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AP Potential™ Expectancy Tables Based on PSAT/NMSQT® and SAT® Scores on the 2015-16 Redesigned Scales

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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 10th- and 11th-grade PSAT/NMSQT data with scores from AP Exams taken as either 11th- or 12th-graders during the following academic year. For AP European History and AP World History, ninth-grade PSAT/NMSQT scores and 10th-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., SAT, PSAT/NMSQT, PSAT™ 10, and PSAT™ 8/9) in the 2015-16 academic year, AP Potential will also be reported based on scores from additional PSAT/NMSQT 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/years:[1]

- Students who took the PSAT/NMSQT in the 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, respectively.
- 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 analyses for these two subjects only.

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, 201a, 2014b. 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, scoring a 4 or better was defined as success in the second scenario.

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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, 2014a.

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Once new expectancy tables 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 cut scores to the redesigned scale using results from a special concordance study that relates scores on the old scale to the new (redesigned) scale. We used the PSAT 10 concordance table for this work.[2] 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 cut scores associated with earning a 3 or higher and a 4 or higher, respectively, at increasing levels of confidence on the redesigned scale.

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2. 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 since the AP Potential tables do not show cut scores in the extremes of the distribution.

Conclusion

The AP Potential expectancy tables in this report are interim tables only. In July 2016, a second version of the concordance tables may be released that, in turn, may necessitate additional adjustments to the AP Potential cut scores for reporting in fall 2016 and beyond. Eventually, we will also recalculate AP Potential based on actual redesigned data. For more information about the research behind AP Potential and the proper use of AP Potential cut scores, 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 Ninth-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

Table 1. Expectancy Tables for AP Score >=3 on Redesigned SAT and PSAT/NMSQT Scale

		N	10%	20%	30%	40%	50%	60%	70%	80%	90%
M	Calculus AB	590,333	23.5	26	27	28.5	29	30	31	33	36
	Biology	319,963	47.5	51.5	54.5	56.5	58	60	62.5	64	68.5
	Chemistry	199,537	47	51	54.5	56.5	58.5	61	63	65.5	71
	Computer Science A	33,299	45	50	53	55.5	57.5	60	63	65.5	71
	Environmental Science	181,153	46.5	50	52.5	54.5	56	57.5	60	62.5	65.5
	Macroeconomics	210,735	45.5	50.5	54	56	58.5	61	63.5	66.5	71.5
	Microeconomics	125,943	45	49.5	52	54.5	56.5	58.5	61.5	64	68
	Physics EM	40,572	46.5	52	55.5	58	61	63.5	66.5	71	74
	Physics M	89,669	47	52	54.5	57	59	61.5	63.5	66.5	71
R + M	Statistics	308,268	46.5	50.5	53	55	57	59	61	63.5	67.5
R + W&L	Art History	45,720	38	45	49	52	56	59	61	65	70
	English Language	510,233	45	48	49	51	52	54	55	57	60
	English Literature	901,369	48	51	54	56	57	59	61	63	66
M+ W&L	Music Theory	31,404	38.5	44.5	49	52	55	58	60.5	64.5	70.5
EBRW+ M	European History	121,749	820	890	950	1000	1040	1090	1140	1180	1270
	Government and Politics: Comparative	39,126	900	1000	1060	1100	1140	1180	1230	1280	1380
	Government and Politics: U.S.	505,103	920	1010	1060	1110	1140	1180	1220	1270	1360
	Human Geography	40,344	860	930	990	1030	1070	1110	1150	1200	1270
	Psychology	337,894	820	880	930	980	1020	1060	1100	1150	1230
	U.S. History	452,416	870	940	1000	1040	1080	1120	1150	1200	1270
	World History	93,941	840	910	960	1010	1050	1090	1130	1180	1250

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; EBRW + M = Evidence-Based Reading and Writing + Math section scores.

Table 2. Expectancy Tables for AP Score >=4 on Redesigned SAT and PSAT/NMSQT Scale

		N	10%	20%	30%	40%	50%	60%	70%	80%	90%
M	Calculus AB	590,333	26.5	28.5	29.5	30.5	31.5	33	35	36.5	37.5
R + M	Biology	319,963	52.5	56	58.5	61	63	64	66.5	70	73
	Chemistry	199,537	53	57.5	60	62.5	64	66.5	69	72	74
	Computer Science A	33,299	50	54.5	57.5	60	62.5	64	67.5	71	73.5
	Environmental Science	181,153	51.5	55.5	57.5	59.5	61.5	63.5	65	68	72
	Macroeconomics	210,735	50.5	55.5	58.5	61.5	63.5	65.5	68.5	72	74.5
	Microeconomics	125,943	51.5	56	58.5	61	63	64.5	67.5	71	73.5
	Physics EM	40,572	50.5	56	59.5	63	65	68	71	73.5	76
	Physics M	89,669	54	58	61	63.5	65	68	71	72.5	75
	Statistics	308,268	54	57.5	60	62	64	65.5	68	71	73
R + W&L	Art History	45,720	49	55	59	62	65	68	70	73	76
	English Language	510,233	52	55	57	59	60	62	63	66	68
	English Literature	901,369	57	60	62	64	66	68	69	71	73
M+ W&L	Music Theory	31,404	48.5	55	58.5	61	63.5	67.5	70.5	73	76
EBRW+ M	European History	121,749	1010	1100	1160	1210	1250	1300	1360	1410	1470
	Government and Politics: Comparative	39,126	1030	1120	1170	1220	1260	1300	1370	1420	1480
	Government and Politics: U.S.	505,103	1080	1160	1210	1250	1290	1340	1390	1430	1480
	Human Geography	40,344	980	1070	1120	1160	1200	1240	1280	1350	1420
	Psychology	337,894	890	990	1050	1100	1140	1170	1220	1270	1370
	U.S. History	452,416	1000	1070	1130	1170	1200	1240	1280	1340	1420
	World History	93,941	970	1060	1110	1150	1190	1230	1270	1340	1420

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; EBRW + M = Evidence-Based Reading and Writing + Math section scores.

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

	PSAT/NMSQT Takers			SAT Takers		
AP Exam	**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	N	Mean	SD	N	Mean	SD
	PSAT/NMSQT Takers			**SAT Takers**		
AP Government and Politics: U.S.	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 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