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## Postsecondary Course Performance of AP ${ }^{\circledR}$ Exam Takers in Subsequent Coursework: Biology, Languages, and Studio Art

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## Executive Summary

The Advanced Placement Program ${ }^{\circledR}$ (AP ${ }^{\circledR}$ ) 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 do 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 Biology
- AP Spanish Literature and Culture
- AP Chinese Language and Culture
- AP Japanese Language and Culture
- AP French Language and Culture
- AP German Language and Culture
- AP Italian Language and Culture
- AP Studio Art: 2-D Design
- AP Studio Art: 3-D Design
- AP Studio Art: Drawing


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## Introduction

The Advanced Placement ${ }^{\oplus}\left(\mathrm{AP}^{\circledR}\right)$ 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 ${ }^{1}$ 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 wellqualified 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 ${ }^{2}$. 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 a prior AP Validity report (Wyatt, Jagesic, Godfrey, 2018) ${ }^{3}$ we relied on one student cohort to examine the grade differences in students earning college credit via an AP Exam and students taking the equivalent course on the college campus. In this study, we had to combine multiple cohorts in order to yield sample sizes that are large enough for analysis. The number of cohorts combined for each analysis was determined by the number of

[^0]students taking the AP Exam and scoring a 3 or higher and timing around significant redesign changes to AP Exam titles. The cohorts used for each exam are outlined in Table 1. Our goal was to use cohorts where we had four years of completed college coursetaking data available for students. As of the writing of this report, the most recent cohort for which we have four years of course-taking data available is 2011. We added additional cohorts with fewer years of college course-taking data when it was necessary to do so in order to yield viable sample sizes for analysis.

AP Biology and AP Spanish Literature and Culture were both redesigned in 2013. Because of the redesign we used the 2014 cohort of students for analysis where one year of completed college course-taking data was available. For AP Chinese Language and Culture and AP Japanese Language and Culture we used cohorts 2008-2012. The 2008-2011 cohorts used for analyses had four years of completed college course-taking data, while the 2012 cohort had three years of completed college course-taking data. AP French Language and Culture and AP German Language and Culture were both redesigned in 2012. As a result, we used the 2013 cohort of students for analysis where two years of completed college course-taking data were available. AP Italian Language and Culture was redesigned in 2011, and the post-redesign cohorts used for analyses were 2012, 2013, and 2014. The 2012 cohort used for AP Italian analyses had three years of completed college coursetaking data, the 2013 cohort had two years of completed college course-taking data, and the 2014 cohort had one year of completed college course-taking data. It was necessary to combine three cohorts for the AP Italian analyses because it is a lower-volume exam and all available cohorts had to be combined to yield more than 15 AP Exam takers in each score group (3, 4, and 5).

## Table 1: Summary of Cohorts Used in Analysis

| AP Exam | Cohorts Used in Analysis |
| :--- | :--- |
| AP Biology | 2014 (1 cohort) |
| AP Spanish Literature and Culture | 2014 (1 cohort) |
| AP Chinese Language and Culture | $2008-2012$ (5 cohorts) |
| AP Japanese Language and Culture | $2008-2012$ (5 cohorts) |
| AP French Language and Culture | 2013 (1 cohort) |
| AP German Language and Culture | 2013 (1 cohort) |
| AP Italian Language and Culture | $2012-2014$ (3 cohorts) |
| AP Studio Art: 2-D Design | $2008-2012$ (5 cohorts) |

For AP Studio Art: 2-D Design and AP Studio Art: Drawing, we used cohorts 2008-2012. The 2008-2011 cohorts used for analyses had four years of completed college course-taking data. The 2012 cohort had three years of completed college course-taking data. For AP Studio Art: 3-D Design, we used cohorts 2008-2014. Cohorts 2008-2011 had four years of college course-taking data. The 2012 cohort had three years of completed college coursetaking data, the 2013 cohort had two years of completed college course-taking data, and the 2014 cohort had one year of completed college course-taking data. It was necessary to use the additional cohorts for AP Studio Art: 3-D Design, both because it is a lower-volume exam and because few institutions in our sample had AP policies that have a specific equivalent course for students who get a 3, 4, or 5 on the AP Studio Art: 3-D Design Exam.

Student transcript data for all included cohorts was collected as part of the National SAT ${ }^{\oplus}$ Validity study. ${ }^{4}$ 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., German Language). 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.

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

[^1]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 ${ }^{5}$ 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 ${ }^{6}$ 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 German 100 as the AP equivalent course for AP German Language and Culture scores of 3, 4 , or 5 . Students who did not take the AP German Language and Culture Exam but did take German 100 as well as a subsequent statistics course would be the appropriate comparison group for all 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).

[^2]
## Results

Table 2 shows the number of institutions included in the analysis of each AP Exam subject. We additionally disaggregate that number by the minimum AP score accepted. The number of institutions range from 16 in Studio Art: 3-D Design to 50 in French Language and Culture. 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

|  | Number of <br>  <br> AP Exam <br> for an AP Exam Score of: |  |  |  |
| :--- | :---: | :---: | :---: | :---: |
| AP Biology | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | Total Institutions |
| AP Spanish Literature and Culture | 10 | 14 | 0 | 41 |
| AP Chinese Language and Culture | 16 | 5 | 2 | 24 |
| AP Japanese Language and Culture | 16 | 3 | 1 | 23 |
| AP French Language and Culture | 34 | 16 | 0 | 20 |
| AP German Language and Culture | 26 | 8 | 0 | 50 |
| AP Italian Language and Culture | 13 | 6 | 0 | 34 |
| AP Studio Art: 2-D Design | 12 | 8 | 1 | 19 |
| AP Studio Art: 3-D Design | 9 | 7 | 0 | 21 |
| AP Studio Art: Drawing | 18 | 14 | 0 | 16 |

Notes: 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 displays the characteristics of the postsecondary institutions in each sample. Descriptive statistics are included for region, control, selectivity, and size. Descriptive characteristics at the student level by AP Exam are provided in Appendix B.

Table 3: Summary of Institutional Characteristics

| Number of Institutions |  | Biology <br> (41) | Spanish Literature (24) | Chinese (23) | Japanese <br> (20) | French (50) | German (34) | Italian (19) | Studio 2-D <br> (21) | Studio 3-D <br> (16) | Studio Drawing (32) |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| U.S. Region | Midwest | 24.4 | 25.0 | 30.4 | 25.0 | 20.0 | 29.4 | 26.3 | 14.3 | 12.5 | 12.5 |
|  | Mid-Atlantic | 9.8 | 8.3 | 13.0 | 20.0 | 10.0 | 11.8 | 31.6 | 4.8 | 0.0 | 21.9 |
|  | New England | 0.0 | 4.2 | 4.3 | 5.0 | 8.0 | 5.9 | 15.8 | 19.0 | 18.8 | 12.5 |
|  | South | 31.7 | 33.3 | 21.7 | 20.0 | 30.0 | 26.5 | 10.5 | 19.0 | 12.5 | 18.8 |
|  | Southwest | 19.5 | 16.7 | 17.4 | 5.0 | 16.0 | 14.7 | 0.0 | 33.3 | 43.8 | 28.1 |
|  | West | 14.6 | 12.5 | 13.0 | 25.0 | 16.0 | 11.8 | 15.8 | 9.5 | 12.5 | 6.3 |
| Control | Public | 63.4 | 58.3 | 60.9 | 75.0 | 50.0 | 64.7 | 63.2 | 81.0 | 81.3 | 68.8 |
|  | Private | 36.6 | 41.7 | 39.1 | 25.0 | 50.0 | 35.3 | 36.8 | 19.0 | 18.8 | 31.3 |
| Admittance Rate | Under 50 | 14.6 | 33.3 | 26.1 | 20.0 | 28.0 | 41.2 | 26.3 | 4.8 | 18.8 | 9.4 |
|  | 50 to 75 | 56.1 | 58.3 | 60.9 | 70.0 | 60.0 | 52.9 | 68.4 | 81.0 | 50.0 | 71.9 |
|  | Over 75 | 29.3 | 8.3 | 13.0 | 10.0 | 12.0 | 5.9 | 5.3 | 14.3 | 31.3 | 18.8 |
| Undergraduate Enrollment | Small | 14.6 | 8.3 | 4.3 | 0.0 | 16.0 | 2.9 | 0.0 | 4.8 | 0.0 | 9.4 |
|  | Medium | 29.3 | 20.8 | 21.7 | 15.0 | 22.0 | 14.7 | 10.5 | 23.8 | 25.0 | 28.1 |
|  | Large | 24.4 | 25.0 | 26.1 | 10.0 | 20.0 | 23.5 | 31.6 | 42.9 | 37.5 | 25.0 |
|  | Very Large | 31.7 | 45.8 | 47.8 | 75.0 | 42.0 | 58.8 | 52.6 | 28.6 | 37.5 | 37.5 |
|  | Missing | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 5.3 | 0.0 | 0.0 | 0.0 |

Note: Institutional Characteristics (U.S. Region, Control, Admittance Rate, and Undergraduate Enrollment) are provided in percent.

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. The AP Italian Language and Culture group of students scoring a 5 on the exam is not shown as there were fewer than 15 students. The popularity of the subject and the number of institutions with explicitly stated AP credit and placement policies in our sample are among the primary determinants of sample size. In cases such as Studio Art 3D, 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. (The Admitted Class Evaluation Service ${ }^{\text {TM }}$ [ACES] is a free online service from the 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/.) For all subjects, the number of students in the non-AP groups is considerably larger than the number of students in the AP groups.

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 Biology | Mean | 2.72 | 2.87 | 2.82 | 0.44* | 0.46* | 0.80* |
|  | $N$ | 755 | 1,860 | 454 | 735 | 666 | 204 |
| AP Spanish Literature and Culture | Mean | 3.20 | 3.47 | 3.47 | 0.40* | 0.21* | 0.31* |
|  | $N$ | 356 | 272 | 158 | 30 | 57 | 28 |
| AP Chinese Language and Culture | Mean | 3.45 | 3.52 | 3.50 | 0.23 | 0.31* | 0.24* |
|  | $N$ | 995 | 809 | 827 | 21 | 31 | 169 |
| AP Japanese Language and Culture | Mean | 3.32 | 3.38 | 3.38 | 0.22 | 0.31 | 0.23* |
|  | $N$ | 983 | 837 | 841 | 26 | 24 | 76 |
| AP French Language and Culture | Mean | 3.14 | 3.27 | 3.30 | 0.37* | 0.36* | 0.52* |
|  | $N$ | 691 | 436 | 268 | 240 | 233 | 117 |
| AP German Language and Culture | Mean | 3.28 | 3.33 | 3.46 | .20* | .30* | . $44^{*}$ |
|  | $N$ | 404 | 231 | 90 | 73 | 67 | 52 |


| AP Italian Language and | Mean | 3.36 | 3.44 | 3.34 | $0.30^{*}$ | $0.27^{*}$ | N/A |
| :--- | :--- | :---: | :---: | :---: | :---: | :---: | :---: |
|  | $N$ | 729 | 479 | 263 | 25 | 37 | N/A |
| AP Studio Art: 2-D Design | Mean | 3.34 | 3.36 | 3.37 | $0.18^{*}$ | $0.29^{*}$ | $0.32^{*}$ |
|  | $N$ | 1,214 | 1,744 | 1,785 | 98 | 140 | 83 |
| AP Studio Art: 3-D Design | Mean | 3.36 | 3.36 | 3.36 | $-0.34^{*}$ | $0.43^{*}$ | 0.13 |
| AP Studio Art: Drawing | Mean | 3.37 | 3.34 | 3.34 | $0.22^{*}$ | $0.21^{*}$ | $0.34^{*}$ |

* $\mathrm{P}<.05$

The course means also vary by subject. The mean grades for the non-AP groups range from 2.72 in Biology to 3.52 in Chinese Language and Literature. In all subjects except for AP Studio Art: 3-D Design, examinees scoring a 3, the AP Exam takers 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 nonAP comparison group whereas the largest differential is between the students scoring a 5 on the AP Exam and their non-AP comparison group.

## 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 her or his 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

This subsequent course is the first course(s) taken in the subject area of the AP Exam at the students' campus. If multiple courses in the same subject area of the AP Exam were taken in the same term, then 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 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., Hist 101, Hist 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, then a weighted average was calculated and used as the course grade. Any same-subject nonequivalent course can serve as the next 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 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 Stat 101 for a score of 3, 4, or 5 , then a non-AP examinee who took Stat 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 Stat 101 for an AP score of 3, and both Stat 101 and Stat 102 for AP scores of 4 or 5, then a student who took Stat 101 in one term, Stat 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 in the AP Biology Analyses

|  |  | Non-AP Comparison Groups |  |  | AP Groups |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 3 | 4 | 5 | 3 | 4 | 5 |
| Number of Students |  | 755 | 1,860 | 454 | 735 | 666 | 204 |
| Gender | Female | 75.1 | 69.5 | 72.9 | 69.8 | 61.6 | 60.8 |
|  | Male | 24.9 | 30.5 | 27.1 | 30.2 | 38.4 | 39.2 |
|  | Missing | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Race/ Ethnicity | American Indian | 0.3 | 0.2 | 0.7 | 0.1 | 0.3 | 1.0 |
|  | Asian American | 2.1 | 6.3 | 5.5 | 15.0 | 20.4 | 38.7 |
|  | Black/African American | 7.2 | 5.1 | 5.5 | 3.7 | 2.1 | 1.0 |
|  | Hispanic | 10.7 | 6.3 | 9.5 | 3.3 | 3.8 | 3.4 |
|  | White | 49.5 | 55.8 | 51.1 | 57.6 | 54.1 | 48.0 |
|  | Other | 2.0 | 2.0 | 2.9 | 2.6 | 3.6 | 2.0 |
|  | No Response/Missing | 28.2 | 24.4 | 24.9 | 17.8 | 15.8 | 5.9 |
| High School GPA | A+ | 6.9 | 13.3 | 9.9 | 14.0 | 22.7 | 37.3 |
|  | A | 26.6 | 28.9 | 28.2 | 36.3 | 40.7 | 39.2 |
|  | A- | 18.0 | 18.6 | 17.6 | 18.2 | 14.4 | 10.8 |
|  | B+ | 11.3 | 8.7 | 10.8 | 7.9 | 4.2 | 3.4 |
|  | B | 5.8 | 3.7 | 5.3 | 3.5 | 1.5 | 1.0 |
|  | B- | 1.6 | 0.7 | 0.4 | 0.4 | 0.3 | 0.0 |
|  | C+ | 0.4 | 0.2 | 0.4 | 0.4 | 0.0 | 0.0 |
|  | C | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | C- or Lower | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | Missing | 29.3 | 25.8 | 27.3 | 19.2 | 16.2 | 8.3 |
| SAT <br> Composite <br> Score Band | 2100-2400 | 0.8 | 2.0 | 1.1 | 1.4 | 14.4 | 53.9 |
|  | 1800-2090 | 8.6 | 21.9 | 14.8 | 32.5 | 50.8 | 33.8 |
|  | 1500-1790 | 32.7 | 37.3 | 33.5 | 43.3 | 16.4 | 3.4 |
|  | 1200-1490 | 27.5 | 13.7 | 24.2 | 3.9 | 0.6 | 0.0 |
|  | 900-1190 | 2.5 | 0.9 | 2.2 | 0.1 | 0.0 | 0.0 |
|  | 600-890 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | Missing | 27.8 | 24.2 | 24.2 | 18.8 | 17.9 | 8.8 |


| Highest Parental Education | No High School Diploma | 2.1 | 1.0 | 2.0 | 1.1 | 0.8 | 0.0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | High School Diploma | 18.0 | 14.0 | 18.3 | 12.5 | 7.2 | 6.9 |
|  | Associate Degree | 7.8 | 6.6 | 8.8 | 4.9 | 2.6 | 2.5 |
|  | Bachelor's Degree | 24.8 | 28.1 | 23.6 | 34.8 | 31.7 | 32.4 |
|  | Graduate Degree | 17.4 | 25.1 | 21.4 | 28.2 | 42.2 | 52.5 |
|  | Missing | 29.9 | 25.3 | 26.0 | 18.5 | 15.6 | 5.9 |

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

Table B-2:Characteristics of Students in the AP Spanish Literature and Culture Analyses

|  |  | Non-AP Comparison Groups |  |  | AP Groups |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 3 | 4 | 5 | 3 | 4 | 5 |
| Number of Students |  | 356 | 272 | 158 | 30 | 57 | 28 |
| Gender | Female | 69.1 | 74.6 | 74.1 | 70.0 | 78.9 | 71.4 |
|  | Male | 30.9 | 25.4 | 25.9 | 30.0 | 21.1 | 28.6 |
|  | Missing | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Race/ <br> Ethnicity | American Indian | 0.6 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | Asian American | 5.1 | 5.1 | 5.7 | 6.7 | 5.3 | 17.9 |
|  | Black/African American | 4.5 | 5.1 | 5.1 | 0.0 | 1.8 | 0.0 |
|  | Hispanic | 7.9 | 8.8 | 10.1 | 26.7 | 22.8 | 21.4 |
|  | White | 65.2 | 63.2 | 63.9 | 53.3 | 49.1 | 35.7 |
|  | Other | 0.8 | 1.8 | 2.5 | 0.0 | 1.8 | 7.1 |
|  | No Response/Missing | 16.0 | 15.4 | 12.7 | 13.3 | 19.3 | 17.9 |
| High <br> School GPA | A+ | 12.9 | 14.0 | 10.8 | 6.7 | 3.5 | 14.3 |
|  | A | 27.5 | 34.6 | 29.7 | 43.3 | 42.1 | 35.7 |
|  | A- | 22.5 | 22.8 | 27.8 | 20.0 | 26.3 | 25.0 |
|  | B+ | 12.6 | 7.7 | 12.7 | 16.7 | 5.3 | 3.6 |
|  | B | 5.1 | 3.3 | 2.5 | 0.0 | 3.5 | 3.6 |
|  | B- | 1.7 | 1.5 | 2.5 | 0.0 | 0.0 | 0.0 |
|  | C+ | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | C | 0.3 | 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 | 17.4 | 16.2 | 13.9 | 13.3 | 19.3 | 17.9 |


| SAT <br> Composite <br> Score Band | 2100-2400 | 2.0 | 8.8 | 7.6 | 3.3 | 8.8 | 39.3 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1800-2090 | 27.8 | 40.4 | 44.9 | 43.3 | 42.1 | 35.7 |
|  | 1500-1790 | 47.5 | 26.8 | 27.2 | 33.3 | 24.6 | 3.6 |
|  | 1200-1490 | 7.0 | 4.4 | 4.4 | 6.7 | 3.5 | 0.0 |
|  | 900-1190 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | 600-890 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | Missing | 15.7 | 19.5 | 15.8 | 13.3 | 21.1 | 21.4 |
| Highest <br> Parental <br> Education | No High School Diploma | 1.7 | 1.8 | 3.2 | 6.7 | 7.0 | 3.6 |
|  | High School Diploma | 11.8 | 8.8 | 9.5 | 3.3 | 10.5 | 7.1 |
|  | Associate Degree | 5.6 | 1.1 | 1.3 | 0.0 | 0.0 | 0.0 |
|  | Bachelor's Degree | 34.8 | 29.4 | 27.2 | 46.7 | 28.1 | 17.9 |
|  | Graduate Degree | 28.7 | 41.9 | 45.6 | 26.7 | 35.1 | 53.6 |
|  | Missing | 17.4 | 16.9 | 13.3 | 16.7 | 19.3 | 17.9 |

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

Table B-3: Characteristics of Students in the AP Chinese Language and Culture Validity Analyses

|  |  | Non-AP Comparison Groups |  | AP Groups |  |  |  |
| :--- | :--- | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ |
| Number of Students | $\mathbf{9 9 5}$ | $\mathbf{8 0 9}$ | $\mathbf{8 2 7}$ | $\mathbf{2 1}$ | $\mathbf{3 1}$ | $\mathbf{1 6 9}$ |  |
| Gender | Female | 49.9 | 52.5 | 52.5 | 52.4 | 54.8 | 63.3 |
|  | Male | $50 . \%$ | 47.5 | 47.5 | 47.6 | 45.2 | 36.7 |
|  | Missing | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Race/ | American Indian | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| Ethnicity | Asian American | 37.9 | 41.7 | 41.1 | 19.0 | 64.5 | 87.6 |
|  | Black/African American | 3.1 | 3.0 | 3.0 | 4.8 | 0.0 | 0.6 |
|  | Hispanic | 3.4 | 2.8 | 3.3 | 14.3 | 0.0 | 0.6 |
|  | White | 37.9 | 35.7 | 36.5 | 47.6 | 16.1 | 3.0 |
|  | Other | 3.5 | 2.7 | 2.4 | 4.8 | 6.5 | 1.8 |
|  | No Response/Missing | 14.1 | 14.0 | 13.5 | 9.5 | 12.9 | 6.5 |
| High | A+ | 8.8 | 9.9 | 9.6 | 4.8 | 0.0 | 7.1 |
| School | A | 26.2 | 30.0 | 30.1 | 14.3 | 22.6 | 25.4 |
| GPA | A- | 22.3 | 20.1 | 21.0 | 42.9 | 29.0 | 26.6 |


|  | B+ | 15.2 | 13.7 | 14.1 | 14.3 | 22.6 | 15.4 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | 8.6 | 6.8 | 6.2 | 9.5 | 6.5 | 11.8 |
|  | B- | 1.0 | 1.0 | 1.0 | 0.0 | 3.2 | 0.6 |
|  | C+ | 0.4 | 0.2 | 0.2 | 4.8 | 3.2 | 1.2 |
|  | C | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
|  | C- or Lower | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
|  | Missing | 17.1 | 17.9 | 17.5 | 9.5 | 12.9 | 11.8 |
| SAT <br> Composite <br> Score Band | 2100-2400 | 6.7 | 10.9 | 11.6 | 4.8 | 22.6 | 16.0 |
|  | 1800-2090 | 32.4 | 36.1 | 39.3 | 33.3 | 22.6 | 40.8 |
|  | 1500-1790 | 36.3 | 30.0 | 28.4 | 42.9 | 29.0 | 23.1 |
|  | 1200-1490 | 10.5 | 8.5 | 7.3 | 9.5 | 6.5 | 8.9 |
|  | 900-1190 | 0.9 | 0.5 | 0.5 | 0.0 | 3.2 | 3.6 |
|  | 600-890 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | Missing | 13.3 | 14.0 | 12.9 | 9.5 | 16.1 | 7.7 |
| Highest Parental Education | No High School Diploma | 3.5 | 3.5 | 3.4 | 0.0 | 6.5 | 10.1 |
|  | High School Diploma | 14.6 | 14.3 | 14.3 | 14.3 | 9.7 | 16.0 |
|  | Associate Degree | 4.7 | 3.7 | 4.4 | 4.8 | 3.2 | 1.2 |
|  | Bachelor's Degree | 25.7 | 24.4 | 24.7 | 14.3 | 9.7 | 19.5 |
|  | Graduate Degree | 31.1 | 33.3 | 32.5 | 52.4 | 48.4 | 34.9 |
|  | Missing | 20.4 | 20.9 | 20.8 | 14.3 | 22.6 | 18.3 |

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

Table B - 4: Characteristics of Students in the AP Japanese Language and Culture Validity Analyses

|  |  | Non-AP Comparison Groups |  | AP Groups |  |  |  |
| :--- | :--- | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ |
| Number of Students | $\mathbf{9 8 3}$ | $\mathbf{8 3 7}$ | $\mathbf{8 4 1}$ | $\mathbf{2 6}$ | $\mathbf{2 4}$ | $\mathbf{7 6}$ |  |
|  | Female | 52.0 | 53.5 | 57.2 | 73.1 | 54.2 | 56.6 |
|  | Male | 47.8 | 46.4 | 42.7 | 26.9 | 45.8 | 43.4 |
|  | Missing | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
| Race/ | American Indian | 0.5 | 0.4 | 0.5 | 0.0 | 0.0 | 0.0 |
| Ethnicity | Asian American | 28.8 | 29.5 | 30.1 | 50.0 | 50.0 | 63.2 |
|  | Black/African American | 3.1 | 3.8 | 3.6 | 0.0 | 0.0 | 0.0 |


|  | Hispanic | 2.8 | 2.7 | 3.0 | 3.8 | 0.0 | 0.0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | White | 35.8 | 34.1 | 33.9 | 42.3 | 29.2 | 10.5 |
|  | Other | 3.0 | 2.5 | 3.4 | 3.8 | 0.0 | 7.9 |
|  | No Response/Missing | 26.0 | 27.0 | 25.6 | 0.0 | 20.8 | 18.4 |
| High School GPA | A+ | 7.8 | 8.4 | 8.3 | 15.4 | 0.0 | 3.9 |
|  | A | 21.1 | 23.1 | 23.3 | 34.6 | 41.7 | 19.7 |
|  | A- | 21.0 | 19.0 | 20.3 | 30.8 | 16.7 | 21.1 |
|  | B+ | 12.5 | 11.8 | 11.3 | 11.5 | 4.2 | 15.8 |
|  | B | 7.4 | 6.8 | 6.1 | 0.0 | 12.5 | 15.8 |
|  | B- | 2.2 | 2.0 | 2.1 | 3.8 | 0.0 | 1.3 |
|  | C+ | 0.3 | 0.4 | 0.4 | 0.0 | 4.2 | 0.0 |
|  | C | 0.1 | 0.0 | 0.0 | 0.0 | 4.2 | 1.3 |
|  | C- or Lower | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | Missing | 27.6 | 28.6 | 28.2 | 3.8 | 16.7 | 21.1 |
| SAT <br> Composite <br> Score Band | 2100-2400 | 3.7 | 5.0 | 5.6 | 15.4 | 20.8 | 10.5 |
|  | 1800-2090 | 29.4 | 28.7 | 31.5 | 42.3 | 37.5 | 35.5 |
|  | 1500-1790 | 32.5 | 31.1 | 31.0 | 30.8 | 16.7 | 28.9 |
|  | 1200-1490 | 9.2 | 8.7 | 6.9 | 7.7 | 4.2 | 10.5 |
|  | 900-1190 | 0.7 | 0.5 | 0.5 | 0.0 | 0.0 | 1.3 |
|  | 600-890 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | Missing | 24.6 | 26.0 | 24.5 | 3.8 | 20.8 | 13.2 |
| Highest Parental Education | No High School Diploma | 1.0 | 1.1 | 0.8 | 3.8 | 0.0 | 1.3 |
|  | High School Diploma | 14.4 | 14.3 | 13.9 | 11.5 | 4.2 | 11.8 |
|  | Associate Degree | 4.8 | 4.7 | 4.5 | 0.0 | 0.0 | 1.3 |
|  | Bachelor's Degree | 26.1 | 25.0 | 25.2 | 30.8 | 20.8 | 31.6 |
|  | Graduate Degree | 23.2 | 24.4 | 24.7 | 42.3 | 50.0 | 26.3 |
|  | Missing | 30.4 | 30.6 | 30.8 | 11.5 | 25.0 | 27.6 |

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

Table B-5: Characteristics of Students in the AP French Language and Culture Validity Analyses

|  |  | Non-AP Comparison Groups |  |  | AP Groups |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 3 | 4 | 5 | 3 | 4 | 5 |
| Number of Students |  | 691 | 436 | 268 | 240 | 227 | 117 |
| Gender | Female | 75.5 | 78.2 | 76.9 | 79.6 | 81.5 | 70.9 |
|  | Male | 24.5 | 21.8 | 23.1 | 20.4 | 18.5 | 29.1 |
|  | Missing | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Race/ Ethnicity | American Indian | 0.3 | 0.2 | 0.0 | 0.0 | 0.4 | 0.9 |
|  | Asian American | 6.9 | 10.1 | 11.2 | 6.7 | 10.7 | 9.4 |
|  | Black/African American | 5.6 | 6.0 | 6.7 | 2.9 | 1.3 | 1.7 |
|  | Hispanic | 5.9 | 7.1 | 7.8 | 5.4 | 7.7 | 6.0 |
|  | White | 57.2 | 52.1 | 47.8 | 61.3 | 65.2 | 70.9 |
|  | Other | 2.0 | 3.7 | 4.5 | 2.1 | 2.6 | 6.0 |
|  | No Response/Missing | 22.0 | 20.9 | 22.0 | 21.7 | 12.0 | 5.1 |
| High School GPA | A+ | 9.4 | 10.1 | 11.9 | 7.5 | 13.3 | 20.5 |
|  | A | 27.4 | 28.9 | 26.9 | 27.1 | 33.5 | 38.5 |
|  | A- | 17.7 | 19.7 | 18.3 | 25.4 | 26.2 | 19.7 |
|  | B+ | 11.9 | 12.4 | 12.3 | 8.3 | 8.6 | 8.5 |
|  | B | 6.7 | 4.4 | 4.5 | 4.6 | 1.7 | 1.7 |
|  | B- | 1.6 | 0.2 | 0.4 | 2.9 | 0.9 | 0.9 |
|  | C+ | 0.4 | 0.5 | 0.7 | 0.0 | 0.4 | 0.9 |
|  | C | 0.1 | 0.2 | 0.4 | 0.0 | 0.0 | 0.0 |
|  | C- or Lower | 0.3 | 0.2 | 0.4 | 0.0 | 0.0 | 0.0 |
|  | Missing | 24.6 | 23.4 | 24.3 | 24.2 | 15.5 | 9.4 |
| SAT <br> Composite Score Band | 2100-2400 | 4.9 | 8.5 | 9.0 | 6.7 | 13.7 | 42.7 |
|  | 1800-2090 | 28.5 | 33.9 | 37.3 | 39.2 | 56.7 | 40.2 |
|  | 1500-1790 | 35.6 | 31.9 | 25.7 | 25.8 | 13.7 | 7.7 |
|  | 1200-1490 | 9.3 | 5.3 | 4.5 | 3.8 | 0.4 | 1.7 |
|  | 900-1190 | 0.1 | 0.2 | 0.4 | 0.0 | 0.0 | 0.0 |
|  | 600-890 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | Missing | 21.6 | 20.2 | 23.1 | 24.6 | 15.5 | 7.7 |


| Highest <br> Parental Education | No High School Diploma | 1.3 | 1.4 | 2.2 | 0.8 | 0.4 | 0.0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | High School Diploma | 11.4 | 9.9 | 9.7 | 7.9 | 6.4 | 5.1 |
|  | Associate Degree | 3.2 | 2.1 | 0.7 | 2.9 | 0.9 | 0.0 |
|  | Bachelor's Degree | 29.8 | 30.7 | 29.1 | 30.4 | 29.6 | 33.3 |
|  | Graduate Degree | 28.5 | 32.3 | 32.1 | 33.3 | 49.8 | 53.8 |
|  | Missing | 25.8 | 23.6 | 26.1 | 24.6 | 12.9 | 7.7 |

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

Table B - 6: Characteristics of Students in the AP German Language and Culture Validity Analyses

|  |  | Non-AP Comparison Groups |  |  | AP Groups |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 3 | 4 | 5 | 3 | 4 | 5 |
| Number of Students |  | 404 | 231 | 90 | 73 | 67 | 52 |
| Gender | Female | 47.8 | 49.4 | 52.2 | 60.3 | 59.7 | 57.7 |
|  | Male | 52.2 | 50.6 | 47.8 | 39.7 | 40.3 | 42.3 |
|  | Missing | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Race/ Ethnicity | American Indian | 0.5 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | Asian American | 5.2 | 12.6 | 12.2 | 1.4 | 3.0 | 5.8 |
|  | Black/African American | 1.7 | 1.7 | 0.0 | 2.7 | 1.5 | 1.9 |
|  | Hispanic | 2.7 | 3.0 | 2.2 | 2.7 | 3.0 | 3.8 |
|  | White | 56.4 | 59.3 | 54.4 | 58.9 | 71.6 | 71.2 |
|  | Other | 2.5 | 1.7 | 2.2 | 2.7 | 4.5 | 0.0 |
|  | No Response/Missing | 30.9 | 21.2 | 28.9 | 31.5 | 16.4 | 17.3 |
| High School GPA | A+ | 11.1 | 8.2 | 8.9 | 9.6 | 11.9 | 25.0 |
|  | A | 28.0 | 29.0 | 25.6 | 16.4 | 40.3 | 25.0 |
|  | A- | 14.1 | 21.6 | 18.9 | 27.4 | 13.4 | 17.3 |
|  | B+ | 9.2 | 11.7 | 11.1 | 6.8 | 9.0 | 3.8 |
|  | B | 4.5 | 4.8 | 3.3 | 5.5 | 4.5 | 3.8 |
|  | B- | 0.2 | 0.4 | 0.0 | 2.7 | 1.5 | 3.8 |
|  | C+ | 1.2 | 0.9 | 1.1 | 0.0 | 0.0 | 0.0 |
|  | C | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | C- or Lower | 0.0 | 0.0 | 0.0 | 1.4 | 0.0 | 0.0 |
|  | Missing | 31.7 | 23.4 | 31.1 | 30.1 | 19.4 | 21.2 |


| SAT <br> Composite <br> Score Band | 2100-2400 | 5.7 | 9.1 | 12.2 | 5.5 | 16.4 | 26.9 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1800-2090 | 31.7 | 36.8 | 37.8 | 35.6 | 46.3 | 40.4 |
|  | 1500-1790 | 26.7 | 30.3 | 16.7 | 26.0 | 13.4 | 17.3 |
|  | 1200-1490 | 3.2 | 1.7 | 1.1 | 2.7 | 1.5 | 0.0 |
|  | 900-1190 | 0.2 | 0.4 | 1.1 | 0.0 | 0.0 | 0.0 |
|  | 600-890 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | Missing | 32.4 | 21.6 | 31.1 | 30.1 | 22.4 | 15.4 |
| Highest Parental Education | No High School Diploma | 0.7 | 1.7 | 3.3 | 0.0 | 1.5 | 0.0 |
|  | High School Diploma | 9.9 | 10.8 | 10.0 | 2.7 | 3.0 | 1.9 |
|  | Associate Degree | 3.7 | 3.5 | 1.1 | 2.7 | 3.0 | 3.8 |
|  | Bachelor's Degree | 24.8 | 27.3 | 17.8 | 28.8 | 40.3 | 21.2 |
|  | Graduate Degree | 29.7 | 33.8 | 36.7 | 35.6 | 34.3 | 57.7 |
|  | Missing | 31.2 | 22.9 | 31.1 | 30.1 | 17.9 | 15.4 |

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

Table B-7: Characteristics of Students in the AP Italian Language and Culture Validity Analyses

|  |  | Non-AP Comparison Groups |  |  | AP Groups |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 3 | 4 | 5 | 3 | 4 | 5 |
| Number of Students |  | 729 | 479 | 263 | 25 | 37 | N/A |
| Gender | Female | 65.7 | 69.3 | 66.2 | 64.0 | 83.8 | N/A |
|  | Male | 34.3 | 30.7 | 33.8 | 36.0 | 16.2 | N/A |
|  | Missing | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | N/A |
| Race/ <br> Ethnicity | American Indian | 0.1 | 0.4 | 0.0 | 0.0 | 0.0 | N/A |
|  | Asian American | 3.4 | 4.8 | 4.2 | 0.0 | 2.7 | N/A |
|  | Black/African American | 3.7 | 3.3 | 4.2 | 0.0 | 2.7 | N/A |
|  | Hispanic | 7.3 | 8.8 | 10.6 | 4.0 | 10.8 | N/A |
|  | White | 64.9 | 64.9 | 62.7 | 76.0 | 73.0 | N/A |
|  | Other | 1.6 | 2.1 | 2.7 | 4.0 | 2.7 | N/A |
|  | No Response/Missing | 18.9 | 15.7 | 15.6 | 16.0 | 8.1 | N/A |
| High School GPA | A+ | 7.1 | 8.6 | 7.6 | 12.0 | 5.4 | N/A |
|  | A | 25.0 | 27.8 | 27.0 | 36.0 | 27.0 | N/A |
|  | A- | 24.8 | 21.7 | 20.5 | 12.0 | 29.7 | N/A |


|  | B+ | 11.8 | 14.4 | 17.9 | 12.0 | 21.6 | N/A |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | B | 9.1 | 8.1 | 7.6 | 8.0 | 2.7 | N/A |
|  | B- | 0.8 | 0.6 | 0.4 | 4.0 | 2.7 | N/A |
|  | $\mathrm{C}_{+}$ | 0.1 | 0.2 | 0.4 | 0.0 | 0.0 | N/A |
|  | C | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | N/A |
|  | C- or Lower | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | N/A |
|  | Missing | 21.0 | 18.6 | 18.6 | 16.0 | 10.8 | N/A |
| SAT <br> Composite <br> Score Band | 2100-2400 | 2.2 | 4.0 | 4.6 | 8.0 | 5.4 | N/A |
|  | 1800-2090 | 28.0 | 31.7 | 27.4 | 28.0 | 24.3 | N/A |
|  | 1500-1790 | 41.8 | 39.7 | 41.1 | 36.0 | 43.2 | N/A |
|  | 1200-1490 | 8.0 | 7.9 | 10.6 | 12.0 | 8.1 | N/A |
|  | 900-1190 | 0.5 | 0.4 | 0.4 | 0.0 | 0.0 | N/A |
|  | 600-890 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | N/A |
|  | Missing | 19.5 | 16.3 | 16.0 | 16.0 | 18.9 | N/A |
| Highest <br> Parental <br> Education | No High School Diploma | 0.8 | 0.6 | 1.1 | 0.0 | 2.7 | N/A |
|  | High School Diploma | 10.7 | 11.7 | 10.6 | 8.0 | 13.5 | N/A |
|  | Associate Degree | 4.1 | 4.6 | 5.3 | 4.0 | 5.4 | N/A |
|  | Bachelor's Degree | 32.2 | 30.7 | 30.0 | 32.0 | 24.3 | N/A |
|  | Graduate Degree | 30.5 | 34.7 | 34.2 | 36.0 | 45.9 | N/A |
|  | Missing | 21.7 | 17.7 | 18.6 | 20.0 | 8.1 | N/A |

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

Table B-8: Characteristics of Students in the AP Studio Art: 2-D Design Validity Analyses

|  |  | Non-AP Comparison Groups |  | AP Groups |  |  |  |
| :--- | :--- | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ | $\mathbf{3}$ | $\mathbf{4}$ | $\mathbf{5}$ |
| Number of | Students | $\mathbf{1 , 2 1 4}$ | $\mathbf{1 , 7 4 4}$ | $\mathbf{1 , 7 8 5}$ | $\mathbf{9 8}$ | $\mathbf{1 4 0}$ | $\mathbf{8 3}$ |
|  | Female | 72.1 | 69.8 | 69.8 | 82.7 | 77.9 | 81.9 |
|  | Male | 27.9 | 30.2 | 30.2 | 17.3 | 22.1 | 18.1 |
|  | Missing | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Race/ | American Indian | 0.3 | 0.4 | 0.4 | 0.0 | 0.7 | 0.0 |
| Ethnicity | Asian American | 3.2 | 6.3 | 6.2 | 2.0 | 8.6 | 9.6 |
|  | Black/African American | 5.4 | 5.2 | 5.2 | 1.0 | 0.7 | 2.4 |


|  | Hispanic | 6.9 | 8.2 | 8.1 | 8.2 | 7.1 | 3.6 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | White | 63.8 | 59.8 | 59.6 | 76.5 | 70.0 | 75.9 |
|  | Other | 2.1 | 2.0 | 2.0 | 2.0 | 5.7 | 1.2 |
|  | No Response/Missing | 18.3 | 18.2 | 18.5 | 10.2 | 7.1 | 7.2 |
| $\begin{aligned} & \text { High } \\ & \text { School } \\ & \text { GPA } \end{aligned}$ | A+ | 3.0 | 4.4 | 4.4 | 3.1 | 9.3 | 14.5 |
|  | A | 12.5 | 15.7 | 15.5 | 22.4 | 27.1 | 20.5 |
|  | A- | 17.8 | 20.0 | 19.9 | 33.7 | 20.7 | 25.3 |
|  | B+ | 17.9 | 16.3 | 16.3 | 15.3 | 19.3 | 19.3 |
|  | B | 17.1 | 14.5 | 14.5 | 10.2 | 8.6 | 7.2 |
|  | B- | 8.0 | 6.5 | 6.4 | 2.0 | 2.9 | 2.4 |
|  | C+ | 2.4 | 1.8 | 1.8 | 2.0 | 0.7 | 2.4 |
|  | C | 1.1 | 0.9 | 0.9 | 0.0 | 0.7 | 0.0 |
|  | C- or Lower | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
|  | Missing | 20.2 | 19.8 | 20.1 | 11.2 | 10.7 | 8.4 |
| SAT <br> Composite <br> Score Band | 2100-2400 | 0.9 | 2.2 | 2.1 | 4.1 | 7.1 | 1.2 |
|  | 1800-2090 | 12.9 | 18.7 | 18.3 | 31.6 | 42.9 | 31.3 |
|  | 1500-1790 | 38.5 | 37.1 | 37.0 | 55.1 | 35.0 | 54.2 |
|  | 1200-1490 | 28.6 | 23.7 | 23.9 | 3.1 | 9.3 | 7.2 |
|  | 900-1190 | 3.6 | 2.8 | 2.9 | 0.0 | 0.0 | 0.0 |
|  | 600-890 | 0.2 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
|  | Missing | 15.4 | 15.4 | 15.7 | 6.1 | 5.7 | 6.0 |
| Highest Parental Education | No High School Diploma | 1.2 | 1.7 | 2.0 | 2.0 | 1.4 | 0.0 |
|  | High School Diploma | 18.7 | 17.2 | 17.1 | 12.2 | 15.7 | 9.6 |
|  | Associate Degree | 7.1 | 6.0 | 6.1 | 6.1 | 3.6 | 7.2 |
|  | Bachelor's Degree | 29.5 | 29.1 | 29.0 | 41.8 | 32.9 | 47.0 |
|  | Graduate Degree | 21.4 | 24.2 | 23.8 | 25.5 | 36.4 | 26.5 |
|  | Missing | 22.2 | 21.8 | 22.0 | 12.2 | 10.0 | 9.6 |

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

Table B-9: Characteristics of Students in the AP Studio Art: 3-D Design Validity Analyses

|  |  | Non-AP Comparison Groups |  |  | AP Groups |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 3 | 4 | 5 | 3 | 4 | 5 |
| Number of Students |  | 450 | 1,376 | 1,376 | 21 | 24 | 16 |
| Gender | Female | 79.3 | 74.0 | 74.0 | 66.7 | 87.5 | 68.8 |
|  | Male | 20.7 | 26.0 | 26.0 | 33.3 | 12.5 | 31.3 |
|  | Missing | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Race/ Ethnicity | American Indian | 0.2 | 0.4 | 0.4 | 0.0 | 0.0 | 0.0 |
|  | Asian American | 3.6 | 6.6 | 6.6 | 4.8 | 4.2 | 6.3 |
|  | Black/African American | 3.6 | 6.5 | 6.5 | 0.0 | 4.2 | 0.0 |
|  | Hispanic | 5.3 | 11.8 | 11.8 | 9.5 | 8.3 | 18.8 |
|  | White | 62.2 | 58.5 | 58.5 | 71.4 | 83.3 | 68.8 |
|  | Other | 1.8 | 2.0 | 2.0 | 4.8 | 0.0 | 0.0 |
|  | No Response/Missing | 23.3 | 14.1 | 14.1 | 9.5 | 0.0 | 6.3 |
| High School GPA | A+ | 5.3 | 5.4 | 5.4 | 14.3 | 4.2 | 12.5 |
|  | A | 13.8 | 19.4 | 19.4 | 19.0 | 45.8 | 18.8 |
|  | A- | 18.2 | 24.9 | 24.9 | 23.8 | 20.8 | 43.8 |
|  | B+ | 17.6 | 18.5 | 18.5 | 14.3 | 20.8 | 6.3 |
|  | B | 12.2 | 11.0 | 11.0 | 9.5 | 4.2 | 12.5 |
|  | B- | 6.9 | 4.2 | 4.2 | 4.8 | 0.0 | 0.0 |
|  | C+ | 1.6 | 1.1 | 1.1 | 4.8 | 0.0 | 0.0 |
|  | C | 0.2 | 0.2 | 0.2 | 0.0 | 0.0 | 0.0 |
|  | C- or Lower | 0.0 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 |
|  | Missing | 24.2 | 15.2 | 15.2 | 9.5 | 4.2 | 6.3 |
| SAT <br> Composite <br> Score Band | 2100-2400 | 1.1 | 2.7 | 2.7 | 4.8 | 8.3 | 6.3 |
|  | 1800-2090 | 12.4 | 19.4 | 19.4 | 28.6 | 25.0 | 37.5 |
|  | 1500-1790 | 39.3 | 41.9 | 41.9 | 42.9 | 58.3 | 43.8 |
|  | 1200-1490 | 22.9 | 22.2 | 22.2 | 19.0 | 8.3 | 6.3 |
|  | 900-1190 | 2.2 | 1.2 | 1.2 | 0.0 | 0.0 | 0.0 |
|  | 600-890 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | Missing | 22.0 | 12.6 | 12.6 | 4.8 | 0.0 | 6.3 |


| Highest <br> Parental Education | No High School Diploma | 1.3 | 2.7 | 2.7 | 0.0 | 0.0 | 0.0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | High School Diploma | 7.8 | 13.8 | 13.8 | 19.0 | 12.5 | 0.0 |
|  | Associate Degree | 5.8 | 5.0 | 5.0 | 9.5 | 0.0 | 0.0 |
|  | Bachelor's Degree | 30.0 | 34.1 | 34.1 | 42.9 | 33.3 | 43.8 |
|  | Graduate Degree | 25.6 | 26.2 | 26.2 | 19.0 | 45.8 | 43.8 |
|  | Missing | 29.6 | 18.2 | 18.2 | 9.5 | 8.3 | 12.5 |

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

Table B-10: Characteristics of Students in the AP Studio Art: Drawing Validity Analyses

|  |  | Non-AP Comparison Groups |  |  | AP Groups |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 3 | 4 | 5 | 3 | 4 | 5 |
| Number of Students |  | 1,702 | 3,503 | 3,488 | 128 | 161 | 140 |
| Gender | Female | 71.6 | 72.1 | 72.2 | 86.7 | 80.1 | 77.1 |
|  | Male | 28.4 | 27.9 | 27.7 | 13.3 | 19.9 | 22.9 |
|  | Missing | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Race/ <br> Ethnicity | American Indian | 0.4 | 0.5 | 0.5 | 0.0 | 0.0 | 0.7 |
|  | Asian American | 3.9 | 6.0 | 6.0 | 5.5 | 7.5 | 9.3 |
|  | Black/African American | 4.0 | 5.2 | 5.3 | 3.9 | 0.6 | 3.6 |
|  | Hispanic | 7.1 | 10.2 | 10.3 | 3.9 | 10.6 | 7.1 |
|  | White | 61.4 | 59.9 | 60.1 | 71.1 | 70.2 | 70.7 |
|  | Other | 2.2 | 2.0 | 1.9 | 3.1 | 3.1 | 0.7 |
|  | No Response/Missing | 21.0 | 16.2 | 15.9 | 12.5 | 8.1 | 7.9 |
| High <br> School GPA | A+ | 3.2 | 4.4 | 4.4 | 5.5 | 9.3 | 12.9 |
|  | A | 12.9 | 18.1 | 18.2 | 23.4 | 30.4 | 26.4 |
|  | A- | 17.6 | 22.6 | 22.6 | 22.7 | 24.2 | 30.0 |
|  | B+ | 17.6 | 17.6 | 17.6 | 22.7 | 18.0 | 11.4 |
|  | B | 15.4 | 12.7 | 12.7 | 13.3 | 5.6 | 7.1 |
|  | B- | 6.9 | 4.8 | 4.8 | 0.8 | 1.9 | 1.4 |
|  | C+ | 2.3 | 1.6 | 1.6 | 0.0 | 0.0 | 0.0 |
|  | C | 0.9 | 0.6 | 0.6 | 0.0 | 0.0 | 0.0 |
|  | C- or Lower | 0.2 | 0.1 | 0.1 | 0.0 | 0.6 | 0.0 |
|  | Missing | 22.9 | 17.7 | 17.3 | 11.7 | 9.9 | 10.7 |


| SAT <br> Composite Score Band | 2100-2400 | 1.1 | 1.6 | 1.5 | 1.6 | 3.7 | 5.0 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | 1800-2090 | 10.3 | 15.2 | 15.4 | 25.0 | 31.1 | 38.6 |
|  | 1500-1790 | 39.2 | 42.7 | 42.9 | 50.0 | 51.6 | 38.6 |
|  | 1200-1490 | 27.6 | 24.4 | 24.5 | 13.3 | 8.1 | 9.3 |
|  | 900-1190 | 3.3 | 2.0 | 2.0 | 1.6 | 0.0 | 0.7 |
|  | 600-890 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
|  | Missing | 18.5 | 14.1 | 13.8 | 8.6 | 5.6 | 7.9 |
| Highest <br> Parental Education | No High School Diploma | 1.8 | 2.5 | 2.5 | 1.6 | 3.1 | 0.7 |
|  | High School Diploma | 17.4 | 17.3 | 17.3 | 13.3 | 13.0 | 9.3 |
|  | Associate Degree | 6.6 | 6.0 | 6.0 | 7.0 | 4.3 | 3.6 |
|  | Bachelor's Degree | 30.9 | 33.3 | 33.3 | 32.0 | 35.4 | 33.6 |
|  | Graduate Degree | 18.8 | 21.2 | 21.4 | 32.0 | 33.5 | 42.9 |
|  | Missing | 24.5 | 19.8 | 19.4 | 14.1 | 10.6 | 10.0 |

[^3]
## About the College Board

The College Board is a mission-driven not-for-profit organization that connects students to college success and opportunity. Founded in 1900, the College Board was created to expand access to higher education. Today, the membership association is made up of over 6,000 of the world's leading educational institutions and is dedicated to promoting excellence and equity in education. Each year, the College Board helps more than seven million students prepare for a successful transition to college through programs and services in college readiness and college success-including the SAT ${ }^{\circledR}$ and the Advanced Placement Program ${ }^{\circledR}$. The organization also serves the education community through research and advocacy on behalf of students, educators and schools. For further information, visit collegeboard.org.
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[^0]:    ${ }^{1}$ 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. are not used as these variables are not considered when course placement decisions are made.
    ${ }^{3}$ Jeff Wyatt, Sanja Jagesic, and Kelly Godfrey, Postsecondary Course Performance of AP Exam Takers in Subsequent Coursework, (New York: College Board Statistical Report, 2018).

[^1]:    ${ }^{4}$ For more information, see: http://files.eric.ed.gov/fulltext/ED563103.pdf.

[^2]:    ${ }^{5}$ An equivalent course is one for which an AP student receives credit and/or placement per institutional policy at their institution.
    ${ }^{6}$ While decisions on group membership were made based on the policies at the attending institution, results were calculated using all the participating institutions.

[^3]:    Note: Characteristics of Students (Gender, Race/Ethnicity, High School GPA, SAT Composite Score Band, and Highest Parental Education) are provided in percent.

