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**Postsecondary Course  
Performance of AP<sup>®</sup> Exam Takers  
in Subsequent Coursework:  
Chemistry, Comparative  
Government, English Language,  
English Literature, Environmental  
Science, Physics 1, Spanish  
Language and Culture, U.S.  
History, and World History**

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## Executive Summary

The Advanced Placement<sup>®</sup> Program (AP<sup>®</sup>) offers high school students the opportunity to take rigorous coursework in high school and receive college credit for AP Exam scores that meet or exceed the requirements of their attending institution. Students receiving AP credit are typically exempted from an introductory-level course or series of courses and are typically able to take more advanced courses in the same subject area. In this study, we compare the subsequent course performance of AP Exam takers who placed out of an introductory college course to students who did not take the AP Exam and completed the introductory course at their respective institutions. Results indicate that AP Exam takers, on average, earn the same or statistically significant higher grades in subsequent courses within the same subject area than students completing the equivalent introductory coursework at their institution. Results provide evidence that AP Exam scores are valid indicators for course credit and placement decisions. The AP Exams covered in this report are:

- AP Chemistry
- AP Comparative Government
- AP English Language and Composition
- AP English Literature and Composition
- AP Environmental Science
- AP Physics 1
- AP Spanish Language and Culture
- AP United States History
- AP World History

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## Introduction

The Advanced Placement (AP) Program offers high school students the opportunity to complete college-level coursework in 38 subjects and demonstrate proficiency by taking a nationally standardized exam at the end of the course. AP Exam scores are criterion referenced<sup>1</sup> and range from 1 to 5. A score of 1 represents “No recommendation for college credit”; 2 represents “Possibly qualified for college credit”; 3 represents “Qualified for college credit”; 4 represents “Well-qualified for college credit”; and 5 represents “Extremely well-qualified for college credit.” The American Council on Education (ACE) recommends awarding college credit or placement into higher-level courses to students scoring 3 or higher. In practice, AP policies vary as the AP score required for credit or placement often differs by institution. The purpose of this study is to compare the subsequent course performance of AP Exam takers who placed out of an introductory college course to students not taking the AP Exam who first took the equivalent introductory course(s) as matriculated college students.<sup>2</sup> For AP Exam takers, the subsequent course will be the first course taken on campus in the same subject area of the AP Exam. For those not taking the AP Exam, the subsequent course is the first course taken following the introductory course(s) for which the AP Exam takers received credit. Specifically, the primary research question is:

*How do AP Exam takers who received credit at an institution perform in the next course taken compared to students who didn't take the AP Exam but took the corresponding introductory course(s) at their institution?*

In this report we compare students who took an AP Exam to students who did not take an AP Exam. While non-AP Exam takers did not take the AP Exam in the particular subject under study, they may have taken the corresponding AP course (or a similar advanced course) while in high school.

## Data and Sample

In this report we investigated nine AP Exams. AP Chemistry, AP English Language, AP English Literature, AP Physics 1, AP Spanish Language, AP U.S. History, and AP World History were studied using data from the 2017 cohort, while AP Comparative Government and AP Environmental Science were studied using data from the 2012 cohort (see Table 1). We used the most recent data possible, which, for most subjects, was course-taking

1. Criterion referenced tests measure student performance against predetermined criteria.

2. Because the primary purpose of this research is to understand the utility of AP Exam scores for making course placement decisions, control variables that may be used in other research to isolate the impact of AP participation on college success measures such as gender, ethnicity, parental income, etc. aren't used as these variables aren't considered when course placement decisions are made.

information from the 2017-18 academic year taken by students who first entered college in fall 2017. Small sample sizes necessitated that we use an older cohort with four years of coursework for AP Comparative Government and AP Environmental Science so as to maximize our sample size. For these AP subjects we used the 2012 college entering class that included coursework through summer 2016.

**Table 1: Summary of Cohorts Used in Analysis**

AP Exam	Cohort Used in Analysis
AP Chemistry	2017
AP Comparative Government	2012
AP English Language and Composition	2017
AP English Literature and Composition	2017
AP Environmental Science	2012
AP Physics 1	2017
AP Spanish Language and Culture	2017
AP United States History	2017
AP World History	2017

Student transcript data from colleges were collected as part of the National SAT<sup>®</sup> Validity study.<sup>3</sup> The sample for all AP Exams was restricted to institutions providing written guidelines on AP credit and placement policies for each cohort year. The number of institutions included in the analysis by AP subject is presented in Table 2.

## Method

In this study the performance of students who took an AP Exam and were exempted from an introductory course on campus is compared to the performance of students who did not take the AP Exam and did take the introductory course on campus. Performance was measured by the grade earned in the subsequent course(s) taken in the same subject area (e.g., chemistry). For AP Exam takers, this represented the first course(s) taken in the same subject area of the AP Exam on campus and for students who did not take the AP Exam, it represents the first course(s) taken following the introductory course for which the AP students received credit. If two or more courses were taken simultaneously, an average of grades is used to measure performance.

3. For more information, see: <http://files.eric.ed.gov/fulltext/ED563103.pdf>.

For each analysis, there were six groups of students: three AP groups and three non-AP comparison groups. The AP groups were divided into students who scored 3 on the AP Exam, students who scored 4 on the AP Exam, and students who scored 5 on the AP Exam. To be included in the AP groups, AP Exam takers eligible for placement could not have taken the equivalent introductory course(s) on campus and must have completed a subsequent course(s) in the same subject. To be included in the non-AP groups, students must not have taken the AP Exam and must have completed the introductory course on campus as well as a subsequent course(s) in the same subject. While AP Exam takers can appear in only one group, students who did not take the AP Exam could appear in multiple groups. The three non-AP groups are divided into those students who participated in courses at the institution that were considered equivalent<sup>4</sup> to the course(s) for which students would earn credit if scoring a 3 on the AP Exam, students who participated in courses at the institution that were considered equivalent to the course(s) for which students would earn credit if scoring a 4 on the AP Exam, and students who participated in courses at the institution<sup>5</sup> that were considered equivalent to the course(s) for which students would earn credit if scoring a 5 on the AP Exam. For example, consider an institution that lists English 100 as the AP equivalent course for AP English Language and Composition scores of 3, 4, or 5. Students who didn't take the AP English Language and Composition Exam but did take English 100 as well as a subsequent English course would be the appropriate comparison group for AP students scoring a 3, 4, or 5 and would appear in all three non-AP comparison groups. More information on identifying AP and non-AP student groups is provided in Appendix A.

Once the AP and non-AP samples were created, a series of regressions were conducted to compare the AP and non-AP groups: The AP 3 group was compared to the non-AP 3 group, the AP 4 group was compared to the non-AP 4 group, and the AP 5 group was compared to the non-AP 5 group. In each regression the outcome was the grade earned in the subsequent course and the predictor was a dichotomous variable representing AP group membership (0, 1).

4. An equivalent course is one for which an AP student receives credit and/or placement per institutional policy at their institution.

5. While decisions on group membership were made based on the policies at the attending institution, results were calculated using all participating institutions.

## Results

Table 2 shows the number of institutions included in the analysis for each AP Exam. We additionally disaggregate that number by the minimum AP score accepted. The number of institutions ranges from 28 in the AP World History sample to 84 in the AP English Language and Composition sample. An AP score of 3 was most frequently the minimum score needed to receive credit or placement.

**Table 2: Summary of Institutional AP Credit- and Placement-Granting Policies**

AP Exam	Number of Institutions Granting Credit/Placement for an AP Exam Score of:			Total Institutions
	3	4	5	
AP Chemistry	33	23	2	58
AP Comparative Government	14	20	2	36
AP English Language and Comp	47	33	4	84
AP English Literature and Comp	39	20	3	62
AP Environmental Science	18	16	0	34
AP Physics 1	23	8	2	33
AP Spanish Language and Culture	19	19	8	46
AP U.S. History	27	11	1	39
AP World History	20	8	0	28

Note: Institutions accepting scores lower than 3 for credit and placement are not reported here and were not considered in our study. All institutions that accept AP scores of 3 for credit and placement also accept scores of 4 and 5, and all schools that accept scores of 4 also accept scores of 5.

**Table 3: Summary of Institutional Characteristics**

Number of Institutions		Chem (58)	Comp Gov't (36)	English Lang (84)	English Lit (62)	Env Science (34)	Physics 1 (33)	Span Lang (46)	U.S. History (39)	World History (28)
U.S. Region	Midwest	24.1	22.2	23.8	17.7	17.6	21.2	17.4	20.5	14.3
	Mid-Atlantic	15.5	16.7	11.9	11.3	2.9	12.1	17.4	10.3	17.9
	New England	6.9	11.1	13.1	8.1	8.8	15.2	8.7	5.1	3.6
	South	19.0	22.2	19.0	24.2	17.6	18.2	17.4	28.2	28.6
	Southwest	15.5	8.3	17.9	19.4	26.5	18.2	13.0	23.1	28.6
	West	19.0	19.4	13.1	17.7	26.5	15.2	26.1	12.8	7.1
	Missing	0.0	0.0	1.2	1.6	0.0	0.0	0.0	0.0	0.0
Control	Public	63.8	58.3	65.5	71.0	55.9	78.8	54.3	76.9	71.4
	Private	36.2	41.7	34.5	29.0	44.1	21.2	45.7	23.1	28.6
Admittance Rate	Under 25	6.9	25.0*	3.6	6.5	32.4*	3.0	6.5	0.0	0.0
	25 to 50	17.2		9.5	11.3		18.2	28.3	20.5	14.3
	50 to 75	43.1	66.7	46.4	45.2	44.1	48.5	34.8	41.0	50.0
	Over 75	29.3	8.3	36.9	33.9	23.5	27.3	28.3	33.3	32.1
	Missing	3.4	0.0	3.6	3.2	0.0	3.0	2.2	5.1	3.6
Undergraduate Enrollment	Small	24.1	0.0	25.0	22.6	8.8	9.1	32.6	25.6	21.4
	Medium	13.8	33.3	26.2	21.0	26.5	12.1	15.2	20.5	21.4
	Large	22.4	22.2	19.0	21.0	29.4	30.3	23.9	15.4	17.9
	Very Large	39.7	44.4	29.8	35.5	35.3	48.5	28.3	38.5	39.3

\*The "Under 25" and "25 to 50" categories were combined in the 2012 cohort.

Note: Institutional Characteristics (U.S. Region, Control, Admittance Rate, and Undergraduate Enrollment) are provided in percentages. For all subjects other than AP Comparative Government and AP Environmental Science the undergraduate enrollment size categories are: small 1,000 to 4,999 students, medium 5,000 to 9,999 students, large 10,000 to 19,999, very large 20,000 and above. For AP Comparative Government and AP Environmental Science the categories are: small 750 to 1,999 students, medium 2,000 to 7,499 students, large 7,500 to 14,999, and very large 15,000 or more students.

Table 4 shows the number of students in each of the AP and non-AP groups as well as the mean subsequent course grades for the non-AP groups and the difference between the AP group mean and non-AP group mean. The number of students included in each analysis varies considerably. We display results if both non-AP group and the corresponding AP group have 15 or more students. In most subjects, sample size was considerably larger than this requirement. In cases where our results are limited by both small sample sizes and a low number of colleges and universities included in the analysis, institutions are encouraged to conduct their own AP Validity studies.<sup>6</sup>

The course means also vary by subject. The mean grades for the non-AP groups range from 2.59 in World History to 3.46 in Physics 1. AP Exam takers scoring a 3 performed the same or better than their respective non-AP comparison group, suggesting that AP Exam scores are valid indicators of adequate preparation for subsequent coursework when applied in accordance with institutional policies. As expected, within subject, the smallest differential is typically between the students scoring a 3 on the AP Exam and their non-AP comparison group whereas the largest differential is between the students scoring a 5 on the AP Exam and their non-AP comparison group.

6. Admitted Class Evaluation Service™ (ACES™) is a free online service of College Board that colleges and universities can use to understand how performance on AP Exams relates to student performance in sequent and subsequent coursework. For more information, visit <https://aces.collegeboard.org/>

**Table 4: Performance Differences in Course(s) Following an Equivalent Course: AP Students Compared to Non-AP Students**

AP Exam		Course Participation and Means			Average Course Performance Differences: AP Students Minus Non-AP Students		
		Non-AP 3	Non-AP 4	Non-AP 5	AP 3	AP 4	AP 5
AP Chemistry	Mean	2.87	2.86	2.82	0.58*	0.74*	0.85*
	N	5,244	6,211	3,788	2,401	1,433	687
AP Comparative Government	Mean	3.14	3.19	3.20	0.29*	0.23*	0.33*
	N	795	1,884	2,002	30	146	112
AP English Language and Composition	Mean	3.11	3.17	3.07	0.33*	0.46*	0.69*
	N	19,915	23,166	13,341	5,457	4,475	1,790
AP English Literature and Composition	Mean	3.17	3.25	3.11	0.33*	0.44*	0.68*
	N	11,187	12,830	5,839	4,241	2,352	817
AP Environmental Science	Mean	2.92	3.01	3.01	0.28*	0.38*	0.67*
	N	1196	1761	1761	381	878	292
AP Physics 1	Mean	2.93	2.96	2.94	0.26*	0.52*	0.81*
	N	168	202	208	589	835	335
AP Spanish Language and Culture	Mean	3.28	3.52	3.46	.30*	.11*	0.26*
	N	805	248	157	573	826	585
AP United States History	Mean	2.88	2.97	3.03	0.34*	0.43*	0.65*
	N	538	493	345	807	752	436
AP World History	Mean	2.59	2.75	3.06	0.65*	0.79*	0.74*
	N	222	271	110	862	470	216

\* P < .05

## Appendix A

### Identifying Equivalent Courses

AP equivalent courses were identified using a College Board database of AP policies at postsecondary institutions for each year included in the analysis. An AP equivalent course is one for which an AP student receives credit and/or placement as per the institutional policy at their institution. We excluded institutions from the study if the courses for which AP credit is awarded are not explicitly stated or if elective credit is awarded. Institutions that awarded course credit for AP Exam scores less than or equal to 2 were excluded from the study.

### Identifying AP Exam Takers and Subsequent Coursework

#### Students

To be included in one of the AP groups, students must have taken the AP Exam and obtained a score greater than or equal to the minimum score required for credit or placement at the postsecondary institution they are attending. Students must also attend an institution that has at least one non-AP student and must not have repeated an equivalent course(s) at their institution.

#### Subsequent Course Identification

For AP students, the subsequent course is the first course(s) taken in the subject area of the AP Exam at the students' campus. If multiple subsequent courses in the same subject area were taken concurrently, a weighted average was calculated and used as the subsequent course grade. A more advanced equivalent course can serve as a subsequent course for a less advanced equivalent course. For example, a course that serves as equivalent to an AP score of 4 or 5 can also serve as a subsequent course for students earning an AP Exam score of 3. A course that serves as an equivalent to an AP score of 5 can serve as a subsequent course for students earning an AP Exam score of 4.

### Identifying the Non-AP Comparison Groups and Subsequent Coursework

#### Students

To be included in one of the non-AP groups students must not have taken the AP Exam, attended a postsecondary institution with one or more AP takers, and must have taken the AP equivalent course(s) as well as a subsequent course on campus. For example, if two courses (e.g., History 101, History 201) are noted as equivalent for an AP Exam (e.g., U.S. History) score (e.g., 3), the student must have taken both courses along with a subsequent history course.

#### Subsequent Course Identification

The next course is the course(s) taken in the first term following the completion of all equivalent courses. If a student took more than one subsequent course in a term, a weighted average was calculated and used as the course grade. Any same subject, nonequivalent course can serve as the subsequent course for all students who have completed the equivalent courses. In addition, a more advanced equivalent course can

serve as a subsequent course to a less advanced equivalent course. For example, any course equivalent to an AP score of 4 or 5 can serve as a subsequent course for a student who took the course(s) on campus that are equivalent to earning a 3 on the AP Exam. Similarly, any course equivalent to an AP score of 5 can also serve as a subsequent course for a student who took the course(s) on campus that are equivalent to earning a 3 or 4 on the AP Exam.

### **Non-AP Comparison Groups**

There are three non-AP comparison groups; those who completed the college course(s) considered equivalent to an AP score of 3 (non-AP 3), those who completed the college course(s) considered equivalent to an AP score of 4 (non-AP 4), and those who completed the college course(s) considered equivalent to an AP score of 5 (non-AP 5). In addition, students must have taken a subsequent course in the same subject. A student could appear in more than one non-AP group and could appear in all three non-AP groups. For example, if a school had one policy for AP Statistics and awarded credit in Statistics 101 for a score of 3, 4, or 5, then a non-AP examinee who took Statistics 101 and another statistics course in a later term would be in the non-AP3, non-AP4, and non-AP5 groups. A school could also have differential policies by AP score that would allow students to be in all three non-AP groups. If a school awarded Statistics 101 for an AP score of 3, and both Statistics 101 and Statistics 102 for AP scores of 4 or 5, then a student who took Statistics 101 in one term, Statistics 102 in a subsequent term, and a next course in a subsequent term would be in all three non-AP comparison groups.

## Appendix B

**Table B-1: Characteristics of Students, AP Chemistry Analyses**

		Non-AP Comparison Groups			AP Groups		
		3	4	5	3	4	5
<b>Number of Students</b>		<b>5,244</b>	<b>6,211</b>	<b>3,788</b>	<b>2,401</b>	<b>1,433</b>	<b>687</b>
Gender	Female	65.8	64.2	63.6	50.5	48.3	38.7
	Male	34.2	35.8	36.4	49.5	51.7	61.3
Race/ Ethnicity	American Indian	0.3	0.2	0.1	0.2	0.1	0.0
	Asian American	8.8	15.8	29.7	31.5	38.7	45.3
	Black/African American	4.9	5.7	3.4	2.3	0.5	0.6
	Hispanic	9.3	10.0	19.0	10.8	6.4	5.5
	White	66.8	57.2	34.7	50.6	49.8	42.8
	Other	3.9	4.0	4.5	4.1	4.1	4.8
	No Response/Missing	6.1	7.1	8.6	0.5	0.5	1.0
High School GPA	A+	17.0	17.9	17.6	22.9	27.8	36.7
	A	38.0	39.1	40.2	46.8	49.1	46.7
	A-	22.0	22.5	21.1	20.7	15.5	11.4
	B+	8.9	8.1	7.2	4.5	2.6	1.6
	B	3.5	2.6	2.1	1.3	0.5	0.7
	B-	0.6	0.4	0.3	0.1	0.1	0.0
	C+	0.0	0.1	0.0	0.2	0.1	0.0
	C	0.0	0.0	0.0	0.0	0.0	0.0
	C- or Lower	0.0	0.0	0.0	0.0	0.0	0.0
	Missing	10.0	9.3	11.5	3.4	4.3	2.9
SAT Composite Score Band	1400-1600	9.9	11.8	18.2	29.4	52.6	76.6
	1200-1390	41.7	48.8	41.2	51.4	31.3	11.6
	1000-1190	25.0	19.0	19.0	4.4	0.3	0.1
	800-990	2.3	0.9	1.8	0.0	0.0	0.0
	400-790	0.0	0.0	0.1	0.0	0.0	0.0
	Missing	21.1	19.4	19.8	14.8	15.8	11.6
Highest Parental Education	No High School Diploma	2.1	2.9	6.6	3.4	2.0	0.7
	High School Diploma	14.1	14.5	18.9	13.3	9.6	6.8
	Associate Degree	6.3	5.6	5.0	4.2	3.3	2.2
	Bachelor's Degree	38.1	34.0	28.9	39.1	35.8	29.3
	Graduate Degree	32.5	35.6	31.8	39.7	49.3	61.0
	Missing	6.9	7.5	8.7	0.4	0.1	0.0

Note: Characteristics of Students (Gender, Race/Ethnicity, High School GPA, SAT Composite Score Band, and Highest Parental Education) are provided in percentages.

**Table B-2: Characteristics of Students, AP Comparative Government and Politics Analyses**

		Non-AP Comparison Groups			AP Groups		
		3	4	5	3	4	5
Number of Students		795	1,884	2,002	30	146	112
Gender	Female	45.7	47.4	46.8	43.3	47.3	41.1
	Male	54.3	52.7	53.2	56.7	52.7	58.9
Race/ Ethnicity	American Indian	0.3	0.4	0.4	0.0	0.7	0.0
	Asian American	3.9	6.2	6.3	10.0	8.2	8.0
	Black/African American	8.8	6.3	6.1	3.3	2.7	1.8
	Hispanic	4.8	5.5	5.7	13.3	4.8	6.3
	White	55.6	57.9	55.4	56.7	65.8	70.5
	Other	2.1	2.6	2.5	3.3	3.4	0.9
	No Response/Missing	24.5	21.1	23.6	13.3	14.4	12.5
High School GPA	A+	5.7	6.1	6.0	3.3	8.9	8.9
	A	21.5	21.7	21.1	40.0	30.8	41.1
	A-	18.7	19.3	18.7	13.3	25.3	18.8
	B+	13.5	15.0	14.4	13.3	11.0	9.8
	B	9.2	10.6	10.1	6.7	4.8	1.8
	B-	2.8	2.7	2.6	6.7	1.4	2.7
	C+	0.9	0.7	0.7	0.0	0.0	0.9
	C	0.4	0.2	0.2	0.0	0.0	0.0
	C- or Lower	0.0	0.0	0.0	0.0	0.7	0.0
Missing	27.4	23.8	26.2	16.7	17.1	16.1	
SAT Composite Score Band	2100–2400	4.3	5.0	4.9	6.7	16.4	23.2
	1800–2090	21.0	26.0	25.6	43.3	48.0	42.0
	1500–1790	36.5	34.8	33.4	36.7	19.2	13.4
	1200–1490	12.7	11.9	11.4	0.0	1.4	0.0
	900–1190	0.3	0.6	0.6	0.0	0.0	0.0
	600–890	0.0	0.0	0.0	0.0	0.0	0.0
	Missing	25.3	21.6	24.2	13.3	15.1	21.4
Highest Parental Education	No High School Diploma	0.9	1.4	1.4	0.0	0.7	0.9
	High School Diploma	12.8	11.6	11.3	13.3	3.4	5.4
	Associate Degree	4.9	3.9	3.8	0.0	3.4	0.9
	Bachelor's Degree	27.7	29.1	27.7	23.3	21.9	24.1
	Graduate Degree	26.2	30.6	30.0	43.3	54.1	56.3
	Missing	27.6	23.4	25.8	20.0	16.4	12.5

Note: Characteristics of Students (Gender, Race/Ethnicity, High School GPA, SAT Composite Score Band, and Highest Parental Education) are provided in percentages.

**Table B-3: Characteristics of Students, AP English Language and Composition Analyses**

		Non-AP Comparison Groups			AP Groups		
		3	4	5	3	4	5
<b>Number of Students</b>		<b>19,915</b>	<b>23,166</b>	<b>13,341</b>	<b>5,457</b>	<b>4,475</b>	<b>1,790</b>
Gender	Female	52.9	54.1	55.9	65.1	64.4	63.7
	Male	47.1	45.9	44.1	34.9	35.6	36.3
Race/ Ethnicity	American Indian	0.5	0.5	0.6	0.2	0.3	0.1
	Asian American	5.5	4.5	5.2	12.1	12.0	16.9
	Black/African American	9.0	8.0	6.9	6.5	3.1	1.6
	Hispanic	17.1	15.2	19.9	18.6	12.4	9.7
	White	52.8	55.8	50.6	58.4	67.7	67.2
	Other	2.3	2.6	2.5	3.3	4.1	3.9
	No Response/Missing	12.8	13.3	14.4	0.8	0.5	0.6
High School GPA	A+	3.2	3.3	3.3	12.3	18.7	27.4
	A	16.3	17.0	16.7	33.8	41.5	45.3
	A-	21.9	21.7	20.7	27.1	23.6	18.7
	B+	20.3	19.8	19.5	13.7	8.0	4.0
	B	14.0	13.5	13.5	6.7	3.2	1.8
	B-	5.3	4.8	4.8	1.6	0.5	0.2
	C+	1.8	1.5	1.4	0.2	0.2	0.0
	C	0.6	0.5	0.5	0.1	0.1	0.1
	C- or Lower	0.1	0.1	0.1	0.0	0.0	0.0
	Missing	16.6	18.0	19.5	4.5	4.3	2.5
SAT Composite Score Band	1400-1600	0.9	1.3	0.9	3.4	15.5	44.1
	1200-1390	14.3	15.0	12.9	45.4	54.3	35.9
	1000-1190	38.9	36.6	37.3	33.4	11.4	2.8
	800-990	16.1	13.8	16.6	1.1	0.2	0.0
	400-790	0.7	0.6	0.7	0.0	0.0	0.0
	Missing	29.1	32.7	31.5	16.7	18.6	17.2
Highest Parental Education	No High School Diploma	5.1	3.6	4.8	4.3	2.3	1.1
	High School Diploma	21.1	18.9	21.6	20.2	12.8	8.7
	Associate Degree	7.1	6.7	6.9	6.7	5.7	3.0
	Bachelor's Degree	32.7	33.6	30.7	40.1	41.3	36.9
	Graduate Degree	18.7	21.5	19.2	28.1	37.6	49.8
	Missing	15.3	15.8	16.8	0.6	0.4	0.5

Note: Characteristics of Students (Gender, Race/Ethnicity, High School GPA, SAT Composite Score Band, and Highest Parental Education) are provided in percentages.

**Table B-4: Characteristics of Students, AP English Literature and Composition Analyses**

		Non-AP Comparison Groups			AP Groups		
		3	4	5	3	4	5
<b>Number of Students</b>		<b>11,187</b>	<b>12,830</b>	<b>5,839</b>	<b>4,241</b>	<b>2,352</b>	<b>817</b>
Gender	Female	54.0	54.1	56.9	65.9	69.3	71.9
	Male	46.0	45.9	43.1	34.1	30.7	28.2
Race/ Ethnicity	American Indian	0.6	0.6	1.1	0.3	0.0	0.2
	Asian American	4.2	4.3	4.7	11.6	13.6	15.5
	Black/African American	9.2	8.4	6.8	6.4	2.7	0.7
	Hispanic	13.4	11.2	17.1	18.7	12.4	10.0
	White	61.6	62.4	54.7	58.8	66.5	68.4
	Other	2.6	3.2	3.6	3.5	4.2	4.3
	No Response/Missing	8.3	9.9	12.0	0.8	0.6	0.7
High School GPA	A+	3.8	3.8	3.1	14.3	20.7	32.6
	A	19.0	19.4	17.9	34.8	42.4	43.5
	A-	24.6	23.5	21.6	26.2	21.1	15.4
	B+	21.6	20.5	20.6	12.3	7.7	3.3
	B	13.9	13.2	14.7	5.9	3.3	2.1
	B-	4.8	4.2	4.9	1.1	0.7	0.1
	C+	1.6	1.4	1.5	0.2	0.3	0.0
	C	0.6	0.5	0.6	0.1	0.0	0.1
	C- or Lower	0.1	0.1	0.1	0.1	0.0	0.0
	Missing	10.0	13.6	15.0	5.1	3.7	2.9
SAT Composite Score Band	1400-1600	1.2	1.9	1.4	5.3	21.5	47.6
	1200-1390	18.2	19.0	14.5	48.0	50.2	35.1
	1000-1190	42.9	38.4	40.8	27.5	9.5	2.0
	800-990	16.5	12.5	17.6	0.7	0.0	0.0
	400-790	0.7	0.7	0.9	0.0	0.0	0.0
	Missing	20.5	27.6	24.8	18.5	18.8	15.3
Highest Parental Education	No High School Diploma	4.4	2.5	4.0	4.3	2.0	0.4
	High School Diploma	19.4	16.9	21.0	20.4	12.9	7.6
	Associate Degree	7.4	6.6	6.8	6.2	4.3	2.7
	Bachelor's Degree	36.0	36.6	32.3	40.4	40.6	35.0
	Graduate Degree	21.8	24.9	20.6	28.3	39.9	53.7
	Missing	11.1	12.6	15.4	0.5	0.2	0.6

Note: Characteristics of Students (Gender, Race/Ethnicity, High School GPA, SAT Composite Score Band, and Highest Parental Education) are provided in percentages.

**Table B-5: Characteristics of Students, AP Environmental Science Validity Analyses**

		Non-AP Comparison Groups			AP Groups		
		3	4	5	3	4	5
<b>Number of Students</b>		<b>1,196</b>	<b>1,761</b>	<b>1,761</b>	<b>381</b>	<b>878</b>	<b>292</b>
Gender	Female	57.9	56.5	56.5	55.6	51.5	53.1
	Male	42.1	43.6	43.6	44.4	48.5	46.9
Race/ Ethnicity	American Indian	1.2	1.0	1.0	0.0	0.1	0.7
	Asian American	7.8	7.8	7.8	5.8	9.9	8.6
	Black/African American	4.6	4.1	4.1	1.6	2.1	0.7
	Hispanic	7.8	7.0	7.0	11.3	7.2	3.4
	White	64.5	59.1	59.1	73.8	72.3	73.6
	Other	2.3	2.2	2.2	2.6	2.4	5.1
	No Response/Missing	12.0	18.8	18.8	5.0	6.0	7.9
	High School GPA	A+	5.5	6.5	6.5	9.2	14.0
	A	20.0	20.2	20.2	35.2	32.0	39.4
	A-	24.4	22.4	22.4	30.2	28.0	20.9
	B+	19.7	17.3	17.3	11.3	12.5	6.5
	B	10.2	8.3	8.3	5.8	4.4	1.4
	B-	4.3	3.1	3.1	1.0	0.7	0.3
	C+	1.4	1.2	1.2	0.3	0.0	0.0
	C	0.1	0.2	0.2	0.3	0.1	0.0
	C- or Lower	0.3	0.2	0.2	0.0	0.1	0.3
	Missing	14.1	20.6	20.6	6.8	8.1	9.9
SAT Composite Score Band	2100-2400	1.3	2.3	2.3	0.8	7.3	27.1
	1800-2090	16.9	19.9	19.9	38.8	54.7	50.7
	1500-1790	45.2	39.6	39.6	51.7	30.8	10.6
	1200-1490	23.1	18.0	18.0	3.1	0.9	0.0
	900-1190	2.3%	1.7	1.7	0.0	0.0	0.0
	600-890	0.0	0.0	0.0	0.0	0.0	0.0
	Missing	11.2	18.5	18.5	5.5	6.4	11.6
Highest Parental Education	No High School Diploma	2.8	2.3	2.3	2.4	1.1	0.0
	High School Diploma	18.1	14.4	14.4	14.4	7.9	5.1
	Associate Degree	6.4	5.1	5.1	6.0	3.5	2.1
	Bachelor's Degree	32.4	29.0	29.0	40.7	41.2	38.4
	Graduate Degree	24.1	26.6	26.6	30.4	39.9	46.2
	Missing	16.1	22.6	22.6	6.0	6.4	8.2

Note: Characteristics of Students (Gender, Race/Ethnicity, High School GPA, SAT Composite Score Band, and Highest Parental Education) are provided in percentages.

**Table B-6: Characteristics of Students, AP Physics 1 Validity Analyses**

		Non-AP Comparison Groups			AP Groups		
		3	4	5	3	4	5
<b>Number of Students</b>		<b>168</b>	<b>202</b>	<b>208</b>	<b>589</b>	<b>835</b>	<b>335</b>
Gender	Female	43.1	45.6	42.9	22.6	18.8	13.4
	Male	56.9	54.4	57.1	77.4	81.2	86.6
Race/ Ethnicity	American Indian	0.6	0.5	0.5	0.2	0.1	0.0
	Asian American	4.2	8.4	8.2	13.2	14.1	15.8
	Black/African American	2.4	2.5	2.4	1.5	1.3	1.5
	Hispanic	13.7	12.4	12.5	11.5	8.4	6.3
	White	66.1	62.4	61.5	68.6	71.5	70.5
	Other	3.6	3.0	2.4	4.8	4.3	4.5
	No Response/Missing	9.5	10.9	12.5	0.2	0.2	1.5
High School GPA	A+	13.1	13.4	13.5	19.9	29.8	39.7
	A	32.7	33.2	32.7	43.5	43.7	45.4
	A-	16.7	15.8	16.4	21.9	16.4	10.5
	B+	12.5	11.9	11.1	7.8	4.3	1.5
	B	7.1	6.9	6.7	2.9	2.0	0.6
	B-	4.8	4.5	3.4	0.5	0.7	0.0
	C+	0.6	0.5	1.0	0.2	0.1	0.0
	C	0.0	0.0	0.0	0.0	0.0	0.0
	C- or Lower	0.0	0.0	0.0	0.0	0.0	0.0
Missing	12.5	13.9	15.4	3.4	2.9	2.4	
SAT Composite Score Band	1400-1600	8.9	11.4	10.6	25.3	48.1	69.6
	1200-1390	29.8	31.2	32.2	48.2	32.7	13.4
	1000-1190	37.5	32.2	31.3	4.4	0.6	0.3
	800-990	5.4	4.5	3.9	0.0	0.0	0.0
	400-790	0.0	0.0	0.0	0.0	0.0	0.0
	Missing	18.5	20.8	22.1	22.1	18.6	16.7
Highest Parental Education	No High School Diploma	1.2	1.5	1.9	1.0	0.8	0.3
	High School Diploma	24.4	22.8	21.6	11.4	7.0	2.4
	Associate Degree	6.6	5.5	5.3	3.6	4.0	3.6
	Bachelor's Degree	33.9	32.7	34.6	45.2	40.2	33.4
	Graduate Degree	22.6	25.7	23.1	38.7	47.9	59.7
	Missing	11.3	11.9	13.5	0.2	0.1	0.6

Note: Characteristics of Students (Gender, Race/Ethnicity, High School GPA, SAT Composite Score Band, and Highest Parental Education) are provided in percentages.

**Table B-7: Characteristics of Students, AP Spanish Language and Culture Validity Analyses**

		Non-AP Comparison Groups			AP Groups		
		3	4	5	3	4	5
<b>Number of Students</b>		<b>805</b>	<b>248</b>	<b>157</b>	<b>573</b>	<b>826</b>	<b>585</b>
Gender	Female	67.5	75.1	76.0	75.0	74.9	75.4
	Male	32.5	24.9	24.0	25.0	25.1	24.6
Race/ Ethnicity	American Indian	0.0	0.0	0.0	0.0	0.0	0.0
	Asian American	5.1	5.2	3.2	5.8	5.0	5.5
	Black/African American	6.0	8.1	4.5	4.2	1.9	0.5
	Hispanic	10.8	12.1	10.8	17.5	29.8	52.8
	White	69.3	61.3	56.7	67.7	59.2	38.6
	Other	3.2	3.6	4.5	4.2	3.2	2.1
	No Response/Missing	5.6	9.7	20.4	0.7	1.0	0.5
High School GPA	A+	11.8	18.6	9.6	11.7	14.8	19.3
	A	31.7	34.3	32.5	43.6	43.7	43.6
	A-	25.1	17.3	15.3	25.7	25.2	22.2
	B+	14.5	10.5	10.2	9.4	7.3	6.7
	B	6.1	5.2	4.5	2.4	1.8	2.7
	B-	1.2	2.0	3.2	0.5	0.7	0.7
	C+	0.1	0.0	0.0	0.0	0.0	0.0
	C	0.0	0.4	0.6	0.0	0.0	0.2
	C- or Lower	0.0	0.0	0.0	0.0	0.0	0.0
Missing	9.4	11.7	24.2	6.6	6.5	4.6	
SAT Composite Score Band	1400-1600	6.1	11.7	5.1	6.6	16.6	27.2
	1200-1390	37.6	33.9	29.9	45.5	36.8	28.5
	1000-1190	27.1	20.2	17.8	17.6	14.5	20.7
	800-990	2.2	2.8	3.8	2.3	3.6	4.6
	400-790	0.1	0.0	0.0	0.0	0.2	0.0
	Missing	26.8	31.5	43.3	27.9	28.2	19.0
Highest Parental Education	No High School Diploma	0.9	0.8	0.6	2.1	9.1	17.8
	High School Diploma	12.3	11.7	14.0	11.5	13.4	19.8
	Associate Degree	6.8	4.4	4.5	4.2	2.5	2.4
	Bachelor's Degree	40.6	32.3	26.1	42.1	35.4	24.8
	Graduate Degree	33.4	41.5	35.0	39.8	39.2	35.0
	Missing	6.0	9.3	19.8	0.4	0.4	0.2

Note: Characteristics of Students (Gender, Race/Ethnicity, High School GPA, SAT Composite Score Band, and Highest Parental Education) are provided in percentages.

**Table B-8: Characteristics of Students, AP United States History Validity Analyses**

		Non-AP Comparison Groups			AP Groups		
		3	4	5	3	4	5
<b>Number of Students</b>		<b>538</b>	<b>493</b>	<b>345</b>	<b>807</b>	<b>752</b>	<b>436</b>
Gender	Female	50.7	53.7	53.0	53.2	49.3	53.7
	Male	49.3	46.3	47.0	46.8	50.7	46.3
Race/ Ethnicity	American Indian	0.0	0.0	0.0	0.1	0.7	0.0
	Asian American	4.1	4.3	4.4	9.4	8.0	12.4
	Black/African American	8.2	9.1	11.9	4.3	2.1	2.5
	Hispanic	10.0	9.9	10.4	16.6	13.4	11.5
	White	63.2	62.7	59.4	65.1	70.5	67.4
	Other	2.2	2.8	3.5	4.3	4.8	5.7
	No Response/Missing	12.3	11.2	10.4	0.1	0.5	0.5
	High School GPA	A+	8.0	7.9	9.0	11.4	14.1
	A	17.7	20.7	22.0	27.8	36.6	46.1
	A-	18.2	19.5	20.6	30.5	24.9	22.3
	B+	19.1	18.5	16.8	16.6	11.8	6.9
	B	14.5	11.2	11.3	8.8	5.1	3.2
	B-	6.9	6.7	6.4	1.6	1.7	0.5
	C+	1.9	2.0	1.2	0.3	0.3	0.2
	C	0.6	0.6	0.6	0.1	0.0	0.0
	C- or Lower	0.0	0.0	0.0	0.0	0.0	0.0
	Missing	13.2	13.0	12.2	3.0	5.6	2.5
SAT Composite Score Band	1400-1600	3.3	4.3	5.8	5.9	13.4	29.4
	1200-1390	17.1	15.4	15.7	47.3	51.1	46.6
	1000-1190	39.2	38.3	40.0	33.0	18.5	8.3
	800-990	13.0	14.2	12.2	1.6	0.1	0.0
	400-790	0.7	0.8	0.9	0.0	0.0	0.0
	Missing	26.6	27.0	25.5	12.1	16.9	15.8
Highest Parental Education	No High School Diploma	1.9	1.8	1.5	3.5	1.5	1.6
	High School Diploma	18.6	17.4	15.1	17.8	14.2	8.5
	Associate Degree	5.6	5.7	6.7	7.6	4.5	4.6
	Bachelor's Degree	33.6	34.3	32.5	41.8	41.8	34.4
	Graduate Degree	24.7	25.8	29.3	29.2	37.8	50.7
	Missing	15.6	15.0	15.1	0.1	0.3	0.2

Note: Characteristics of Students (Gender, Race/Ethnicity, High School GPA, SAT Composite Score Band, and Highest Parental Education) are provided in percentages.

**Table B-9: Characteristics of Students, AP World History Validity Analyses**

		Non-AP Comparison Groups			AP Groups		
		3	4	5	3	4	5
<b>Number of Students</b>		<b>222</b>	<b>271</b>	<b>110</b>	<b>862</b>	<b>470</b>	<b>216</b>
Gender	Female	38.4	43.1	49.0	53.3	48.3	42.6
	Male	61.6	56.9	51.0	46.8	51.7	57.4
Race/ Ethnicity	American Indian	0.9	1.1	1.8	0.7	0.0	0.0
	Asian American	3.6	4.4	4.6	11.6	16.2	26.4
	Black/African American	3.2	3.0	4.6	4.4	3.6	0.5
	Hispanic	11.3	9.6	10.9	24.6	13.4	11.6
	White	68.5	67.9	66.4	54.5	61.9	56.9
	Other	0.9	0.7	0.9	3.7	4.3	3.7
	No Response/Missing	11.7	13.3	10.9	0.5	0.6	0.9
High School GPA	A+	4.1	4.4	9.1	18.8	24.7	29.2
	A	18.5	20.3	20.9	33.3	37.9	48.2
	A-	19.4	19.9	19.1	23.4	22.8	19.4
	B+	23.0	22.1	19.1	13.6	7.7	1.4
	B	13.5	12.6	17.3	6.3	3.6	1.4
	B-	3.6	3.0	0.9	2.1	0.9	0.0
	C+	3.2	2.6	0.9	0.4	0.2	0.0
	C	0.5	0.4	0.0	0.4	0.0	0.0
	C- or Lower	0.0	0.0	0.0	0.0	0.0	0.0
	Missing	14.4	14.8	12.7	1.9	2.3	0.5
SAT Composite Score Band	1400-1600	0.5	0.4	0.9	12.3	29.8	61.6
	1200-1390	12.2	15.5	16.4	50.0	47.4	27.3
	1000-1190	44.6	43.2	40.9	26.6	8.5	2.8
	800-990	19.8	14.8	16.4	1.3	0.2	0.0
	400-790	0.9	0.7	1.8	0.0	0.0	0.0
	Missing	22.1	25.5	23.6	9.9	14.0	8.3
Highest Parental Education	No High School Diploma	3.2	3.0	0.9	3.1	0.4	0.5
	High School Diploma	26.6	21.0	19.1	18.0	10.9	6.9
	Associate Degree	6.8	8.1	12.7	6.4	3.6	3.2
	Bachelor's Degree	28.4	31.0	32.7	41.1	43.0	36.1
	Graduate Degree	18.0	19.9	20.9	31.1	41.9	53.2
	Missing	17.1	17.0	13.6	0.4	0.2	0.0

Note: Characteristics of Students (Gender, Race/Ethnicity, High School GPA, SAT Composite Score Band, and Highest Parental Education) are provided in percentages.



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