

Effects of Early AP Course Taking on High School Outcomes and College Enrollment for Less Academically Prepared Students

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August 2024

What We Studied

Existing research suggests a strong relationship between a rigorous high school curriculum and academic outcomes. The literature supports the premise that students who engage in challenging high school coursework are more likely to graduate, enroll in higher education, and complete their college degrees (e.g., Adelman, 2006; Long et al., 2012). Within this academic discourse, the Advanced Placement (AP) curriculum is often recognized as a cornerstone of college preparatory education, offering rigorous coursework that purportedly equips students with the skills and knowledge necessary for postsecondary success (see Kolluri (2018) for a comprehensive review). Originating from a collaboration between elite high schools and colleges, the AP program was designed to offer academically talented students an opportunity to undertake college-level academic work during their high school years. With the increasing need for jobs requiring postsecondary education, enhancing college readiness has become a critical concern for educational leaders and policymakers, and the AP program, in particular, has taken a pivotal role in addressing this challenge. It has been deliberately expanded to include a wider range of schools, especially those serving underrepresented demographics and low-income student populations. This expansion is part of a broader strategy to make high-quality academic experiences more accessible to all students, irrespective of their socioeconomic status (Schneider, 2011).

Importantly, broadening the AP program has not necessarily yielded the expected benefits. Despite the program's objectives, research indicates that many students fail to reap the anticipated benefits of AP participation (Dougherty et al., 2006; Geiser & Santelices, 2006). This gap between expectation and reality has sparked a scholarly debate regarding the inclusivity and effectiveness of AP courses, questioning whether these benefits are equitably distributed or primarily advantageous to students already on a trajectory for academic success. Kolluri (2018) proposed three hypotheses to make sense of the relationship between AP participation and outcomes, one of which suggests that underrepresented student populations do not pursue AP-level coursework because they may not be academically "ready" (typically as measured by past grades or past performance on standardized tests). Despite the fallibility of such measures and the fact that future academic success is more than one's past performance, many teachers and counselors rely heavily on standardized test performance and/or past grades to identify (or encourage) student placement in AP coursework. Therefore, underrepresented student populations (those from poorer communities or those identified among minoritized populations) who disproportionately score lower on these "traditional" metrics are also disproportionately left out of AP pursuits. One goal of this paper is to challenge the assumption that only high achieving students (as gauged by performance on standardized test scores, for example) can persist in and would yield the benefits of AP course taking.

The expansion and increasing popularity of AP programs have also led to a new and significant trend: students are taking AP courses earlier in their high school journey, with a notable increase in enrollment among freshmen and sophomores. This emerging pattern signals a growing ambition among younger students to challenge themselves

with AP exams (TPEIR, 2023). However, despite this shift towards early engagement in AP coursework, research on its effectiveness remains scarce, particularly for students who may not be academically prepared for such rigorous academic challenges or who take AP earlier in their high school years.

This study examines the effects of early engagement in AP courses for students deemed “academically underprepared”, as indicated by their previous standardized test scores in reading and mathematics. By examining ‘academically underprepared’ students transitioning from public middle schools to public high schools in Texas, this research challenges the prevailing assumption that early AP involvement is less advantageous for students with lower prior test scores. Our goal is to understand whether early participation in AP courses might contribute to greater educational equity and enhancement, providing perspectives on how AP involvement can improve academic success and readiness for college among students often considered underprepared. This research not only reassesses conventional measures of academic readiness but also seeks to highlight the AP program’s potential as a tool for educational advancement and equity.

How We Analyzed the Data

We use student-level administrative records from the Texas Education Research Center (ERC) at the University of Texas at Austin. This study examines 98,040 students who transitioned from public middle schools to high schools in the 2010/2011 school year in Texas and were identified as having lower prior academic achievement. More specifically, the study population includes students who attended public middle schools across Texas for the duration of their 6th through 8th grade years. In addition, students transitioning to high schools that do not offer AP course(s) were excluded from the study. This exclusion clarifies the distinction between non-enrollment due to AP unavailability and voluntary non-participation in available AP courses, isolating the factors influencing students' decisions to take AP classes when possible and ensuring a focused analysis on access versus interest. Academically underprepared students are defined by scoring below their cohort’s median on both the mathematics and reading sections of the Texas Assessment of Knowledge and Skills (TAKS) taken in 8th grade. Within this population, 6.1% (or 5,940 students) participated in the AP program during their first two years of high school (hereafter, EAP).

Shifting our focus to the analytic method, previous literature considered AP participation as endogenous in postsecondary education models. That is, students strategically choose whether and when to take AP courses, and their decisions are made based on various individual and contextual factors. Thus, ignoring the difference in characteristics between the EAP and non-EAP students would cause selection bias in EAP effects, potentially yielding erroneous conclusions and misguided policy recommendations. To reduce potential selection bias inherent in the endogenous nature of AP participation, we employ propensity score matching (PSM) to calculate counterfactual mean outcomes, which is what EAP students would have accomplished without AP participation. The robustness of the matching estimator relies on satisfying the conditional independence assumption (CIA), which makes the potential outcome independent of treatment conditional on observed characteristics. In other words, the outcome of interest is independent of treatment if matching estimation includes sufficient predictors, determining EAP participation. The present study includes a rich set of student and school characteristics collected from the 6th to 8th grade, that is, prior to students’ earliest AP participation in 9th grade.

What We Discovered

The results in Table 1 show that EAP students were predicted to have a higher probability of participating in AP and dual credit programs in their latter two years of high school by 33.8 and 11.5 percentage points relative to the matched non-EAP students with a group mean of 27.3% and 13.9%, respectively. Here, we find that the AP participation rate for matched non-EAP students was 13.5 percentage points higher than the entire non-EAP student population. This finding suggests that EAP students were matched to a subgroup of non-EAP students who were above average in AP participation among all non-EAP students. A similar pattern is found for dual credit participation, where matched non-EAP students participated at a rate 6.2 percentage points greater than the entire

non-EAP student cohort. Additionally, EAP participants also outperformed matched non-EAP students across all exit exam subjects, with particularly pronounced effects observed in social studies. Specifically, EAP students scored an average of 17.6 and 19.2 scale points higher in reading and mathematics, respectively, with matched non-EAP students averaging scores of 2254.8 and 2201.4. The advantages extended to science and social science exams, where EAP students outscored their counterparts by 20.7 and 33.6 scale points, against averages of 2232.5 and 2373.7, respectively. Furthermore, EAP students exhibited an on-time high school graduation rate that was 7.4 percentage points higher than that of the matched comparison group, with a rate of 86.5%. These findings align with earlier observations, showing that matched non-EAP students generally achieved higher exam scores and graduation rates on time than the entire comparison group.

Moreover, the results show that EAP students were predicted to have a higher likelihood of enrolling in any form of postsecondary institution in the year following their expected high school graduation by 14.2 percentage points than matched non-EAP students with a group mean of 48.7%. Moreover, of those college-going students, EAP students were more likely to attend four-year colleges than two-year colleges by 13.3 percentage points than matched counterfactuals who did not take AP courses during their first two years of high school and enrolled in college immediately after high school. For those entering two-year colleges, EAP students were more likely to complete certificates or associate degrees within two and four years of college entry by 3.7 and 7.2 percentage points than their counterparts, respectively. Additionally, a significant gap was observed in bachelor's degree attainment, with EAP students being 7.7 and 12.2 percentage points more likely to earn their degrees within four and six years of college entry, respectively, compared to matched non-EAP students who pursued four-year college degrees immediately after high school.

Although not included in this research brief, we conducted three robustness checks to validate the matching estimates. These checks include Rosenbaum's hidden bias tests, refining the definition of academic under-preparedness to incorporate both 7th and 8th grades, and comparing outcomes only between EAP and non-EAP students who attended the same middle and high schools. Depending on the scenario, the matching estimates vary slightly, but the main findings remain consistent.

Policy Recommendations

Reconsidering AP Placement Processes

In this study, we defined underprepared students as those who scored below the median on high stakes standardized tests in Texas at the time. Our findings suggest that less academically prepared students who participated in AP courses early in their high school years had better secondary and postsecondary outcomes relative to similar students who did not take AP courses during their freshman or sophomore years. Importantly, our proxy for students' "academic preparedness" is an imperfect measure and does not include factors relevant to the idea of "preparedness" such as interest, engagement, or opportunity. Still, this analysis provides some insight on the connections between standardized test performance and preparation and likelihood of early AP course taking.

Our findings suggest that educators and school leaders should think carefully about their selection processes and the criteria by which they identify potential AP students. Specifically, we argue that educators should guard against determining students' academic potential largely based on their academic histories. Our data suggest that underprepared students (defined here as those with low standardized test scores) are capable of succeeding in AP coursework and subsequently reaping the academic benefits. Similarly, educators should work to encourage students who might otherwise self-select out of AP due to low academic achievement. The Education Commission of the States highlights that students may sometimes self-select themselves out of taking AP courses if they do not view themselves as "college material" (Zinth, 2016). Rather than discounting students who may initially not be as academically prepared, school policies should provide adequate support and comprehensive assistance that can help students succeed in AP classes and yield benefits from participation that extend beyond the exam scores themselves.

Table 1. EAP Effects on High School and College Outcomes

High School Outcomes	Exit Exams					Early College Coursework		On Time HS Graduation
	Attrition	Reading	Mathematics	Science	Social Studies	AP Participation	DC Participation	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
EAP	-0.808*** (0.071)	17.597*** (2.665)	19.157*** (2.636)	20.699*** (2.446)	33.576*** (3.102)	1.433*** (0.040)	0.745*** (0.049)	0.873*** (0.067)
M.E. Matched CGM	-0.060 0.114	2254.791	2201.373	2231.271	2371.592	0.338 0.273	0.115 0.139	0.074 0.865
Γ (hidden bias) Observations	1.9-2.0 11,540	1.2-1.3 10,850	1.2-1.3 10,850	1.3-1.4 10,850	1.4-1.5 10,850	3.9-4.0 11,540	1.9-2.0 11,540	2.1-2.2 11,540

College Outcomes	Immediate College Enrollment	Four-Year College Enrollment	Certificate or Associate Degree Attainment		Bachelor's Degree Attainment	
			Within Two Years	Within Four Years	Within Four Years	Within Eight Years
	(9)	(10)	(11)	(12)	(13)	(14)
EAP	0.580*** (0.038)	0.539*** (0.048)	0.384*** (0.109)	0.353*** (0.075)	0.584*** (0.094)	0.492*** (0.068)
Marginal effect Matched CGM	0.142 0.487	0.133 0.383	0.037 0.092	0.072 0.248	0.077 0.120	0.122 0.411
Γ (hidden bias) Observations	1.6-1.7 11,540	1.5-1.6 7,164	1.2-1.3 3,522	1.2-1.3 3,522	1.5-1.6 3,576	1.4-1.5 3,576

Notes. Weights are calculated from single-nearest-neighbor with no sample replacement, common support, and the caliper of 0.25 standard deviations of estimated propensity scores. Robust standard errors were reported in parenthesis.

M.E. – Marginal effect.

CGM – Comparison group mean.

** $p < 0.05$. *** $p < 0.01$.

Enhancing Student Support for Success

As others have argued, access in itself is not enough to guarantee that students will enroll and succeed in AP courses. In a recent report, the Center for American Progress (Chatterji et al., 2021) highlights that despite having AP offerings in schools, the proportion of students who enroll in an AP course, take the AP exam, and successfully pass the exam shrinks with each step. The authors noted that for every 1000 students, only 174 enroll in at least one AP course, 129 take at least one AP exam, and only 74 ultimately earn a passing score. Indeed, within the context of our study, the academically less prepared students would have contributed to this trend. Providing additional support systems are just as necessary as increasing access to ensure student success. The ECS's recommendations support both the educators teaching AP courses and the students taking them, such as pre-AP workshops or summer institutes and teacher training and professional development (Zinth, 2016).

Concluding Remarks

The implications of the findings extend beyond AP and speak to the benefits of exposing all students, including low-performing (i.e., under-prepared) students, to high-quality, rigorous curricula. Of course, as many other scholars have indicated, efforts to increase access should also be coupled with resources to support students in successfully meeting the expectations of those courses (including investments in tutoring, workshops, and other strategies that support student learning). Closing gaps in educational attainment will require addressing the gaps in academic preparation (Reber & Smith, 2023) and fostering positive classroom climates with high expectations (Patrick et al., 2022).

The mission of the AP Program has broadened to be inclusive of a broader range of students than when it was first designed. Indeed, the College Board has explicitly committed to “developing college-level knowledge and skills...built on the deep conviction that all students who are academically prepared - no matter their location, background, or socioeconomic status - deserve the opportunity to access the rigor and benefits of AP” (College Board, 2014, in Kolluri, 2018, p. 671). In expanding their purpose, alongside state policies that also increase AP offerings and opportunities, access to rigorous curriculum options has become a relatively cost-effective way of improving student human capital and thereby promoting their academic success in high school and college (Conger et al., 2021).

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