Inequality in Academic Preparation for College

Sherrie Reed
Alexandria Hurtt
Michal Kurlaender
Justin Luu
Cassandra Merritt

July 2023

PACE
Policy Analysis for California Education

Inequality in Academic Preparation for College

Sherrie Reed, Alexandria Hurtt, Michal Kurlaender, Justin Luu, and Cassandra Merritt
University of California, Davis

Acknowledgements

The research reported here was supported through the generosity of funding from Tipping Point Community, College Futures Foundation, Stuart Foundation, UC Office of the President, Multicampus Research Programs and Initiatives, through grant M21PR3278, and the Institute of Education Sciences, U.S. Department of Education, Grant R305E150006 to the Regents of the University of California. The quantitative analysis was completed under research partnership agreements with the California Department of Education and the California Community Colleges Chancellor's Office (Michal Kurlaender, principal investigator). The findings and conclusions here are those of the authors alone and do not necessarily reflect the positions or policies of the funders, including the Institute of Education Sciences, or the data providers. This report, like all PACE publications, has been thoroughly reviewed for factual accuracy and research integrity. The authors assume full responsibility for the accuracy of the report contents.

This report, like all PACE publications, has been thoroughly reviewed for factual accuracy and research integrity. The authors assume full responsibility for the accuracy of the report contents.

Suggested Citation
Reed, S., Hurtt, A., Kurlaender, M., Luu, J., & Merritt, C. (2023, July). *Inequality in academic preparation for college* [Report]. Policy Analysis for California Education. edpolicyinca.org/publications/addressing-inequities-college-preparatory-course-taking

PACE
Policy Analysis for California Education

Contents

Executive Summary

Academic preparation is a key factor in readiness for college-level work. Students who enroll in rigorous courses while in high school realize better secondary and postsecondary outcomes. Evidence from California suggests that rigorous learning opportunities may not be equally distributed across the state, prompting questions about course availability and accessibility. This study examines the variation in statewide participation in a host of courses that are recognized as critical to students' preparation for college: A–G courses (required for admissions eligibility to California's public 4-year universities), college-credit coursework, and the level of math courses that students take their senior year. Drawing on comprehensive student- and course-level administrative data, we explore college preparatory course-taking patterns for the four most recent graduating cohorts unaffected by the COVID-19 pandemic (2016, 2017, 2018, and 2019).

Results reveal that although participation in college preparatory coursework among California public high school students is increasing, disparities in course access and success by race/ethnicity and socioeconomic status persist. Specifically, we find:

- Fewer than half of all California high school graduates complete the A–G course sequence.
- Enrollment in advanced math in 12th grade increased between 2016 and 2019 while the number of 12th-grade students enrolled in lower level math (up to Algebra 2) declined. The percentage of 12th graders not enrolled in any math course also waned.
- Participation patterns in A–G courses, college-credit courses, and advanced math are not the same for all students, with variation across racial/ethnic subgroups and schools.
- Institutional characteristics, such as demographic composition or school size, do not fully explain these disparities. Notable differences in A–G completion rates by race/ethnicity and socioeconomic status are also found within schools.

Policies and practices as well as institutions and staff ultimately shape students' opportunities and choices, steering students' pathways to college and beyond. As such, education leaders should consider the following improvements:

- strengthen K–12 and higher education partnerships;
- diversify course offerings;
- ensure equitable course access; and
- track course access, participation, and performance systematically.

Introduction

Rates of college-degree attainment continue to lag postsecondary enrollment (Causey et al., 2022), which has declined in the wake of the COVID-19 pandemic (National Student Clearinghouse, 2022; Saul, 2022). Our country faces dual priorities in education: increase students' access to college and ensure that, once enrolled, students have the skills, knowledge, and disposition to be successful.

Success in higher education is the result of multiple factors (Kurlaender et al., 2019). Chief among these is academic preparation (Bettinger et al., 2013; Kurlaender & Howell, 2012). The courses that students take while in high school signal readiness during the college-admissions process and prepare students for the academic demands of college-level work. Students who engage in a rigorous course of study realize better high school and postsecondary outcomes (Adelman, 2006; Attewell & Domina, 2008; Long et al., 2012).

In California, policymakers and education leaders have taken measured steps to strengthen students' academic preparation while in high school, including recent efforts to support students' access to and success in college preparatory courses (A–G Completion Improvement Grant Program, 2021), expanded dual enrollment opportunities (California Department of Finance, 2022), and increased diversity of advanced math offerings (Burdman et al., 2018). Coupled with changes in higher education admissions requirements and course-placement policies, these efforts underscore the state's desire to ensure academic opportunities that better prepare high school students for college-level work.

A key choice students face in their education trajectory is the type of academic program to pursue, but this choice is predicated on the options available at the high school they attend and the advising (or lack thereof) they receive from teachers, counselors, parents, or peers (Kurlaender & Hibel, 2018). This study explores the variation in statewide participation in a host of course options that aim to prepare students for college. Specifically, our analysis explores students' enrollment patterns in college preparatory courses, with particular attention on how enrollment patterns diverge across student subgroups and schools. To examine this, we consider several course options that the state and prior literature have recognized as critical to students' academic preparation for college: A–G courses, required for admissions eligibility to California's public 4-year colleges; college-credit coursework, including both AP and dual enrollment opportunities; and the level of math that students take in their senior year.

Policy Context: California's Efforts to Prioritize College Readiness

In California, the concept of academic preparation for college has long been synonymous with the A–G course requirements set forth by the University of California (UC) and California State University (CSU) systems. A–G course requirements are a set of 15 courses that students must complete while in high school to be eligible for admission to the state's public 4-year universities. These course requirements represent a range of subject areas: (a) history, (b) English, (c) math, (d) science, (e) world languages, (f) visual and performing arts, and (g) an additional college preparatory elective in any subject (Figure 1). Every A–G course has been approved by the state's CSU and UC postsecondary systems, so A–G requirements reflect a concerted effort both to ensure that students are enrolled in rigorous coursework that prepares them for the demands of college-level work and to establish a common pathway to college for students across the state.

Figure 1. A–G Course Requirements by Subject

A		**History** 1 year of World History, Historical Geography, or Cultures; 1 year of U.S. History or one half year of U.S. History and one half year of Civics or American Government
B		**English** 4 years of English composition and literature that includes practice listening and speaking with different audiences
C		**Mathematics** 3 years of math that includes or integrates topics covered in Elementary Algebra, 2D and 3D Geometry, and Advanced Algebra
D		**Science** 2 years of science in two of the following: Biology, Chemistry, and Physics
E		**World Language** 2 years or equivalent to the second level of high school instruction of the same language other than English
F		**Visual and Performing Arts** 1 year of dance, music, theater, visual arts (e.g., painting or film/video), or interdisciplinary arts
G		**College Prep Elective** 1 year of additional college preparatory coursework

Note. Adapted from information from the University of California Office of the President.

During the past decade, a key tenet of education policy in California has centered on bolstering students' academic preparation for and access to postsecondary schooling. These efforts have spanned the K–12 and college sectors and have included changing state standards and their corresponding assessments, expanding and diversifying the coursework and college-participation experiences available to students, and making shifts in college-admissions and course-placement policies.

California's increased attention towards college readiness was initially evident in its adoption of the Common Core State Standards (CCSS) in 2010. The CCSS, which are substantially more rigorous than the previous state standards (Schmidt & Houang, 2012), were developed with the intention of preparing students for college and beyond, integrating subjects and expanding the skills that students would develop (Kurlaender et al., 2019). Soon after, in 2014–15, the state implemented the CCSS-aligned Smarter Balanced assessments: comprehensive end-of-year tests administered in Grades 3–8 and 11 to measure students' standards-level progress towards college readiness in English and math. In addition to achievement, results from the 11th-grade assessments are used to gauge students' readiness for college-level coursework through the Early Assessment Program, which plays a role in the course-placement process for the CSU system as well as for California Community Colleges (CCCs) after admission.

The state's new school accountability system—the California School Dashboard, which debuted in March 2017—also considers students' college readiness through the College/Career Indicator (CCI). The CCI measures how well a high school supports students' preparation for college and career; it is determined by the proportion of students deemed *prepared* or *approaching prepared* across eight pathways. High school course-taking plays an important role in the indicators that make up the CCI, as A–G course completion, AP exam scores, college-credit courses (e.g., dual enrollment), and career technical education are all included in the metric. Collectively, the state's move towards a set of learning standards, assessments, and an accountability framework that all promote college and career readiness reflects a resolve to support students' preparation for college—particularly in coursework deemed critical for college success.

Layered policy measures in California have reaffirmed the state's intentions to expand students' access to both college preparatory and college-credit-bearing coursework in high school. For example, the 2016 California Mathematics Readiness Challenge Initiative supported partnerships between K–12 and higher education in developing and implementing new math courses to offer additional options that would prepare high school students for college-level math. That same year, the California State Legislature enacted Assembly Bill (AB) 288, the College and Career Access Pathways Partnerships Act, which aimed to expand dual enrollment opportunities for students, including those historically underrepresented in higher education. More recently, in 2022, AB 181 provided additional funding to continue to strengthen as well as broaden access to and participation in dual enrollment programs across the state. In the same year, AB 130 addressed A–G coursework by establishing the A–G Completion Improvement Grant Program, which offers financial support to local educational agencies (LEAs) to increase the number of students who graduate having completed the full A–G course sequence. These measures emphasize the commitment California has made not only to increase access to college preparatory courses but also to diversify the coursework and college-participation experiences available to students, particularly students who are currently underserved.

Recent changes to college-admissions and course-placement policies have also increased emphasis on course enrollment and performance in high school. For example, in 2017 both the CSU system (through Executive Order 1110, passed by the CSU Board of Trustees) and the CCCs (though the passage of AB 705 by the state legislature) ended the use of college-specific assessments to determine remedial course placement. Alternatively, high school coursework and grades would be leveraged for placement decisions, with the default being college-level placement. Similarly, in 2020 UC and CSU eliminated SAT scores from their admissions requirements (California State University, 2022; del Rio, 2021), magnifying the importance of coursework and course performance in admissions. These changes further demonstrate the role that high school courses play in college access and degree attainment. Thus, it is critical to examine the availability and accessibility of college preparatory coursework to understand how opportunities for academic preparation can be better distributed across the state.

Prior Research

Students' access to quality curricula and instruction while in high school can have a profound effect on their education trajectory. Students who complete a rigorous high school curriculum—particularly in math—may realize better college outcomes than those who complete less-demanding coursework (Adelman, 1999; Smith et al., 2017; Woods et al., 2018). In fact, students who take just one rigorous course while in high school are more likely to enroll in college than students who do not take a rigorous course at all (Long et al., 2012).

It is important to note that causality between high school course pathways and college outcomes is difficult to establish because students who typically enroll in advanced courses differ in many ways from those who do not, including but not limited to preparation, motivation, and education goals (Attewell & Domina, 2008; Lee & Ready, 2009). Further, school practices that are difficult to measure—such as advising or early schooling experiences—may confound the impact of course enrollment. Differences in course instructors may also result in variation in the depth, breadth, and pace of the content provided, even in courses with the same title (Dougherty et al., 2006). For example, college-credit courses, such as AP courses, may expose students to instructors with more specialized knowledge, which can influence student outcomes (Clotfelter et al., 2010). Similarly, dual enrollment courses offer early exposure to college experiences. Nevertheless, when scholars control for a host of observable characteristics in both individuals and course types (Allensworth et al., 2009; Long et al., 2012), there is strong evidence that enrolling in more advanced courses is positively associated with better college outcomes (Byun et al., 2015; Gamoran & Hannigan, 2000).

A key finding from the literature on course enrollment in high school is that substantial differences in advanced course participation emerge across demographic groups, many of which cannot be explained by prior academic performance (Attewell & Domina, 2008). For example,

women are more likely to take advanced courses than men (National Center for Education Statistics, 2007), and higher income, White, and Asian American students tend to enroll in college preparatory courses more than any other group (Attewell & Domina, 2008). Disparities in course-taking are also prevalent for English learners (ELs), who typically experience less exposure to academically rigorous material (Callahan & Shifrer, 2016) and may be tracked into lower level classes (Kanno & Kangas, 2014; Umansky, 2016).

These differences, however, do not necessarily reflect a lack of interest in rigorous coursework among students but instead often highlight a lack of access at the school level. Schools serving primarily low-income students tend to offer fewer advanced courses than those serving a more affluent population (Adelman, 1999; Conger et al., 2009). Moreover, the size of the school can affect the types and number of courses available to students (Monk & Haller, 1993), although the literature is mixed on whether and how school size influences postsecondary outcomes (Lee & Smith, 1997; Leithwood & Jantzi, 2009; Schreiber, 2002). Disparities in course access are also a result of the practices, beliefs, and culture within schools (Attewell & Domina, 2008; Gamoran, 1987). The advanced courses that are available, students' access to these courses, and the courses that students take thus largely depend on the high school of attendance, suggesting that student- and school-level factors must be considered concurrently.

The notion of choice is inherent in any investigation of students' education pathways, as pathways are driven by the choices students make during course selection. However, these choices are first limited by the academic organization of high schools (Lee et al., 1997; McFarland, 2006) and their curricular offerings (Lantz & Smith, 1981; Schmidt, 1983). For example, studies indicate that small schools located in rural areas primarily serving lower income and minority students are less likely to offer AP courses than other schools (Iatarola et al., 2011; Klopfenstein, 2004). Course availability is thus an essential component of course-taking, as students cannot take an advanced course that is not available.

Beyond the overall offerings, school structures and personnel can limit students' choices through the information they provide to students, explicit or implicit placement policies, and advising practices, among other considerations. Therefore, a student's education pathway may be constrained by a complex interplay between structural forces in the schooling environment and the student's decision-making (Kurlaender & Hibel, 2018). In the context of education, both the student's own positioning as well as the organization of the school are involved, making course-taking a dynamic relationship between the student's individual consciousness and the social structure of the school.

Beyond structural constraints, a student may choose to enroll or eschew enrollment in a particular course for a few different reasons. A course may be seen as holding value for a student because of the skills it can potentially impart; in those cases, students may select an advanced course because of a perceived absolute effect it could have on academic skill building. This suggests that the more rigorous a course, the more one's skills may develop (Adelman, 1999).

In contrast, a signaling model (Spence, 1973) posits that a student may select a course because of the perceived value others, such as college admissions officers, may ascribe to it. Under this framework, enrollment in a rigorous course does not *cause* a student to be more motivated or possess a higher degree of ability, but rather, students who already possess these attributes enroll in advanced courses to signal these qualities to postsecondary institutions.

Methodology

Data and Methods

The descriptions of high school course-taking patterns in this report leverage both student- and course-level administrative data available to us through longstanding partnerships with the California Department of Education (CDE), University of California Office of the President (UCOP), and California Community Colleges Chancellor's Office (CCCCO). We also relied on publicly available information on school type from CDE.

The primary course-taking data set maintained by CDE is the California Longitudinal Pupil Achievement Data System (CALPADS), which contains student- and course-level information. At the student level, CALPADS includes data for each course in which a California public high school student enrolled, the school of course attendance, and final course grades. Course-level information also includes the course name, term, description, local and state course codes, A–G approval (as reported by the school), and AP or Honors designation.

Our analysis also drew on student-level assessment data from the 11th-grade Smarter Balanced Assessment Consortium (SBAC) tests—part of the California Assessment of Student Performance and Progress (CAASPP)—as well as student performance information from the CCI, including performance on AP and/or International Baccalaureate (IB) tests, successful completion of the A–G course sequence, and completion of college-credit courses (i.e., dual enrollment). SBAC data provided demographic information for each student, including race/ethnicity, whether a student is socioeconomically disadvantaged (SED), English learner (EL) status, disability status, and high school of graduation.

We also relied on a comprehensive set of observations listing those courses approved by UCOP to meet the requirements for A–G eligibility for each public high school in the state. This A–G Course Approval List maintained by UCOP provides critical information on the landscape of A–G high school courses offered in schools across the state. The data, which include course names, state course IDs, local course IDs (where applicable), and A–G approval dates, were merged with student- and course-level data from CDE to investigate student participation and success in A–G courses. To explore patterns in AP course-taking, we leveraged AP test participation and performance indicators included in the CCI as proxies for AP course enrollment.

Additionally, student- and course-level data provided by CDE were used to describe math course-taking in students' senior year of high school.

To investigate student participation in dual enrollment, we merged data from CDE with data from CCCCO. Specifically, we merged each student in a high school graduating cohort with CCCCO course-enrollment data for "special admits"—the indicator in the CCCCO data for high school students concurrently enrolled in a community college—for their 4 normative high school years prior to graduation. These data included credits attempted and earned as well as course characteristics, such as subject area.

To examine differences in course participation and success across schools, we aggregated student-level observations to the school level. From this aggregate data, we constructed cohort-level characteristics, including racial composition and the proportion of SED students, and linked these data with the public schools and districts list available on the CDE website to identify school type (e.g., traditional, charter, or alternative) using the charter school indicator and School Ownership Code (SOC) variable.

We used descriptive statistics across all analyses in this report. In many cases, the information presented in the tables and figures result from tabulations and calculations of proportions of students and schools. To evaluate whether subgroup disparities found at the state level are also found within schools, we employed statistical modeling that enabled us to predict the likelihood—of A–G course completion, for example—for a typical student with a specific set of characteristics while accounting for school of attendance.

Sample

Our analytical sample included students from four graduate cohorts—2016, 2017, 2018, and 2019—extending to the most recent graduate cohort unaffected by the COVID-19 pandemic. The first cohort selected was determined based on the availability of comprehensive data from CALPADS and SBAC.[1] Samples were constructed using the CCI (which includes the census of students expected to graduate from California public high schools in a given school year)[2] or from the students participating in the 11th-grade SBAC for whom we also have course-taking data for the following year.

[1] CALPADS was launched in 2009 with a rollout of data collection over several years. SBAC, which is taken in Grades 3–8 and 11, was first administered in 2014–15—the year in which our earliest cohort for analysis was in 11th grade.

[2] CDE constructs the CCI data set for district and school accountability purposes. The data set contains student-level observations for all students expected to graduate in either the 4-year or 1-year cohort during a given year, inclusive of those who graduated, those who left school during the 4 normative years of high school, and those who will remain enrolled in subsequent years to finish graduation requirements. For more information, please refer to the CCI Technical Guide at cde.ca.gov/ta/ac/cm/documents/dashboardguide18.pdf.

We then limited our sample to students attending traditional public and charter high schools.[3] We thus excluded students in schools primarily serving high-needs students in alternative environments (e.g., community day schools, juvenile court schools, or state special schools), whose high school course-taking may not follow traditional trajectories and whose education outcomes may vary due to extenuating circumstances. We also excluded students and schools with fewer than 15 students in a graduating cohort given that schools with so few students may have atypical outcomes for any given cohort as well as the cell-size reporting restrictions in our data-sharing agreements.

Along with our examination of student-level course-taking, we explored how college preparatory course enrollment is distributed across schools, taking into account racial composition, the percentage of students who are SED, and the size of schools.

Throughout this report, we provide results at the state and school level as well as by racial/ethnic subgroup. Specifically, we examine outcomes across seven racial/ethnic categories: Asian American, Black, Filipino, Latinx, Pacific Islander, Other, and White. The Other category includes Native American students, multiracial students (labeled as Two or More Races in CDE data), and students for whom race was not reported in data provided by CDE. In some analyses, we collapse these categories to Asian American/Pacific Islander (AA/PI), Black, Latinx, White, and Other because of sample restrictions. Student race/ethnicity is defined using variables at the time of SBAC testing in 11th grade.

Although, in this report, we focus on how academic opportunities are distributed by race/ethnicity, we recognize that there are other key subgroups for whom disparate opportunities and outcomes persist. We provide detailed information about the high school course-taking patterns of ELs, SED students, and students with disabilities (SWD) in Appendix A.

Findings

Core Pathway: A–G Course Requirements

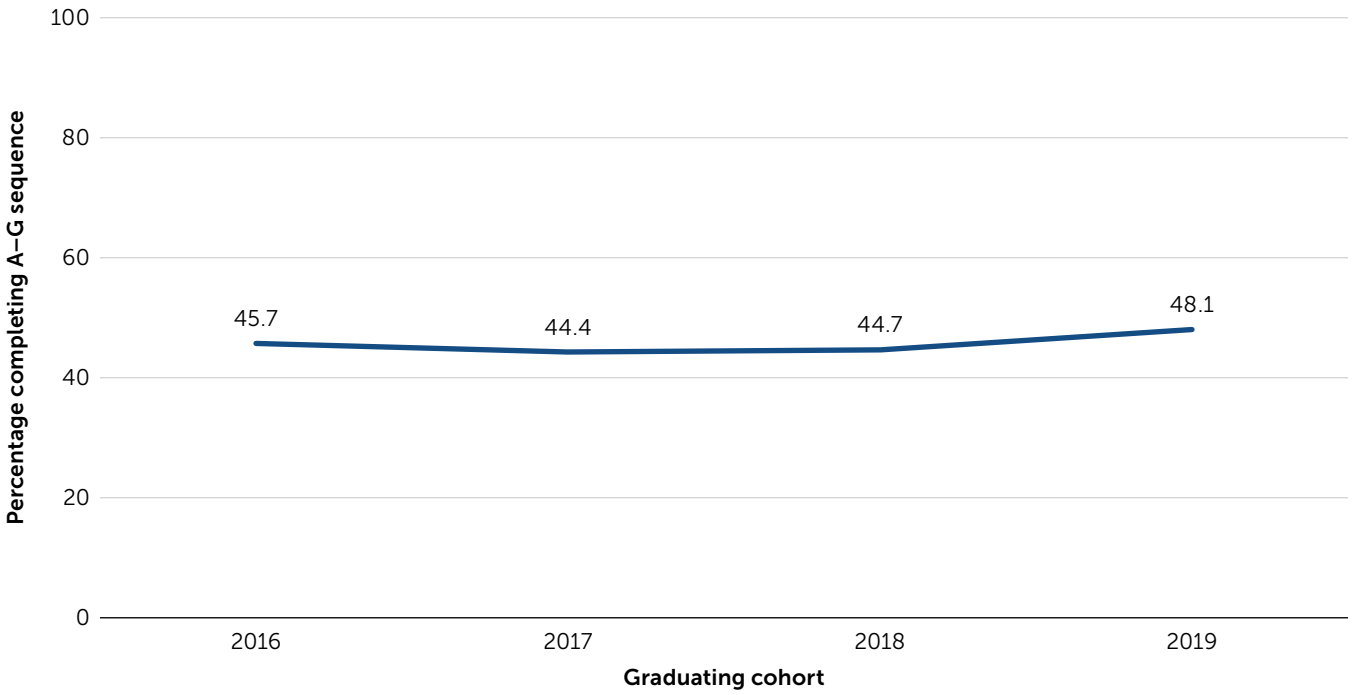
College-bound high school students in California must complete A–G course requirements to be eligible for admissions to schools in the UC and CSU systems. These courses are approved by the university systems and reflect a specific set of academic subject requirements that represent a range of subjects: (a) history and social sciences (2 years); (b) English (4 years); (c) mathematics (3 years); (d) science (2 years); (e) world language (2 years); (f) visual and performing arts (1 year); and (g) an additional college preparatory elective course in any aforementioned subject (1 year).

[3] To limit the school-level analyses to traditional public high schools, we used the SOC in CDE's public schools database (cde.ca.gov/ds/si/ds/fspubschls.asp), only keeping schools with SOCs of 65, 66, or 67.

Therefore, completion of the A–G course sequence has been established as a core pathway to college for high school graduates across the state.

Completion of the A–G course sequence. Slightly less than half of all California high school graduates complete the A–G course sequence. Since 2016, A–G course completion rates have risen slightly (Figure 2), with 45.7 percent of all public high school graduates completing the full sequence of A–G courses in 2016 and 48.1 percent in 2019.[4] Prior to 2016, evidence suggests there was a modest increase (about four percentage points) in statewide A–G completion since 2000 (Gao, 2016).

Figure 2. A–G Course Completion Rates Over Time, 2016–19 Cohorts

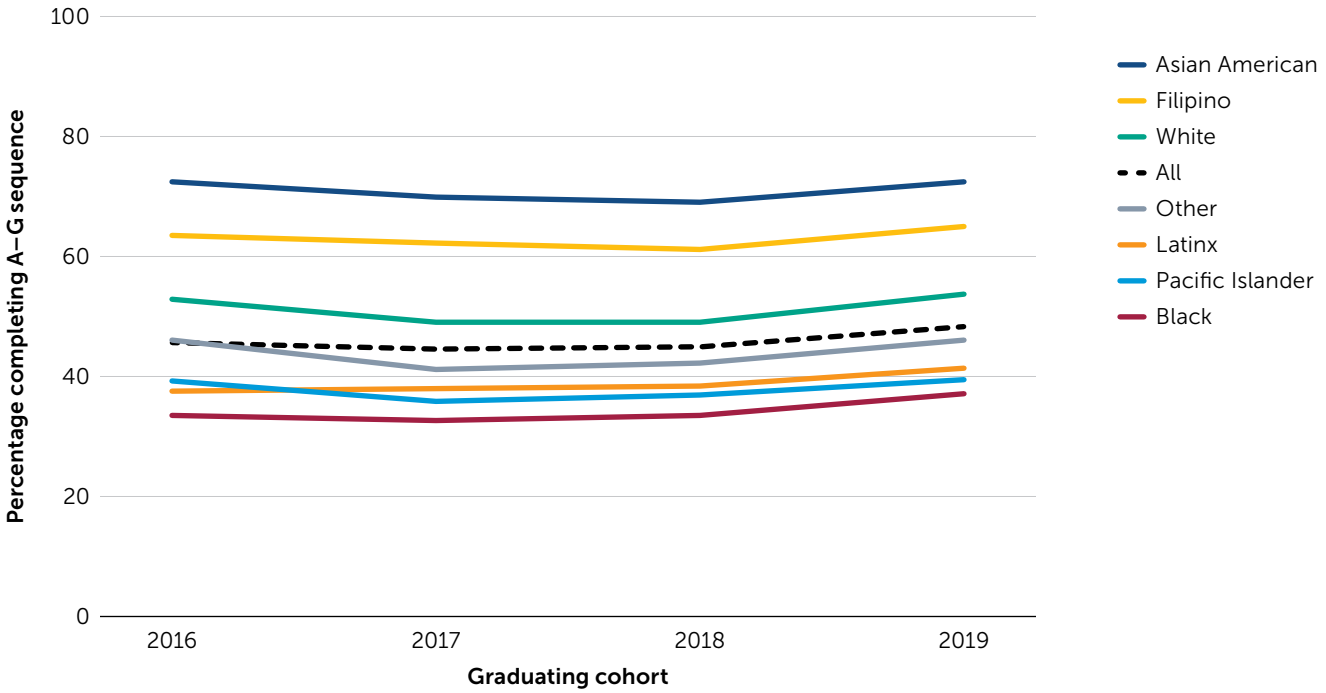


Note. A–G course completion rates were calculated from restricted-use student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownerships Codes other than 65, 66, or 67 and schools with fewer than 15 students in a graduating cohort.

[4] In other published work, A–G completion rates may differ because of sample restrictions and/or cohort composition. For example, CDE's DataQuest reports lower rates of A–G completion (41.2 percent in 2017, 41.4 percent in 2018, and 42.7 percent in 2019) because the analysis includes all students who graduated from high school. Given that we exclude alternative schools and schools with graduating cohorts of fewer than 15 students, where students may be less likely (or have less opportunity) to complete A–G coursework, we would expect our reported rates to be higher.

Individual-level differences. The statewide A–G course completion rates largely conceal the nuanced variation that emerges when considering student and school characteristics. Figure 3 presents A–G course completion rates by racial/ethnic subgroup. Findings reveal that rates remained relatively unchanged between 2016 and 2019 across subgroups, with a slight increase in the completion rate among Latinx and Black students. Importantly, large gaps in A–G completion persist across subgroups from year to year. Asian American and Filipino students completed the A–G course sequence at consistently higher rates compared with students from other racial/ethnic subgroups—close to twice that of Black and Pacific Islander students. In 2019, our most recent year of analysis, 72.4 percent of Asian American students and 64.9 percent of Filipino students completed A–G course requirements, while Black and Pacific Islander students completed the requirements at the rate of 36.9 percent and 39.3 percent, respectively.

Figure 3. A–G Completion Rates by Racial/Ethnic Subgroup, 2016–19 Cohorts

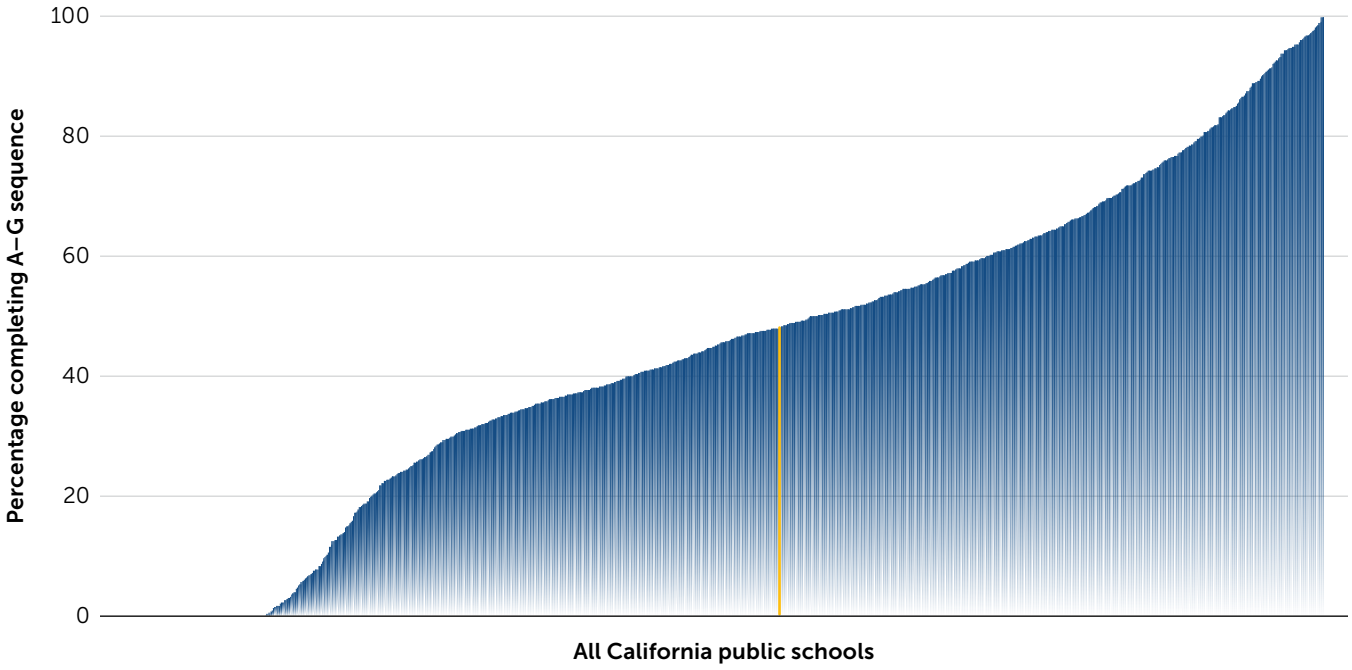


Note. A–G course completion rates were calculated from restricted-use student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownership Codes other than 65, 66, or 67 and schools with fewer than 15 students in a graduating cohort.

School-level differences. In addition to the individual differences across racial/ethnic subgroups, the percentage of high school graduates who met A–G eligibility in 2019 varied depending on where a student attended high school. Figure 4 depicts this variation, with each blue bar representing the A–G course completion rate in a single school and the yellow bar representing the statewide rate. At 125 traditional public high schools, more than 90 percent of students completed the full A–G course sequence, with every student completing the

requirements at four high schools.[5] Importantly, nearly half of all students in the state (45.5 percent) attend schools with higher A–G completion rates than the rate statewide (48.1 percent). Yet at 174 traditional public schools, serving 5 percent of the statewide graduating cohort, no graduates completed the full A–G course sequence. The majority of these schools are charter schools (*n* = 153), of which 91 are designated as Dashboard Alternative Status Schools (DASS).[6] Of the noncharter schools (*n* = 21) that have no graduates completing A—G requirements, three are DASS schools.

Figure 4. A–G Course Completion Rates by High School (*N* = 1,500), 2019 Cohort



Note. Each blue bar represents a single high school in California. The yellow bar indicates the statewide A–G completion rate. A–G course completion rates were calculated from restricted-use student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownership Codes other than 65, 66, or 67 and schools with fewer than 15 students in a graduating cohort.

There are important differences in the characteristics of schools with varying rates of A–G completion. Schools at either end of the spectrum—those with very low completion rates and those with very high completion rates—are, on average, smaller (serving 200 fewer students per graduating cohort) than schools with A–G rates that fall between 40 and 80 percent. Similarly,

[5] In addition to the four high schools where all graduates completed the A–G course requirements, there were 42 traditional public high schools where 95 percent of students completed the necessary courses and 79 schools where 90 percent of students completed the full A–G course sequence.

[6] DASS are alternative schools and alternative schools of choice. The DASS program replaces the previously administered Alternative Schools Accountability Model (ASAM) and is authorized in Cal. Ed. Code § 52052(d).

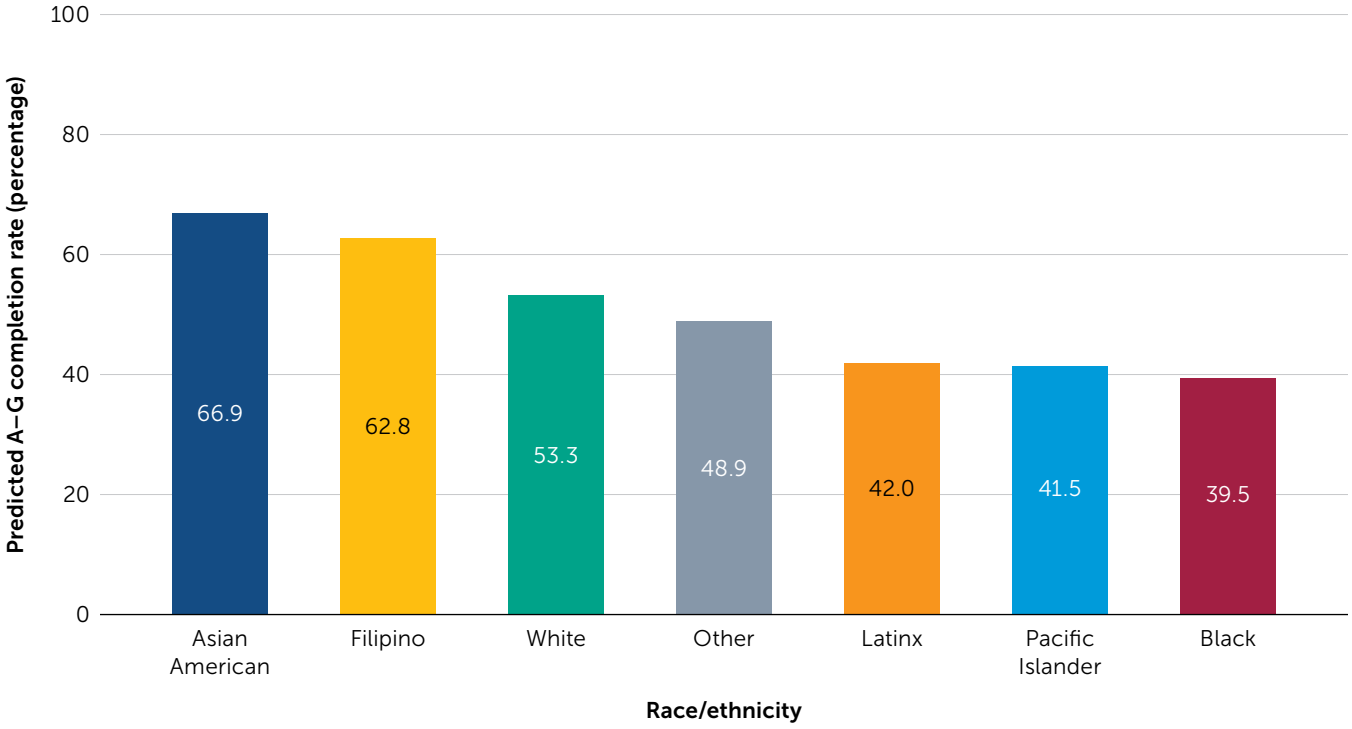
these schools are more likely to be charter schools. Schools in which 40 percent or fewer students complete the A–G course requirements have a greater concentration of SED students and a larger proportion of ELs than schools with higher rates of A–G completion.

The racial composition of high schools also noticeably differs across schools with varying A–G completion rates. For example, while Latinx students make up the largest share of students in the state (55 percent),[7] they are often enrolled in schools with considerably lower A–G course completion rates overall. Asian American students—who make up just 10.2 percent of the 2019 graduating cohort—are more likely to attend schools with above-average A–G completion rates, with nearly 40 percent of Asian American students enrolled in schools where at least 60 percent of students completed the full sequence of A–G coursework. The opposite is true for Black students; where school A–G completion rates were higher, the proportion of Black students was lower. (For more information on the average characteristics of schools across rates of A–G completion, including demographics, see Appendix B.)

Despite differences across schools, characteristics like demographic composition or school size do not fully explain the disparities we observe among students from various racial/ethnic backgrounds at the state level. In fact, notable differences in A–G completion rates by race/ethnicity are also found *within* schools, as shown in Figure 5. Although the magnitude of the difference in rates between racial/ethnic subgroups is narrower within schools (Figure 5) than across schools (Figure 3), we observe similar disparate patterns. The gaps in A–G completion for the highest and lowest performing subgroups are slightly smaller within schools (27 percentage points) than across schools (36 percentage points), but this difference is still quite large.

[7] Results from CDE's DataQuest are based on full K–12 enrollment in 2018–19. See dq.cde.ca.gov/dataquest/dqcensus/EnrEthGrd.aspx?cds=00&agglevel=state&year=2018-19.

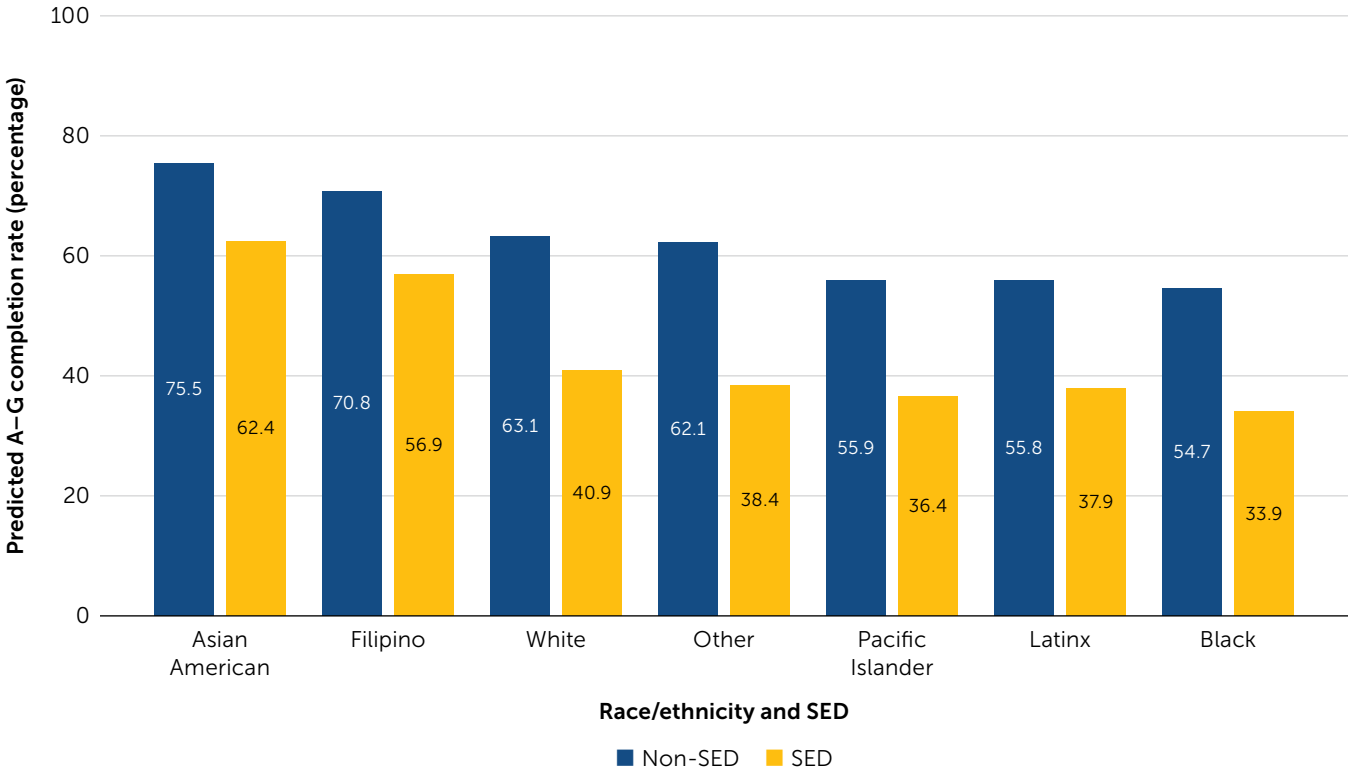
Figure 5. Predicting A–G Completion Using Race/Ethnicity and School of Attendance, 2019 Cohort



Note. A–G course completion rates were predicted using school fixed effects methods and restricted-use student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownership Codes other than 65, 66, or 67 and schools with fewer than 15 students in a graduating cohort.

Given that socioeconomic status also plays an important role in students' education outcomes, in Figure 6 we consider the intersection of race and SED status, depicting predicted differences in the A–G completion rate within each racial/ethnic subgroup by socioeconomic status while controlling for high school of attendance. Findings reveal that the magnitude of differences across racial/ethnic subgroups is narrower when considering SED and non-SED students separately. Yet, marked differences in A–G completion rates by socioeconomic status emerge for each racial/ethnic subgroup, suggesting that family income is a factor in the differences we observe by race/ethnicity. These differences in completion rates by socioeconomic status range widely across racial/ethnic groups, from 13 percentage points (Asian American) to 24 percentage points (Other). Notably, we predict greater A–G completion rates for lower income Asian American and Filipino students than for higher income Black, Pacific Islander, and Latinx students—even after accounting for school differences.

Figure 6. Predicting A–G Completion Using Race/Ethnicity, School, and Student SED Status, 2019 Cohort

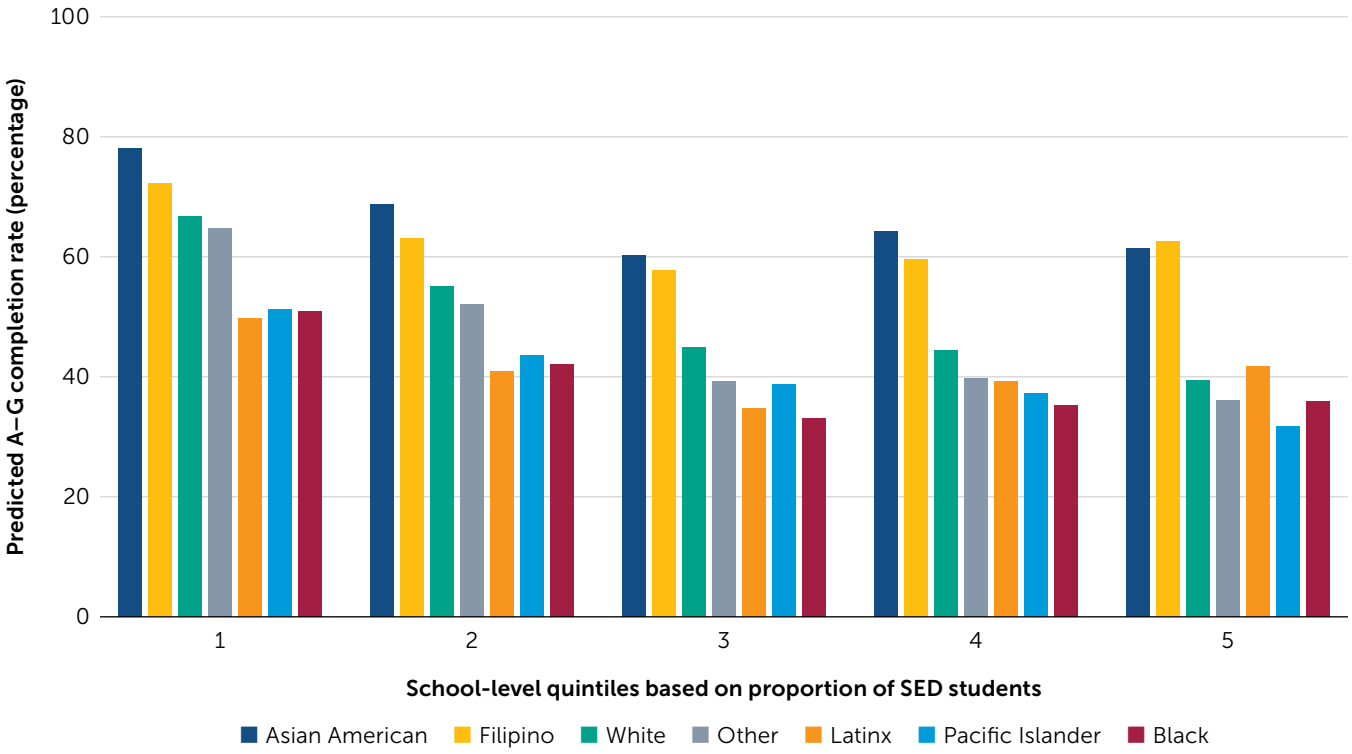


Note. SED = socioeconomically disadvantaged. A–G course completion rates were predicted using school fixed effects methods and restricted-use student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownership Codes other than 65, 66, or 67 and schools with fewer than 15 students in a graduating cohort.

We also consider the concentration of students who may be SED in a school given the resource challenges that schools with a larger proportion of low-income students may experience (Adelman, 1999; Conger et al., 2009; Monk & Haller, 1993; Schreiber, 2002) in addition to the targeted efforts often implemented in these schools to increase college preparatory course-taking (Bausmith & France, 2012; Renbarger & Long, 2019). Figure 7 presents the predicted A–G completion rates of racial/ethnic subgroups by the proportion of SED students within a school using school-level quintiles, wherein the fifth quintile includes schools with the highest proportion of SED students. We predict that students attending schools in the first quintile—where less than 40 percent of students are low income (see Table 1)—will complete the A–G sequence at higher rates than students attending schools in the fifth quintile, where more than 92 percent of students are SED. Results further indicate that the lowest predicted A–G completion rates for Asian American, Filipino, Latinx, and Black students fall within the third quintile of schools, where, on average, about 70 percent of students are SED. The predicted higher rates of A–G completion at schools in the fourth and fifth quintiles provide some evidence of targeted efforts to increase

college readiness among students with the greatest need. Moreover, Asian American and Filipino students have higher predicted A–G completion rates than their peers across school-level quintiles of SED—a trend that persists in the most affluent and the least affluent of schools.

Figure 7. Predicting A–G Completion Using Race/Ethnicity and School, by School SED Quintile



Note. SED = socioeconomically disadvantaged. A–G course completion is indicated in restricted-use student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownership Codes other than 65, 66, or 67 and schools with fewer than 15 students in a graduating cohort.

Table 1 presents descriptive statistics about A–G completion within each school-level quintile to consider characteristics of these schools across the proportion of SED students enrolled. First, we note that cohort size tends to be larger in schools with more affluent students than in those with more lower income students. Clear patterns in the racial/ethnic composition of schools in each quintile also emerge. For example, more Asian American (20.2 percent) and White students (46.3 percent) are enrolled in schools within the first quintile, in which fewer SED students are enrolled, than in any other quintile. Conversely, fewer Latinx students (20.3 percent) attend schools in the first quintile. On the other end of the spectrum, within the fifth quintile we observe the opposite trend; collectively, Asian American and White students account for only 7.2 percent of students while Latinx students account for 83 percent. These results highlight that students from different racial/ethnic subgroups by and large experience very different levels of socioeconomic segregation in school enrollment.

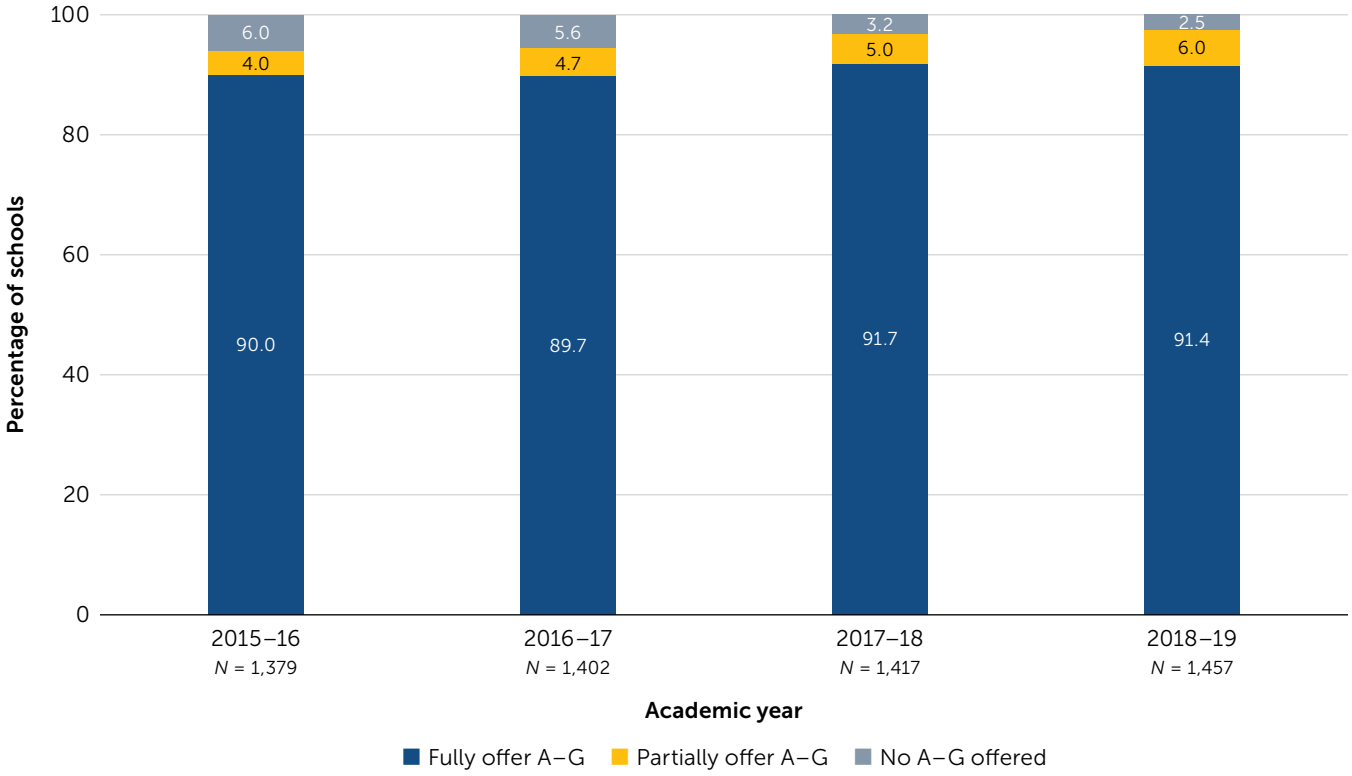
Table 1. Characteristics of Schools by SED Quintile, 2019 Cohort

SED Quintile	1	2	3	4	5
	Lower percentage SED				Higher percentage SED
Minimum percentage SED	4.2	40.0	63.0	79.8	92.3
Maximum percentage SED	39.9	62.9	79.8	92.3	100.0
Total number of schools	212	296	322	309	359
Total number of students	85,191	84,953	84,873	84,806	84,798
Average cohort size	518	465	460	416	391
Percentage of all schools (rounded)	20.1	20.0	20.0	20.0	20.0
Percentage of schools in quintile that are charter	16.0	32.4	39.8	27.5	39.3
Average A–G completion rate (percentage)	**65.2**	**50.8**	**40.6**	**41.7**	**42.2**
Percentage of students in quintile by subgroup					
English learners	5.2	8.4	12.4	18.3	23.6
SED	25.9	51.5	71.7	86.7	96.1
Students with disabilities	8.9	10.4	11.5	11.5	11.8
Asian American	20.2	11.0	9.7	6.9	3.4
Black	2.6	4.7	6.6	6.4	6.5
Filipino	3.8	4.8	3.7	2.6	1.5
Native American	0.3	0.6	0.7	0.5	0.3
Latinx	20.3	37.1	50.5	69.8	83.0
Two or more races	5.2	4.2	3.0	1.5	0.9
Pacific Islander	0.4	0.5	0.6	0.5	0.3
White	46.3	36.3	23.6	11.1	3.8
Other	6.4	5.6	5.3	2.6	1.5

Note. SED = socioeconomically disadvantaged. A–G course completion rates were calculated from restricted-use student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownership Codes other than 65, 66, or 67 and schools with fewer than 15 students in a graduating cohort.

Availability of the A–G course sequence. Availability of courses is a key factor in a student's ability to complete the A–G requirements. Fortunately, most traditional public high schools (91.4 percent in 2018–19) offer approved courses in all the A–G academic subject areas so that students can complete the full set of A–G requirements (Figure 8). However, nearly 10 percent of schools do not have a sufficient number of approved courses in order for students to complete the full A–G sequence; the vast majority of these are charter schools (84 percent) and small schools.

Figure 8. A–G Course Provision Across Traditional Public High Schools, 2016–19 Cohorts



Note. A–G course availability was calculated from school-level data on A–G course approval provided by the University of California Office of the President through our partnership. The graph includes traditional public high schools (as identified in the public school directory from the California Department of Education).

Analysis indicates that there is variation in the subject areas of courses available in schools that partially offer the A–G course sequence. For example, while a school may offer enough A–G-approved history courses to satisfy eligibility requirements (at least two), the same school may not offer all of the A–G-approved courses needed to satisfy the science or visual and performing arts requirements. Across all public schools that partially offered the A–G course sequence in 2018–19, history, English, math, and college preparatory electives were more likely to be available. In contrast, A–G-approved courses to meet requirements in science, world languages, and visual and performing arts were less likely to be offered at public high schools across the state, forcing students to seek options from neighboring schools, online programs, or community colleges.

A–G course performance. To be eligible for enrollment at a UC or CSU school, students must not only complete the full sequence of A–G courses but also pass each course with a grade of C or better. Table 2 presents A–G course passing rates by academic subject in recent academic years. While the majority of students enrolled in A–G courses successfully complete the full sequence, math and science remain the subjects that students are least likely to pass; passing rates for these courses have slightly improved over time, however. In contrast, the A-G course subjects that students are most likely to complete successfully are world languages and visual and performing arts, with an average of 82 percent and 88 percent of students passing, respectively.

Table 2. A–G Course Passing Rates by Academic Subject, 2016–19 Academic Years

Course designation	Academic subject	Percentage of sudents passing an A–G course			
		2015–16	2016–17	2017–18	2018–19
A	History	78.2	78.9	78.8	79.0
B	English	76.5	77.3	77.1	77.2
C	Mathematics	68.2	69.4	69.6	70.2
D	Science	75.9	76.4	76.4	76.3
E	World language	82.0	82.5	82.1	82.0
F	Visual and performing arts	88.9	88.9	88.5	88.1

Note. Performance in courses designated as "G" (i.e., an additional college preparatory elective in any A–F course) is included in the associated subject results. Passing rates were calculated by collapsing student- and course-level data in CALPADS. See the "Data and Methods" section for more specifics on CALPADS data.

Table 3 presents A–G course passing rates by academic subject across key student subgroups for the 2018–19 academic year. Results reveal distinct differences in A–G passing rates by both subject area and demographic characteristics. For example, while fewer students pass A–G math courses (70.2 percent) compared with other subjects, students who are SED (62.8 percent), Black (58.5 percent), and Latinx (62.2 percent) pass math at disproportionately lower rates than their counterparts—a pattern that extends across all subjects.

Table 3. A–G Course Passing Rates by Academic Subject and Key Subgroup, 2019 Cohort

Course designation	Academic subject	Percentage of sudents passing an A–G course by race/ethnicity					SED (percentage)
		AA/PI	Black	Latinx	White	Other	
A	History	90.5	71.4	73.8	85.5	82.1	73.7
B	English	90.5	69.7	71.3	84.5	81.1	71.2
C	Mathematics	86.1	58.5	62.2	79.4	76.0	62.8
D	Science	89.9	65.4	69.2	84.8	81.2	69.3
E	World language	92.3	69.2	77.4	87.2	84.6	76.6
F	Visual and performing arts	95.3	81.1	84.5	92.9	90.3	84.1

Note. AA/PI = Asian American/Pacific Islander; SED = socioeconomically disadvantaged. A–G course completion rates and demographic subgroups were calculated from student-level data in the College/Career Readiness Indicator data set. Performance in courses designated as "G" (i.e., an additional college preparatory elective in any A–F course) is included in the associated subject results. Passing rates were calculated by collapsing student- and course-level data in CALPADS. See the "Data and Methods" section for more specifics on CALPADS data and student subgroups.

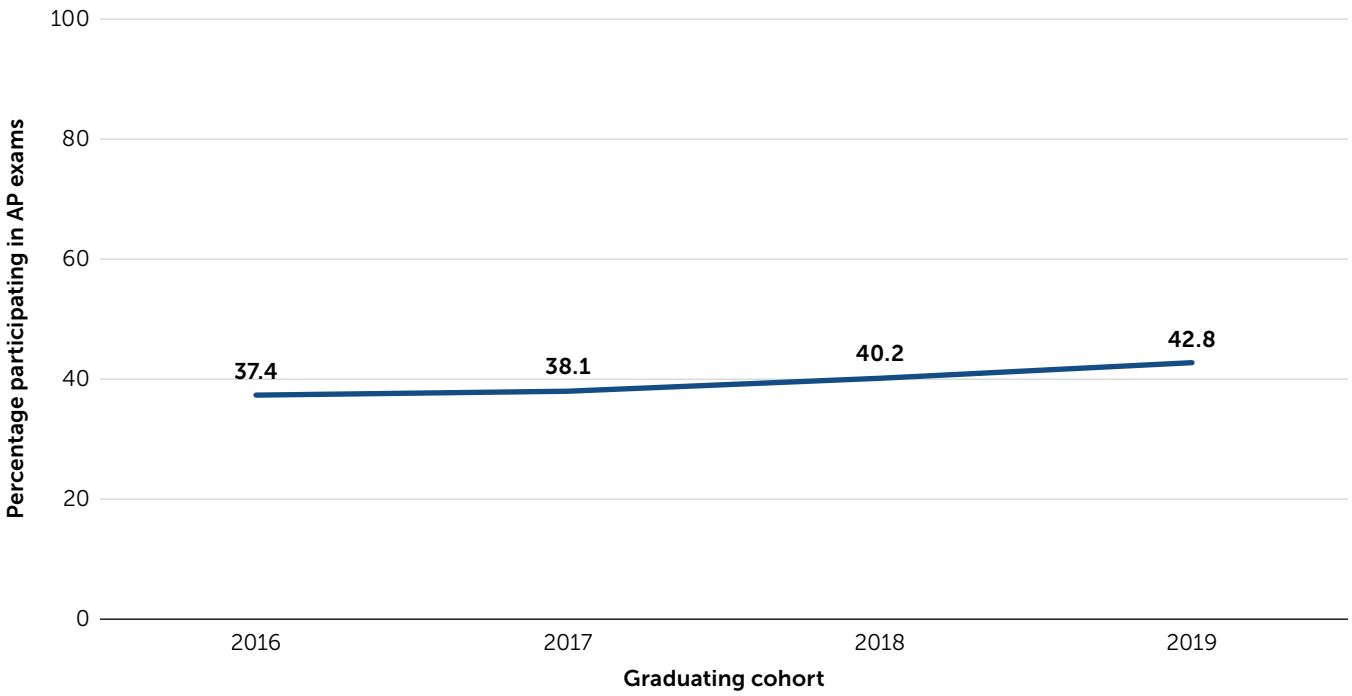
Supplementary Opportunities: College-Level Coursework

Although A–G courses reflect the minimum requirements to meet eligibility for admission to California's 4-year public colleges, readiness for college-level coursework is not a guaranteed outcome upon successful completion of the course sequence. This may be because the rigor of A–G courses differs across California (Dougherty et al., 2006); for example, depending on where a student attends high school, the same course of study could amount to varying degrees of college preparedness (Kurlaender, 2018)—a result of the quality, preparation, and experience of teachers, the curriculum itself, or the pedagogy of instruction (among other explanations). In this case, other rigorous course-taking experiences, such as AP and dual enrollment courses—which expose high school students to college-level content and offer opportunities to earn college credit—are a critical component of improving college readiness, especially since they allow students to develop a sense of the college experience prior to enrollment (American Institutes for Research & SRI International, 2009).

Advanced Placement. In addition to their A–G label, AP courses allow high school students to directly experience college-level coursework and earn college credit based on their performance on AP exams, both of which have been found to improve students' preparedness

for college (Dougherty et al., 2006; Morgan & Klaric, 2007; Scott et al., 2010).[8] It is important to note that, unlike most A–G courses—which are designed at the local level—AP courses require specific standards for both course content and teacher preparation, although this requirement does not preclude potential variation in the experience of each student in terms of the depth, breadth, and pace of the material covered in preparation for the comprehensive exam. Nevertheless, we used AP exam data as a proxy for AP course enrollment and access to college-level material across California high schools, drawing on the assumption that if students participated in AP exams, they also enrolled in the corresponding courses within their high schools. Regardless of exam participation, AP courses are weighted for students' cumulative grade point average (GPA) in high school and thus offer a potential advantage in college admissions. We found that rates of AP exam participation increased steadily between 2016 and 2019, with the percentage of California public high school graduates taking at least one AP exam increasing from 37.4 percent to 42.8 percent (Figure 9).

Figure 9. AP Exam Participation Rates, 2016–19 Cohorts

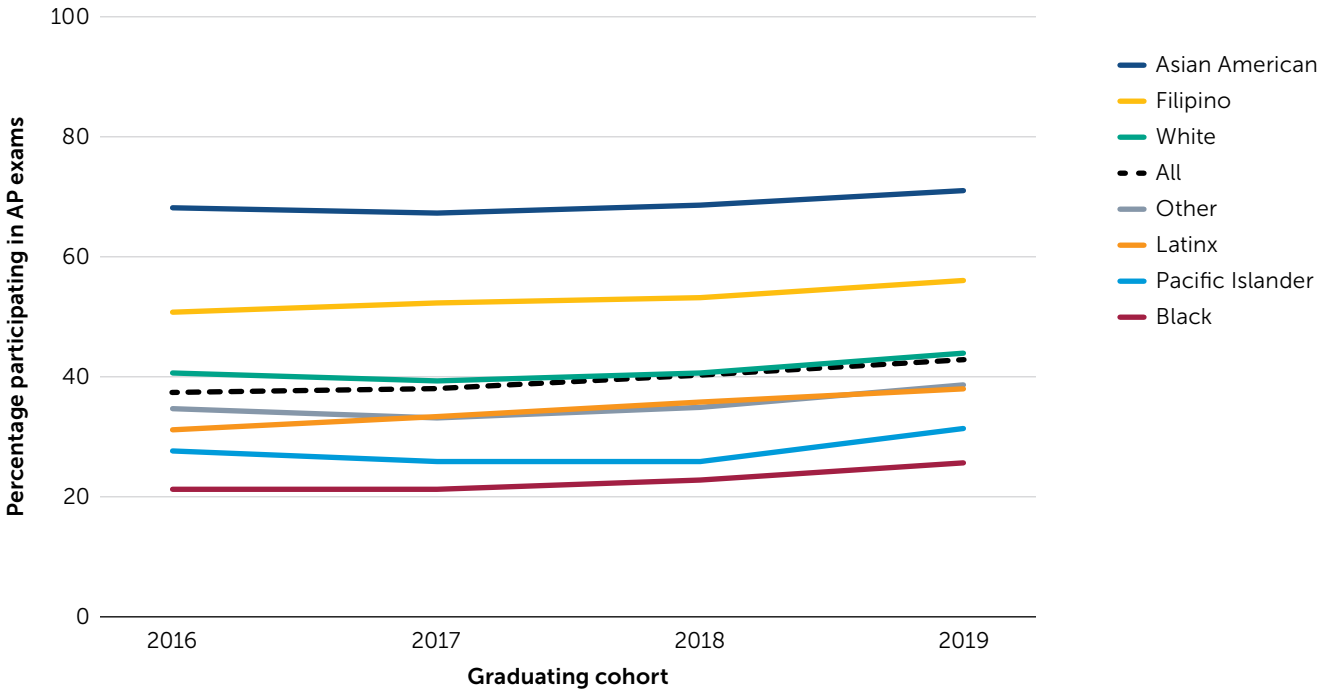


Note. Rates of AP exam participation were calculated from student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownership Codes other than 65, 66, or 67 and schools with fewer than 15 students in a graduating cohort.

[8] Our data also allowed us to examine the extent to which students participated in IB exams; IB participation overall is relatively limited in California, though, as less than 2 percent of our sample of graduates participated in IB tests. Since 65 percent of students who take IB tests also take at least one AP test, we focused on AP exam participation with the aim of best capturing students participating in college-level coursework (less than 1 percent of all students in our sample participated in IB tests only).

Despite steady increases in AP exam participation among all students, participation differs dramatically across racial/ethnic subgroups (Figure 10). For example, in 2019, 71.2 percent of Asian American students and 56.1 percent of Filipino students took at least one AP exam, whereas rates for other racial/ethnic subgroups were substantially lower: 44.1 percent of White students, 38.1 percent of Latinx students, 31.5 percent of Pacific Islander students, and 25.6 percent of Black students.

Figure 10. AP Exam Participation Rates by Racial/Ethnic Subgroup, 2016–19 Cohorts

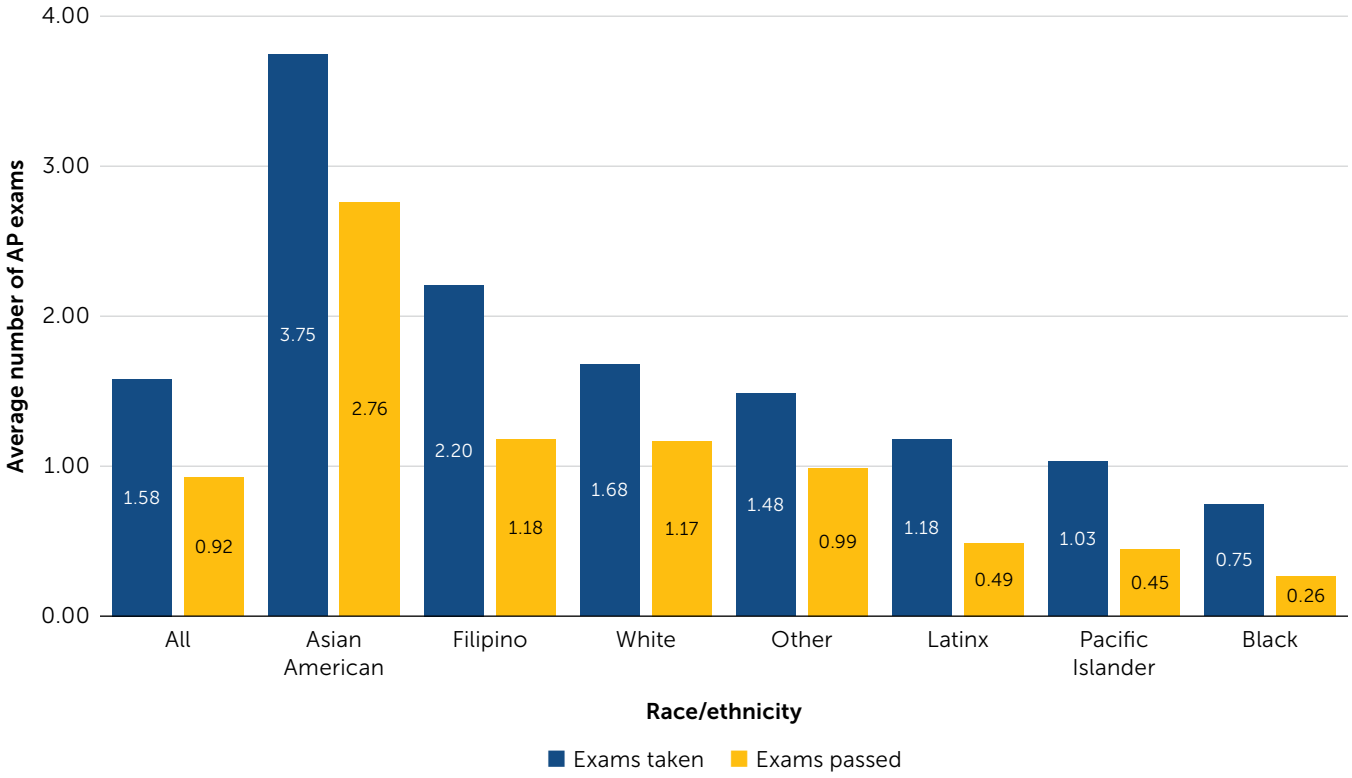


Note. Rates of AP exam participation were calculated from student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownership Codes other than 65, 66, or 67 and schools with fewer than 15 students in a graduating cohort.

AP exam performance also reveals important information about the accessibility and applicability of the additional premium that AP courses can provide in the form of college credit. As AP exams are scored on a scale of 1 to 5, with higher scores (typically 3 and above, depending on the subject) translating into college credit, students may take more courses in an attempt to enter college with course requirements or elective credits already complete. Figure 11 presents the average number of AP exams taken as well as passed (i.e., earning a score of 3 or above) by race/ethnicity for the 2019 graduating cohort. Patterns across exam participation and passing rates by racial/ethnic subgroup mirror those of A–G course completion, wherein Asian American and Filipino students both take and pass more AP exams than their counterparts. Strikingly, results indicate that Asian American students pass more AP exams than students in other racial/ethnic subgroups even attempt. If colleges accept the scores for the two to three AP exams that

Asian American students pass with full college credit, these students may begin college with a substantial advantage: one full semester ahead of their peers from other subgroups, potentially decreasing the time and cost associated with degree completion.

Figure 11. Average Number of AP Exams Taken and Passed by Racial/Ethnic Subgroup, 2019 Cohort



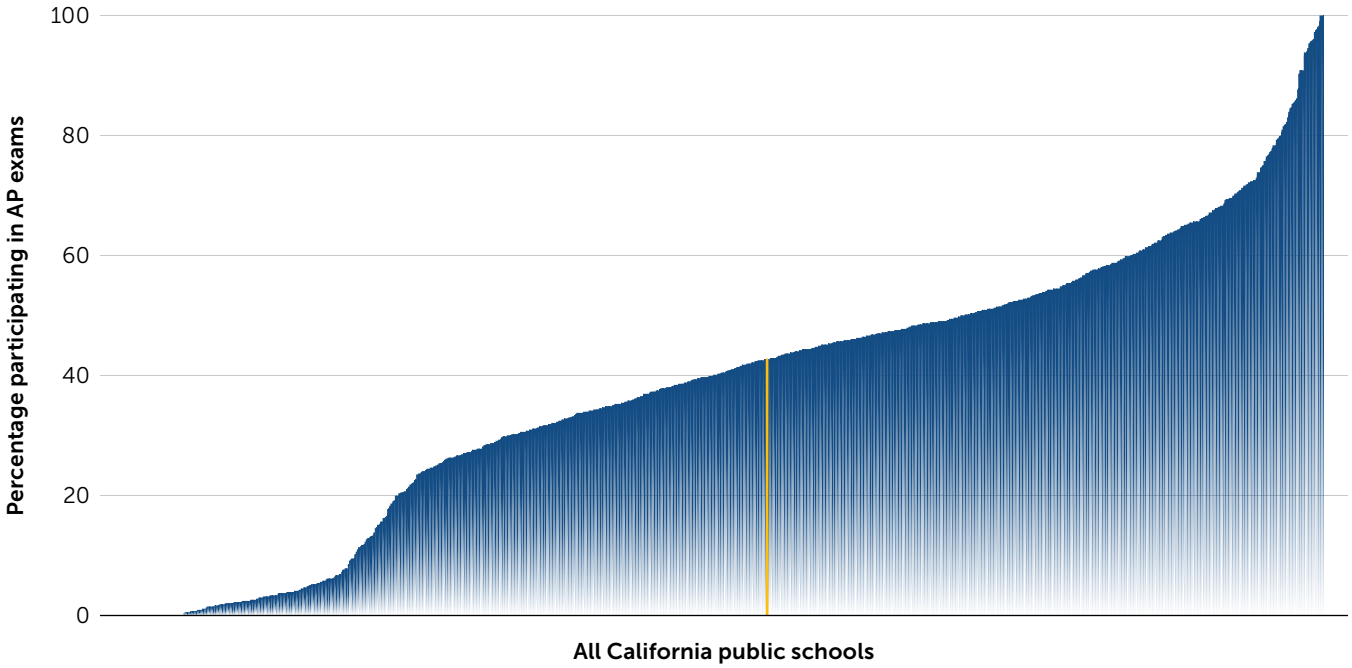
Note. Rates for taking and passing AP exams were calculated from student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownership Codes other than 65, 66, 67 and schools with fewer than 15 students in a graduating cohort.

The disparities we observed in AP exam participation and performance can be attributed to a host of factors; however, as we described in our previous discussion of A–G completion rates, schools matter. Findings reveal that rates of AP exam participation—our proxy for AP course enrollment—also differ across schools (Figure 12). In 120 public high schools, most of which are charter schools (86 percent),[9] no students take an AP exam, suggesting that access to AP courses is limited in these schools. On the other hand, in five schools, all students take at least one AP exam. In two thirds of schools statewide, at least 25 percent of students take an AP exam.

[9] Of the 120 schools with zero participation in AP exams, 29 are DASS charter schools, 74 are non-DASS charter schools, one is a noncharter DASS school, and 16 are traditional public schools.

Given that AP courses also receive the A–G label, it may be reasonable to assume that patterns of AP exam participation across and within schools mirror those observed in A–G course completion. That is, differences in participation exist when comparing SED and non-SED students within racial/ethnic subgroups, and these disparities persist even in schools with similar concentrations of lower income students.

Figure 12. AP Exam Participation Rates by High School, 2019 Cohort

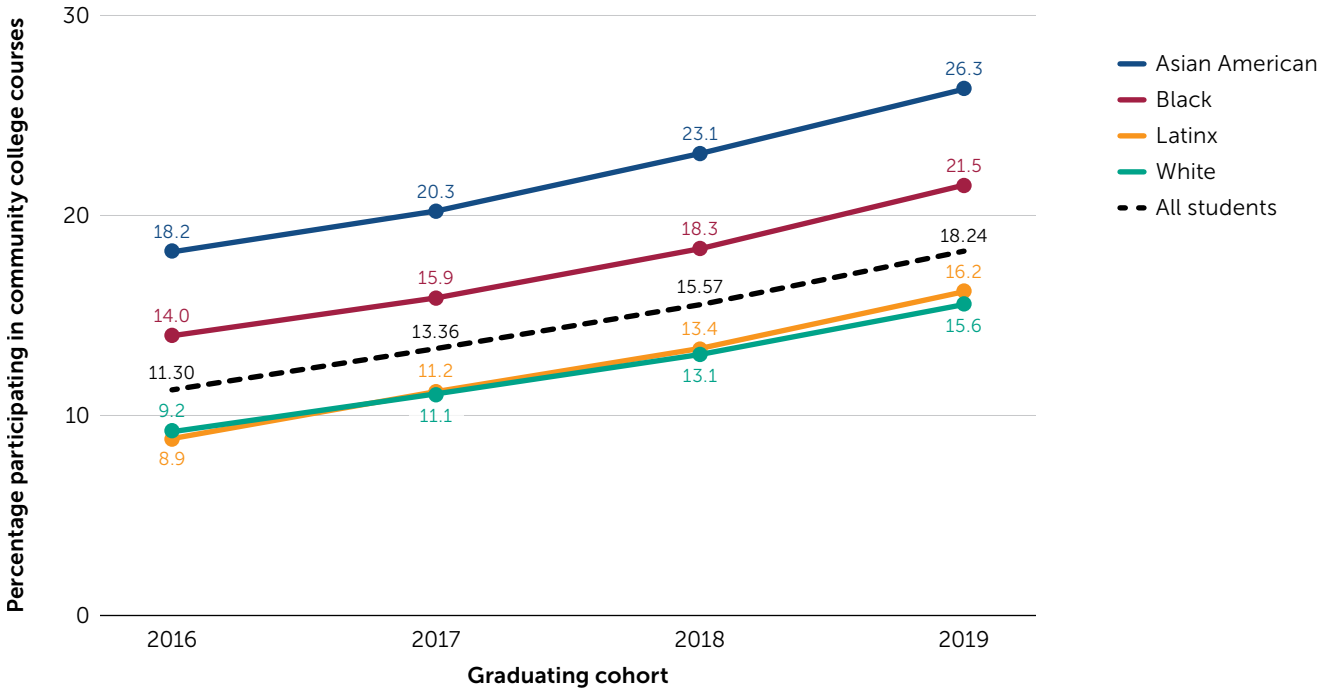


Note. Each blue bar represents a single high school in California. The yellow bar indicates the statewide AP exam participation rate. AP exam participation rates were calculated from student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownership Codes other than 65, 66, or 67 and schools with fewer than 15 students in a graduating cohort.

Dual enrollment. Courses offered through dual enrollment are another college preparatory option for many California high school students. School districts work in partnership with local community colleges to establish dual enrollment programs, granting high school students opportunities to earn both high school and college credit. Like AP courses, dual enrollment courses support students' development of college-level academic skills prior to college and are weighted to enhance students' GPAs. In California, recent policy changes—in addition to mounting evidence that participating in college courses while in high school is beneficial for both preparation and persistence—have led to a steady rise in dual enrollment programs. In an earlier report published by our partners at Wheelhouse (Kurlaender et al., 2021), results indicated that dual enrollment participation increased by nearly seven percentage points between 2016 and 2019 (Figure 13). Dual enrollment participation also differs across student subgroups. Although more students have enrolled in dual enrollment programs over time, there have been

consistent gaps in participation rates among students from different racial/ethnic subgroups. Notably, as more high schools and community colleges create formal dual enrollment opportunities, participation among previously underrepresented groups (in particular, Black and Latinx students) has improved (Kurlaender et al., 2021, Figure 9). Nevertheless, even as participation by Black and Latinx students has nearly doubled in recent years, these rates are still disproportionate to other student groups.

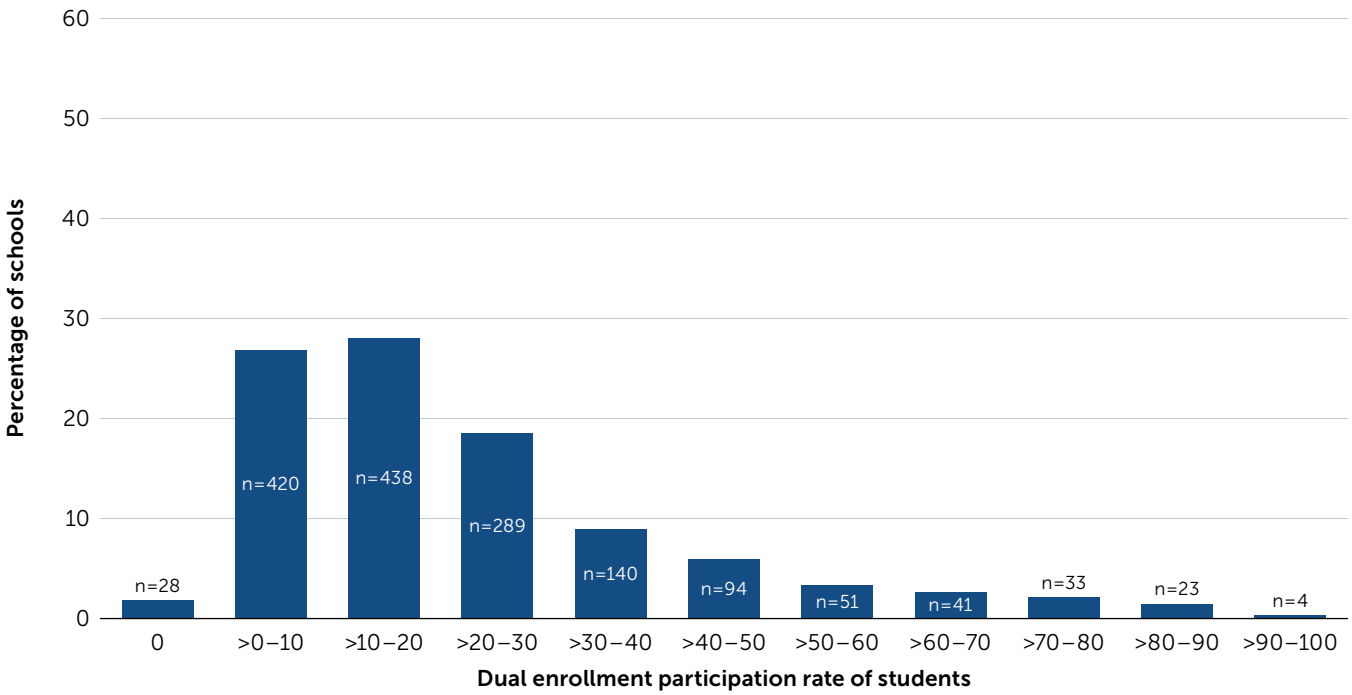
Figure 13. Dual Enrollment Participation by Student Race/Ethnicity and Over Time



Note. Adapted from a figure previously published in *A Foot in the Door: Growth in Participation and Equity in Dual Enrollment in California* by Kurlaender et al., 2021, Wheelhouse (files.eric.ed.gov/fulltext/ED624034.pdf). Statistics were calculated by merging student-level College/Career Indicator data from the California Department of Education and special admit data from the California Community Colleges Chancellor's Office. Years were limited to those for which CCI data were available.

Despite the increase in dual enrollment participation, results from our research partners indicate that access to dual enrollment community college courses is not equally distributed across schools. Figure 14 presents dual enrollment participation rates by high school for the 2019 graduating cohort. Although nearly every public high school in the state (98 percent) has at least one student enrolled in a dual enrollment course, participation varies by school, ranging from less than 1 percent to 95 percent of students taking at least one dual enrollment course. Nearly three quarters of California high schools have dual enrollment participation rates below 30 percent. Conversely, high participation rates are evident in a few schools; for example, at 152 schools across the state, more than half of the students participate in dual enrollment, and at four schools, nearly all students (90 percent or more) enroll in community college courses in high school. These schools tend to be small schools and/or Early and Middle College High Schools.

Figure 14. Dual Enrollment Participation Rates by School, 2019 Cohort



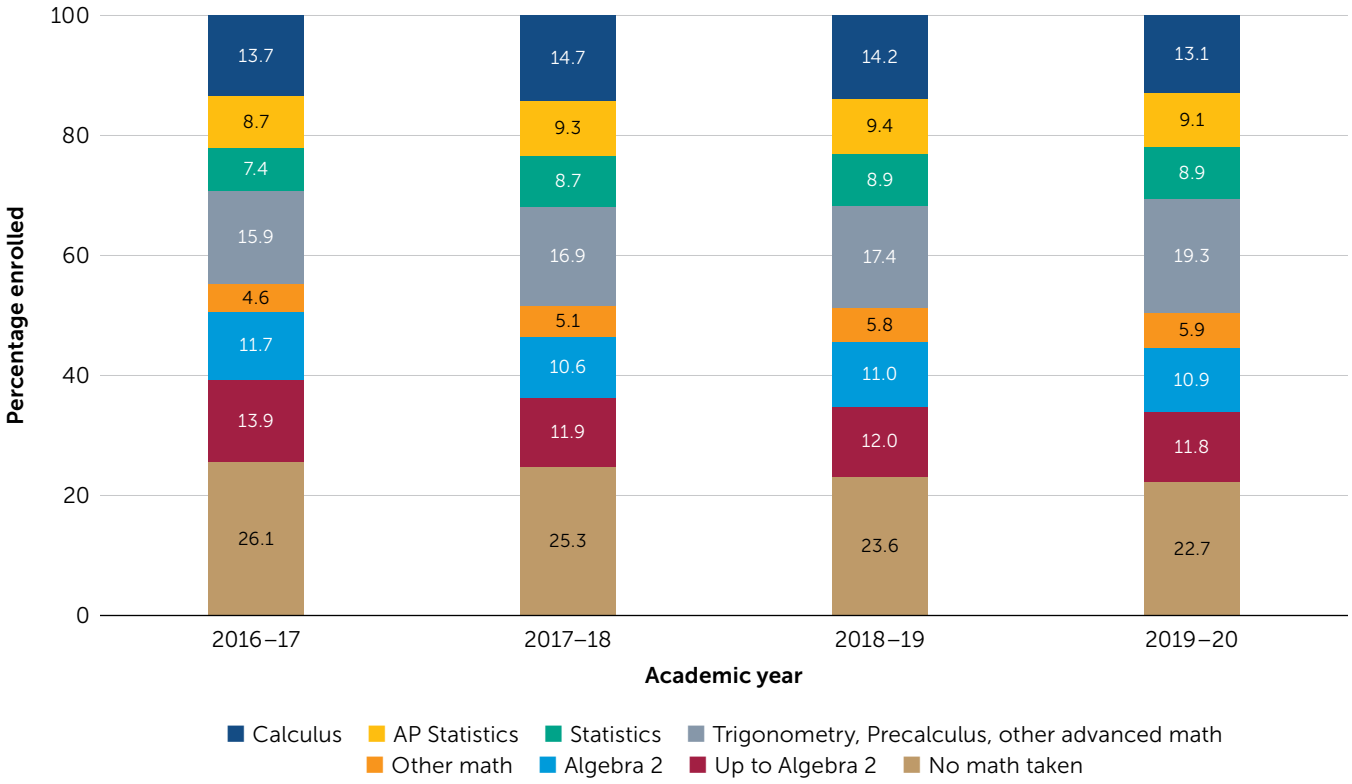
Note. Adapted from a figure previously published in *A Foot in the Door: Growth in Participation and Equity in Dual Enrollment in California* by Kurlaender et al., 2021, Wheelhouse (files.eric.ed.gov/fulltext/ED624034.pdf). The figure includes 1,561 California public high schools with 15 or more graduates in the 2019 4-year cohort and excludes 426 small schools, 319 of which did not have any dual enrollment participation.

Senior-year math course-taking opportunities. The types of math courses that students take in high school are particularly important for college readiness. Taking advanced math in high school is positively associated with the likelihood of college enrollment, the type of college attended (Dougherty et al., 2017; Kim et al., 2015; Long et al., 2012), and college completion (Adelman, 1999, 2006; Smith et al., 2017). A recent study of high school graduates of Los Angeles Unified School District found that enrollment in a math course during 12th grade had a positive impact on college eligibility, enrollment, and persistence (Wainstein et al., 2023). Given these outcomes, efforts to increase the number of students taking advanced math and the number of years that students enroll in math courses have been front and center across initiatives to improve college and career readiness. For example, educators have debated whether middle school students should enroll in algebra to allow them additional time to take advanced math courses while in high school. More recently, CSU considered revisions to admission criteria that would require students to complete 4 years of math while in high school to be eligible to enroll.[10]

[10] Although ultimately this proposal was not approved, it prompted robust conversations about the importance and accessibility of high school math for California students. In California, the state's 4-year university systems require 3 years of high school mathematics, but a fourth year is recommended.

Evidence indicates that nearly one quarter of all high school students in the state do not take math during their senior year (Asim et al., 2019; Reed et al., 2023). Importantly, senior-year math course-taking is on the rise among students in traditional public high schools. The number of students who did not enroll in a math course in 12th grade declined three percentage points between 2015–16 and 2018–19 (Figure 15).[11] Enrollment in Algebra 2 and lower level math courses also waned during this period, indicating that the increase in math enrollment occurred across higher levels of math. Specifically, an increasing number of California seniors enrolled in precalculus and statistics courses.

Figure 15. Math Course Enrollment for 12th Graders, 2016–19

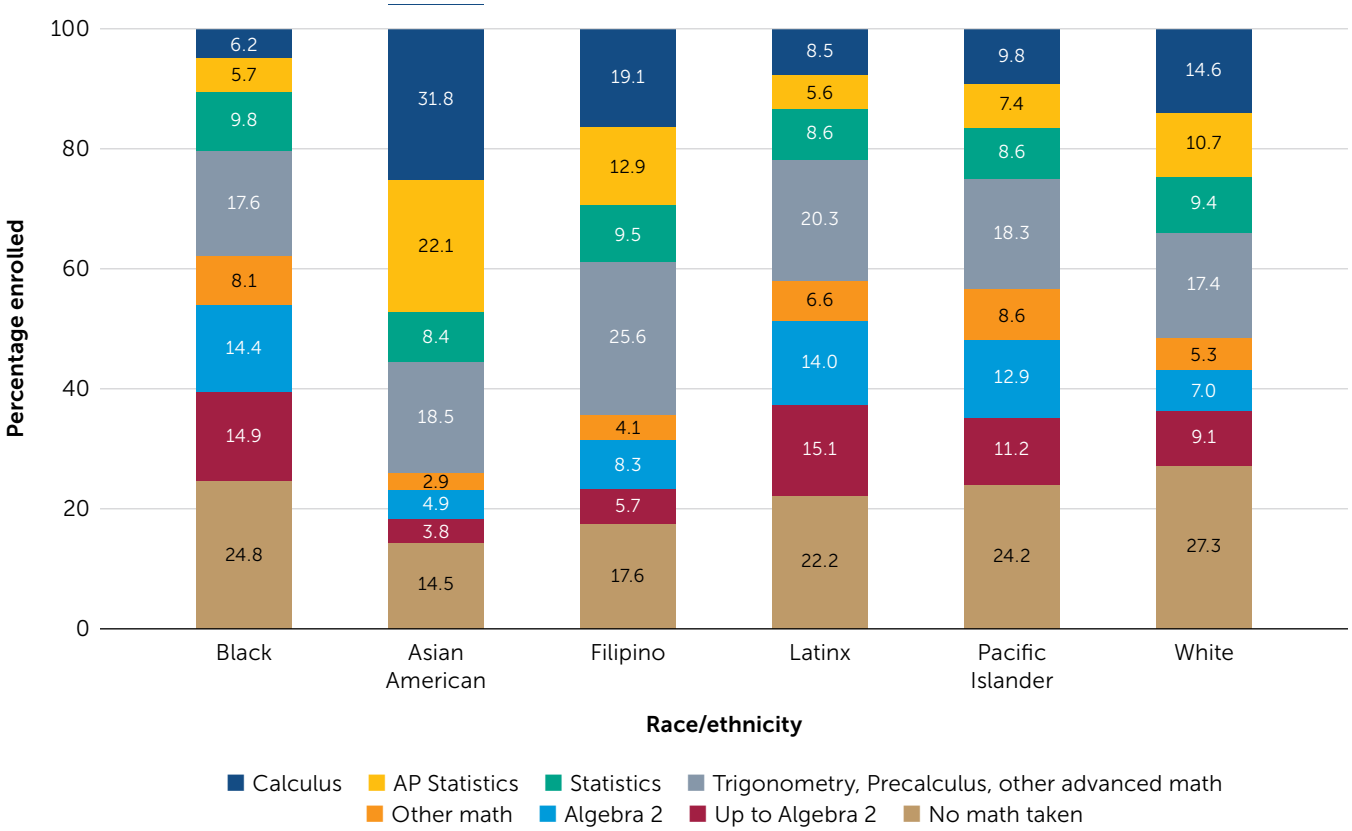


Note. Math course-taking was calculated from student-level data in the CALPADS data set provided by the California Department of Education. The sample is constructed from the students participating in the 11th-grade SBAC test the prior year. Course-taking percentages in the graph total more than 100 percent because categories are not mutually exclusive.

[11] In other work by the same authors, we report different rates of advanced math course-taking due to sample differences. Reed et al. (2023) report senior-year math course enrollment for all 12th graders in the state, whereas the sample in this work is limited to students attending traditional public schools with more than 15 students per graduating cohort. With these sample differences, we would expect higher rates of advanced math enrollment and lower rates of no math enrollment for the sample in this study, which effectively eliminates students attending school in alternative educational settings who may struggle with academic demands.

As with other courses, math course-taking patterns are not the same for all students (Figure 16). Asian American and Filipino students enroll in advanced math courses like Calculus and AP Statistics at higher rates than their peers from other racial/ethnic subgroups. Asian American students are also more likely to enroll in more than one advanced math course during their senior year. In contrast, Black, Latinx, and Pacific Islander students are more likely to enroll in Algebra 2 and less advanced math courses in 12th grade, suggesting potential disparities in preparation for advanced math courses. Over 27 percent of White students, more than any other group, do not take math in their senior year.

Figure 16. Enrollment in 12th-Grade Math Courses by Student Race/Ethnicity, 2018–19 Academic Year



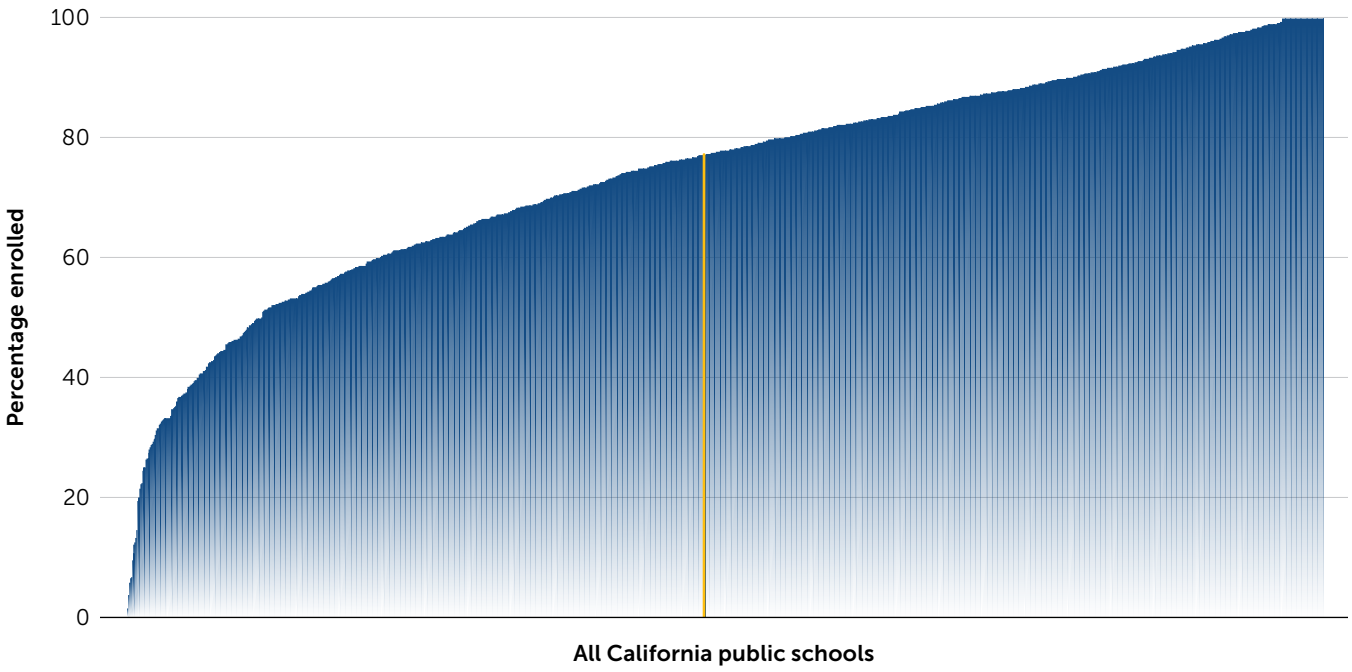
Note. Math course-taking was calculated from student-level data in the CALPADS data set provided by the California Department of Education. The sample is constructed from the students participating in the 11th-grade SBAC test the prior year. Course-taking percentages in the graph total more than 100 percent because categories are not mutually exclusive.

As with A–G courses more generally, course availability affects math course-taking during senior year. While some schools may offer a wide variety of math courses and encourage seniors to enroll, it may be a challenge for others to provide enough sections and a diverse set of courses from which students can choose. The differences between high school graduation,

UC/CSU eligibility, and competitive college admissions requirements may also be a factor, as some high schools may be scheduling and staffing math instruction at the minimum levels, providing fewer students with the opportunity to take more advanced options in upper grades. Many schools and districts may also be hindered by a nationwide shortage of math teachers, particularly those qualified to teach advanced math (Fortin & Fawcett, 2022), which likely contributes to a limited schedule of course offerings.

Math course-taking varies considerably across high schools in California. To illustrate differences in 12th-grade math course-taking across schools, Figure 17 presents the percentage of students enrolled in math during their senior year in 2018–19. There were just two traditional public high schools in California at which not a single 12th grader took a math course; conversely, at 51 schools, there was universal participation, with every 12th grader enrolled in math. This further underscores the critical role that schools play in course accessibility and the options available to students to prepare for college-level work.

Figure 17. Percentage of 12th Graders Enrolled in Math, 2018–19



Note. Each blue bar represents a single high school in California. The yellow bar indicates the statewide rate of 12th-grade math course-taking. Math course-taking was calculated from student-level data in the CALPADS data set provided by the California Department of Education. The sample was constructed from the students participating in the 11th-grade SBAC test the prior year.

Implications and Recommendations

Although the evidence clearly indicates that participation in college preparatory coursework among California public high school students has increased over time, glaring disparities in course access and success by student race/ethnicity and socioeconomic status persist.

Recent policy efforts intend to expand access to and success in both college preparatory and college-credit-bearing coursework. For example, AB 130, passed in 2021, includes the A–G Completion Improvement Grant Program, which provides financial support to LEAs to increase the number of students who graduate having successfully completed the full A–G course sequence, in part targeting pandemic-affected students. Monies from these A–G improvement grants can be used many ways, including expanding access to coursework and strengthening academic supports to ensure students' attainment. AB 181, passed in 2022, addressed dual enrollment, aiming to strengthen and expand access to and participation in dual enrollment programs across the state. Part of this expansion included funds to establish additional College and Career Access Pathways partnerships between community colleges and high schools, which offer dual enrollment courses that count towards a high school diploma and an Associate of Arts degree.

Beyond the availability of advanced coursework, recent legislation has considered how high school coursework could align with individuals' postsecondary education and career goals as well as the workforce needs of the state and local communities. For example, dual enrollment courses should be part of "structured, well-sequenced pathways" (Dual Enrollment Opportunities, 2022) that enable students to earn credit for high school and college. The Golden State Pathways Program (2022) encourages collaboration among LEAs, postsecondary institutions, and employers to develop and strengthen pathways to college and career in several areas, including but not limited to technology, health care, and education.

The promise of these state-level investments can be realized only with intentional implementation and careful monitoring. Efforts to increase access to and participation in college preparatory courses in California often leads to more complexity in college and career pathways. This very complexity could ultimately serve students by giving them additional options to bridge their high school courses with postsecondary plans. However, more options, if not carefully implemented, will not necessarily lead to improving outcomes nor to closing persistent opportunity gaps related to students' race and socioeconomic status. As such, education leaders statewide must incorporate the following considerations in their continued efforts to broaden access to college and increase equity in high school course-taking.

Strengthen K–12 and Higher Education Partnerships

Given that gaps in access to A–G, AP, dual enrollment, and advanced math courses may result from resource limitations in local high schools, districts could develop or extend partnerships with neighboring districts or schools to increase course availability by expanding academic opportunities across schools. For example, in some districts students may take courses that are not offered by their home schools at another high school in the district where the course is available. New and expanded dual enrollment partnerships between LEAs and community colleges increase opportunities for high school students to access college courses. Evidence indicates that when high schools and community colleges partner to offer community college courses that only high school students enroll in, gaps in participation across racial/ethnic subgroups nearly disappear (Kurlaender et al., 2021), suggesting that expanded dual enrollment can result in more equitable opportunities. Moreover, online courses and virtual learning options (many at community colleges) are more readily available, especially since the pandemic, and could increase opportunities for advanced course-taking for students where offerings are otherwise limited.

Diversify Courses

Diversification of course offerings may allow more students to access college and career preparatory coursework by broadening the curricula within schools. For example, several higher education and K–12 partnerships have developed and implemented innovative advanced math courses as alternatives to traditional advanced math for students who are interested in pursuing postsecondary education and may not need calculus in their field of study (Reed et al., 2023). Moreover, diversifying A–G offerings within a school, including career technical education courses and pathways, may reach more students with varying interests.

Ensure Equitable Access by Supporting Students

Districts and schools must work intentionally to ensure that opportunities are shared equally across student subgroups. This could include scheduling classes in a manner that does not systematically exclude some students, attending to advising and counseling practices, adopting default A–G scheduling, and providing structures to support students' academic success, such as strong preparation in earlier grades, tutoring, and fair and equitable grading practices, among others (Lee, 2023). Accessibility may also be hindered by cost and locale; for online courses, schools may need to assist students with course fees, and for courses on another campus, students may need support with transportation.

Track Access, Participation, and Attainment

Key to meeting any goal is monitoring progress towards its attainment (Harkin et al., 2016). If the state, districts, and schools intend to improve equitable access to and success in courses that prepare young people for college and career, this effort must be accompanied by tools and systems to monitor that access and attainment. Recent evidence from qualitative work suggests that monitoring course enrollment and performance is integral to ensuring students' progress towards A–G completion, and that this monitoring should be supported by frequent communication, personal advising, and appropriate interventions from counselors (Lee, 2023). It is important that such tools or systems require integration into organizational goals, as their existence alone is not enough to affect student outcomes (Kurlaender et al., 2019). Statewide, CCI monitors a host of college-readiness indicators at the school level, and districts and schools can do more through Local Control and Accountability Plan goals and other mechanisms to ensure that college preparatory courses are distributed equally and are serving marginalized students.

The California Cradle-to-Career longitudinal database intends to combine student-level information from early childhood through postsecondary education to help students and families—as well as district- and school-level staff—get a better sense of where students are headed given their course-enrollment patterns and performance throughout their schooling career. Although still in development, such an indicator system will be critical to identifying obstacles to academic opportunities. Such a database can also give researchers, policymakers, and practitioners a more direct and complete assessment of student outcomes across education trajectories as well as an opportunity to design better strategies to improve student outcomes across the state.

Conclusion

Research reveals that, although opportunity and performance gaps have narrowed, they continue to persist across California for lower income students and students of color. Equitable access to higher education ultimately begins at the K–12 level. When critical courses to support this access, such as the A–G course sequence, are limited—or, in some cases, unavailable—it is no surprise that some students are left underrepresented in postsecondary spaces. While strides have been made, evidenced by generally increasing rates of participation and successful completion of college preparatory coursework, there is still a lot of work to be done to broaden academic opportunities for historically underserved and marginalized students. Ultimately, students' education trajectories are a function of the institutions and staff that shape students' opportunities and choices. In addition, policies and practices play an enormous role in steering students' pathways to college. It is more important than ever to ensure that these policies and practices yield more equitable outcomes for California schools and the diverse students they serve.

References

Adelman, C. (1999). *Answers in the tool box: Academic intensity, attendance patterns and bachelor's degree attainment*. U.S. Department of Education.

Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college*. U.S. Department of Education. files.eric.ed.gov/fulltext/ED490195.pdf

A–G Completion Improvement Grant Program, Cal. Ed. Code § 41590 (2021). leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=41590&lawCode=EDC

Allensworth, E., Nomi, T., Montgomery, N., & Lee, V. E. (2009). College preparatory curriculum for all: Academic consequences of requiring algebra and English I for ninth graders in Chicago. *Educational Evaluation and Policy Analysis*, *31*(4), 367–391. doi.org/10.3102/0162373709343471

American Institutes for Research & SRI International. (2009, August). *Six years and counting: The ECHSI matures* [Report]. files.eric.ed.gov/fulltext/ED514090.pdf

Asim, M., Kurlaender, M., & Reed, S. (2019, August). *12th grade course-taking and the distribution of opportunity for college readiness in mathematics* [Report and infographic]. Policy Analysis for California Education. edpolicyinca.org/publications/12th-grade-course-taking-and-distribution-opportunity-college-readiness-mathematics

Attewell, P., & Domina, T. (2008). Raising the bar: Curricular intensity and academic performance. *Educational Evaluation and Policy Analysis*, *30*(1), 51–71. doi.org/10.3102/0162373707313409

Bausmith, J. M., & France, M. (2012). The impact of GEAR UP on college readiness for students in low income schools. *Journal of Education for Students Placed at Risk* (JESPAR), *17*(4), 234–246. doi.org/10.1080/10824669.2012.717036

Bettinger, E. P., Boatman, A., & Long, B. T. (2013). Student supports: Developmental education and other academic programs. *The Future of Children 23*(1), 93–115. jstor.org/stable/23409490

Burdman, P., Booth, K., Thorn, C., Bahr, P. R., McNaughtan, J., & Jackson, G. (2018, May). *Multiple paths forward: Diversifying math pathways as a strategy for college success* [Report]. Just Equations and Center for the Study of Higher and Postsecondary Education. justequations.org/resource/multiple-paths-forward-diversifying-math-pathways-as-a-strategy-for-college-success

Byun, S. Y., Irvin, M. J., & Bell, B. A. (2015). Advanced math course taking: Effects on math achievement and college enrollment. *The Journal of Experimental Education*, *83*(4), 439–468. doi.org/10.1080/00220973.2014.919570

California Department of Finance. (2022, June 27). *2022–23 state budget: Enacted budget summary.* California State Budget. ebudget.ca.gov/budget/publication/#/e/2022-23/BudgetSummary

California State University. (2022, March). *CSU trustees vote to amend Title 5 to remove SAT and ACT tests from undergraduate admissions*. calstate.edu/csu-system/news/Pages/trustees-vote-remove-SAT-ACT-standardized-tests-2022.aspx

Callahan, R. M., & Shifrer, D. (2016). Equitable access for secondary English learner students: Course taking as evidence of EL program effectiveness. *Educational Administration Quarterly*, *52*(3), 463–496. doi.org/10.1177/0013161X16648190

Causey, J., Kim, H., Ryu, M., Scheetz, A., & Shapiro, D. (2022, May). *Some college, no credential student outcomes: Annual progress report—academic year 2020/21*. National Student Clearinghouse Research Center. files.eric.ed.gov/fulltext/ED620650.pdf

Clotfelter, C. T., Ladd, H. F., & Vigdor, J. L. (2010). Teacher credentials and student achievement in high school: A cross-subject analysis with student fixed effects. *Journal of Human Resources*, *45*(3), 655–681. doi.org/10.3368/jhr.45.3.655

Conger, D., Long, M. C., & Iatarola, P. (2009). Explaining race, poverty, and gender disparities in advanced course-taking. *Journal of Policy Analysis and Management*, *28*(4), 555–576. doi.org/10.1002/pam.20455

del Rio, G. M. N. (2021, May 16). University of California will no longer consider SAT and ACT scores. *The New York Times*. nytimes.com/2021/05/15/us/SAT-scores-uc-university-of-california.html

Dougherty, C., Mellor, L., & Jian, S. (2006). *Orange juice or orange drink? Ensuring that "advanced courses" live up to their labels* [Policy brief]. National Center for Educational Accountability. files.eric.ed.gov/fulltext/ED519415.pdf

Dougherty, S. M., Goodman, J. S., Hill, D. V., Litke, E. G., & Page, L. C. (2017). Objective course placement and college readiness: Evidence from targeted middle school math acceleration. *Economics of Education Review*, *58*, 141–161. doi.org/10.1016/j.econedurev.2017.04.002

Dual Enrollment Opportunities, Cal. Ed. Code § 41585 (2022). leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=41585&lawCode=EDC

Fortin, J., & Fawcett, E. (2022, September 2). How bad is the teacher shortage? Depends where you live. *The New York Times*. nytimes.com/2022/08/29/us/schools-teacher-shortages.html

Gamoran, A. (1987). The stratification of high school learning opportunities. *Sociology of Education*, *60*(3), 135–155. doi.org/10.2307/2112271

Gamoran, A., & Hannigan, E. C. (2000). Algebra for everyone? Benefits of college-preparatory mathematics for students with diverse abilities in early secondary school. *Educational Evaluation and Policy Analysis*, *22*(3), 241–254. doi.org/10.3102/01623737022003241

Gao, N. (2016). *College readiness in California: A look at rigorous high school course-taking*. Public Policy Institute of California. ppic.org/content/pubs/report/R_0716NGR.pdf

Golden State Pathways Program, Cal. Ed. Code § 53020 et seq. (2022). leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?sectionNum=53020&lawCode=EDC

Harkin, B., Webb, T. L., Chang, B. P. I., Prestwich, A., Conner, M., Kellar, I., Benn, Y., & Sheeran, P. (2016). Does monitoring goal progress promote goal attainment? A meta-analysis of the experimental evidence. *Psychological Bulletin*, *142*(2), 198–229. dx.doi.org/10.1037/bul0000025

Iatarola, P., Conger, D., & Long, M. C. (2011). Determinants of high schools' advanced course offerings. *Educational Evaluation and Policy Analysis, 33*(3), 340–359. doi.org/10.3102/0162373711398124

Kanno, Y., & Kangas, S. E. (2014). "I'm not going to be, like, for the AP": English language learners' limited access to advanced college-preparatory courses in high school. *American Educational Research Journal*, *51*(5), 848–878. doi.org/10.3102/0002831214544716

Kim, J., Kim, J., DesJardins, S. L., & McCall, B. P. (2015). Completing Algebra II in high school: Does it increase college access and success? *The Journal of Higher Education*, *86*(4), 628–662. doi.org/10.1080/00221546.2015.11777377

Klopfenstein, K. (2004). The advanced placement expansion of the 1990s: How did traditionally underserved students fare? *Education Policy Analysis Archives*, *12*(68). files.eric.ed.gov/fulltext/EJ853532.pdf

Kurlaender, M. (2018, September 11). *High expectations demand high support: Strengthening college readiness at the California state universities*. EducationNext. educationnext.org/high-expectations-demand-high-support-strengthening-college-readiness-california-state-universities

Kurlaender, M., & Hibel, J. (2018). Students' educational pathways: Aspirations, decisions, and constrained choices along the education lifecourse. In B. Schneider (Ed.), *Handbook of the sociology of education in the 21st century* (pp. 361–384). Springer.

Kurlaender, M., & Howell, J. S. (2012, September). *Collegiate remediation: A review of the causes and consequences* [Literature brief]. College Board Advocacy and Policy Center. files.eric.ed.gov/fulltext/ED562687.pdf

Kurlaender, M., Reed, S., Grosz, M., Mathias, J., & Hughes, K. (2021, October). *A foot in the door: Growth in participation and equity in dual enrollment in California* [Research brief]. Wheelhouse: The Center for Community College Leadership and Research, University of California, Davis. files.eric.ed.gov/fulltext/ED624034.pdf

Kurlaender, M., Reed, S., & Hurtt, A. (2019, August). *Improving college readiness: A research summary and implications for practice* [Policy brief and report]. Policy Analysis for California Education. edpolicyinca.org/publications/improving-college-readiness-research-summary-and-implications-practice

Lantz, A. E., & Smith, G. P. (1981). Factors influencing the choice of non-required mathematics courses. *Journal of Educational Psychology*, *73*(6), 825–837. doi.org/10.1037/0022-0663.73.6.825

Lee, P. (2023). *A–G resource guide: Insights and strategies from exemplar school districts* [Report]. Policy Analysis for California Education. edpolicyinca.org/publications/a-g-resource-guide

Lee, V. E., Croninger, R. G., & Smith, J. B. (1997). Course-taking, equity, and mathematics learning: Testing the constrained curriculum hypothesis in US secondary schools. *Educational Evaluation and Policy Analysis*, *19*(2), 99–121. doi.org/10.3102/01623737019002099

Lee, V. E., & Ready, D. D. (2009). U.S. high school curriculum: Three phases of contemporary research and reform. *The Future of Children, (19)*1, 135–156. jstor.org/stable/27795038

Lee, V. E., & Smith, J. B. (1997). High school size: Which works best, and for whom? *Educational Evaluation and Policy Analysis*, *19*(3), 205–227. doi.org/10.3102/01623737019003205

Leithwood, K., & Jantzi, D. (2009). A review of empirical evidence about school size effects: A policy perspective. *Review of Educational Research*, *79*(1), 464–490. doi.org/10.3102/0034654308326158

Long, M. C., Conger, D., & Iatarola, P. (2012). Effects of high school course-taking on secondary and postsecondary success. *American Educational Research Journal*, *49*(2), 285–322. doi.org/10.3102/0002831211431952

McFarland, D. A. (2006). Curricular flows: Trajectories, turning points, and assignment criteria in high school math careers. *Sociology of Education*, *79*(3), 177–205. doi.org/10.1177/003804070607900301

Monk, D. H., & Haller, E. J. (1993). Predictors of high school academic course offerings: The role of school size. *American Educational Research Journal*, *30*(1), 3–21. doi.org/10.3102/00028312030001003

Morgan, R., & Klaric, J. (2007). *AP students in college: An analysis of five-year academic careers* (Research Report No. 2007-4). College Board. eric.ed.gov/?id=ED561034

National Center for Education Statistics. (2007). *The nation's report card: America's high school graduates* (NCES 2007-467). U.S. Department of Education. files.eric.ed.gov/fulltext/ED495682.pdf

National Student Clearinghouse. (2022, May 26). College enrollment falls 662,000 students in spring 2022 and 1.4 million during the pandemic. *Clearinghouse Today Blog*. studentclearinghouse.org/nscblog/undergraduate-enrollment-falls-662000-students-in-spring-2022-and-1-4-million-during-the-pandemic

Reed, S., Bracco, K., Kurlaender, M., & Merritt, C. (2023, February). *Innovating high school math through K–12 and higher education partnerships* [Report]. Policy Analysis for California Education. edpolicyinca.org/publications/innovating-high-school-math-through-k-12-and-higher-education-partnerships

Renbarger, R., & Long, K. (2019). Interventions for postsecondary success for low-income and high-potential students: A systematic review. *Journal of Advanced Academics*, *30*(2), 178–202. doi.org/10.1177/1932202X19828744

Saul, S. (2022, May 27). College enrollment drops, even as the pandemic's effects ebb. *The New York Times*. nytimes.com/2022/05/26/us/college-enrollment.html

Schmidt, W. H. (1983). High school course-taking: Its relationship to achievement. *Journal of Curriculum Studies*, *15*(3), 311–332. doi.org/10.1080/0022027830150307

Schmidt, W. H., & Houang, R. T. (2012). Curricular coherence and the common core state standards for mathematics. *Educational Researcher*, *41*(8), 294–308. doi.org/10.3102/0013189X12464517

Schreiber, J. B. (2002). Institutional and student factors and their influence on advanced mathematics achievement. *The Journal of Educational Research*, *95*(5), 274–286. doi.org/10.1080/00220670209596601

Scott, T. P., Tolson, H. L., & Lee, Y. H. (2010). Assessment of advanced placement participation and university academic success in the first semester: Controlling for selected high school academic abilities. *Journal of College Admission*, *208*, 26–30. files.eric.ed.gov/fulltext/EJ893892.pdf

Smith, J., Hurwitz, M., & Avery, C. (2017). Giving college credit where it is due: Advanced Placement exam scores and college outcomes. *Journal of Labor Economics*, *35*(1), 67–147. doi.org/10.1086/687568

Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economics*, *87*(3), 355–374. doi.org/10.1016/B978-0-12-214850-7.50025-5

Umansky, I. M. (2016). Leveled and exclusionary tracking: English learners' access to academic content in middle school. *American Educational Research Journal*, *53*(6), 1792–1833. doi.org/10.3102/0002831216675404

Wainstein, L., Miller, C., Phillips, M., Yamashiro, K., & Melguizo, T. (2023, January). *Twelfth grade math and college access*. Los Angeles Education Research Institute. laeri.luskin.ucla.edu/12thgrademathandcollegeaccess

Wheelhouse, California Education Lab, & Policy Analysis for California Education. (2020, December). *A rising tide: Dual enrollment is growing among California high school students* [Infographic]. edpolicyinca.org/publications/rising-tide

Woods, C. S., Park, T., Hu, S., & Betrand Jones, T. (2018). How high school coursework predicts introductory college-level course success. *Community College Review*, *46*(2), 176–196. doi.org/10.1177/0091552118759419

Author Biographies

Sherrie Reed is executive director of the California Education Lab in the School of Education at the University of California, Davis.

Alexandria Hurtt is a research fellow with the California Education Lab in the School of Education at the University of California, Davis.

Michal Kurlaender is professor of educational policy at the University of California, Davis; faculty director of the California Education Lab; and faculty codirector of Policy Analysis for California Education.

Justin Luu is a doctoral candidate in the School of Education at the University of California, Davis, and a member of the California Education Lab.

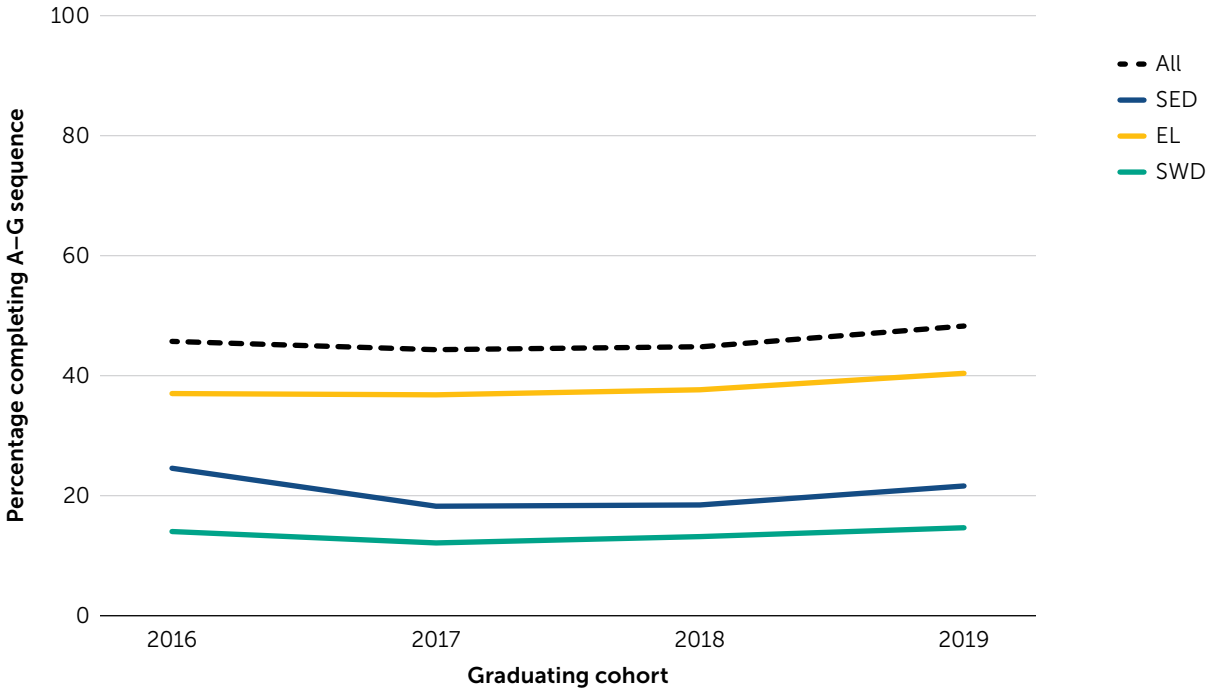
Cassandra Merritt is a doctoral candidate in the Department of Economics at the University of California, Davis, and a member of the California Education Lab.

Appendix A: Course-Taking Patterns for Other Key Student Subgroups

Throughout this report, we provide results at the state and school level as well as examine outcomes for specific racial/ethnic student subgroups. We recognize that there are other key subgroups for whom disparate opportunities and outcomes persist. In this appendix, we provide detailed information about the high school course-taking patterns for the following key subgroups:

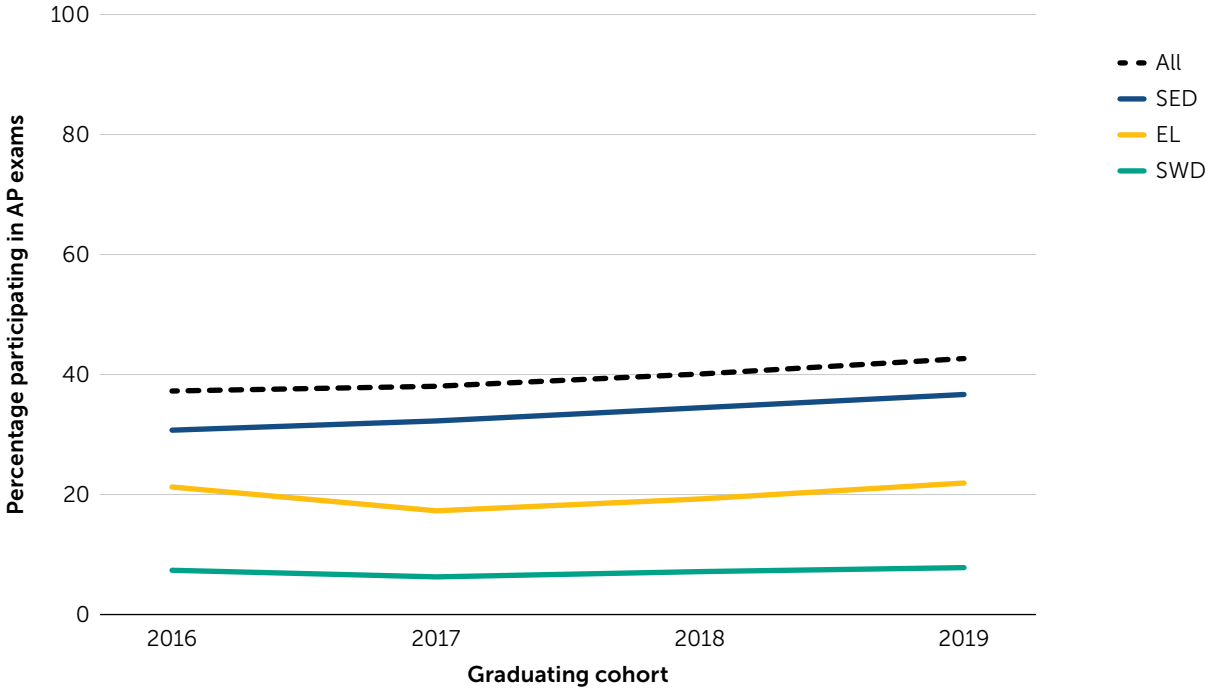
- **English learners (EL)** include students who were identified as English learners at the time of 11th-grade assessment.
- **Socioeconomically disadvantaged (SED)** students either qualify for the free or reduced-price school lunch program or do not have a parent who graduated from high school.
- **Students with disabilities (SWD)** include students who received services through an Individualized Education Plan (IEP) or identified with a disability during the normative 4 years of high school.

Figure A1. A–G Completion Rates by Key Student Subgroup, 2016–19 Cohorts



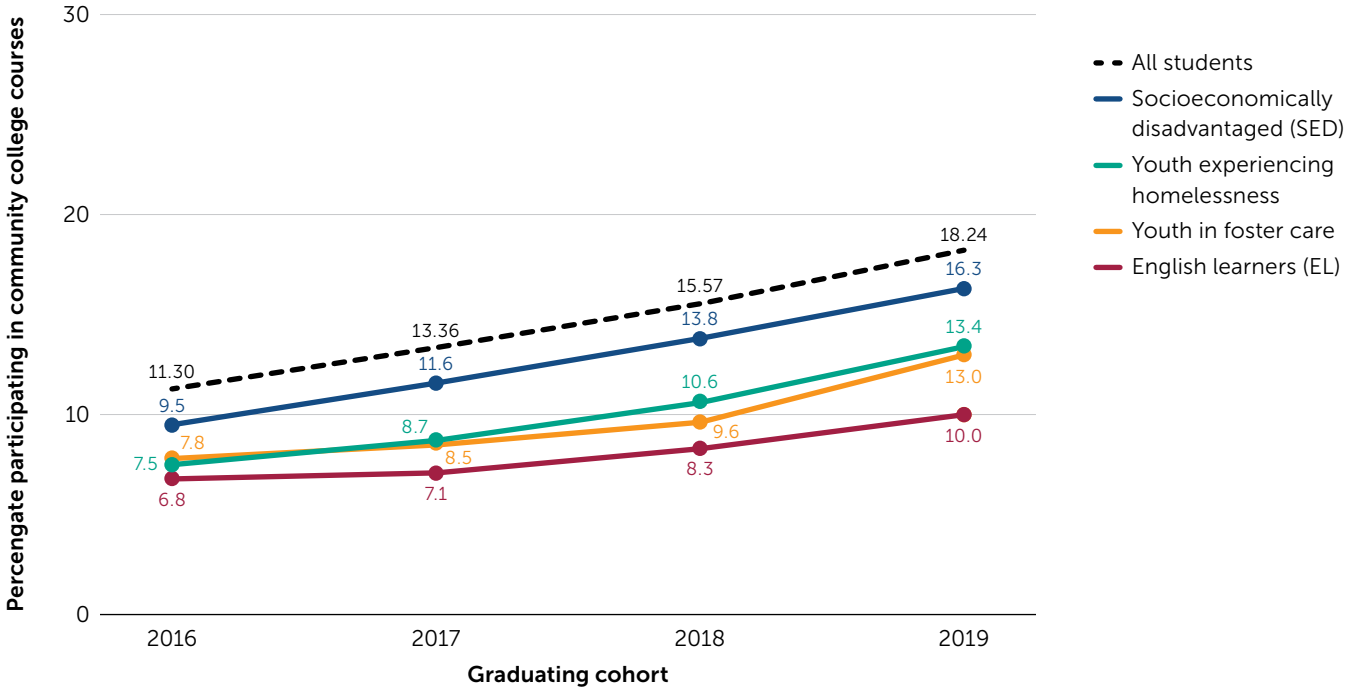
Note. SED = socioeconomically disadvantaged; EL = English learner; SWD = students with disabilities. A–G course completion rates and demographic subgroups were calculated from student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownership Codes other than 65, 66, or 67 and schools with fewer than 15 students in a graduating cohort.

Figure A2. AP Exam Participation Rates by Key Student Subgroup, 2016–19 Cohorts



Note. SED = socioeconomically disadvantaged; EL = English learner; SWD = students with disabilities. AP exam participation rates were calculated from student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownership Codes other than 65, 66, or 67 and schools with fewer than 15 students in a graduating cohort.

Figure A3. Dual Enrollment Participation Rates by Key Student Subgroup, 2016–19 Cohorts



Note. Adapted from a figure previously published in *A Rising Tide: Dual Enrollment Is Growing Among California High School Students* by Wheelhouse, California Education Lab, and Policy Analysis for California Education, 2020 (edpolicyinca.org/sites/default/files/2020-12/ig_wheelhousedec2020.pdf). Statistics were calculated by merging student-level College/Career Indicator (CCI) data from the California Department of Education and special admit data from the California Community Colleges Chancellor's Office. Years are limited to those for which CCI data were available.

Appendix B: Characteristics of Schools by A–G Completion Rates

	School-level A–G completion rate (percentage)					
	0	>0–20	>20–40	>40–60	>60–80	>80
Number of schools	174	133	319	449	268	155
Number of students	23,016	16,863	95,356	166,907	97,916	24,563
Average school size	332	303	415	480	520	315
Percentage of total schools	5.4	4.0	22.5	39.3	23.1	5.8
Percentage of schools in the category that are charter	87.9	65.4	9.7	7.3	25.0	72.9
Percentage of students in key subgroups						
English learners	16.1	11.6	19.1	13.9	8.6	8.6
Socioeconomically disadvantaged	76.0	72.5	82.0	69.4	45.9	52.9
Students with disabilities	10.5	12.4	12.2	11.1	9.3	8.9
Asian American	3.2	4.1	4.9	9.0	17.9	19.9
Black	8.8	7.0	6.0	5.0	4.4	5.0
Filipino	1.3	1.7	2.9	3.4	4.1	3.1
Latinx	56.0	45.0	64.6	56.2	35.7	42.5
Pacific Islander	0.4	0.6	0.5	0.5	0.4	0.3
White	20.8	34.5	18.1	22.5	32.2	23.8
Other	9.5	7.0	3.0	3.3	5.3	5.3

Note. A–G course completion rates were calculated from restricted-use student-level data in the College/Career Readiness Indicator data set provided by the California Department of Education. Analysis excludes students attending schools with School Ownerships Codes other than 65, 66, or 67 and schools with fewer than 15 students in a graduating cohort.

Policy Analysis for California Education (PACE)

Improving education policy and practice and advancing equity through evidence

PACE is an independent, non-partisan research center led by faculty directors at Stanford University, the University of Southern California, the University of California Davis, the University of California Los Angeles, and the University of California Berkeley. Founded in 1983, PACE bridges the gap between research, policy, and practice, working with scholars from California's leading universities and with state and local decision makers to achieve improvement in performance and more equitable outcomes at all levels of California's education system, from early childhood to postsecondary education and training. We do this through:

1. bringing evidence to bear on the most critical issues facing our state;
2. making research evidence accessible; and
3. leveraging partnership and collaboration to drive system improvement.

PACE
Policy Analysis for California Education

Stanford Graduate School of Education
520 Galvez Mall, Suite 444
Stanford, CA 94305

Inquiry: info@edpolicyinca.org
Media: press@edpolicyinca.org

Office: 650.576.8484

edpolicyinca.org

Follow us on social media: