N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned	
	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	135	111	-3.650	(2.709)	-0.871*	(0.367)	-0.302	(0.431)	581	262	-4.256*	(1.776)	-0.506*	(0.231)	-0.656*	(0.305)
CM+OLS	-	-	-	-	-	-	-	-	331	211	-3.036	(1.742)	-0.390	(0.223)	-0.407	(0.343)
w/ CCP			-	-	-	-	-	-			-3.697	(2.063)	-0.369	(0.240)	-0.394	(0.433)
OLS	135	111	-1.105	(2.367)	-0.502	(0.456)	0.048	(0.549)	581	262	-2.273	(1.522)	-0.184	(0.249)	-0.234	(0.321)
w/ CCP			-1.253	(2.424)	-0.330	(0.559)	0.136	(0.609)			-1.669	(1.717)	-0.207	(0.277)	-0.176	(0.371)
SM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
w/ CCP			-	-	-	-	-	-			-	-	-	-	-	-
KBAL+OLS	-	-	-	-	-	-	-	-	581	262	-1.983	(1.692)	-0.392*	(0.200)	-0.154	(0.329)
w/ CCP			-	-	-	-	-	-			-2.413	(1.657)	-0.393	(0.214)	-0.255	(0.366)
KM+OLS	135	62	-0.187	(1.846)	-0.590	(0.395)	0.165	(0.358)	581	248	-2.822	(1.590)	-0.390*	(0.195)	-0.219	(0.320)
w/ CCP			-1.794	(2.160)	-0.603	(0.473)	-0.124	(0.504)			-2.543	(1.747)	-0.356	(0.204)	-0.198	(0.375)
RE	-	-	-	-	-	-	-	-	581	262	-1.100	(1.640)	-0.152	(0.253)	-0.234	(0.321)
w/ CCP			-	-	-	-	-	-			-0.742	(1.764)	-0.179	(0.282)	-0.176	(0.371)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
Unadjust	130	97	-10.771**	(3.657)	-1.242*	(0.530)	-3.642***	(0.753)	997	166	-6.261**	(2.167)	-0.738*	(0.315)	-1.684***	(0.417)
CM+OLS	-	-	-	-	-	-	-	-	274	116	-2.548	(2.841)	-0.021	(0.319)	-1.033*	(0.499)
w/ CCP			-	-	-	-	-	-			-2.401	(3.201)	-0.298	(0.383)	-1.474**	(0.502)
OLS	-	-	-	-	-	-	-	-	997	166	-1.969	(2.007)	0.184	(0.288)	-0.730	(0.413)
w/ CCP			-	-	-	-	-	-			-1.230	(1.990)	-0.073	(0.329)	-1.013*	(0.517)
SM+OLS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
w/ CCP			-	-	-	-	-	-			-	-	-	-	-	-

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C80 Continued. Estimated Effects of Taking TCMS (Compared to Statistics) on Credits Earned in Community College

School Fixed Effects									School-Cohort Controls							
N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned		N	N		Overall Credits Earned		College-Level Math Credits Earned		Non-Math STEM Credits Earned	
Stat	TCMS	b	se	b	se	b	se		Stat	TCMS	b	se	b	se	b	se
Group 5: Math A-G Complete with a "C" + 1 Advanced Math																
KBAL+OLS	-	-	-	-	-	-	-	997	166	-2.618	(1.863)	-0.042	(0.297)	-0.826*	(0.414)	
w/ CCP			-	-	-	-	-			-1.392	(1.904)	-0.124	(0.320)	-1.175*	(0.539)	
KM+OLS	-	-	-	-	-	-	-	997	159	-2.133	(2.116)	0.115	(0.274)	-0.810*	(0.397)	
w/ CCP			-	-	-	-	-			-1.657	(2.299)	-0.197	(0.308)	-1.103*	(0.489)	
RE	-	-	-	-	-	-	-	997	166	-1.749	(1.992)	0.174	(0.291)	-0.781	(0.418)	
w/ CCP			-	-	-	-	-			-1.592	(2.036)	-0.098	(0.332)	-1.051*	(0.524)	

See the note on the first page of the table.

Table C81. Estimated Effects of Taking TCMS (Compared to Statistics) on Starting in College-Level Math in Community College

	School Fixed Effects				School-Cohort Controls			
	Stat	TCMS	b	se	Stat	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	117	93	-0.136*	(0.067)	514	223	-0.008	(0.036)
CM+OLS	-	-	-	-	290	165	0.016	(0.037)
w/ CCP			-	-			0.007	(0.044)
OLS	117	93	-0.003	(0.083)	514	223	-0.010	(0.034)
w/ CCP			0.007	(0.078)			-0.042	(0.048)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	514	223	-0.027	(0.031)
w/ CCP			-	-			-0.059	(0.037)
KM+OLS	117	42	-0.028	(0.074)	514	192	0.007	(0.030)
w/ CCP			-0.027	(0.044)			-0.017	(0.040)
RE	-	-	-	-	514	223	-0.010	(0.034)
w/ CCP			-	-			-0.042	(0.048)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	119	87	-0.185***	(0.051)	871	145	0.012	(0.047)
CM+OLS	-	-	-	-	218	95	0.136**	(0.052)
w/ CCP			-	-			0.094*	(0.045)
OLS	-	-	-	-	871	145	0.075	(0.052)
w/ CCP			-	-			0.017	(0.042)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	871	145	0.081	(0.061)
w/ CCP			-	-			0.019	(0.056)
KM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
RE	-	-	-	-	871	145	0.051	(0.048)
w/ CCP			-	-			0.017	(0.041)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C82. Estimated Effects of Taking TCMS (Compared to Statistics) on Overall GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Overall GPA		N		Overall GPA	
	Stat	TCMS	b	se	Stat	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	136	111	-0.316*	(0.140)	589	263	-0.178	(0.095)
CM+OLS	-	-	-	-	333	207	-0.033	(0.078)
w/ CCP			-	-			0.010	(0.104)
OLS	136	111	-0.179	(0.156)	589	263	-0.062	(0.071)
w/ CCP			-0.321	(0.191)			-0.006	(0.082)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	589	263	-0.077	(0.075)
w/ CCP			-	-			-0.088	(0.071)
KM+OLS	136	62	-0.147	(0.120)	589	247	-0.090	(0.073)
w/ CCP			-0.323**	(0.115)			-0.063	(0.089)
RE	-	-	-	-	589	263	-0.045	(0.074)
w/ CCP			-	-			0.005	(0.085)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	135	98	-0.531**	(0.172)	1,017	168	-0.375**	(0.127)
CM+OLS	-	-	-	-	282	117	-0.116	(0.114)
w/ CCP			-	-			-0.036	(0.115)
OLS	-	-	-	-	1,017	168	-0.096	(0.085)
w/ CCP			-	-			0.002	(0.086)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	1,017	168	-0.031	(0.090)
w/ CCP			-	-			0.077	(0.091)
KM+OLS	-	-	-	-	1,017	161	-0.076	(0.088)
w/ CCP			-	-			-0.013	(0.092)
RE	-	-	-	-	1,017	168	-0.076	(0.089)
w/ CCP			-	-			-0.009	(0.093)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C83. Estimated Effects of Taking TCMS (Compared to Statistics) on Non-Math STEM GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N	Non-Math STEM GPA			N	Non-Math STEM GPA		
	Stat	TCMS	b	se	Stat	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	52	53	-0.167	(0.234)	291	109	-0.105	(0.152)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	-	-	-	-	291	109	-0.141	(0.156)
w/ CCP			-	-			-0.046	(0.173)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	291	109	-0.037	(0.145)
w/ CCP			-	-			-0.017	(0.149)
KM+OLS	-	-	-	-	291	84	-0.085	(0.132)
w/ CCP			-	-			-0.090	(0.139)
RE	-	-	-	-	291	109	-0.141	(0.159)
w/ CCP			-	-			-0.081	(0.178)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	91	48	-0.471**	(0.155)	606	81	-0.234	(0.124)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	-	-	-	-	606	81	-0.019	(0.161)
w/ CCP			-	-			0.072	(0.153)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	606	81	-0.036	(0.193)
w/ CCP			-	-			0.235	(0.168)
KM+OLS	-	-	-	-	606	72	-0.127	(0.149)
w/ CCP			-	-			0.102	(0.164)
RE	-	-	-	-	606	81	-0.020	(0.161)
w/ CCP			-	-			0.055	(0.154)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C84. Estimated Effects of Taking TCMS (Compared to Statistics) on Degree-Applicable Math Credits Earned in Community College

	School Fixed Effects				School-Cohort Controls			
	Stat	TCMS	b	se	Stat	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	135	111	-0.189	(0.553)	587	262	-0.452	(0.374)
CM+OLS	-	-	-	-	335	204	0.257	(0.394)
w/ CCP			-	-			0.406	(0.423)
OLS	135	111	0.520	(0.744)	587	262	0.056	(0.429)
w/ CCP			0.818	(0.749)			0.132	(0.432)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	587	262	-0.087	(0.457)
w/ CCP			-	-			0.107	(0.436)
KM+OLS	135	62	0.874	(0.561)	587	245	-0.203	(0.413)
w/ CCP			0.851	(0.756)			0.031	(0.356)
RE	-	-	-	-	587	262	0.141	(0.431)
w/ CCP			-	-			0.212	(0.434)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	133	98	-1.036	(0.621)	1,009	168	-0.996*	(0.407)
CM+OLS	-	-	-	-	281	118	0.129	(0.421)
w/ CCP			-	-			0.012	(0.497)
OLS	-	-	-	-	1,009	168	-0.009	(0.493)
w/ CCP			-	-			-0.025	(0.476)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	1,009	168	-0.291	(0.505)
w/ CCP			-	-			-0.136	(0.578)
KM+OLS	-	-	-	-	1,009	161	-0.228	(0.480)
w/ CCP			-	-			-0.256	(0.497)
RE	-	-	-	-	1,009	168	0.080	(0.468)
w/ CCP			-	-			-0.121	(0.486)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C85. Estimated Effects of Taking TCMS (Compared to Statistics) on Starting in Degree-Applicable Math in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Started in Degree-Applicable Math		N		Started in Degree-Applicable Math	
	Stat	TCMS	b	se	Stat	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	117	93	0.054	(0.067)	514	223	0.105*	(0.041)
CM+OLS	-	-	-	-	290	165	0.156**	(0.049)
w/ CCP			-	-			0.145*	(0.065)
OLS	117	93	0.100	(0.062)	514	223	0.098*	(0.048)
w/ CCP			0.161	(0.083)			0.062	(0.056)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	514	223	0.117**	(0.039)
w/ CCP			-	-			0.075	(0.046)
KM+OLS	117	42	0.153**	(0.047)	514	192	0.123**	(0.045)
w/ CCP			0.237***	(0.064)			0.092	(0.060)
RE	-	-	-	-	514	223	0.097	(0.051)
w/ CCP			-	-			0.071	(0.059)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	119	87	-0.000	(0.038)	871	145	0.043	(0.033)
CM+OLS	-	-	-	-	218	95	0.077	(0.040)
w/ CCP			-	-			0.050	(0.043)
OLS	-	-	-	-	871	145	0.052	(0.035)
w/ CCP			-	-			0.038	(0.032)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	871	145	0.044	(0.045)
w/ CCP			-	-			0.009	(0.043)
KM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
RE	-	-	-	-	871	145	0.053	(0.035)
w/ CCP			-	-			0.039	(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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C86. Estimated Effects of Taking TCMS (Compared to Statistics) on Degree-Applicable Math GPA in Community College

	School Fixed Effects				School-Cohort Controls			
	N		Degree Applicable Math GPA		N		Degree Applicable Math GPA	
	Stat	TCMS	b	se	Stat	TCMS	b	se
Group 4: Math A-G Complete with a "C"								
Unadjust	90	71	-0.278	(0.143)	385	170	-0.294*	(0.138)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	-	-	-	-	385	170	-0.074	(0.132)
w/ CCP			-	-			0.024	(0.157)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	385	170	-0.147	(0.130)
w/ CCP			-	-			-0.216	(0.161)
KM+OLS	-	-	-	-	385	141	-0.120	(0.115)
w/ CCP			-	-			0.003	(0.150)
RE	-	-	-	-	385	170	-0.035	(0.136)
w/ CCP			-	-			0.077	(0.166)
Group 5: Math A-G Complete with a "C" + 1 Advanced Math								
Unadjust	106	73	-0.520*	(0.215)	737	121	-0.405*	(0.158)
CM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
OLS	-	-	-	-	737	121	0.022	(0.137)
w/ CCP			-	-			0.080	(0.136)
SM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
KBAL+OLS	-	-	-	-	737	121	-0.201	(0.182)
w/ CCP			-	-			0.051	(0.164)
KM+OLS	-	-	-	-	-	-	-	-
w/ CCP			-	-			-	-
RE	-	-	-	-	737	121	0.041	(0.132)
w/ CCP			-	-			0.053	(0.134)

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. CCP = Community College Predictors (i.e., campus fixed effects and an indicator of being a full-time student) included as regressors in the outcome model. 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 C87. College Math Course Taking Patterns for Math vs. No Math

	Community College		CSUN	
	No Math	Math	No Math	Math
Group 3: Math A-G Complete with a "D"				
Algebra 2 or Lower	5.0%	10.7%	-	-
Statistics	80.7%	73.5%	-	-
Precalculus	14.3%	20.4%	-	-
Calculus	3.6%	7.1%	-	-
Higher Level	0.0%	0.5%	-	-
Other	1.4%	2.0%	-	-
Group 4: Math A-G Complete with a "C"				
Algebra 2 or Lower	9.8%	10.4%	69.6%	58.8%
Statistics	79.1%	69.9%	48.5%	44.5%
Precalculus	17.6%	27.5%	3.9%	18.7%
Calculus	6.4%	13.4%	14.7%	24.7%
Higher Level	0.2%	0.8%	0.0%	0.8%
Other	3.3%	3.5%	3.9%	4.1%
Group 5: Math A-G Complete with a "C" + 1 Advanced Math				
Algebra 2 or Lower	9.9%	10.8%	57.5%	51.3%
Statistics	71.4%	62.3%	43.6%	42.8%
Precalculus	26.8%	29.9%	13.9%	20.6%
Calculus	14.9%	25.6%	20.8%	33.7%
Higher Level	0.8%	5.1%	0.8%	4.3%
Other	5.1%	4.4%	5.4%	3.2%

Note: Percentages are the percent of students who took each type of math course in their first two years of college. For example, 80.7% of Group 3 community college students who did not take math in 12th grade subsequently took a Statistics course at some point in their first two years of college.

Table C88. College Math Course Taking Patterns for Statistics vs. Precalculus or Calculus

	Community College		CSUN	
	Precalc or Calc	Stat	Precalc or Calc	Stat
Group 4: Math A-G Complete with a "C"				
Algebra 2 or Lower	8.9%	13.9%	59.3%	54.8%
Statistics	67.1%	78.8%	44.4%	49.2%
Precalculus	30.3%	20.5%	23.9%	11.1%
Calculus	16.0%	7.3%	27.8%	22.2%
Higher Level	0.7%	0.4%	1.3%	0.0%
Other	3.2%	3.1%	4.7%	2.4%
Group 5: Math A-G Complete with a "C" + 1 Advanced Math				
Algebra 2 or Lower	7.8%	11.8%	50.0%	53.6%
Statistics	48.8%	73.4%	41.0%	41.9%
Precalculus	34.5%	27.4%	27.4%	15.1%
Calculus	41.0%	14.8%	40.3%	29.4%
Higher Level	11.1%	1.2%	7.7%	0.8%
Other	4.7%	3.4%	2.5%	4.2%

Note: Among community college students, we compare those who took Statistics to those who took Precalculus in Group 4, or Calculus in Group 5. Among CSUN students, we compare those who took Statistics to those who took Precalculus or Calculus in both Groups 4 and 5. Percentages are the percent of students who took each type of math course in their first two years of college. For example, 67.1% of Group 4 community college students who took Precalculus in 12th grade subsequently took a Statistics course at some point in their first two years of college.

Table D1. Community College 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 Credits Earned	3.513**	0.321	0.230	0.273	0.182	0.590	0.079	0.095	0.180	0.024	0.029
College-Level Math Credits Earned	0.285*	0.321	0.230	0.232	0.177	0.590	0.079	0.055	0.030	0.004	0.003
Non-Math STEM Credits Earned	0.518*	0.321	0.230	0.202	0.142	0.550	0.074	0.053	0.000	0.000	0.000
Overall GPA	-0.017	0.333	0.250	0.276	0.148	0.040	0.005	0.009	0.000	0.000	0.000
College-Level Math GPA	-	-	-	-	-	-	-	-	-	-	-
Non-Math STEM GPA	-0.198	0.362	0.238	0.384	0.252	0.310	0.060	0.093	0.000	0.000	0.000
Started in College-Level Math	0.000	0.329	0.239	0.225	0.137	0.000	0.000	0.000	0.000	0.000	0.000

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. Community College 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 Credits Earned	1.301	0.309	0.206	0.195	0.118	0.210	0.031	0.026	0.000	0.000	0.000
College-Level Math Credits Earned	0.569***	0.309	0.206	0.238	0.149	0.570	0.085	0.088	0.360	0.054	0.055
Non-Math STEM Credits Earned	0.469*	0.309	0.206	0.177	0.113	0.370	0.055	0.038	0.100	0.015	0.010
Overall GPA	-0.040	0.310	0.206	0.247	0.116	0.090	0.014	0.020	0.000	0.000	0.000
College-Level Math GPA	-0.115	0.295	0.174	0.221	0.125	0.230	0.040	0.038	0.000	0.000	0.000
Non-Math STEM GPA	-0.213**	0.345	0.192	0.212	0.120	0.360	0.084	0.063	0.110	0.026	0.019
Started in College-Level Math	0.053**	0.311	0.199	0.272	0.176	0.340	0.055	0.060	0.130	0.021	0.023

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. Community College Sensitivity Analysis Results for Math vs. No Math, Group 5

	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 Credits Earned	0.497	0.269	0.184	0.223	0.144	0.090	0.010	0.011	0.000	0.000	0.000
College-Level Math Credits Earned	0.484**	0.269	0.184	0.228	0.139	0.400	0.046	0.058	0.130	0.015	0.019
Non-Math STEM Credits Earned	0.259	0.269	0.184	0.210	0.137	0.170	0.020	0.019	0.000	0.000	0.000
Overall GPA	-0.039	0.268	0.184	0.346	0.163	0.090	0.010	0.031	0.000	0.000	0.000
College-Level Math GPA	0.002	0.302	0.184	0.269	0.151	0.000	0.000	0.000	0.000	0.000	0.000
Non-Math STEM GPA	-0.048	0.275	0.173	0.251	0.115	0.100	0.014	0.023	0.000	0.000	0.000
Started in College-Level Math	0.073**	0.272	0.185	0.366	0.217	0.390	0.047	0.114	0.190	0.023	0.055

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 D4. CSUN Sensitivity Analysis Results for Math vs. No Math in Groups 4 and 5

	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 Credits Earned	-0.809	0.181	0.117	0.198	0.111	0.200	0.016	0.025	0.000	0.000	0.000
College-Level Math Credits Earned	0.369	0.181	0.117	0.144	0.077	0.400	0.031	0.036	0.000	0.000	0.000
Non-Math STEM Credits Earned	0.474	0.181	0.117	0.218	0.117	0.290	0.023	0.043	0.000	0.000	0.000
Overall GPA	-0.048	0.180	0.115	0.288	0.156	0.190	0.015	0.041	0.000	0.000	0.000
College-Level Math GPA	-0.004	0.199	0.126	0.204	0.091	0.010	0.001	0.002	0.000	0.000	0.000
Non-Math STEM GPA	-0.092	0.181	0.113	0.214	0.111	0.320	0.026	0.049	0.000	0.000	0.000
Avoided Developmental Math	0.107***	0.178	0.115	0.357	0.145	0.610	0.047	0.234	0.380	0.029	0.146

Note: The "OLS Estimate" corresponds to the estimate from the "OLS without Matching" model that uses school-level predictors. 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 D5. Community College Sensitivity Analysis Results for Statistics vs. Precalculus, 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 Credits Earned	0.450	0.312	0.254	0.267	0.166	0.080	0.007	0.013	0.000	0.000	0.000
College-Level Math Credits Earned	-0.492*	0.312	0.254	0.337	0.213	0.510	0.043	0.112	0.070	0.006	0.015
Non-Math STEM Credits Earned	-0.412	0.312	0.254	0.241	0.130	0.300	0.025	0.052	0.000	0.000	0.000
Overall GPA	0.000	0.302	0.242	0.317	0.180	0.000	0.000	0.000	0.000	0.000	0.000
College-Level Math GPA	-0.148	0.334	0.230	0.318	0.202	0.300	0.047	0.068	0.000	0.000	0.000
Non-Math STEM GPA	0.265	0.355	0.209	0.304	0.192	0.430	0.097	0.103	0.000	0.000	0.000
Started in College-Level Math	-0.074*	0.300	0.232	0.314	0.225	0.640	0.062	0.100	0.110	0.011	0.017

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 Statistics-taking (over Precalculus) 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 the student took Statistics or Precalculus ("Total"), and the R2 after removing the Academics+ predictors ("Without Academics+"). *p<0.05, **p<0.01, and ***p<0.001.

Table D6. Community College Sensitivity Analysis Results for Statistics vs. Calculus, Group 5

	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 Credits Earned	2.264	0.320	0.161	0.259	0.189	0.260	0.060	0.037	0.000	0.000	0.000
College-Level Math Credits Earned	-1.342**	0.320	0.161	0.266	0.204	0.700	0.163	0.092	0.410	0.095	0.053
Non-Math STEM Credits Earned	-0.568	0.320	0.161	0.255	0.188	0.220	0.051	0.030	0.000	0.000	0.000
Overall GPA	0.100	0.318	0.162	0.399	0.221	0.150	0.034	0.066	0.000	0.000	0.000
College-Level Math GPA	0.193	0.344	0.197	0.369	0.211	0.260	0.058	0.096	0.000	0.000	0.000
Non-Math STEM GPA	0.188	0.345	0.173	0.326	0.163	0.240	0.063	0.091	0.000	0.000	0.000
Started in College-Level Math	-0.173***	0.331	0.177	0.439	0.303	0.580	0.134	0.215	0.400	0.092	0.146

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 Statistics-taking (over Calculus) 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 the student took Statistics or Calculus ("Total"), and the R2 after removing the Academics+ predictors ("Without Academics+"). *p<0.05, **p<0.01, and ***p<0.001.

Table D7. CSUN Sensitivity Analysis Results for Statistics vs. Precalculus or Calculus in Groups 4 and 5

	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 Credits Earned	0.279	0.197	0.117	0.236	0.130	0.060	0.006	0.010	0.000	0.000	0.000
College-Level Math Credits Earned	-1.023***	0.197	0.117	0.183	0.112	0.940	0.093	0.100	0.430	0.043	0.045
Non-Math STEM Credits Earned	-0.92*	0.197	0.117	0.241	0.138	0.510	0.051	0.084	0.080	0.008	0.013
Overall GPA	0.049	0.198	0.115	0.317	0.178	0.170	0.018	0.042	0.000	0.000	0.000
College-Level Math GPA	0.17*	0.220	0.130	0.249	0.118	0.450	0.052	0.097	0.060	0.007	0.013
Non-Math STEM GPA	0.050	0.206	0.116	0.249	0.133	0.150	0.017	0.029	0.000	0.000	0.000
Avoided Developmental Math	-0.052	0.210	0.122	0.352	0.127	0.270	0.030	0.115	0.000	0.000	0.000

Note: The "OLS Estimate" corresponds to the estimate from the "OLS without Matching" model that uses school-level predictors. The "R2 with Treatment" set of columns gives the R2 from a linear regression of Statistics-taking (over Precalculus/Calculus) 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 the student took Statistics or Precalculus/Calculus ("Total"), and the R2 after removing the Academics+ predictors ("Without Academics+"). *p<0.05, **p<0.01, and ***p<0.001.