

AP Potential Expectancy Tables based on PSAT/NMSQT and SAT Scores on the 2015-16 Redesigned Scales Using Final Concordance Tables

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January 2017

COLLEGE BOARD RESEARCH

Introduction

Historically, AP Potential™ has used PSAT/NMSQT® scores to identify students who are likely to earn a 3 or higher on a specific AP Exam based on research showing moderate to strong relationships between PSAT/NMSQT scores and AP Exam scores (Camara & Millsap, 1998; Ewing, Camara, & Millsap, 2006; Zhang, Patel, & Ewing, 2014a). For most subjects, AP Potential expectancy tables have been derived by combining tenth and eleventh grade PSAT/NMSQT data with scores from AP Exams taken as either eleventh or twelfth graders during the following academic year. For AP European History and AP World History, ninth grade PSAT/NMSQT scores and tenth grade AP Exam scores were also recently included in the expectancy table calculations (Zhang, Patel, & Ewing, 2014b). Starting with the launch of the redesigned SAT® Suite of Assessments (i.e., PSAT 8/9, PSAT 10, PSAT/NMSQT, and SAT) in the 2015-16 academic year, AP Potential will also be reported based on scores from additional PSAT tests (depending on the student's grade level) as well as be extended to reporting based on SAT scores.

The purpose of this report is (1) to describe how we created blended AP Potential tables that include PSAT/NMSQT and SAT data and (2) to present these new tables on the 2015-16 redesigned scale for the SAT Suite of Assessments.

Methodology and Results

To create blended AP Potential tables that include PSAT/NMSQT and SAT scores, analyses were conducted using data from the following students/years¹:

- Students who took the PSAT/NMSQT in fall of October 2007 and/or October 2008 as sophomores or juniors and then completed one or more AP Exams during the following academic year in May 2009 or May 2010, respectively².
- Students who took the SAT anytime during their sophomore or junior year in 2007 or 2008 and one or more AP Exams the following academic year in May 2009 or May 2010, respectively. If a student participated in more than one administration of the SAT in the same *academic year*, only scores from the earliest administration were used in the analysis.
- For the AP European History and AP World History samples, students who took the PSAT/NMSQT or SAT as freshmen and an AP Exam as sophomores were also included in the analysis for these two subjects only.

¹ These years of data were chosen to be compatible with the version of the AP Potential tables that use only PSAT/NMSQT scores as reported in Zhang, Patel, & Ewing, 2014. One exception is the calculation of cutscores for students who completed AP Physics 1. Because AP Physics 1 is a relatively new exam title, we calculated cutscores for this course based on data from students who completed an AP Physics 1 Exam in 2015 and 2016 and were either in their junior or senior year of high school.

The appendix shows descriptive statistics (i.e., sample sizes, means, and standard deviations) on the AP, SAT, and PSAT/NMSQT assessments for the sample of students used to calculate the expectancy tables.

Before developing the blended PSAT/NMSQT and SAT AP Potential tables, SAT scores were placed on the PSAT/NMSQT scale by dividing SAT scores by 10. Next, we ran logistic regression models to predict success on a given AP Exam based on the PSAT/NMSQT score or combinations of scores used in previous research as the basis for the given expectancy table calculation (Zhang, Patel, & Ewing, 2014). Two binary outcome variables, with different definitions of success, were examined. In the first scenario, scoring a 3 or better on the AP Exam was defined as success; whereas, in the second scenario, scoring a 4 or better was defined as success.

Once new AP Potential cutscores were calculated using test score data obtained prior to the PSAT/NMSQT redesign in October 2015 and the SAT redesign in March 2016, we converted those cutscores to the redesigned scale using results from concordance tables developed by the psychometrics team at the College Board. Concordance tables relate scores on the old scale to the new (redesigned) scale. For the academic year 2015-16, interim concordance tables were provided by the psychometrics team and used to enable the continued reporting of AP Potential for the redesigned assessment with the knowledge that these interim concordance tables would be updated once more data were available. Recently, final concordance tables were developed by the psychometrics team at the College Board and these final concordance tables were used to adjust the AP Potential cutscores that are provided in this report. These adjusted cutscores became effective in the 2016-17 academic year. We used PSAT 10 concordance tables created specifically for use with AP Potential for this work³. Scores were concorded at the test score level for AP Potential tables that used (1) Math, (2) Critical Reading + Math, (3) Critical Reading + Writing, and (4) Math + Writing. Scores were concorded at the total section level for AP Potential tables that used Critical Reading + Math + Writing.

Tables 1 and 2 show the cutscores associated with earning a 3 or higher and a 4 or higher, respectively, at increasing levels of confidence on the redesigned scale.

Conclusion

This report provides AP Potential cutscores on the new PSAT and SAT scales using the final version of the concordance tables. Eventually, we will also recalculate AP Potential based on actual data from the new assessments. For more information about the research behind AP Potential and the proper use of AP Potential cutscores please see the following reports and links:

- (1) AP[®] Potential Predicted by PSAT/NMSQT[®] Scores Using Logistic Regression

<http://eric.ed.gov/?q=AP+Potential&id=ED558092>

- (2) Incorporating 9th grade PSAT/NMSQT[®] Scores into AP Potential[™] Predictions for AP[®] European History and AP World History

<http://eric.ed.gov/?q=AP+Potential&id=ED558118>

³ Given that the AP Potential tables now include SAT data, we discussed whether to use PSAT-based or SAT-based concordance tables. We decided it was reasonable to use PSAT10 concordances as originally planned given the AP Potential tables do not show cut scores in the extremes of the distribution.

Table 1. Expectancy Tables for AP Score ≥ 3 on the New SAT and PSAT Scale

		N	10%	20%	30%	40%	50%	60%	70%	80%	90%
M	Calculus AB	590,333	24	26	28	28.5	30	31.5	32.5	35	37.5
R + M	Biology	319,963	48.5	52	55	57.5	59.5	61.5	64	66.5	70.5
	Chemistry	199,537	47.5	51.5	55	57.5	60	62.5	65	68	72.5
	Computer Science A	33,299	45.5	50.5	53.5	56.5	59	61.5	64.5	68	72.5
	Environmental Science	181,153	47	50.5	53	55	57	59	61.5	64	68
	Macroeconomics	210,735	46	51	54.5	57	60	62.5	65.5	68.5	73
	Microeconomics	125,943	45	50	52.5	55.5	57.5	60	63	66	70
	Physics 1	291,922	51	55.5	58.5	61	63.5	65.5	68	70.5	75
	Physics C: Electricity & Magnetism	40,572	47	52.5	56.5	59.5	62.5	65.5	68.5	72.5	76
	Physics C: Mechanics	89,669	48	52.5	55.5	58	60.5	63	65.5	68.5	72.5
	Statistics	308,268	47	51	53.5	56	58	60.5	62.5	65.5	69
R + W&L	Art History	45,720	38	45	49	53	57	60	63	67	72
	English Language	510,233	44	48	50	51	53	55	56	58	61
	English Literature	901,369	48	52	55	57	58	60	62	65	68
M+ W&L	Music Theory	31,404	38	45	49.5	53	56.5	59.5	63	67	72.5
ERW+M	European History	121,749	800	890	960	1020	1060	1110	1160	1220	1320
	Government and Politics: Comparative	39,126	910	1010	1070	1120	1170	1210	1270	1330	1420
	Government and Politics: US	505,103	930	1030	1080	1130	1170	1210	1260	1320	1400
	Human Geography	40,344	850	940	1000	1050	1090	1130	1180	1230	1320
	Psychology	337,894	800	890	940	1000	1030	1080	1120	1180	1270
	US History	452,416	870	950	1020	1060	1100	1140	1180	1240	1320
	World History	93,941	820	910	980	1020	1070	1110	1160	1210	1300

Note: M = Math test score; R+M = Reading + Math test scores; R+W&L = Reading + Writing and Language test scores; M + W & L = Math + Writing and Language test scores; ERW + M = Evidence-based Reading and Writing + Math section scores.

Table 2. Expectancy Tables for AP Score ≥ 4 on the New SAT and PSAT Scale

		N	10%	20%	30%	40%	50%	60%	70%	80%	90%
M	Calculus AB	590,333	26.5	28.5	30.5	32	33	35	36	38	38
R + M	Biology	319,963	53	57	60	62.5	64.5	66.5	68.5	71.5	75.5
	Chemistry	199,537	53.5	58.5	61.5	64	66.5	68.5	71	73.5	76
	Computer Science A	33,299	50.5	55	58.5	61.5	64	66.5	69	72.5	76
	Environmental Science	181,153	52	56.5	59	61	63	65.5	67.5	69.5	73.5
	Macroeconomics	210,735	51	56.5	60	63	65.5	68	70.5	73.5	76
	Microeconomics	125,943	52	57	60	62.5	65	67	69	72.5	76
	Physics 1	291,922	59.5	64	67	69	71.5	73	75.5	76	76
	Physics C: Electricity & Magnetism	40,572	51	57	61	64.5	67.5	70	72.5	76	76
	Physics C: Mechanics	89,669	54.5	59.5	62.5	65.5	67.5	69.5	72.5	75	76
	Statistics	308,268	54.5	58.5	61.5	63.5	66	68	69.5	72.5	76
R + W&L	Art History	45,720	50	56	61	64	67	69	72	75	76
	English Language	510,233	53	56	58	60	62	64	65	67	70
	English Literature	901,369	58	62	64	66	68	69	71	73	75
M + W&L	Music Theory	31,404	49	56	60	63	66	69	72	75.5	76
ERW+M	European History	121,749	1030	1120	1200	1250	1300	1350	1400	1450	1520
	Government and Politics: Comparative	39,126	1040	1140	1210	1260	1310	1350	1410	1470	1520
	Government and Politics: US	505,103	1100	1190	1250	1300	1340	1380	1430	1480	1520
	Human Geography	40,344	1000	1090	1140	1200	1240	1290	1330	1390	1470
	Psychology	337,894	900	1000	1070	1120	1160	1210	1260	1320	1410
	US History	452,416	1010	1090	1150	1200	1240	1290	1330	1380	1460
	World History	93,941	980	1070	1130	1180	1230	1270	1320	1380	1470

Note: M = Math test score; R+M = Reading + Math test scores; R+W&L = Reading + Writing and Language test scores; M + W & L = Math + Writing and Language test scores; ERW + M = Evidence-based Reading and Writing + Math section scores.

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.

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Appendix. Descriptive Statistics for PSAT/NMSQT and SAT Samples by AP Exam.

AP Exam	PSAT/NMSQT Takers			SAT Takers		
	N	Mean	SD	N	Mean	SD
AP Art History	27,679	2.90	1.31	18,041	2.96	1.30
Critical Reading		55.07	10.11		584.27	97.75
Math		54.81	10.03		576.49	98.35
Writing		53.95	10.31		580.27	98.81
AP Biology	20,5036	2.76	1.54	114,927	2.75	1.53
Critical Reading		54.37	9.75		572.90	97.21
Math		56.61	9.76		529.89	97.92
Writing		53.32	10.03		568.81	97.90
AP Calculus AB	341,698	2.92	1.52	248,635	2.88	1.51
Critical Reading		54.79	9.39		567.36	93.81
Math		59.72	7.99		611.61	78.85
Writing		54.10	9.62		565.44	94.08
AP Chemistry	139,600	2.82	1.48	59,937	2.81	1.49
Critical Reading		55.27	9.89		584.55	100.30
Math		59.81	9.28		630.63	92.49
Writing		54.22	10.05		580.34	100.07
AP Computer Science A	21,607	3.05	1.57	11,692	3.04	1.57
Critical Reading		55.78	10.43		589.85	101.20
Math		61.41	9.65		644.69	92.93
Writing		54.14	10.58		576.20	100.83
AP English Language	445,235	2.99	1.18	64,998	3.21	1.17
Critical Reading		51.56	9.59		567.55	98.38
Math		52.66	9.95		576.44	101.00
Writing		50.66	9.75		562.03	97.29
AP English Literature	500,972	2.95	1.10	400,397	3.02	1.09
Critical Reading		55.55	9.87		579.48	96.45
Math		55.90	10.12		577.58	99.64
Writing		54.72	10.07		573.83	95.79
AP Environmental Science	109,290	2.69	1.39	71,863	2.74	1.39
Critical Reading		52.75	9.60		558.00	94.58
Math		54.86	9.60		573.87	94.67
Writing		51.73	9.86		554.67	95.20
AP European History	80,532	3.05	1.32	41,217	3.19	1.29
Critical Reading		55.48	10.11		603.78	92.50
Math		55.45	9.91		593.27	93.95
Writing		53.76	10.30		589.83	94.00
AP Government and Politics: Comparative	22,037	3.17	1.36	17,089	3.18	1.36
Critical Reading		58.54	9.66		611.25	91.22
Math		58.83	9.73		609.49	93.80
Writing		56.70	9.85		600.33	92.01

Appendix Continued

AP Exam	PSAT/NMSQT Takers			SAT Takers		
	N	Mean	SD	N	Mean	SD
AP Government and Politics: US	271,899	2.83	1.32	233,204	2.85	1.31
Critical Reading		55.34	9.81		574.55	95.73
Math		56.58	10.01		582.65	98.28
Writing		54.13	10.05		565.95	95.63
AP Human Geography	25,017	2.96	1.39	15,327	3.02	1.39
Critical Reading		52.76	9.87		560.19	95.47
Math		54.19	9.95		567.93	96.73
Writing		51.53	9.99		554.02	95.21
AP Macroeconomics	112,839	2.88	1.44	97,896	2.87	1.43
Critical Reading		56.41	10.02		583.85	97.61
Math		59.39	10.07		610.73	98.92
Writing		55.27	10.21		577.10	98.22
AP Microeconomics	68,095	3.08	1.38	57,848	3.05	1.37
Critical Reading		56.80	10.05		587.87	97.13
Math		60.21	10.10		617.94	99.46
Writing		55.62	10.26		582.35	97.92
AP Music Theory	19,842	3.07	1.29	11,562	3.14	1.28
Critical Reading		54.99	10.00		585.25	96.02
Math		57.22	10.09		599.53	97.76
Writing		54.57	10.25		579.67	95.90
AP Physics 1	218,072			73,850		
Critical Reading		533.11	96.77		580.58	100.67
Math		572.70	96.16		619.61	91.97
Writing		517.45	101.02		569.51	102.86
AP Physics C: Electricity and Magnetism	21,847	3.49	1.39	18,725	3.46	1.40
Critical Reading		62.63	9.60		642.71	91.25
Math		69.04	7.12		707.36	66.06
Writing		61.35	9.69		636.72	91.61
AP Physics C: Mechanics	48,928	3.37	1.35	40,741	3.37	1.34
Critical Reading		60.58	9.77		624.65	93.66
Math		66.71	7.92		685.96	74.12
Writing		59.41	9.94		618.96	94.65
AP Psychology	212,402	3.26	1.41	125,492	3.30	1.40
Critical Reading		52.74	9.51		558.08	94.74
Math		54.22	9.94		568.67	98.98
Writing		51.75	9.80		555.62	94.77
AP Statistics	171,871	2.89	1.33	136,397	2.86	1.32
Critical Reading		54.81	9.72		569.45	95.44
Math		59.10	9.27		607.17	91.84
Writing		54.06	9.96		568.36	95.34
AP U.S. History	419,099	2.79	1.31	33,317	2.97	1.30
Critical Reading		51.70	9.51		566.92	98.62
Math		52.99	9.74		577.20	99.97
Writing		50.38	9.70		554.96	98.02
AP World History	84,942	2.66	1.33	8,999	3.18	1.33
Critical Reading		48.81	9.98		585.75	98.72
Math		50.42	9.98		582.18	99.12
Writing		47.64	9.98		573.27	99.15