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CollegeBoard

Low-SES Students and College Outcomes: The Role of AP® Fee Reductions

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Executive Summary

The College Board offers fee reductions to students based on eligibility for free and reduced-price lunch in an attempt to introduce the benefits of AP® Exam participation to students most at risk in the education system. This report examined college outcomes of low-SES students with a focused investigation comparing students who took an AP Exam and received a fee reduction to students who took no AP Exams. Students were classified as low-SES if they reported that their annual household income was $30,000 or less. The results indicated that students who completed an AP Exam using a College Board–issued fee reduction had higher four-year college-going rates, retention rates, and first-year grade point average (FYGPA) than did their non-AP peers. Additionally, these results held generally even when the data were disaggregated by demographic variables (gender, ethnicity, parental income, or parental education) or by academic variables (high school GPA or SAT® score).

Introduction

One goal of educators is to increase college access and success among students from low socioeconomic status (SES) backgrounds. Typically, students' SES levels are determined by their parents' income and level of education. Nationally, students from low-income households enroll in college at lower rates than do students from middle- or high-income families (Aud et al., 2010). Specifically, in 2007, 58.4 percent of high school graduates from low-income families' enrolled in a two- or four-year college immediately after high school, compared to 63.3 percent of students from middle-income families and 78.2 percent of students from high-income families. The U.S. Department of Education reported that students from households earning $20,000 or less were underrepresented in colleges and universities, accounting for only 8.7 percent of immediate college enrollees but 13.0 percent of the 12th-grade high school cohort (Provasnik & Planty, 2008).

Additionally, low-SES students who enroll in a postsecondary program are more likely to attend a two-year institution. Approximately, 44 percent of low-SES college enrollees enter a two-year college, compared to 16 percent of those students from households with incomes in excess of $100,000 (Provasnik & Planty, 2008). Thus, low-SES students were proportionately less likely to attend a postsecondary institution, and when they did, were less likely to attend a four-year institution than their more economically privileged peers. Similar results were found when the data were parsed by their parents' highest level of education. Students from households where neither parent obtained a college degree were less likely to enroll in a postsecondary institution, and those who did were more likely to enroll in a two-year institution.

Furthermore, research has shown that economically disadvantaged students who attend college are more likely to need remedial education than students who come from high-SES families (Wirt, Choy, Rooney, Provasnik, Sen, & Tobin, 2004). Approximately 75 percent of students in the top quintile of SES bypassed remedial courses in college, compared to only 37 percent in the bottom quintile. More telling, only 6 percent of students from the top quintile took at least one remedial reading course in college, compared to 23 percent of students from the lowest quintile. This difference is stark because remedial reading course participation is tied to higher rates of remediation in other courses and lower graduation rates. Specifically, 51 percent of students who took a remedial reading course took at least three other remedial courses, and 68 percent completed a remedial mathematics course. More important, students who took at least one remedial reading course were considerably less likely to obtain a college degree (24 percent) than students without a remedial course (65 percent).

Research has suggested that rigorous academic course work helps prepare students for college-level work and is one of the best predictors of college success (Adelman, 1999). For example, the most advanced level mathematics course completed by a student was highly correlated with bachelor's degree completion. Adelman (2006) reported that 83 percent of 12th-graders who had taken or were taking a calculus course in 1992 graduated with a bachelor's degree by 2000. For those whose most advanced course was precalculus, 75 percent graduated, compared to 60 percent for trigonometry and 40 percent for algebra II. Adelman also suggested that a rigorous curriculum could also help bridge the achievement gap for students traditionally underserved by the education system. For example, the overall college completion gap between Hispanic and white students is 22.2 percent, but falls to 16.6 percent for Hispanic and white students in the highest category of academic intensity. Additionally, Adelman hypothesized that the bachelor's degree completion rate for students in the lowest socioeconomic quintile would increase from 40 percent to 59 percent if students were in the top 40 percent in terms of curricular intensity and completed a mathematics

course higher than algebra II. Unfortunately, low-SES students are less likely to attend high schools that offer the courses needed to complete an intense curriculum. Approximately 64 percent of students in the lowest SES quintile attended a high school that offered trigonometry, and 44 percent attended a high school that offered calculus. Of students in the highest SES quintile, 83 percent attended a high school that offered trigonometry, and 72 percent attended a high school that offered calculus (Adelman, 2006).

In an attempt to better prepare disadvantaged students for college work, many educational organizations are emphasizing the importance of an academically rigorous curriculum and/or advocating college-preparatory standards for high school degrees. One organization, Achieve Inc., worked with college instructors to develop English and mathematics benchmarks that specify the knowledge and skills that students should possess at various stages throughout high school to ensure adequate preparation for college (Achieve, 2004). Other organizations, such as the Association of American Universities and the Pew Charitable Trusts, have also worked to identify the knowledge and skills needed for success in introductory courses at colleges and universities (Conley, 2003).

Other opportunities exist for students to participate in a rigorous curriculum during high school in the form of dual enrollment, and the International Baccalaureate (IB) and Advanced Placement® (AP) programs. The AP Program consists of more than 30 courses and exams designed to offer college-level curricula to high school students in multiple subject areas. These courses are offered within high school and taught by high school teachers. Research found that students who participate in the AP Program earned higher grades in college (Mattern, Shaw, & Xiong, 2009), had higher graduation rates (Dougherty, Mellor, & Jian, 2005), and were more likely to earn an advanced degree than non-AP students (Bleske-Rechek, Lubinski, & Benbow, 2004). Unfortunately, many students attend high schools not widely offering AP courses. Betts, Rueben, and Danenberg (2000) found that the percentage of California high school students who attended a high school that did not offer an AP course in English was 22 percent, mathematics was 32 percent, science was 34 percent, and social science was 19 percent. Other research has found that low-SES students are much less likely to participate in AP courses (Handwerk, Tognatta, Coley, & Gitomer, 2008).

To increase access to the AP program for low-SES students, the College Board, schools, and states collaborate to provide AP fee reductions to students who qualify based on eligibility for free and reduced-price lunch. Typically, students receiving a College Board-issued fee reduction take AP Exam(s) at no cost or for a nominal fee (College Board, n.d.). Through such efforts, an increasing number of low-SES students have participated in AP programs. In 2009, over 150,000 graduating seniors, or 18.9 percent of the AP cohort, had received an AP fee reduction for at least one AP Exam, up from 17.0 percent in 2008 and 13.7 percent in 2004 (College Board, 2010). Some more targeted initiatives such as the Expansion Project, cosponsored by the National Governors Association for Best Practices, have achieved even more dramatic results. This initiative provided funding to 51 pilot schools in six states to expand their AP course offerings, thereby allowing more minority and low-SES students to participate (College Board, 2010). Within two years, low-SES and minority AP Exam participation had more than doubled. The overarching goal of such efforts is to provide low-SES students with the opportunity to take rigorous courses in high school to better prepare them for college-level work.

Given the commitment to providing increased access to AP programs, this paper sought to investigate the relationship between AP participation and college outcomes for low-income students (household income ≤ $30,000). Specifically, the study examined the college outcomes of students who took an AP Exam and received a College Board fee reduction (AP

fee reduction) as compared to their peers who did not take an AP Exam (low SES, no AP). The college outcomes examined were enrollment in two-year and four-year institutions, first-year GPA (FYGPA), and retention to second year. The purpose of this study is to determine whether low-SES students in the AP fee reduction group have better postsecondary outcomes than students in the low-SES, no-AP group. As such, these findings can provide evidence on the efficacy of educational initiatives targeted to increase AP participation for low-SES students.

Method

Participants

Sample 1. Two national data sets were used in this study. The first data set utilized postsecondary records from the National Student Clearinghouse (NSC). NSC tracks student enrollment and degree attainment for over 3,100 two- and four-year colleges and universities in the United States (a list of participating institutions is located at www.studentclearinghouse.org), equivalent to 91 percent of the U.S. college-going population. NSC enrollment data were matched to the College Board's 2007 cohort database of 2,522,235 students to obtain AP Exam participation, official SAT scores, self-reported high school grade point average (HSGPA), and demographic information. The 2007 College Board cohort included all students who graduated from high school in 2007 and took the SAT, PSAT/NMSQT®, or an AP Exam. The data set used in this study was restricted to those students who attended a U.S. high school, took the SAT exam with writing, indicated a household income of $30,000 or less, and either took an AP Exam(s) using a College Board fee reduction or did not take any AP Exams. The final sample included 135,652 students.

Sample 2. College performance data were only available for a subsample of the students in Sample 1. The data were obtained from a partnership between the College Board and four-year institutions that agreed to provide college performance data (i.e., course grades, FYGPA, and retention) on their entering freshman class for research and validation purposes. Institutions were recruited to be representative of the target population, which included the 726 four-year institutions that received at least 200 SAT score reports in 2005. The sample of institutions was diverse with respect to region of the U.S., control (i.e., public vs. private), selectivity, and size. Data from the final sample of 110 institutions were matched to College Board records that included AP Exam participation, SAT scores, self-reported HSGPA, and demographic information. Analyses were limited to students who had taken the SAT exam, self-reported a household income of $30,000 or less, and had either taken an AP Exam using an AP fee reduction or not taken any AP Exams, resulting in a final sample of 8,482 students.

Table 1 compares Sample 1, which included all students with household incomes less than $30,000 who took the SAT exam, with Sample 2, which included the subsample of those students who attended one of the 110 four-year colleges and universities that provided college performance data. Compared to Sample 1, Sample 2 has a greater representation of white and Asian students and a smaller representation of African American students. The two samples have a similar representation of Hispanic students. These findings are consistent with research showing that white and Asian students enroll in higher education institutions, and in particular at four-year institutions, at a higher rate than their peers (National Center for Education Statistics, 2005).

Table 1

Demographic Characteristics of Sample 1 and Sample 2

		Sample 1		Sample 2	
		Number	Percent	Number	Percent
Gender	Female	81,809	60.3	5,126	60.4
	Male	53,416	39.4	3,356	39.6
	No Response	427	0.3	0	0.0
Race/ Ethnicity	American Indian	1,227	0.9	55	0.6
	Asian	15,962	11.8	1,154	13.6
	Black /African American	36,955	27.2	1,802	21.2
	Hispanic	38,295	28.2	2,357	27.8
	White	36,375	26.8	2,650	31.2
	Other	5,753	4.2	291	3.4
	No Response	1,085	0.8	173	2.0

Measures

Advanced Placement® Participation. Advanced Placement (AP) Exam participation was obtained from College Board data. AP classes are college-level courses provided to high school students within a high school setting. These courses must conform to an AP course description, which provides guidance on the depth and breadth of content that should be covered during the course. At the completion of the course, students may choose to complete a standardized exam that measures domain-specific college-level knowledge and skills. The exam is scored from 1 to 5, with each score corresponding to 1 — "no recommendation," 2 — "possibly qualified," 3 — "qualified," 4 — "well qualified," or 5 —"extremely well qualified." The American Council on Education recommends awarding college credit or placement into higher level courses for students scoring 3 or higher (College Board, 2011).

AP Exam participation is used as a proxy for AP course participation, although some students take an AP Exam without having taken the corresponding course; however, this is fairly uncommon. An analysis on a subset of over 71,000 students from the class of 2007 who attended one of the 110 colleges providing performance data indicated that it is unusual for students to take an AP Exam without reporting completion of the corresponding AP course, although the results vary by discipline. In mathematics, between 2 percent and 5 percent take an exam without having reported taking the corresponding course, compared to 1 percent to 2 percent in science, between 1 percent and 5 percent in social science, fewer than 2 percent in a language subject, and between 10 percent and 18 percent in English. It is more common for students to take an AP course without taking the AP Exam but these students could not be identified consistently from the data sets. Thus, students taking an AP course but not an AP Exam are not included in the AP fee reduction group but could be inadvertently included in the low-SES, no-AP group.

SAT® Scores. SAT test scores were obtained from the 2007 College Board cohort, which included students who graduated from high school in 2007 and had taken an SAT exam. The SAT consists of three sections: critical reading, mathematics, and writing, each with a score scale ranging from 200 to 800 with 10-point increments. An SAT composite score is the sum of the scores for all three sections, and therefore has a score scale range of 600 to 2400. For reporting purposes, these scores were aggregated into 300-point score bands (e.g., 600–890).

HSGPA. Cumulative high school GPA (HSGPA) was self-reported by students on the SAT Questionnaire (SAT-Q), which is completed during registration for the SAT. Grades were

reported in letter grades ranging from an F (below 65) to an A+ (97–100). Due to small sample sizes, particularly with Sample 2, grades of C- or lower were combined into a single category.

Household Income. Household income was obtained from self-reported data on the SAT-Q. Only students indicating household incomes of $30,000 or less were included in the study.

Highest Parental Education. Parental education was also derived from self-reported data obtained from responses on the SAT-Q. Student responses were provided for both mother's and father's highest educational level. The highest degree (i.e., No High School Diploma, High School Diploma, Associate Degree, Bachelor's Degree, or Graduate Degree) of either parent was used to create this variable.

Gender. Students provided gender information (female or male) when they completed the SAT-Q.

Ethnicity. Students indicated their race/ethnicity on the SAT-Q. The categories include: (1) Native American or Alaska Native; (2) Asian, Asian American, or Pacific Islander; (3) black or African American; (4) Mexican or Mexican American; (5) Puerto Rican; (6) Other Hispanic, Latino, or Latin American; (7) white; and (8) Other. In this report, categories 4, 5, and 6 were combined into a single category titled "Hispanic."

College Enrollment. Fall 2007 college enrollment data were obtained for the students in Sample 1. College enrollment was segmented by college type (i.e., two year or four year) and presented separately for two-year and four-year institutions.

First-Year GPA (FYGPA). For Sample 2, FYGPA was obtained from participating colleges and universities. The values of FYGPA ranged from 0.00 to 4.07, with only one student having a FYGPA greater than 4.00.

Retention to Second Year. For Sample 2, institutions also indicated whether students returned for the fall semester of their sophomore year. It should be noted that this variable is not an absolute measure of persistence, as a student may transfer to another institution and persist even though he or she was not retained by his or her original institution.

Maximum AP® Score. Maximum AP score represents the highest score that students earned on any AP Exam taken during their high school career.

Analysis

A series of descriptive analyses were conducted to investigate three educational outcomes: 1) college enrollment, 2) FYGPA, and 3) retention to second year for low-SES, no-AP students and AP fee reduction students. Each of these analyses was disaggregated by gender, ethnicity, HSGPA, SAT score band, and highest parental education to isolate the relationship between AP participation and college outcomes within each of these relevant variables. Additionally, only students who indicated a household income of $30,000 or less were included, because the purpose of this study was to examine the relationship between AP Exam participation and college outcomes for low-SES students who take advantage of the AP fee reduction program versus those who do not.

Results

Demographic Characteristics of Sample 1

Table 2 compares the demographic characteristics of low-SES, no-AP students to AP fee reduction students. Females made up a slightly larger proportion of AP fee reduction

students (64.4 percent) than Low-SES No-AP students (59.2 percent). Compared to the low-SES, no-AP students, Asian and Hispanic students accounted for a larger proportion of all students in the AP fee reduction group, while African American and white students accounted for a smaller proportion of all students. Additionally, Table 2 provides information on the distribution of highest parental education level (degree attained), HSGPA, and SAT scores for both groups. Over two-thirds of students from each group came from a household with a highest parental degree of a high school diploma or less (69.6 percent for low-SES, no-AP students and 71.5 percent for AP fee reduction students); however, the AP fee reduction students were almost twice as likely as the low-SES, no-AP students to come from a household where neither parent earned a high school diploma (28.0 percent vs. 15.6 percent).

Table 2

Demographic and Academic Characteristics by AP Exam Participation Group for Sample 1

		Low SES, No AP*	AP Fee Reduction
Number of Students		106,517	29,135
Gender	Female	59.2	64.4
	Male	40.4	35.6
	No Response	0.4	0.0
Race/ Ethnicity	American Indian	1.0	0.4
	Asian	9.6	19.6
	Black/African American	30.2	16.5
	Hispanic	23.5	45.7
	White	30.4	13.8
	Other	4.3	4.0
	No Response	1.0	0.0
High School GPA	A+	2.1	8.5
	A	9.1	21.2
	A-	11.4	19.4
	B+	17.7	18.9
	B	20.8	16.1
	B-	13.0	6.9
	C+	11.1	4.1
	C	7.6	2.3
	C- or Lower	3.4	0.6
	No Response	3.7	2.1
SAT Composite Score Band	2100–2400	0.1	1.3
	1800–2090	1.8	9.2
	1500–1790	13.9	29.6
	1200–1490	42.6	42.0
	900–1190	35.5	16.7
	600–890	6.0	1.2
Highest Parental Education	No High School Diploma	15.6	28.0
	High School Diploma	54.0	43.5
	Associate Degree	8.5	6.4
	Bachelor's Degree	12.8	11.4
	Graduate Degree	5.6	6.1
	No response	3.4	4.6

Note. Percentages may not sum to 100 because of rounding. Parental education information is obtained from the SAT Questionnaire.

AP fee reduction students were more academically able than their low-SES, no-AP counterparts, as demonstrated by higher SAT scores and HSGPA. The AP fee reduction students had a higher percentage achieving an A- HSGPA or higher and an SAT score of 1500 or higher, compared to low-SES, no-AP students (49.1 percent vs. 22.6 percent and 40.1 percent vs. 15.8 percent, respectively). Table 3 indicates that AP fee reduction students had higher mean HSGPA and SAT composite scores than low-SES, no-AP students (3.44 vs. 3.01 and 1443 vs. 1256, respectively).

Table 3

High School Academic Performance by AP® Group for Sample 1

Variable	Low SES, No AP		AP Fee Reduction	
	Mean	SD	Mean	SD
HSGPA	3.01	0.66	3.44	0.59
SAT	1256	242	1443	270

College Enrollment for Sample 1

Table 4 compares the two-year college-going rates for both groups of students. Overall, the low-SES, no-AP students had higher two-year college-going rates than did the AP fee reduction students. Specifically, 29.5 percent of low-SES, no-AP students went to a two-year institution, compared to 18.0 percent of AP fee reduction students. This pattern was consistent across gender and ethnic groups, and all levels of parental education. This trend was also consistent among students with average to strong academic credentials, as measured by HSGPA and SAT scores. For example, within the 1500–1790 SAT score band, 18.3 percent of low-SES, no-AP students attended a two-year college, compared to 12.0 percent of AP fee reduction students. There were smaller differences between the two groups of students in lower SAT score bands and students with lower HSGPAs.

Table 4

Two-Year College Enrollment by AP Group for Sample 1

		Low SES, No AP	AP Fee Reduction
Number of Students		106,517	29,135
Total		29.5	18.0
Gender	Female	29.4	18.4
	Male	29.8	17.5
Race/Ethnicity	American Indian	27.5	20.9
	Asian	31.6	16.4
	Black /African American	26.5	13.6
	Hispanic	33.6	21.4
	White	28.6	14.5
	Other	31.2	17.7
HSGPA	A+	17.5	7.6
	A	21.9	12.5
	A-	23.6	14.5
	B+	27.3	19.0
	B	30.2	23.0
	B-	32.5	26.5
	C+	35.6	28.3
	C	36.2	33.5
	C- or Lower	35.1	38.7
SAT Score Band	2100–2400	1.3	1.1
	1800–2090	11.2	4.8
	1500–1790	18.3	12.0
	1200–1490	28.0	20.5
	900–1190	35.7	30.0
	600–890	36.7	36.5
Highest Parental Education	Less than High School	31.2	20.0
	High School Graduate	29.8	18.1
	Associate Degree	30.9	16.0
	Bachelor's Degree	26.7	14.0
	Graduate Degree	26.9	15.5

Table 5 provides four-year college enrollment rates for low-SES, no-AP and AP fee reduction students. Unlike the two-year enrollment rate, which was higher for the low-SES, no-AP group, 38.0 percent of low-SES, no-AP students attended a four-year institution as compared to 60.5 percent of AP fee reduction students. Differences in the four-year college enrollment rate for the two AP groups were fairly consistent across gender and ethnic subgroups, with the AP fee reduction students having much higher rates in all cases. AP fee reduction students also had higher four-year college-going rates within each parental education level. Of students who came from homes where no parent graduated high school, more than 50 percent of AP fee reduction students went on to attend college, compared to less than 30 percent of their low-SES, no-AP counterparts. AP fee reduction students with moderate to strong academic performance in high school attended college in higher numbers than did low-SES, no-AP students with similar academic credentials. For example, 70.8 percent of AP fee reduction students with an SAT score of between 1500 and 1790 attended a four-year college, compared to 56.8 percent of low-SES, no-AP students. Results are similar by HSGPA. For example, 69.2 percent of AP fee reduction students with an A attended a four-year college,

compared to 52.5 percent of low-SES, no-AP students. In sum, AP fee reduction students were much more likely to enroll in a four-year college than their low-SES, no-AP peers.[1]

Table 5
Four-Year College Enrollment by AP Group for Sample 1

		Low SES, No AP	AP Fee Reduction
Number of Students		106,517	29,135
Total		38.0	60.5
Gender	Female	39.0	60.8
	Male	36.7	59.9
Race/Ethnicity	American Indian	35.4	62.0
	Asian	40.1	70.6
	Black/African American	41.8	67.7
	Hispanic	27.7	50.6
	White	42.0	69.0
	Other	36.5	65.5
HSGPA	A+	57.2	74.5
	A	52.5	69.2
	A-	49.6	65.8
	B+	43.8	59.1
	B	38.6	53.9
	B-	33.7	50.0
	C+	26.0	40.9
	C	23.0	33.1
	C- or Lower	17.6	18.8
SAT Score Band	2100–2400	72.5	86.8
	1800–2090	63.8	79.2
	1500–1790	56.8	70.8
	1200–1490	43.2	57.8
	900–1190	27.0	39.9
	600–890	13.5	19.6
Highest Parental Education	Less than High School	29.6	54.0
	High School Graduate	37.7	62.5
	Associate Degree	42.4	65.9
	Bachelor's Degree	45.6	66.9
	Graduate Degree	42.6	61.8

Demographic Characteristics of Sample 2

Table 6 compares the demographic characteristics of low-SES, no-AP students and AP fee reduction students for Sample 2. Females represent about 60 percent of both groups. Relative to the low-SES, no-AP students, there was a larger proportion of Asian and Hispanic students and a smaller proportion of African American and white students in the AP fee reduction group. AP fee reduction students came from households with lower levels of parental education, as nearly one-quarter reported neither parent obtaining a high school degree, compared to 10.7

1. To obtain the percentage of students by each group who did not attend college, add the percentages from Tables 4 and 5 together and subtract that number from 100. For example, in the low-SES, no-AP group, 32.5 percent (i.e., 100 – (29.5 + 38.0)) did not go to college, as compared to 21.5 percent for the AP fee reduction group.

percent of the low-SES, no-AP students. AP fee reduction students were higher academic achievers, as 66.1 percent reported a HSGPA of A- or higher and 55.6 percent had combined SAT scores of 1500 or higher, compared to 41.2 percent and 33.8 percent, respectively, of low-SES, no-AP students. The difference in HSGPA could be partly attributable to the fact that many high schools give higher weight to AP courses; however, this does not explain the differences in SAT scores for the two groups. Additionally, Table 7 provides the mean HSGPA and SAT scores for both groups. The AP fee reduction students have a mean HSGPA and SAT composite score of 3.67 and 1545, compared to 3.34 and 1404, respectively, for the low-SES, no-AP group.

Table 6

Demographic and Academic Characteristics by AP Exam Participation Group for Sample 2

		Low SES, No AP	AP Fee Reduction
Number of Students		5,217	3,265
Gender	Female	59.9	61.3
	Male	40.1	38.7
Race/Ethnicity	American Indian	0.8	0.5
	Asian	10.6	18.4
	Black/African American	25.1	15.1
	Hispanic	17.4	44.4
	White	40.3	16.8
	Other	3.7	3.0
	No response	2.2	1.8
High School GPA	A+	4.7	13.7
	A	16.6	29.1
	A-	19.9	23.3
	B+	21.0	16.9
	B	19.2	10.0
	B-	9.0	3.4
	C+	4.4	1.2
	C	2.5	0.7
	C- or Lower	0.7	0.2
	No response	2.1	1.4
SAT Composite Score Band	2100–2400	0.4	1.8
	1800–2090	4.7	14.0
	1500–1790	28.7	39.8
	1200–1490	48.6	37.7
	900–1190	16.4	6.5
	600–890	1.3	0.1
	No response	0.0	0.0
Highest Parental Education	No High School Diploma	10.7	24.6
	High School Diploma	53.7	45.5
	Associate Degree	9.7	7.0
	Bachelor's Degree	16.6	13.6
	Graduate Degree	7.0	6.2
	No response	2.2	3.1

Note. Percentages may not sum to 100 because of rounding.

Table 7

High School Academic Performance by AP Exam Participation Group for Sample 2

Variable	Low SES, No AP		AP Fee Reduction	
	Mean	SD	Mean	SD
HSGPA	3.34	.57	3.67	.49
SAT	1404	230	1545	247

FYGPA for Sample 2

Table 8 provides the mean FYGPA for AP fee reduction students and low-SES, no-AP students overall and by relevant subgroups. Overall, AP fee reduction students earned FYGPAs that were 0.27 higher than that of low-SES, no-AP students (2.76. vs. 2.49). The performance gap persisted within race/ethnicity and gender subgroups. AP fee reduction students also had higher FYGPAs than low-SES, no-AP students at every level of parental education. AP fee reduction students from households without a parent who graduated from high school obtained a mean FYGPA of around a B-, a level of performance that has been suggested by previous research as being indicative of a successful college career (Wyatt, Kobrin, Wiley, Camara, & Proestler, 2011). This finding suggests that even the least economically advantaged AP students are on track to achieve college success. When disaggregated by high school achievement, AP fee reduction students outperformed low-SES, no-AP students. Within HSGPA levels, AP fee reduction students had higher FYGPAs at every letter grade though the differences were consistently larger for lower performing students. For each SAT score band except the highest (2100–2400), AP fee reduction students outperformed the low-SES, no-AP students. However, it should be noted that students in the highest score band accounted for less than 2 percent of the students in the sample. In sum, AP fee reduction students earned higher grades in college than their low-SES, no-AP peers.

Table 8

FYGPA by AP Exam Participation Group for Sample 2

		Low SES, No AP	AP Fee Reduction
Number of Students		4,883	3,150
Total		2.49	2.76
Gender	Female	2.54	2.81
	Male	2.42	2.69
Race/Ethnicity	American Indian	2.33	3.03
	Asian	2.73	3.02
	Black/African American	2.28	2.62
	Hispanic	2.35	2.60
	White	2.61	2.99
	Other	2.61	2.87
HSGPA	A+	3.09	3.13
	A	2.83	2.93
	A-	2.65	2.77
	B+	2.48	2.54
	B	2.30	2.40
	B-	2.09	2.34
	C+	2.04	2.06
	C	1.92	2.27
	C- or Lower	2.04	2.34
SAT Score Band	2100–2400	3.54	3.45
	1800–2090	3.04	3.17
	1500–1790	2.73	2.87
	1200–1490	2.41	2.55
	900–1190	2.20	2.27
	600–890	1.85	2.52
Highest Parental Education	Less than High School	2.44	2.66
	High School Graduate	2.42	2.74
	Associate Degree	2.48	2.82
	Bachelor's Degree	2.65	2.92
	Graduate Degree	2.73	3.00

Second-Year Retention Rates for Sample 2

Table 9 provides the second-year retention rates for AP fee reduction students and low-SES, no-AP students overall and by relevant student subgroups. Overall, low-SES, no-AP students had a second year retention rate of 74.1 percent while AP fee reduction students had a retention rate of 83.6 percent, a difference of almost 10 percent. The performance gaps in retention rates persisted even within gender, race/ethnicity, and parental education subgroups, although the differences were slightly smaller for those students with parents without a high school diploma or those with a parent(s) with a graduate degree. AP fee reduction students also had higher retention rates than low-SES, no-AP students with similar academic credentials in high school. For example, 87.6 percent of AP fee reduction students with an HSGPA of A returned for their second year, as compared to 81.5 percent of low-SES, no-AP students with the same HSGPA. While this trend held generally, it is worth noting that the results were not consistent across all high school GPAs. Within each SAT score band, AP fee reduction students had retention rates between 5 percent and 11 percent higher than low-SES, no-AP students.

Table 9

Second-Year Retention Rates by AP Exam Participation Group for Sample 2

		Low SES, No AP	AP Fee Reduction
Number of Students		5,211	3,262
Total		74.1	83.6
Gender	Female	73.8	83.9
	Male	74.5	83.2
Race/Ethnicity	American Indian	52.5	60.0
	Asian	83.9	91.3
	Black/African American	73.5	83.8
	Hispanic	71.6	81.3
	White	73.0	82.1
	Other	75.8	83.5
HSGPA	A+	86.4	88.8
	A	81.5	87.6
	A-	78.1	82.6
	B+	74.3	83.4
	B	69.9	77.0
	B-	64.9	68.5
	C+	64.0	63.2
	C	62.0	83.3
	C- or Lower	57.9	33.3
SAT Score Band	2100–2400	84.2	94.9
	1800–2090	84.8	89.7
	1500–1790	77.9	85.1
	1200–1490	72.9	80.8
	900–1190	69.0	75.1
	600–890	55.9	66.7
Highest Parental Education	Less than High School	74.1	81.7
	High School Graduate	72.0	82.8
	Associate Degree	73.1	83.7
	Bachelor's Degree	77.9	87.2
	Graduate Degree	82.1	87.2

Note. Percentages may not sum to 100 because of rounding.

AP Performance and College Outcomes for AP® Fee-Reduction Students

Table 10 contains the two-year and four-year college enrollment rates, FYGPA, and retention rates for the AP fee reduction students by the maximum AP Exam score attained, as compared to low-SES, no-AP students. Overall, the results indicate a positive relationship between AP Exam performance and desirable college outcomes. For the first outcome examined, two-year college enrollment, 29.5 percent of low-SES, no-AP students attended a two-year college, which was about 5 percent higher than the enrollment rate for AP fee reduction students who earned a maximum AP score of 1 (24.1 percent). On the other hand, only 13.2 percent of students with a maximum AP score of 5 enrolled in a two-year college. Higher AP scores were associated with lower two-year college attendance rates at every point on the 1–5 score scale. Thus, AP participation and performance were inversely

related to two-year college enrollment. The opposite was true of the relationship between AP performance and four-year college enrollment; low-SES, no-AP students were the least likely to enroll in a four-year college (38.0 percent). Additionally, 52 percent of AP fee reduction students whose highest AP score was a 1 enrolled at a four-year institution, as compared to between 62 percent and 64 percent of students whose highest AP score was a 2 or higher.

Table 10

College Enrollment Rate, FYGPA, and Retention Rate by Highest AP Exam Score

Outcome	Highest AP Exam Score for AP Fee Reduction					
	Low-SES No-AP	1	2	3	4	5
Two-Year Enrollment Rate	29.5	24.1	18.6	16.7	15.4	13.2
	(106,517)	(6,972)	(6,420)	(5,430)	(5,249)	(5,064)
Four-Year Enrollment Rate	38.0	52.3	62.4	63.7	63.1	63.3
	(106,517)	(6,972)	(6,420)	(5,430)	(5,249)	(5,064)
FYGPA	2.49	2.35	2.66	2.79	2.89	3.07
	(4,883)	(550)	(671)	(646)	(640)	(643)
Retention Rate	74.1	75.3	82.6	84.2	86.9	88.1
	(5,211)	(574)	(702)	(665)	(657)	(664)

Note. Percentages may not sum to 100 because of rounding.

AP performance was also related to FYGPA, as students with higher AP scores also had higher college grades. The low-SES, no-AP students had a mean FYGPA of 2.49, higher than students with a maximum AP score of 1 (2.35) but lower than that of students scoring a 2, 3, 4, or 5 (2.66, 2.79, 2.89, and 3.07, respectively). Thus, FYGPA increased at every AP score point. The pattern was fairly similar with retention rates, as retention rates were similar between low-SES, no-AP students and AP fee reduction students with a maximum AP score of 1, at about 74 percent to 75 percent. Retention rates were higher among students with a higher maximum AP score, ranging between 82.6 percent and 88.1 percent for students scoring between 2 and 5. These results suggest that both participation and performance are related to subsequent college outcomes.

Discussion

Low-SES students are often educationally disadvantaged relative to their higher-SES peers (Adelman 1999; 2006). The AP fee reduction program is an initiative intended to extend the educational benefits associated with the AP Program and exam participation to a segment of the population that has been traditionally underserved by the education community. During the last five years, the number of low-SES students participating in an AP Exam has increased considerably, doubling from about 75,000 in 2004 to around 150,000 in 2009 (College Board, 2010). Given the increased presence of low-SES students in AP, this study sought to measure how these students fare in terms of college outcomes compared to their low-SES, no-AP peers. The results were encouraging, as low-SES AP students had higher four-year college-going rates, FYGPAs, and retention rates than their counterparts who did not take any AP Exams. This was generally true even when students were matched for ethnicity, parental education, or measures of high school performance. More in-depth analyses confirmed that stronger AP performance, as measured by highest exam score, was positively related to four-year college attendance rates, FYGPA, and retention rates.

The results by maximum AP score obtained suggest that there still may be some benefit

for students who do not achieve a score of 3 or higher, the typical cut point associated with granting college credit. While students who score a 1 or 2 do not typically earn college credit for taking an AP Exam, the results presented here suggest that low-SES students who score a 2 on at least one AP Exam are more likely to experience positive outcomes, including higher four-year enrollment rates, FYGPA, and retention rates. In sum, these students appeared to benefit from their AP experience even though during high school they failed to perform at a level widely considered adequate for college-level work. However, one troubling finding is that African American students are substantially underrepresented among the AP fee reduction population as well as in the overall population of students taking AP (College Board, 2010). Perhaps further research could investigate how to better engage this traditionally underserved population.

This study is notable because it focused solely on economically disadvantaged students who were provided an opportunity to participate in AP through the College Board's fee-reduction program. The results indicate that these students achieved more positive postsecondary results than students not participating in AP. Prior research has indicated that schools with large populations of low-SES or minority students are less likely to offer rigorous course work including AP courses. In this study, the low-SES students who participated in AP through the fee-reduction program went to high schools that offered more unique AP courses than the low-SES students not participating in AP. This highlights the importance of introducing a college-going culture featuring rigorous course work typical of AP programs into underserved high schools nationwide.

However, several limitations of this study must be noted. First, this study was descriptive in nature. More sophisticated analyses were intentionally avoided because this paper is intended to provide straightforward results that would be widely accessible to our various stakeholders. Future research should statistically control for demographic and academic variables in order to isolate the effect of AP participation on college success.

A second limitation is that the data available only afforded the opportunity to evaluate students identified as having taken an AP Exam. While AP Exam participation is a reasonable proxy for AP course participation, this study was unable to evaluate AP course takers who did not take an AP Exam or to disentangle AP Exam takers who took the relevant AP course from those who only took the exam and not the course.

A third limitation is that this paper does not directly test why low-SES AP fee reduction students have more positive college outcomes, although several possibilities exist. Arguably, the exposure to college-level work in the form of AP participation may establish a clear set of expectations prior to entering college that leaves these students better prepared for the rigors of college. Additionally, for those scoring a 3 or higher, AP Exam success may increase students' self-efficacy or belief that they can succeed in college. Finally, motivation could play a role, as AP students may be more motivated to attend and succeed in high school and college. Future research should explicitly test for the underlying psychological processes driving the AP performance relationship.

Overall, these results suggest that increasing academic intensity through AP participation may increase college enrollment, performance, and retention for low-SES students.

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