

Falling Further Behind: Underlying Dynamics of Racial Disparities in Advanced Course Taking

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Racial disparities in advanced course taking have remained and even increased against the backdrop of the recent advanced placement (AP) and dual enrollment (DE) program expansion to an open access, yet few have examined the underlying dynamics. Using the College Board's SAT questionnaire data of the 2008 and 2014 public high school seniors, we show that advanced course taking became increasingly prevalent, yet Black students' course taking rates remained the lowest, and Hispanic students' progress was relatively limited. The three-way interaction models illustrate the underlying dynamics. Black students had persistently lower academic achievement; higher-achieving Black fell further behind, and mid-achieving Hispanic students had not kept up with their respective White counterpart in advanced course taking over time. Just as the effectively maintained inequality (EMI) theory predicts that advantaged groups would effectively seek qualitative advantages, White students not only had further strengthened their academic achievements, they had also increasingly grasped the opportunities to take advanced courses across achievement levels, which would enable them to distinguish themselves in the upcoming transition to college.

Keywords: racial disparity, advanced placement, dual enrollment, effectively maintained inequality, PSAT

Introduction

Nearly 70% high school completers go on to receive postsecondary education nowadays (Snyder, Brey, & Dillow, 2018), thus the attention has turned to access to selective institutions and on time college completion. And advanced course programs¹, such as advanced placement[®] (AP[®]) and dual credit/dual enrollment (DE) are considered as a useful tool to promote both access to selective institution and success in college completion. Admission rates to selective institutions have dropped dramatically (Avery & Levin, 2010). Advanced course taking, as a mark of distinction, can provide an admission advantage at selective institutions (Santoli, 2002; Duffett & Farkas, 2009; Duta & Iannelli, 2018). Meanwhile, less than 40% of college students graduate in four years, and over 30% of college freshmen require remediation (Snyder, Brey, & Dillow, 2018). Researchers and policy-makers have proposed advanced course programs as a viable strategy to improve both college readiness and college completion (U.S. Department of Education, 2006; Holstead, Spradlin, Mcgillivray, & Burroughs, 2010; Hofmann, 2012).

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¹ The International Baccalaureate (IB) Diploma program is another advanced course program. IB courses are taught at the high schools authorized by the IB, which is an international education foundation headquartered in Geneva, Switzerland. The IB program has a rather limited presence in the U.S., 1.3% public high school graduates earned IB credits in 2000 and the rate increased to 1.9% in 2009.

AP and DE programs offer high school students an opportunity to take college level courses in high school. The College Board provides course and exam descriptions for AP courses and administers AP exams, and individual high schools develop their own curriculum (AP Program Guide 2016-2017). DE or dual credit program allows high school students to take actual college courses. It is the second most popular college preparation program nationwide after AP (Cowan & Goldhaber, 2015), serving different student populations (Klopfenstein & Lively, 2012).

AP and DE programs were initially reserved for high-achieving students. Earlier studies show that Black and Hispanic students were substantially underrepresented in AP and DE classes (Klopfenstein, 2004a, 2004b; Museus, Lutovsky, & Colbeck, 2007), and their prior achievement was the single most important factor in explaining the disparities (Conger, Long, & Iatarola, 2009; Allen & Dadgar, 2012). Federal, state, and local government grants aiming at promoting equal access to AP program for underrepresented minority students and low-income students have fueled the great expansion of the AP program since the 1990s (Klopfenstein, 2004b; the College Board, 2014a).

The expansion efforts have gradually evolved to an open access with the expectations to further promote racial equity, and to improve college readiness and completion. It has been argued that earning college credits in high school can save college tuition costs and shorten the time to degree for students (Bailey, Hughes, & Karp, 2002; Hoffman, 2003; Rutschow & Schneider, 2011). Rigorous course work can motivate mid- and low- achieving students to learn (see review in Bailey et al., 2002) and actual college course experience can provide non-academic knowledge and skills (Karp, 2012). Consequently, the majority of public high schools have opened their AP courses to any students wanting to take them (Duffett & Farkas, 2009). One goal of DE programs is to provide access and support for students at risk of education failure (Hofmann, 2012).

Yet, racial disparities in AP and DE course taking remained (Snyder et al., 2018) even when program access became more open, and few have investigated the underlying dynamics. The effectively maintained inequality (EMI) theory (Lucas, 2001) argued that socio-economically advantaged parents are able to recognize pivotal decisions in curriculum tracking. It is likely that advantaged students would effectively seek qualitative advantages, such as AP and DE course taking that enables them to distinguish themselves in the upcoming transitions to college and to complete college faster. In this study, utilizing the SAT questionnaire data of the 2008 and 2014 high school senior cohorts, and applying a three-way interaction modeling technique, we show that White students had further strengthened their academic achievement and increasingly grasped advanced course taking opportunities across achievement levels. Thus, they had effectively maintained and even increased their relative advantages over Black and Hispanic students in advanced course taking.

Literature Review and Research Questions

Advanced Course Taking: Antecedents and Consequences

Significant racial disparities existed in AP and DE program participation, and prior achievement was the single most important reason. Several single state studies consistently reported Black-White and Hispanic-White disparities in AP course taking (Klopfenstein, 2004a, 2004b; Conger, Long, & Iatarola, 2009) and DE program participation (Museus et al., 2007; Allen & Dadgar, 2012). However, Conger et al. (2009) showed that the racial disparities in AP course taking were completely eliminated once pre-high school

academic achievement and family backgrounds were considered². Two studies by Klopfenstein (2004a; 2004b) showed that low-income and special education participation variables were the most important factors behind the minority AP participation gap. Lacking a control of prior achievement, these two variables likely acted as a proxy for prior achievement. Past academic achievements, along with participation fees and transportation to college, information about earning college credits were considered as the major obstacles for Black and Hispanic students and low-income students to participate in DE programs (Museus et al., 2007).

Meanwhile, AP and DE participation was associated with better college outcomes even when students' demographics and prior academic performance were considered. Substantial literature reveals positive association between AP or DE participation and college readiness and completion. AP participants, especially those who did well in AP exams and had better college access outcomes, were less likely to need remediation and better prepared for college work. They typically had better college graduation results, and many continued to pursue the subject areas of their AP exams (see Ewing, 2006 and Ewing, Huff, & Kaliski, 2010 for review). The association between AP participation and college outcomes held even when students' demographics and prior academic performance were accounted for (e.g., Chajewski, Mattern & Shaw, 2011; Murphy & Dodd, 2009; Long, Conger, & Iatarola, 2012; Patterson & Ewing, 2013). DE participants also had better college access and success outcomes (see review section in Museus et al., 2007). Recent studies took into consideration of observed and unobserved confounders, and further confirmed that DE participation decreased the likelihood for remediation, reduced the time to degree, and led to a higher persistent rate (Swanson, 2008; Speroni, 2010; Allen & Dadgar, 2012; Rodríguez, Hughes, & Belfield, 2012). Limited evidences also showed that low-income students benefited as much as or more than high-income students (Karp, Calcagno, Hughes, Jeong, & Bailey, 2007; An, 2013a, 2013b).

AP and DE Program Expansion: Equal Access to Open Access

Researchers and policy advocates initially called to better prepare students for advanced courses, and to expand the AP and DE opportunities to qualified underrepresented minorities and low-income students (Klopfenstein, 2004b; Museus et al., 2007). Facing the serious issues of college readiness and completion, and perhaps encouraged by the positive association between program participation and college outcomes, expansion efforts have gradually evolved to aim at removing access barriers for all students, and the prior academic requirements for taking the advanced courses have been relaxed. It was argued that rigorous course work could motivate mid- and low- achieving students to work harder and to be engaged in otherwise idle senior year (see review in Bailey et al., 2002). Actual college course experience afforded by DE programs could provide non-academic knowledge and skills necessary for college success (Karp, 2012).

The open access principle is embodied well in the current College Board's AP Equity Policy Statement: All students who are willing to accept the challenge of a rigorous academic curriculum should be considered for admission to AP courses. As such, the majority of public high schools have opened their AP courses to any students wanting to take those (Duffett & Farkas, 2009). And one goal of DE programs has been to provide access and support for students at risk of education failure (Hofmann, 2012). That is, AP and DE programs have expanded with the expectation to reduce the disparities in advanced course taking and to improve college readiness and completion as well.

² Attewell and Domina (2008) obtained the same finding examining racial disparities in curricular intensity with AP courses taken as a component.

Of course, academics have questioned the validity of such an expectation to improve college readiness and completion. They have warned that causal inference cannot be drawn from validity and correlation studies, and results on AP course taking alone were much weaker. In addition, there was some evidence that DE participation increases enrollment at two-year colleges at the expense of the decrease of enrollment at four-year colleges (Geiser & Santelices, 2004; Speroni, 2010; Cowan & Goldhaber, 2015).

Nevertheless, AP and DE programs have expanded dramatically. AP and DE course offerings became more common in public high schools from 2002 to 2010 based on two national reports using school level data. About 67% and 71% of public high schools offered AP and DE courses, respectively, in 2002, and the rates increased to 69% and 82%, respectively, in 2010, testifying a recent growth of the DE program. Furthermore, AP and DE program enrollment almost doubled (Waits, Setzer, & Lewis, 2005; Thomas, Marken, Gray, & Lewis, 2013). Based on high school transcript data, about 25% of the 2,000 public high school graduating senior cohort earned AP or DE course credits, and the rate increased to about 33% for the 2005 cohort and 40% for the 2009 cohort (Snyder et al., 2018).

Effectively Maintained Inequality and Changing Racial Disparities

Despite AP and DE program expansion toward an open access, racial disparities in advanced course taking remained in the early 2000's. Black students' course taking rates remained the lowest, and Hispanic students fell behind White students over time (Snyder et al., 2018). An analysis based on the Florida data in the early 2000's showed that racial disparities in advanced course taking actually increased despite the government efforts that targeted at minorities and low-income students (Conger et al., 2009). The authors speculated that the secular trends or spillovers of the efforts had spurred a faster growth among White and Asian students.

Although somewhat unexpected, these findings are entirely consistent with the effectively maintained inequality (EMI) theory. Scholars have debated whether background related competition would disappear when high school completion becomes universal. Based on high school and beyond data, Lucas (2001) found that, when high school completion became universal, social background still mattered for curricular tracking, or relevant qualitative dimensions of education, which had implications for students' chances in making later transitions. Summarizing earlier research, Lucas (2001) argued that socio-economically advantaged parents had not only resources, but also personal experiences to enable them to recognize pivotal decision points. Thus, they could guide their children to navigate through curricular structure ensuring successful transition to college. He further speculated that the simple extension of universal access was unlikely to undo powerful effects of social background, at least in the U.S. In light of the EMI theory, the racial disparities in advanced course taking may not decrease with open access. Socio-economically advantaged groups may further strengthen their academic achievements, and they may take more advanced courses and more demanding ones, such as STEM courses, to ensure their competitive edge over disadvantaged groups in the later transition to college and college completion.

Research Hypotheses

Racial disparities in AP and DE course taking have remained when grade point average (GPA) or other prior achievement requirements have been relaxed, yet few have examined underlying dynamics for the most recent high school graduating cohorts. Using the College Board's SAT questionnaire data of the 2008 and 2014 public high school graduating seniors, we test the following three research hypotheses: First, advanced course taking rates had increased for all racial groups, but racial disparities had persisted; Second, academic

achievements had been improved for all racial groups, but racial disparities had persisted or even increased; and Third, at a given achievement level, racial disparities in advanced course taking had persisted or even increased. The results may have important policy implications to ongoing battles against unequal college readiness and access to quality college education.

Data and Methods

Sample

We use the College Board SAT registration and questionnaire data for the 2008 and 2014 graduating seniors³. When students registered to take SAT, a college entrance exam usually taken around the beginning of high school senior year, they were asked to complete the SAT questionnaire, which included questions about demographics, academic achievement, etc. The questionnaire also included questions about the specific courses they had taken or planned to take in high school, and whether the courses were taken as honors, AP, or DE courses. Student data for this study also included students' PSAT and the most recent SAT scores. To this student data, we appended public high school characteristics data obtained from the National Center for Educational Statistics.

The working samples include public school students who completed the SAT questionnaire during the last three years of high school⁴, for whom public school characteristics are available. For both cohorts, the working sample includes around 100,000 randomly drawn public school students while maintaining advanced course taking proportions¹⁵.

Outcome Measure

In this study, the outcome of interest is students' advanced course taking. The SAT questionnaire listed a total of 47 courses (including "other mathematics", "other science", "other social science or history", and "other language" courses, intended to capture any other courses not on the list). For each course, students were asked to indicate whether he/she took it as an honor course. For a subset of 37 courses, students were also asked to indicate whether he/she took it as a DE courses. And for a subset of 25 courses, students were again asked to indicate whether he/she took it as an AP courses. Therefore, the course-taking data clearly report whether a student took a specific course, such as Calculus, and at which levels. Based on students' responses to the course taking questions, we classify students into the following three mutually exclusive groups:

1. None—took no advanced courses (i.e., no honors, AP or DE courses);
2. Honors only—took at least one honor courses but no AP or DE courses;
3. AP or DE—took at least one AP or DE courses (may also took honors courses).

³ The 2008 high school senior cohort was the first of few cohorts who were asked about specific course taking choice and response data are of high quality. The 2014 high school senior cohort was the last cohort before new SAT was implemented.

⁴ Although students mostly take AP and DE courses during the last two years of high school, the proportion of advanced course taking among those completing the questionnaire in sophomore and junior years were rather similar as the questionnaire asks about the courses students have taken or plan to take. Therefore, we decide to include students completing the questionnaire in sophomore, junior, and senior years.

⁵ The 2008 SAT data was obtained when the lead author worked at the College Board. The 2014 SAT data were obtained after the lead author left the College Board, and the College Board was only willing to provide a subsample of 100,000 SAT takers. However, working with the lead author, the data department provides a 2014 subsample that was randomly drawn while maintaining the advanced course taking proportions. Considering the comments to an earlier draft of this manuscript, we decide to use a similarly drawn subsample of 100,000 SAT takers for 2008 cohort as well. As expected, the descriptive analyses results based on the full working sample of 2008 cohort are almost identical to those reported in this paper.

In fact, all students taking at least one AP or DE course have taken honor courses.

Data Analysis Strategies

We first report changing racial differences in advanced course taking for 2008 and 2014 high school senior cohorts to compare against the existing findings based on the earlier cohorts, we then report racial differences in academic achievement and advanced course taking across achievement levels for these two cohorts. High school GPA is used as a measure of academic achievement, and we also check the sensitivity of the results using sophomore year PSAT scores as a measure of academic achievement. As we will show later, the main findings are rather consistent regardless which measure we use, yet the results from the models using sophomore PAST scores provide further insights as whom to target to further promote college success and racial equity.

To test the statistical significance of these changing racial disparities, we employ multinomial logistic regressions to model students' advanced course taking behaviors. We combine the 2008 and 2014 cohort data⁶ and utilize a three-way interaction model technique to investigate how changing racial disparities in advanced course taking can be explained by changing racial differences in academic achievement and in course taking rates across achievement levels over time. Formally,

$$P_{ij} = \frac{e^{\beta Z}}{\sum_j e^{\beta Z}} \quad (1)$$

Where P_{ij} is the probability of individual student i choosing advanced course taking outcome j out of J possible outcomes. In this study, three possible outcomes ($J = 3$) are “no advanced courses”, “only honor courses”, and “AP or DE courses”. Z is a vector of race/ethnicity, academic achievement, and cohort variables, two-way interactions between race/ethnicity and cohort, academic achievement, and race/ethnicity, academic achievement and cohort, and three-way interaction of race/ethnicity, academic achievement, and cohort.

Maximum likelihood estimation of coefficient β can be transformed to the relative-risk ratio (RRR), which provides the marginal effect of individual characteristics on the probability of choosing “only honor courses”, or “AP or DE” (AP/DE hereafter) over the reference category “no advanced courses”.

A baseline model includes only race/ethnicity and cohort variables, and interaction between race/ethnicity and cohort variables. This baseline model allows us to quantify the following three factors: racial differences in advanced course taking, the change in advanced course taking, and the change of racial differences in advanced course taking over the past decade. Subsequently, the baseline model is expanded by including variables that represent students' academic achievements, two-way interactions between academic achievement and race/ethnicity, academic achievement and cohort, and three-way interaction of race/ethnicity, academic achievement and cohort. These models allow us to investigate how changing racial differences in academic achievement and course taking rates across achievement levels may explain changing racial differences in advanced course taking.

Considering multiple interaction terms in the models, in order to ease the burden of presenting results, we run three sets of models separately to contrast Black and White students, Hispanic and White students, and Asian and White students.

⁶ Because working sample of SAT data for the 2014 cohort include only a random subsample of all SAT takers, to keep the balanced cohort size in combined data, we also drew a random subsample of all SAT takers of the 2008 cohort preserving advanced course taking proportions.

Data Limitations

An important limitation of SAT questionnaire data is that course taking was self-reported. Students might misreport their course taking, and about half of SAT takers of the 2008 and 2014 cohorts completed the SAT questionnaire in junior year, and they might not actually take advanced courses as planned. However, this limitation seems not consequential for this study. Student may misreport a specific course taking, yet the reporting errors were very minimum as whether they had taken or planned to take any AP or DE courses. Advanced course taking results for the 2008 cohort reported in the next section are very close to those for the 2009 cohort reported by Snyder et al. (2018) using transcript data.

Note that AP and DE program expansion had gradually evolved to an open access in the recent years, although no specific time point signified the beginning of the open access era, schools had embraced the open access principle by 2008 (Duffett & Farkas, 2009). A future study may replicate the analyses for different cohorts using national datasets, Education Longitudinal Study of 2002 (ELS: 2002) and High School Longitudinal Study of 2009 (HSL: 2009) can be good options.

There is another limitation of using data based on SAT takers. In a number of states, many high school graduates took the American College Testing (ACT, the other college entrance exam) instead of the SAT. Empirically, the students in ACT-dominant states who took the SAT tended to have higher academic profiles, with higher scores on the SAT (Clark, Rothstein, & Schanzenbach, 2009; Niu, 2015). Yet, the states with the largest Hispanic and Asian populations are also SAT-dominant states; this data limitation may not have significant implications when we investigate racial disparities. We also re-estimate the full model including only students from 24 states and Washington DC with high SAT participation rates (i.e., states where at least 40% of high school graduating seniors took the SAT⁷). The RRR estimates are almost identical to those reported⁸. Nevertheless, there might be concerns as to whether the patterns in changing racial differences are similar in states where most students take the ACT.

Descriptive Analyses

Advanced course taking became increasingly prevalent yet racial disparities increased. Descriptive analyses allow us to portray the changing racial disparities in advanced course taking when AP and DE programs have been expanded to a broader range of students, therefore test the first research hypothesis. Comparing advanced course taking between the 2008 and 2014 public high school senior cohorts, we find that, consistent with the trend established by existing studies (Waits et al., 2005; Thomas et al., 2013; Snyder et al., 2018), advanced course taking became increasingly prevalent. Overall, approximately half the 2008 public high school seniors took at least one advanced course (honor, AP or DE courses), and the proportion increased to about 56% for 2014 senior cohort. Meanwhile, taking AP/DE in addition to honor courses increasingly became the mode of advanced course taking and the proportion of students only taking honor courses had slid (the left panel, see Table 1).

However, racial disparities in advanced course taking had persisted and even increased. All racial groups had made considerable progress in advanced course taking, yet Black students' course taking rates remained the lowest, and Hispanic students' progress was relatively limited. For example, AP/DE course taking rates increased from 43% to 51% for White students, from 27% to 32% for Black students, and from 41% to 44% for

⁷ The College Board (2009).

⁸ Results are available upon request.

Hispanic students. In addition, consistent with results on single states (Conger et al., 2009), Asian students took a leading position in advanced course taking.

Table 1

Advanced Course Taking, Race/Ethnicity Differences (Random Subsample of 100K Maintaining Advanced Course Taking Proportions)

AP, DE, or honor courses	Advanced courses				AP or DE courses			
	None	Honor only	AP or DE	Total	AP, no DE	DE, no AP	AP or DE	Total
2008								
White (<i>N</i> = 56,678)	46.0%	11.0%	43.0%	100.0%	34.3%	2.4%	6.4%	43.0%
Black (<i>N</i> = 13,059)	61.0%	11.9%	27.2%	100.0%	22.4%	1.6%	3.2%	27.2%
Hispanic (<i>N</i> = 13,906)	50.3%	8.6%	41.1%	100.0%	33.5%	1.6%	6.0%	41.1%
Asian (<i>N</i> = 8,483)	38.0%	7.8%	54.2%	100.0%	45.3%	1.1%	7.8%	54.2%
Total (<i>N</i> = 100,081)	49.1%	10.2%	40.7%	100.0%	32.9%	2.0%	5.8%	40.7%
2014								
White (<i>N</i> = 50,615)	40.1%	9.1%	50.7%	100.0%	38.2%	3.2%	9.4%	50.7%
Black (<i>N</i> = 14,056)	56.5%	11.3%	32.3%	100.0%	25.2%	2.1%	4.9%	32.3%
Hispanic (<i>N</i> = 19,746)	48.8%	7.5%	43.8%	100.0%	34.3%	2.0%	7.5%	43.8%
Asian (<i>N</i> = 10,145)	32.4%	6.5%	61.1%	100.0%	51.1%	1.4%	8.5%	61.1%
Total (<i>N</i> = 99,979)	44.1%	8.8%	47.1%	100.0%	36.4%	2.6%	8.1%	47.1%

Note. Students with missing values for race/ethnicity variables are not reported in the table.

Source: 2008, 2014 SAT Questionnaire data, the College Board.

It is worth noting that, although AP had been the dominating choice in advanced courses, recent expansion of DE program is hard to dismiss. With strong voices in support of DE program expansion (Hoffman, 2003, 2012; Museus et al., 2007), the proportion of students taking both AP and DE courses increased from 6% for the 2008 cohort to 9% for the 2014 cohort. White students in particular, and Black students to some extent, seemed to gain from the opportunities rendered by DE program expansion (the right panel, see Table 1).

Racial disparities increased in academic achievement and advanced course taking rates across achievement levels. To test the second and third research hypotheses, we graph academic achievement and the advanced course taking rates across achievement levels for all racial groups of the 2008 and 2014 cohorts. These descriptive analyses show that, in the most recent years, White students had kept their relative advantageous positions—they had not only further strengthened their academic achievement, but also increasingly grasped the opportunities to take advanced courses across achievement levels.

Although all racial groups raised their academic achievement levels, White and Asian students had maintained and even strengthened their competitive edges. Figure 1 shows that, the proportion of straight-A (GPA A+/A) students increased from 25% for the 2008 cohort to 30% for the 2014 cohort for White students, from 27% to 33% for Asian students, yet stayed low and rather flat for Black students (11% to 13%) and for Hispanic students (16% to 17%). It is arguable whether fairly large increases in proportion of the straight-A students among White and Asian students reflect the grade inflation phenomenon, yet strong grades nevertheless facilitated access to advanced courses even when requirements were relaxed.

Changing racial disparities in sophomore PSAT scores are even more telling (see Figure 2). As PSAT taking became more common from 2008 to 2014, the proportions of White and Asian students scoring top quartile increased significantly, yet Black and Hispanic students mainly gained at the third quartile.

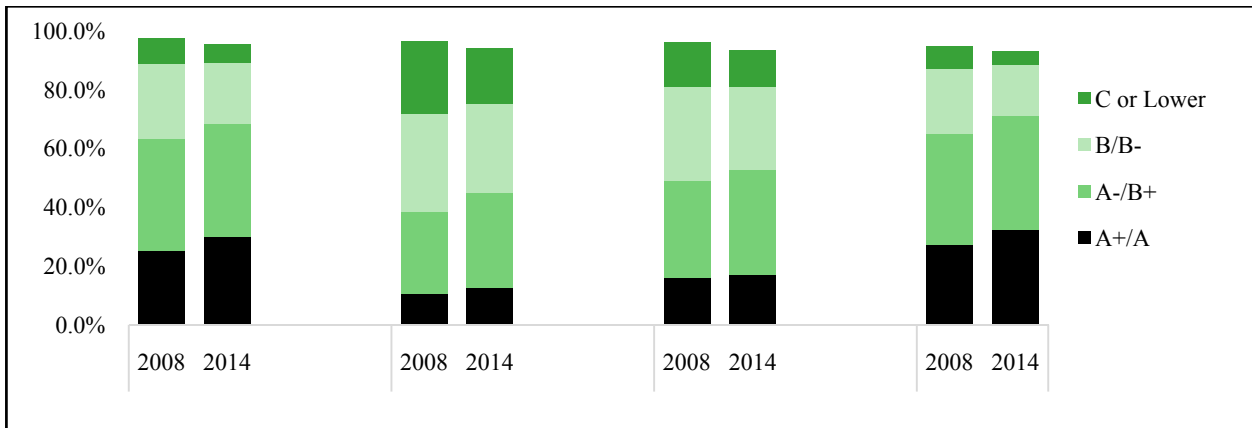


Figure 1. GPA by race/ethnicity, 2008 and 2014 senior cohorts.
 Source: 2008, 2014 SAT Questionnaire data, the College Board.
 Note. Percentages do not sum up to 100% due to missing data.

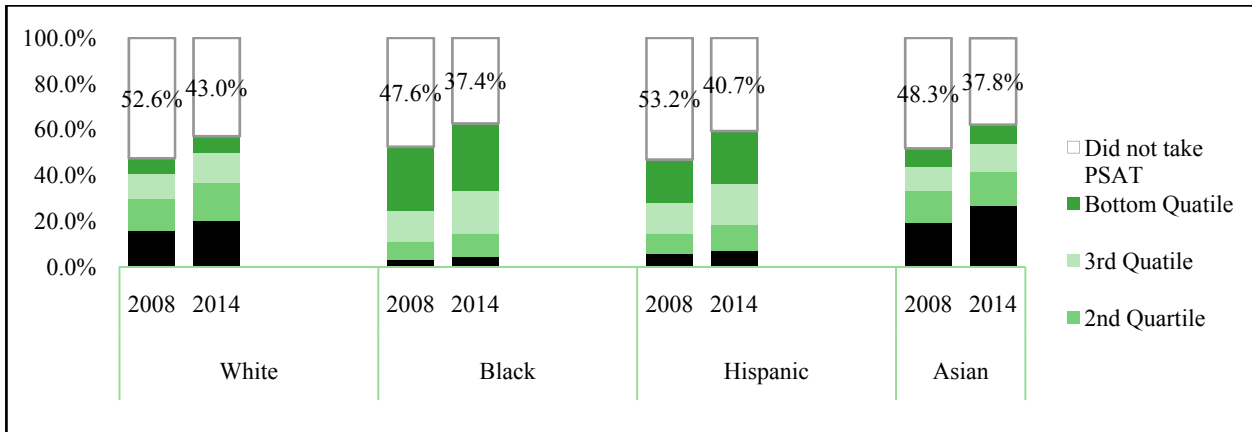


Figure 2. Sophomore PSAT quartile distribution by race/ethnicity, 2008 and 2014 senior cohorts.
 Source: 2008, 2014 SAT Questionnaire data, the College Board.

More importantly, across achievement levels, all racial groups had increased their advanced course taking rates, yet mid-achieving Hispanic students had fallen behind. Specifically, mid-high (A-/B+) and mid-achieving (B/B-) students were the main driving force for the increased AP/DE course taking—by achievement distribution, about 60% students fell into these two categories (see Figure 1), and by in large, AP/DE course taking rates increased the most for students in these two categories for all racial groups (see Figures 3-6)⁹. However, the increases in course taking rates were limited for such Hispanic students—from 50% to 51% for A-/B+ students and from 32% to 34% for B/B- students. These limited increases are particularly pale in comparison with the progress that other racial groups had made—from 47% to 53% and from 24% to 31% for White students of A-/B+ level, for example. Note that even though advanced course taking rates of straight-A students were already quite high at 60-70% for the 2008 cohort, and these rates were further pushed up for the 2014 cohort, White students gained the most.

When using PSAT score as an alternative measure of academic achievement, we confirm that mid-achieving Hispanic students had fallen behind in advanced course taking. White, Black, and Asian students

⁹ A notable exception is low-achieving (GPA C or lower) Asians, whose AP or DE course taking increased dramatically. However, the proportions of low-performing Asians were very low in both cohorts.

across PSAT ranges had maintained or increased their AP/DE course taking. Meanwhile, among PSAT takers and non-takers, White students were particularly noteworthy in their progress in AP/DE course taking rates. However, Hispanic students across PSAT ranges decreased their course taking over time (see Figures 7-11).

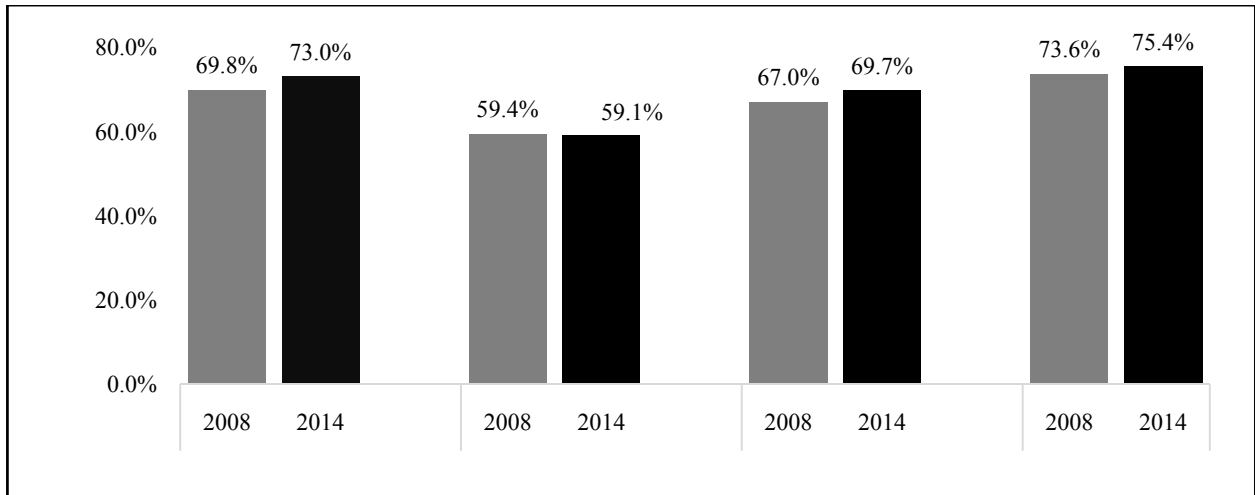


Figure 3. AP or DE course taking rates, A+/A students, 2008 and 2014 senior cohorts.
Source: 2008, 2014 SAT questionnaire data, the College Board.

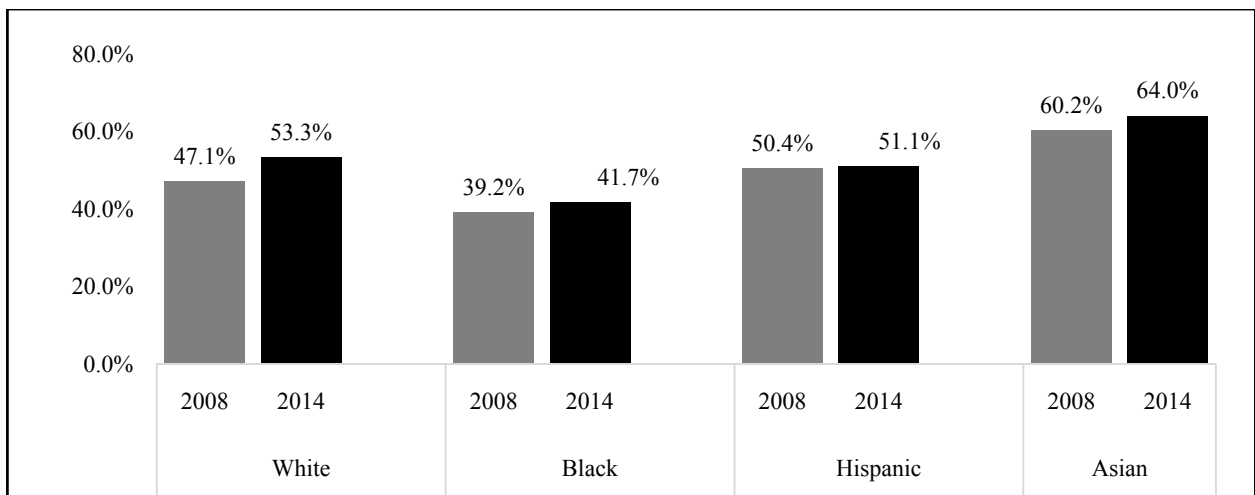


Figure 4. AP or DE course taking rates, A-/B+ students, 2008 and 2014 senior cohorts.
Source: 2008, 2014 SAT Questionnaire data, the College Board.

Nevertheless, half of the 2008 cohort did not take sophomore PSAT and about 40% of the 2014 cohort did not take sophomore PSAT, and AP/DE course taking rates among those non-PSAT takers were rather low. Therefore, in multivariate analyses, we also run the extended models using PSAT to quantify how much non-PSAT takers lag in advanced course taking. A comparison analysis of PSAT and non-PSAT takers in their individual and school characteristics illustrates that higher achieving students who did not take PSAT should be purposely targeted to further promote advanced course taking and to promote racial equity.

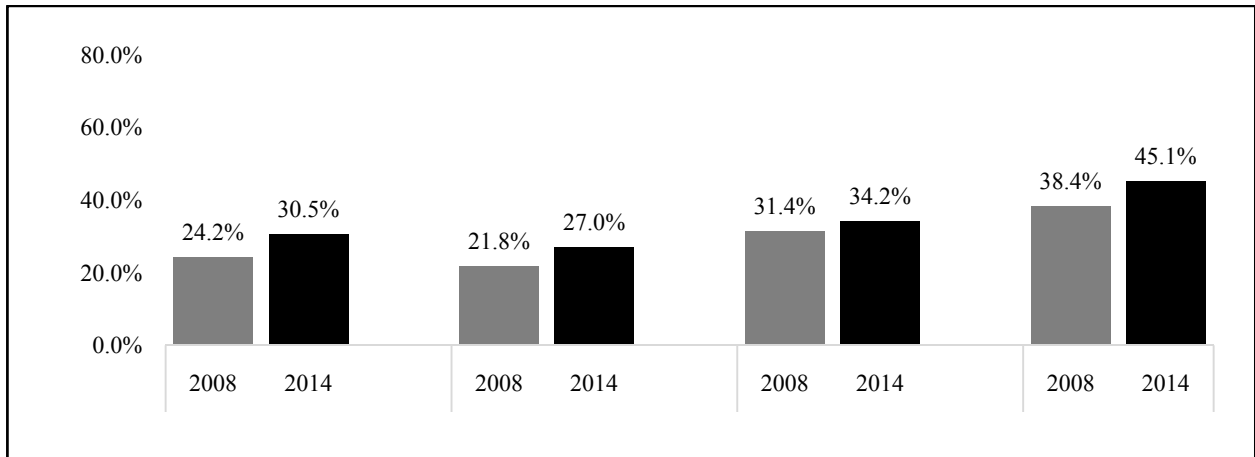


Figure 5. AP or DE course taking rates, B/B- students, 2008 and 2014 senior cohorts.
Source: 2008, 2014 Questionnaire data, the College Board.

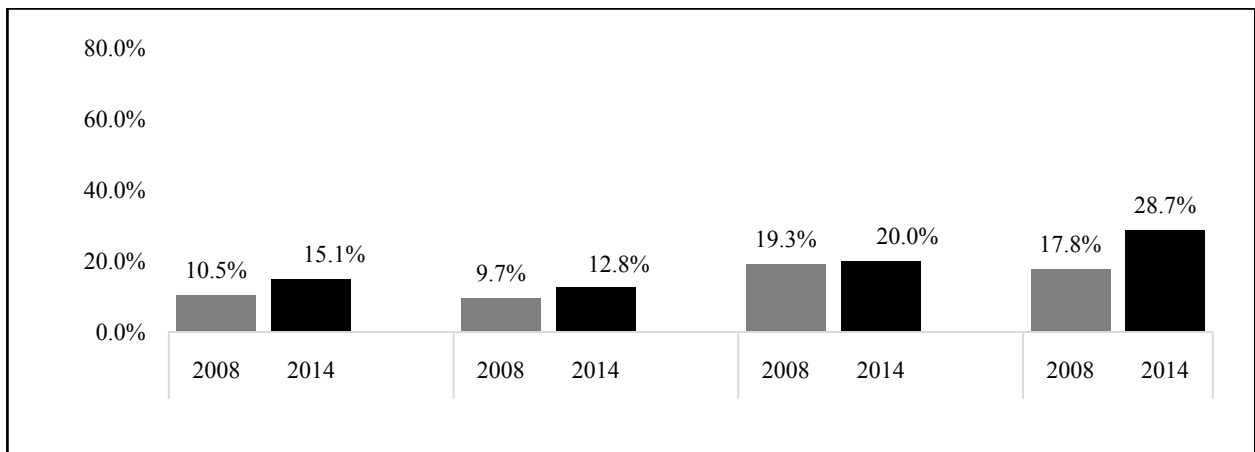


Figure 6. AP or DE course taking rates, C/lower students, 2008 and 2014 senior cohorts.
Source: 2008, 2014 Questionnaire data, the College Board.

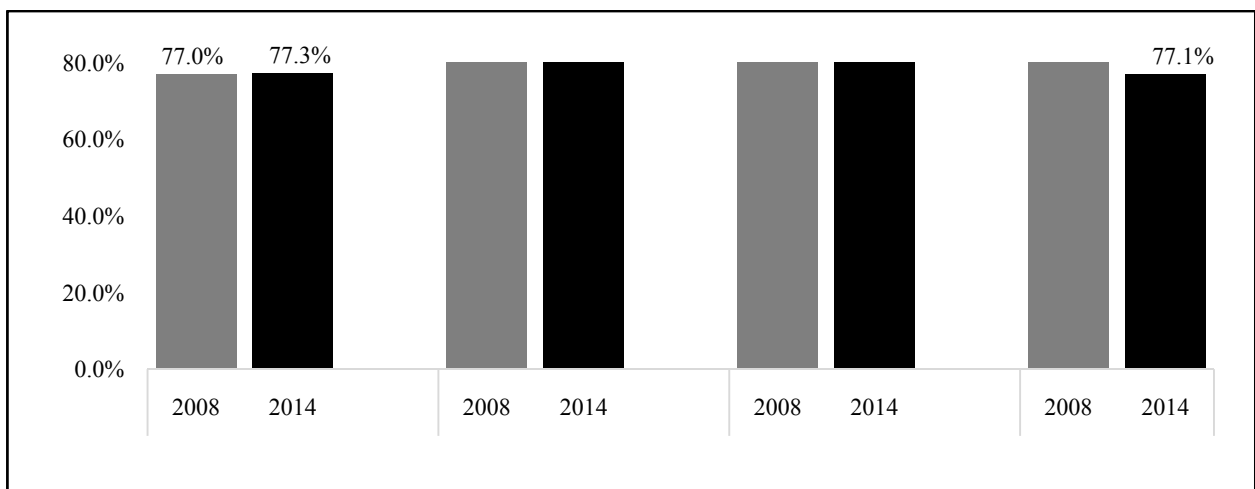


Figure 7. AP or DE course taking rates, PSAT top quartile students, 2008 and 2014 senior cohorts.
Source: 2008, 2014 SAT Questionnaire data, the College Board.

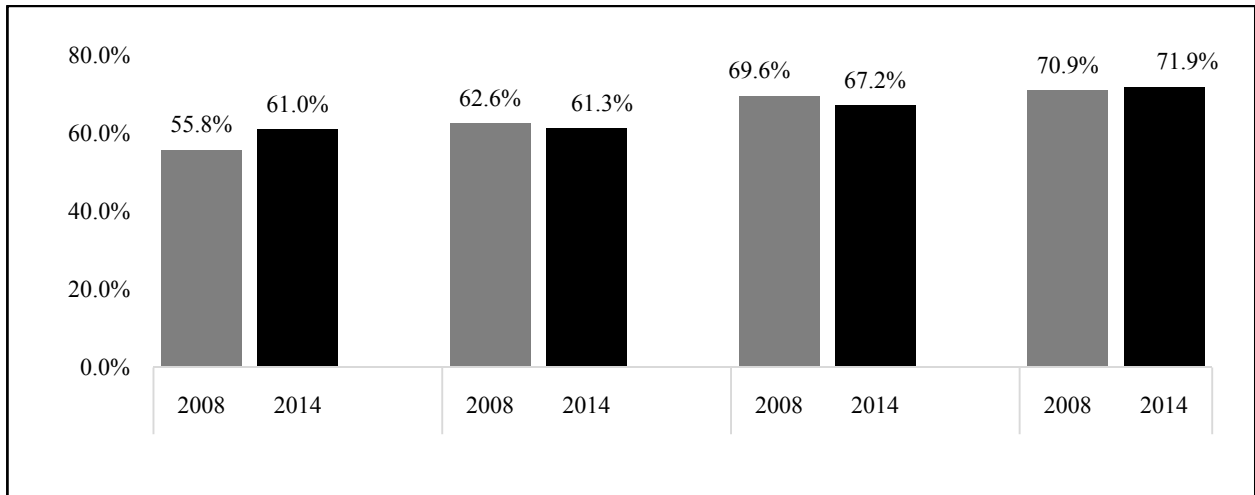


Figure 8. AP or DE course taking rates, PSAT 2nd quartile students, 2008 and 2014 senior cohorts.
 Source: 2008, 2014 SAT Questionnaire data, the College Board.

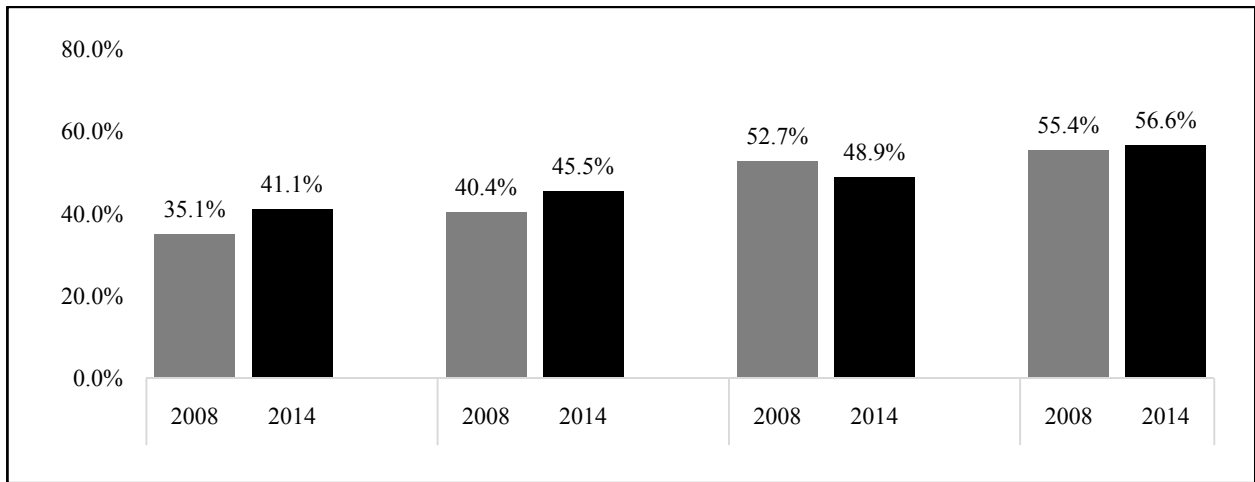


Figure 9. AP or DE course taking rates, PSAT 3rd quartile students, 2008 and 2014 senior cohorts.
 Source: 2008, 2014 SAT Questionnaire data, the College Board.

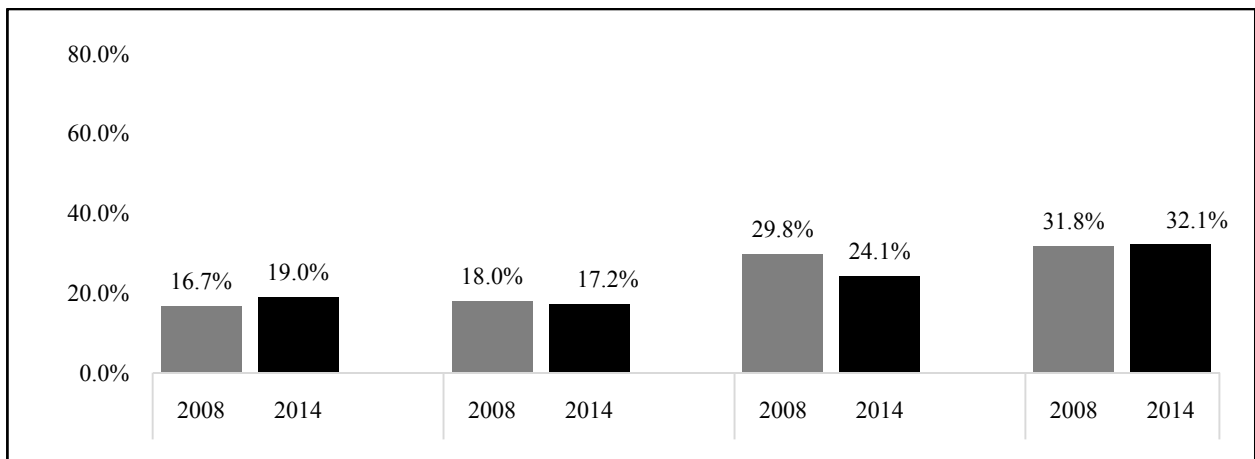


Figure 10. AP or DE course taking rates, PSAT bottom quartile students, 2008 and 2014 senior cohorts.
 Source: 2008, 2014 SAT Questionnaire data, the College Board.

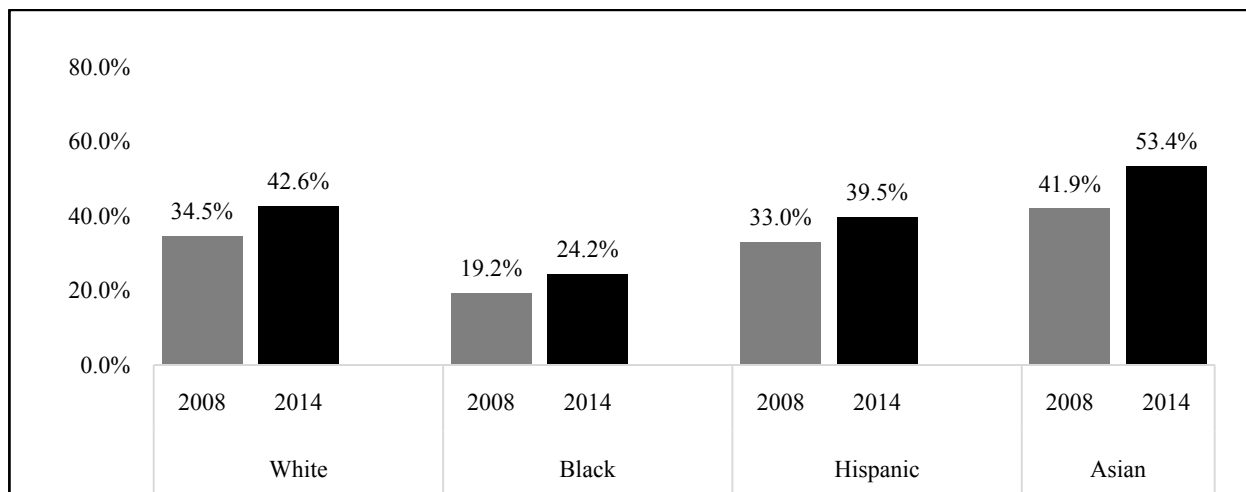


Figure 11. AP or DE course taking rates, students who did not take PSAT, 2008 and 2014 senior cohorts.

Source: 2008, 2014 SAT Questionnaire data, the College Board.

Multivariate Analyses

To confirm the statistical significance of these changing racial disparities and to investigate the significance of underlying dynamics of racial disparities in advanced course taking, we now turn to the multivariate modeling.

Low academic achievement explained Black-White disparities in advanced course taking. Black students had remained severely lagged behind in AP/DE course taking compared to White students, and Black students' persistently low academic achievement appeared to be the main reason. Specifically, relative to the White counterparts, Black students of the 2008 cohort were only 48% as likely to take AP or DE courses as to take no advanced courses. Both White and Black students of the 2014 cohort increased their AP/DE course taking, yet Black students lagged slightly behind White students in their rate of increase. White students of the 2014 cohort were 35% more likely to take AP/DE courses compared with their counterparts of the 2008 cohort, and Black students of the 2014 cohort were 28% more likely (roughly equal to 1.35×0.95) to take AP/DE courses compared with their counterparts of the 2008 cohort. Consequently, relative to the White counterparts, Black students of the 2014 cohort were 45% (roughly equal to 0.48×0.95) as likely to take AP/DE courses as to take no advanced courses (Model 1, see Table 2). That is, despite the open access efforts in AP and DE program expansion in recent years, not only did Black students remain severely lagged behind White students in AP/DE course taking, but it also seemed that they had fallen slightly further behind.

When academic achievement is accounted for, the Black-White course taking differences shrink greatly—relative to White counterparts with similar academic achievement, Black students of the 2008 cohort were 75% as likely to take AP/DE courses as to take no advanced courses (Model 2, see Table 2). However, racial disparities in AP/DE course taking rates were much more pronounced among straight-A students than among mid- and low- achieving students. Relative to their White counterparts, straight-A Black students were only 59% as likely to take AP/DE courses as to take no advanced courses (Model 3, see Table 2). The ratio was 89% for mid-achievers (roughly equal to 0.59×1.51). These changes in RRR estimates for Black students indicate that Black students' persistently low academic achievement could be the main reason why they severely lagged behind in advanced course taking, and relatively higher course taking rates among mid- and low- achieving Blacks helped raise their overall course taking rates.

Table 2

*Relative Risk Ratios, Advanced Course Taking, Blacks Versers Whites (N = 134,408)
2008, 2014 Public School Graduating Seniors*

Reference category: None Results for "Honor only" not reported	AP or DE course taking							
	Model 1		Model 2		Model 3		Model 4	
Race/ethnicity (Ref.: White, 2008 cohort)								
Black	0.48	***	0.75	***	0.59	***	0.63	**
2014 cohort	1.35	***	1.26	***	1.26	***	1.10	***
Black*2014	0.95	†	0.93	*	0.95	†	0.85	*
Academic achievement								
GPA (Ref.: A+/A)								
A-&B+			0.39	***	0.38	***	0.36	***
B&B-			0.14	***	0.13	***	0.12	***
C/below			0.05	***	0.05	***	0.04	***
(A-/B+)*Black					1.19	***	1.15	***
(B/B-)*Black					1.51	***	1.40	***
(C/below)*Black					1.55	***	1.45	***
(A-/B+)*2014							1.13	***
(B/B-)*2014							1.26	***
(C/below)*2014							1.39	***
(A-/B+)*Black*2014							1.04	
(B/B-)*Black*2014							1.12	
(C/below)*Black*2014							1.07	

Note. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; † $p < 0.10$.

Source: 2008, 2014 SAT Questionnaire data, the College Board.

Random subsample of 100K maintaining advanced course taking proportions.

For both Black and White students, improved academic achievement and increased course taking rates among mid- and low- achieving students contributed to higher course taking rates over time. When academic achievement variables are added to the baseline model, the RRR estimate for the 2014 cohort variable shrinks from 1.35 to 1.26. When the two-way interactions between academic achievement and cohort, and the three-way interactions of academic achievement, race, and cohort are further included, the RRR estimate for the 2014 cohort variable further shrinks to 1.10, and the RRR estimates of two-way interactions between academic achievement and cohort are significant and rather large for (B/B-)*2014 and (C/below)*2014 items (Model 4, see Table 2). Taken together, these results confirm that the 2014 cohort not only improved their academic achievement, but also increased their course taking rates particularly among mid- and low- achieving students. These results testify the open access efforts of AP and DE program expansion. Yet ironically, high-achieving Blacks had fallen further behind their White counterparts, indicated by the RRR estimate for Black*2014 item in the full model. Although not significant, the RRR estimates for three-way interactions seem to indicate that mid-achieving Black students improved more in advanced course taking than high-achieving Blacks.

Mid-achieving Hispanics had not kept up in advanced course taking. Although Hispanic students, at least those taking SAT, did not lag behind White as severely as Black students did, they had fallen much further in AP/DE course taking. A main reason was that mid-achieving Hispanic students had not kept up over time. Specifically, relative to the White counterparts, Hispanic students of the 2008 cohort were 87% as likely to take

AP/DE courses as to take no advanced courses, but over time their increase in AP/DE course taking was only 81% of how much White students had increased (Model 1, see Table 3). Consequently, relative to White counterparts, Hispanic students of the 2014 cohort were 71% (roughly equal to 0.87×0.81) as likely to take AP/DE courses as to take no advanced courses. The RRR estimates of three-way interactions reveal that mid-high, mid-, and low- achieving Hispanic had not kept up with their White counterparts in advanced course taking, but straight-A Hispanic students had (Model 4, see Table 3). Nevertheless, Hispanic-White disparities were again more pronounced among straight-A students than among mid- and low- achieving students.

Table 3

*Relative Risk Ratios, Advanced Course Taking, Hispanics Verses Whites (N = 140,945)
2008, 2014 Public School Graduating Seniors*

Reference category: None Results for “Honor only” not reported	AP or DE course taking							
	Model 1		Model 2		Model 3		Model 4	
Race/ethnicity (Ref.: White, 2008 cohort)								
Hispanic	0.87	***	1.16	***	0.85	***	0.79	***
2014 cohort	1.35	***	1.26	***	1.26	***	1.10	***
Hispanic*2014	0.81	***	0.83	***	0.85	***	0.99	
Academic achievement								
GPA (Ref.: A+/A)								
A-/B+			0.39	***	0.38	***	0.36	***
B/B-			0.14	***	0.13	***	0.12	***
C/below			0.06	***	0.05	***	0.04	***
(A-/B+)*Hispanic					1.20	***	1.36	***
(B/B-)*Hispanic					1.61	***	1.77	***
(C/below)*Hispanic					2.15	***	2.58	***
(A-/B+)*2014							1.13	***
(B/B-)*2014							1.26	***
(C/below)*2014							1.39	***
(A-/B+)*Hispanic*2014							0.81	**
(B/B-)*Hispanic*2014							0.82	*
(C/below)*Hispanic*2014							0.69	**

Note. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; † $p < 0.10$.

Source: 2008, 2014 SAT Questionnaire data, the College Board.

Random subsample of 100K maintaining advanced course taking proportions.

High-achieving white students were catching up with Asian in advanced course taking. Although Asian students had kept their leading position in AP/DE course taking, high-achieving White students were catching up. Specifically, relative to the White counterparts, Asian students of the 2008 cohort were 52% more likely to take AP/DE courses as to take no advanced courses (Model 1, see Table 4). Over time, Asian students increased AP/DE course taking at about the same pace as White students, yet high-achieving Asians’ rate of increase was only 86% of that of their White counterpart (Model 4, see Table 4).

Descriptive analyses provide some clues to understand how White students had been catching up. White students were better to grasp advanced course taking opportunity rendered by the DE program expansion (see Table 1). School location is a contributing factor—A higher proportion of White students were from town and rural schools. These schools were more likely to offer DE courses than urban and suburban schools, and DE

programs expanded more than AP program in terms of course offering high schools, particularly among town and rural high schools in most recent years (Waits et al., 2005; Thomas et al., 2013). Asians' strong preference for AP courses is another cause. Asians had much higher application rates to selective institutions, and taking AP courses had been traditionally touted as an admission advantage at selective institutions (Santoli, 2002).

Table 4

*Relative Risk Ratios, Advanced Course Taking, Asians Versus Whites (N = 125,921)
2008, 2014 Public School Graduating Seniors*

Reference category: None Results for "Honor only" not reported	AP or DE course taking							
	Model 1		Model 2		Model 3		Model 4	
Race/ethnicity (Ref.: White, 2008 cohort)								
Asian	1.52	***	1.58	***	1.08	†	1.16	**
2014 cohort	1.35	***	1.26	***	1.26	***	1.10	***
Asian*2014	0.98		0.95		0.97		0.86	*
Academic achievement								
GPA (Ref.: A+/A)								
A-/B+			0.40	***	0.38	***	0.36	***
B/B-			0.14	***	0.13	***	0.12	***
C/below			0.05	***	0.05	***	0.04	***
(A-/B+)*Asian					1.47	***	1.38	***
(B/B-)*Asian					1.79	***	1.64	***
(C/below)*Asian					1.96	***	1.61	***
(A-/B+)*2014							1.13	***
(B/B-)*2014							1.26	***
(C/below)*2014							1.39	***
(A-/B+)*Asian*2014							1.10	
(B/B-)*Asian*2014							1.12	
(C/below)*Asian*2014							1.43	*

Note. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; † $p < 0.10$.

Source: 2008, 2014 SAT Questionnaire data, the College Board.

Random subsample of 100 K maintaining advanced course taking proportions.

The estimates of an auxiliary model further confirm that White students were catching up in terms of taking advantage of DE program expansion. We run the baseline model separating AP/DE course taking into three different categories: "AP, no DE", "DE, no AP", and "AP & DE", the same classification reported in Table 1. The RRR estimates of Asian and the 2014 cohort interaction terms indicate that Asians had maintained their advantages in "AP, no DE" course taking over time. Yet, they had lost ground in "AP & DE" course taking—their rate of increase in "AP & DE" course taking were only 76% of how much White students had increased. And they lagged behind in "DE, no AP" course taking—they were only 54% as likely as White students to only take DE in 2008, and they did not catch up over time.

AP/DE courses became a new imperative in advanced course taking. To be parsimonious, RRR estimates on "honors only" outcome are not reported in Tables 2, 3, and 4¹⁰, yet two findings are noteworthy. First, in contrast to the increased AP/DE course taking over time, students became less likely to take "honors only".

¹⁰ Results are available upon request.

Second, although racial disparities were present in taking “honors only”, the differences were much smaller, and Black and Hispanic students were not falling behind over time. Apparently, as AP and DE programs have expanded, the competitive ground in advanced course taking has shifted. Taking AP/DE courses in addition to honors has become a new imperative and a new qualitative dimension of high school education.

AP and DE Program Expansion: Whom to Target?

In the previous sections, two findings call for attention against AP and DE program expansions toward open access. First, racial disparities in AP/DE course taking rates were much more pronounced among straight-A students than among mid- and low- achievers for both cohorts. Second, relative to straight-A counterparts, mid- and low- achieving students particularly increased their course taking rates over time, particularly so for Black students. These findings have in fact testified the open access efforts of AP and DE program expansion. Although it is quite reasonable to dig into the pool of lower academic achievers in program expansions, these findings reveal inadequate attention to higher-achieving Black and Hispanic students (Hedrick & Edwards, 2010).

To understand why some higher-achieving students took no AP/DE courses, we re-run multivariate models constraining to students earning B+ or better GPA, and furthermore, we use sophomore PSAT as an alternative measure of academic achievement. Table 5 reports (selective) the RRR estimates of the models for the constrained sample. The RRR estimate of (higher-achieving) Black and Hispanic variables from model 4 indicates that their disadvantages in AP/DE course taking would reverse if differential course taking rates by PSAT ranges were considered. The RRR estimate of interactions between Black and cohort indicates that higher-achieving Black falling further behind would not occur if differential course taking rates by PSAT ranges were considered.

Those who did not take sophomore PSAT really stand out. First, a substantial portion of these higher-achieving students did not take sophomore PSAT, accounting for about 46% for the 2008 cohort, and 38% for the 2014 cohort. And recall that the PSAT taking rates were 50% and 40% for all SAT takers, which is the very reason why we use GPA as a measure of academic achievement in modeling advanced course taking in the previous section. Second, AP/DE taking rates were substantially lower for those who did not take sophomore PSAT. Even among these higher-achieving Whites, students who did not take PSAT were only 22% as likely to take AP/DE courses relative to those scoring top quartile in PSAT, and the ratio was 9% (equivalent to 0.22×0.41) for Black students and 13% (equivalent to 0.22×0.57) for Hispanic students. Though advanced course taking rates increased over time for all higher-achieving non PSAT taking students, Black and Hispanic students did not catch up, as indicated by the RRR estimates of three-way interactions.

Descriptive comparison between sophomore PSAT takers and non-takers sheds light on characteristics of non-takers. Again, we constrain to higher-achieving (B+ or better) students in this exercise, and Table 6 reports the descriptive comparison results. Compared with sophomore PSAT takers, a higher proportion of non-takers came from high schools located in towns and rural areas, and a lower proportion of non-takers had college-educated parents. Meanwhile, the schools where non-takers came from on average were smaller, and yet were not lower-SES schools. For all racial groups and for both cohorts, the percentages of students receiving free/reduced lunch at schools where PSAT takers attended were comparable to that of schools where non-takers came from. Compared with PSAT takers, non-takers had similar college-going expectations, and the percentages of students expecting to complete a Bachelor’s degree were even higher. It is true

that, compared with PSAT takers, non-takers were weaker in class rank and lower in self-assessed abilities, and they scored lower in SAT. Yet, the differences seemed not large enough to justify AP/DE course taking disparities.

Table 5

*Relative Risk Ratios, Advanced Course Taking for Higher-Achieving (B+ or Better) Students
2008, 2014 Public School Graduating Seniors*

		AP or DE course taking					
Reference category: None		Black		Hispanic		Asian	
Results for "Honor only" not reported		Model 1'					
Race/ethnicity (Ref.: White, 2008 cohort)							
Minority	0.63	***	0.91	**	1.43	***	
2014 cohort	1.22	***	1.22	***	1.22	***	
Minority*2014	0.86	***	0.83	***	0.91	*	
Model 4'							
Race/ethnicity (Ref.: White, 2008 cohort)							
Minority	0.63	***	0.79	***	1.16	**	
2014 cohort	1.10	***	1.10	***	1.10	***	
Minority*2014	0.85	*	0.99		0.86	*	
Model 4''							
Race/ethnicity (Ref.: White, 2008 cohort)							
Minority	1.43		1.51	**	1.11		
2014 cohort	0.92	†	0.93	†	0.92	†	
Minority*2014	1.03		0.89		0.74	**	
Academic achievement							
Sophomore PSAT V+M (Ref.: Top quartile)							
Second quartile	0.44	***	0.44	***	0.44	***	
Third quartile	0.20	***	0.20	***	0.20	***	
Bottom quartile	0.08	***	0.08	***	0.08	***	
No PSAT	0.22	***	0.22	***	0.22	***	
Second quartile*Minority	1.11		1.34	†	1.63	***	
Third quartile*Minority	0.98		1.44	*	2.08	***	
Bottom quartile*Minority	0.77		1.25		1.79	***	
No PSAT*Minority	0.41	***	0.57	***	1.15		
Second quartile*2014	1.22	**	1.22	**	1.22	**	
Third quartile*2014	1.30	***	1.30	***	1.30	***	
Bottom quartile*2014	1.05		1.05		1.05		
No PSAT*2014	1.41	***	1.41	***	1.41	***	
Second quartile*Minority*2014	0.63	†	0.71	†	1.10		
Third quartile*Minority*2014	0.91		0.66	*	1.06		
Bottom quartile*Minority*2014	0.86		0.75		1.36		
No PSAT*Minority*2014	0.79		1.10		1.44	**	

Note. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$; † $p < 0.10$.

Source: 2008, 2014 SAT Questionnaire data, the College Board.

Random subsample of 100K maintaining advanced course taking proportions.

Table 6
Summary Statistics for Higher-Achieving (B+ or Better) Students, by PSAT Taking
2008, 2014 Public School Graduating Seniors

Sophomore PAST taking	Yes				No			
2008 cohort	White	Black	Hispanic	Asian	White	Black	Hispanic	Asian
<i>N</i>	18,841	3,022	3,539	3,157	16,894	1,991	3,286	2,368
AP or DE taking rates	63.3%	50.6%	64.3%	74.0%	48.2%	35.8%	46.7%	54.9%
Non-language AP or DE taking rates	62.5%	50.1%	59.6%	73.4%	47.2%	34.9%	40.4%	54.1%
STEM AP or DE taking rates	45.5%	33.2%	43.1%	62.6%	32.0%	20.2%	27.9%	43.4%
High school characteristics								
Urban	22.5%	39.1%	44.3%	41.6%	16.6%	36.6%	37.6%	40.2%
Suburb	44.6%	40.9%	39.4%	47.3%	43.2%	38.2%	38.9%	44.3%
Town	9.0%	4.8%	4.7%	2.9%	13.6%	6.0%	8.0%	5.2%
Rural	23.9%	15.2%	11.6%	8.2%	26.6%	19.2%	15.5%	10.3%
Enrollments 9-12 grades	1,667	1,722	2,177	2,060	1,467	1,684	1,978	1,991
Poverty status (% Receiving free/reduced-priced lunch)	21.5%	42.2%	41.8%	26.1%	21.7%	41.5%	41.8%	28.0%
Race/ethnicity composition (% White among 9-12 graders)	70.5%	32.5%	31.8%	46.1%	77.0%	36.6%	34.0%	46.2%
Individual characteristics								
Parents college-educated	65.8%	39.6%	34.2%	55.7%	55.8%	34.9%	25.1%	48.0%
Educational expectations								
BA	22.4%	16.9%	15.7%	12.1%	26.2%	21.3%	18.7%	17.7%
MA or higher	31.5%	30.9%	32.2%	26.5%	29.7%	30.4%	32.0%	28.2%
Other academic achievement measures								
Ranked top 30% in class	61.8%	54.4%	54.1%	55.6%	54.8%	49.4%	48.2%	51.3%
Abilities above average	80.8%	75.6%	73.2%	76.3%	77.4%	71.3%	67.4%	73.3%
SAT V+M	113.3	94.2	99.2	116.2	107.4	88.7	92.7	105.8
Sophomore PAST taking	Yes				No			
2014 cohort	White	Black	Hispanic	Asian	White	Black	Hispanic	Asian
<i>N</i>	20,773	4,108	6,547	4,720	13,803	2,171	3,910	2,479
AP or DE taking rates	66.5%	52.0%	60.1%	72.4%	54.9%	36.4%	51.9%	63.1%
Non-language AP or DE taking rates	66.0%	51.3%	57.7%	71.8%	54.1%	35.7%	47.2%	62.8%
STEM AP or DE taking rates	52.5%	36.1%	45.1%	64.2%	40.0%	23.1%	35.2%	54.5%
High school characteristics								
Urban	21.1%	39.0%	43.6%	41.3%	16.3%	32.3%	32.1%	36.7%
Suburb	48.9%	43.5%	42.2%	48.6%	49.2%	43.9%	48.1%	52.9%
Town	8.6%	4.4%	4.3%	2.6%	11.1%	6.4%	7.1%	3.3%
Rural	20.2%	12.0%	8.6%	6.3%	22.4%	14.6%	11.2%	6.5%
Enrollments 9-12 grades	1,562	1,609	1,905	2,004	1,381	1,526	1,827	1,872
Poverty status (% Receiving free/reduced-priced lunch)	30.0%	53.9%	56.2%	35.7%	29.9%	53.5%	55.7%	36.9%
Race/ethnicity composition (% White among 9-12 Graders)	66.5%	30.3%	27.3%	40.7%	72.7%	35.4%	30.8%	41.6%
Individual characteristics								
Parents college-educated	69.1%	44.1%	29.9%	59.6%	59.1%	39.0%	25.1%	53.2%
Educational expectations								
BA	28.9%	20.2%	19.4%	14.9%	31.5%	23.4%	23.4%	21.4%

(Table 6 to be continued)

MA or higher	30.3%	29.0%	30.8%	27.8%	28.5%	27.7%	30.2%	26.8%
<i>Other academic achievement measures</i>								
Ranked top 30% in class	53.1%	45.2%	43.3%	45.8%	46.2%	40.5%	41.5%	43.6%
Abilities above average	82.1%	76.9%	72.9%	80.3%	80.9%	74.3%	74.0%	78.1%
SAT V+M	112.5	93.6	97.9	118.1	107.2	88.3	93.2	108.6

Source: 2008, 2014 SAT Questionnaire data, the College Board.

Random subsample of 100K maintaining advanced course taking proportions.

Taken altogether, and referencing to the EMI theory and findings of college-going literature, perhaps it is not sophomore PSAT taking per se that matters, but college-going planning. Due to the remoteness of high school location and the lack of parental guidance, a quite substantial portion of higher-achieving students did not plan well for their college-going. They did not take sophomore PSAT to compete for National Merit Scholarship and to gain visibility to college and university recruitment, and their AP/DE courses taking rates were not commensurate to their academic qualifications. Should AP and DE programs continue to expand, these higher-achieving students, particularly those Black and Hispanic higher-achieving students, could be targeted before low-achievers.

Concluding Remarks

Using the College Board's SAT questionnaire data of the 2008 and 2014 public high school graduating seniors, we investigate the underlying dynamics of persistent racial disparities in AP and DE course taking even when program access became more open. We confirm that advanced course taking had expanded for all racial groups in term of all advanced course taking. However, racial disparities in advanced course taking had persisted and even increased. Black students' course taking rates remained the lowest, and Hispanic students' progress was relatively limited.

We explore the underlying dynamics of persistent racial disparities in advanced course taking and use a three-way interaction modeling technique to confirm the statistical significance. Relative to White students, Black students had persistently lower academic achievement, higher-achieving Black fell further behind and mid-achieving Hispanic students had not kept up over time in advanced course taking. White students had not only further strengthened their academic achievement, but also increasingly grasped the opportunities to take advanced courses. High-achieving White students were also catching up with Asian students in advanced courses by taking advantages of the DE program expansion.

The results are highly consistent with the effectively maintained inequality (EMI) theory first proposed by Lucas (2001). Lucas (2001) found that students from advantaged background increased their chances for quality education when high school completion became universal. Recently, Posselt, Jaquette, Bielby, and Bastedo (2012) also found that White and Asian students had maintained their access to selective institutions when college enrollment became universal. Lucas (2001) further speculated that social background would continue to matter even in the presence of universal access. Against the backdrop of the open access efforts in recent AP and DE program expansion, the persisted and even increased racial disparities in course taking certainly affirmed such speculation.

Furthermore, higher-achieving White students had best maintained their advantageous position, which questions how well the open access efforts have accomplished an equity goal. Mid- and low-achievers increased their course taking the most, and straight-A Blacks had fallen further behind their White counterparts

over time. If the goal of recent AP and DE program expansions was to promote racial equity, overall persisted and increased racial disparities and inadequate attention to higher-achieving Black and Hispanic students indicate a failure not a success of the program expansions.

Of course, a related question needs to be answered in order to promote racial equity among higher-achievers. Where were the higher-achieving students, higher-achieving Black and Hispanic students to be included in the AP and DE programs? When Hill and Winston (2006) asked whether there were many low-income and high-ability students to be recruited to selective institutions, Hill and Winston (2010) explained that institutions paid inadequate attention to geography and ACT takers. The analyses on higher-achieving (earning B+ or better GPA) students show that a substantial portion of these higher-achieving students did not take sophomore PSAT. In addition, students who did not take sophomore PSAT had much lower advance course taking rates, more so for Blacks and Hispanics. Geography again is a contributing factor to the AP and DE equity problem, and lacking proper college-going planning guidance is another. To effectively mitigate racial disparities in advanced course taking, the AP and DE program expansions need to redirect the efforts towards these higher-achieving Black and Hispanic students. One possibility is that governmental funds target the collaboration between high schools utilizing modern technologies, and make innovative initiatives more sustainable (Hedrick & Edwards, 2010).

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