

Updates to AP Potential™ Expectancy Tables

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Introduction

AP Potential™ uses SAT® Suite of Assessment scores to identify students who are likely to do well on one or more AP® Exams. Support for using scores for this purpose is grounded in research, which shows that SAT Suite of Assessment scores are stronger predictors of AP Exam performance than self-reported high school grade point average (HSGPA), grades in related subjects, and total years of study in related subjects (Camara & Millsap, 1998; Ewing, Camara, & Millsap, 2006; Zhang, Patel, & Ewing, 2014a).

As an educational guidance tool, AP Potential is meant to encourage students to participate in the AP Program. This encouragement can have a positive impact on students' opportunities to earn college credit while in high school. For example, a small-scale study at two high schools in Oakland, California, found that students who receive a personalized message about their AP Potential on a College Board score report are substantially more likely to enroll in an AP course and pass the AP Exam than students who do not receive the personalized message (Gonzalez, 2017). AP Potential also encourages participation among students who are historically less likely to participate in the AP Program.

Updating AP Potential

AP Potential has been used to identify prospective AP students for more than 20 years. Because testing populations change over time and assessments are redesigned, it is necessary to evaluate and update the predictions that underlie AP Potential on a periodic basis. This report provides updated AP Potential Expectancy Tables based on recent data from the SAT Suite of Assessments, which includes the SAT, PSAT/NMSQT®, PSAT™ 10, and PSAT™ 8/9, as well as recent AP administrations. For most subjects, AP Potential predictions are derived by combining 10th- and 11th-grade SAT Suite of Assessment test scores from the 2017 and 2018 academic years, with 11th- or 12th-grade AP Exam scores from the May 2018 or May 2019 exam administrations. We also include 9th-grade SAT Suite of Assessments test scores and 10th-grade AP Exam scores for five AP Exams in subjects more commonly taken earlier in high school. These exams are: Art History, Computer Science Principles, European History, Human Geography, and World History: Modern.

Results

SAT Suite of Assessment scores are strong predictors of AP Exam success. Table 1 shows the correlations between AP Exam scores and the SAT Suite of Assessment Evidence-Based Reading and Writing section score (ERW), Math section score, and Total score. Correlation values range from -1.00 (indicating a perfect negative relationship) to +1.00 (indicating a perfect positive relationship), with values close to zero indicating no relationship between variables.

As is shown in Table 1, the correlation values for the 22 AP Exams for which AP Potential is reported are all in the moderate to high range. Specific values range from 0.48 for Physics C: Electricity and Magnetism to 0.75 for Biology, with most correlations above 0.60. The boldface number in each row indicates the SAT Suite of Assessments score that had the strongest correlation with the corresponding AP Exam score. In most cases, the Total score, or the sum of

ERW + Math section scores, was the strongest predictor of AP Exam performance and was most frequently chosen as the basis for computing the expectancy table, as indicated in the “predictor” column.¹ The exceptions are Calculus AB, which correlated highest with Math section scores, and English Language, English Literature, and Art History, which correlated highest with ERW scores.²

AP Potential Expectancy Tables

To develop the AP Potential Expectancy Tables, logistic regression models are fitted for each AP Exam by including the most appropriate predictor from the SAT Suite of Assessments (i.e., Total score, Math section score, or ERW section score) to predict the probability of achieving an AP score of 3 or better, or 4 or better. The SAT Suite of Assessment scores associated with specific probabilities of success are calculated for each AP Exam based on the parameter estimates from the logistic regression model. The AP Potential Expectancy Tables show scores associated with achieving success on AP Exams at various probability levels ranging from 10% to 90% in 10% increments (See Tables 2 and 3).

Using AP Potential Expectancy Tables

To use the expectancy tables to identify students' for enrollment in specific AP courses, educators would first locate the cut score associated with a level of probability (or threshold) they are comfortable with for achieving an AP score of 3 or better, or 4 or better. For example, if a school chooses the 60% threshold for success on the Calculus AB Exam, the expectancy tables indicate that a student should have a minimum SAT or PSAT/NMSQT Math score of 600 for achieving a score of 3 or better, and a minimum SAT or PSAT/NMSQT Math score of 670 for achieving a score of 4 or better. Users should keep in mind that the logistic regression models on which the expectancy tables are built involve measurement errors. Classification rates are imperfect, meaning that SAT Suite of Assessment scores do not account for all of the variability in AP Exam performance, and some uncertainty about the probability of succeeding on AP Exams remains. The actual chance of any individual student succeeding might be lower or higher given many other factors. Student characteristics such as motivation and interest in the subject content, previous prerequisite courses taken, and other academic performance indicators should be taken into consideration when making final course recommendations.

Conclusion

SAT Suite of Assessment scores continue to be strong predictors of success on AP Exams. The updates to the AP Potential Expectancy Tables discussed in this report were implemented in December 2019. Updates to the expectancy tables will be made subject-by-subject on a periodic basis. The most up-to-date expectancy tables can always be found on the College Board website.³

¹ The relationship between Physics C: Electricity and Magnetism with Math section scores and Total scores, as well as the relationship between Physics C: Mechanics with Math section scores and Total scores, were essentially identical; therefore the Total score was chosen as the basis for computing the expectancy tables to be consistent with other AP science subjects.

² As in the past, AP Potential is not reported for the AP World Language and AP Art and Design Exams because the correlations do not meet the threshold ($r = 0.40$ or higher) required for reporting.

³ <http://www.collegeboard.com/counselors/app/expectancy.html>

References

Camara, W. J., & Millsap, R. E. (1998). Using the PSAT/NMSQT and course grades in predicting success in the Advanced Placement Program (College Board Research Report No. 98-4). New York: The College Board.

Ewing, M., Camara, W. J., & Millsap, R. E. (2006). The relationship between PSAT/NMSQT scores and AP Exam grades: A follow-up study (College Board Research Report No. 2006-1). New York: The College Board.

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Zhang, X., Patel, P., Ewing, M. (2014a). AP Potential predicted by PSAT/NMSQT scores using logistic regression (College Board Statistical Report 2014-1). New York: The College Board.

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Table 1: Correlations Between the SAT Suite of Assessment Scores and AP Exam Scores

AP Exam	Grades	Sample <i>N</i>	Correlations			Selected Predictor
			Total	ERW	Math	Predictor
	SAT- PSAT/NMSQT					
Art History	9/10/11	36,698	0.497	0.521	0.405	ERW
Biology	10/11	343,360	0.752	0.71	0.69	Total
Calculus AB	10/11	480,485	0.540	0.418	0.558	Math
Chemistry	10/11	221,688	0.655	0.549	0.649	Total
Comparative Government and Politics	10/11	36,346	0.589	0.588	0.503	Total
Computer Science A	10/11	85,611	0.603	0.521	0.584	Total
Computer Science Principles	9/10/11	102,407	0.654	0.602	0.615	Total
English Language and Composition	10/11	823,584	0.725	0.739	0.613	ERW
English Literature and Composition	10/11	638,629	0.700	0.728	0.584	ERW
Environmental Science	10/11	240,839	0.706	0.675	0.634	Total
European History	9/10/11	97,535	0.630	0.626	0.545	Total
Human Geography	9/10/11	76,080	0.623	0.620	0.535	Total
Macroeconomics	10/11	237,142	0.624	0.540	0.609	Total
Microeconomics	10/11	134,359	0.632	0.537	0.618	Total
Music	10/11	25,549	0.542	0.482	0.527	Total
Physics 1: Algebra-Based	10/11	238,540	0.647	0.545	0.645	Total
Physics C: Electricity and Magnetism	10/11	42,468	0.474	0.363	0.478	Total
Physics C: Mechanics	10/11	95,021	0.586	0.455	0.592	Total
Psychology	10/11	426,236	0.636	0.632	0.553	Total
Statistics	10/11	342,715	0.697	0.593	0.684	Total
U.S. Government and Politics	10/11	461,065	0.647	0.637	0.574	Total
U.S. History	10/11	640,108	0.675	0.667	0.585	Total
World History: Modern	9/10/11	232,331	0.676	0.658	0.591	Total

Table 2: AP Potential Cut Scores by AP Exam Associated with Scores of 3 or Higher

AP Exam	Predictor	AP Potential Cut Scores								
		10%	20%	30%	40%	50%	60%	70%	80%	90%
Art History	ERW	340	410	450	490	520	550	590	630	700
Biology	Total	910	970	1010	1040	1070	1100	1130	1170	1220
Calculus AB	Math	440	490	520	550	570	600	620	660	700
Chemistry	Total	950	1030	1080	1120	1160	1200	1250	1300	1380
Comparative Government and Politics	Total	850	940	1000	1050	1100	1140	1190	1250	1350
Computer Science A	Total	860	960	1020	1080	1130	1180	1230	1300	1390
Computer Science Principles	Total	740	830	880	930	970	1020	1060	1120	1210
English Language and Composition	ERW	440	480	500	520	530	550	570	590	620
English Literature and Composition	ERW	500	530	550	570	590	600	620	640	670
Environmental Science	Total	930	1000	1040	1080	1110	1150	1180	1230	1290
European History	Total	820	900	960	1010	1050	1090	1140	1200	1290
Human Geography	Total	770	860	910	960	1000	1050	1090	1150	1230
Macroeconomics	Total	910	1000	1060	1110	1150	1200	1250	1310	1400
Microeconomics	Total	860	950	1010	1060	1100	1150	1200	1260	1350
Music	Total	720	840	920	990	1050	1110	1170	1250	1370
Physics 1: Algebra-Based	Total	1010	1090	1140	1180	1220	1250	1300	1350	1420
Physics C: Electricity and Magnetism	Total	950	1050	1120	1170	1220	1270	1330	1390	1500
Physics C: Mechanics	Total	920	1000	1060	1100	1140	1180	1230	1280	1360
Psychology	Total	790	870	920	970	1010	1050	1090	1150	1230
Statistics	Total	940	1010	1060	1100	1140	1170	1210	1260	1330
U.S. Government and Politics	Total	900	980	1030	1080	1120	1160	1210	1260	1340
U.S. History	Total	860	930	980	1020	1060	1100	1140	1190	1260
World History: Modern	Total	800	880	920	960	1000	1040	1070	1120	1200

Table 3: AP Potential Cut Scores by AP Exam Associated with Scores of 4 or Higher

AP Exam	Predictor	AP Potential Cut Scores								
		10%	20%	30%	40%	50%	60%	70%	80%	90%
Art History	ERW	460	520	560	600	630	660	700	740	800
Biology	Total	1090	1150	1190	1230	1260	1290	1320	1360	1420
Calculus AB	Math	510	560	590	620	640	670	700	730	780
Chemistry	Total	1120	1200	1250	1290	1330	1370	1410	1470	1540
Comparative Government and Politics	Total	950	1050	1120	1170	1220	1270	1330	1400	1500
Computer Science A	Total	1010	1110	1180	1230	1280	1330	1380	1450	1540
Computer Science Principles	Total	980	1070	1130	1170	1220	1260	1310	1370	1460
English Language and Composition	ERW	530	560	580	600	610	630	640	670	700
English Literature and Composition	ERW	590	620	640	660	670	690	700	720	760
Environmental Science	Total	1010	1080	1120	1160	1200	1230	1270	1320	1390
European History	Total	960	1060	1120	1170	1220	1260	1310	1370	1470
Human Geography	Total	890	980	1040	1090	1140	1190	1240	1300	1390
Macroeconomics	Total	1010	1100	1160	1210	1260	1310	1360	1420	1520
Microeconomics	Total	980	1070	1130	1180	1230	1270	1320	1390	1480
Music	Total	910	1030	1110	1180	1240	1300	1370	1450	1570
Physics 1: Algebra-Based	Total	1040	1120	1180	1230	1270	1310	1360	1410	1500
Physics C: Electricity and Magnetism	Total	1040	1140	1210	1260	1310	1360	1420	1480	1580
Physics C: Mechanics	Total	1140	1220	1270	1310	1350	1390	1430	1480	1550
Psychology	Total	880	970	1030	1080	1120	1160	1210	1270	1360
Statistics	Total	1090	1160	1210	1250	1280	1320	1350	1400	1470
U.S. Government and Politics	Total	1060	1150	1220	1270	1320	1360	1410	1480	1570
U.S. History	Total	990	1070	1120	1160	1200	1240	1290	1340	1420
World History: Modern	Total	950	1030	1080	1120	1160	1200	1240	1290	1370