Digital SAT® Score Relationships with Other Educational Measures

Early Convergent Validity Evidence

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Key Takeaways

- Students' digital SAT scores are strongly related to their scores on the current SAT, suggesting that the digital and current SAT scores measure highly similar constructs.
- The strength of the relationships between students' digital SAT scores with their HSGPAs, PSAT/NMSQT® Total scores, and Average AP® Exam scores parallel the strength of the relationships between their current SAT scores with these same measures.
- This study provides initial evidence that digital SAT scores can be used in the same ways as current SAT scores.

Introduction

According to the *Standards for Educational and Psychological Testing*, one of the five primary sources of test score validity evidence is that based on relations to other variables (AERA, APA, NCME, 2014). While most frequently those other variables are relevant outcomes or criteria of interest, there is also value in collecting what is referred to as convergent evidence, or relationships between test scores and other measures that assess similar constructs (e.g., academic preparation, college readiness). This study examines relationships between digital SAT scores and other relevant educational measures, such as high school grade point average (HSGPA), PSAT/NMSQT Total score, and Average AP Exam score, and compares those relationships to current paper and pencil SAT score relationships with the same measures. This information can provide reassurances to future digital SAT-takers and test score users when findings show that digital SAT scores are measuring the constructs they are intended to, and that they are doing so in nearly identical ways to the paper and pencil SAT. That is what this study aims to do.

It's useful to recall what is changing about the SAT and what remains the same. The SAT will transition from a paper-and-pencil to a digital exam at international test centers in spring 2023 and at U.S. schools and test centers in spring 2024. Central to this transition is making an SAT that is shorter, more secure, more relevant, and simpler to deliver than ever before. The digital SAT will continue to measure the skills and knowledge that students are learning in school and that matter most for college and career readiness, and the scores will be reported on the 200-800 scale for both the Reading and Writing and Math sections. However, the digital SAT will be shorter than the current SAT (about 2 hours and 14 minutes instead of 3 hours), students will have more time, on average, to answer each test question, the Reading and Writing section will feature many shorter passages instead of longer texts, calculators will be permitted throughout the entire Math section, and the length of the word problems in the Math section has been

reduced. The digital SAT will utilize a multistage adaptive testing design that will result in the shorter test length while maintaining the measurement precision of the current test. For more information on all of these design changes and more, please see *The Digital SAT Suite of Assessments Specifications Overview* (College Board, 2022).

There is a critical pilot study underway to examine the predictive validity of digital SAT scores with college outcomes and the findings from this pilot study will be available at the launch of the digital SAT. Until then, this study can help us better understand the nature and meaning of digital SAT scores, how they relate to current SAT scores, and how we might expect them to relate to various other educational measures. We will continue to study the predictive validity of digital SAT score relationships with college outcomes across large national samples of students in the coming years as the applicable data become available.

Sample

The sample of students for this study comes from a pilot concordance study conducted in spring 2022 where high school students were invited to take both a digital SAT and paper and pencil SAT. This initial sample included 6,373 students[1]. Three subsamples were also created—one for those with a self-reported high school grade point average (HSGPA; n=6,160), one for those with PSAT/NMSQT Total scores (n=5,638) and one for those with AP Exam scores (n=5,171). See Table 1 for more information about the characteristics of the full sample of students. (See Table A 1 for details on each subsample). The study sample tended to be female, primarily White, Asian, or Hispanic, have parents with a bachelor's degree or higher, and state that English is their best language. While this sample is not representative of the general SAT taking population, these demographic characteristics closely resemble our validity research samples in larger studies of college-going students.

Table 1: Student Demographics of the Overall Sample

Student Characteristic		**Overall Sample (n=6,373)**
Gender	Male	40%
	Female	59%
	Another/No Response	<1%
Race/Ethnicity	American Indian or Alaska Native	<1%
	Asian	24%
	Black or African American	7%
	Hispanic or Latino	21%
	Native Hawaiian or Other Pacific Islander	<1%
	White	28%
	Two or More Races	4%
	Not Stated	16%
Highest Parental Education Level	No High School Diploma	4%
	High School Diploma	13%
	Associate Degree	4%
	Bachelor's Degree	36%
	Graduate Degree	38%
	Not Stated	5%
Best Language	English Only	68%
	English and Another Language	29%
	Another Language	3%
	Not Stated	1%

Note: Percentages may not sum to 100% due to rounding.

[1] Students had to be in their junior year and have taken the current SAT in either March, April, or May 2022. As student motivation was a concern, students with more than a 200-point difference in performance on corresponding section scores on the current SAT or digital SAT were remove (n=18). As a final check, we removed one student with a 200 section score on the current SAT and a corresponding PSAT section score that was more than 200 points higher.

Measures

Current SAT scores. Current SAT scores were obtained from College Board's database and matched to each student that participated in the special administration of the digital SAT. The current SAT scores included in this study are

SAT Total Score (400 to 1600 scale)—increments of 10, sample mean of 1242 (SD=166)

SAT Evidence-Based Reading and Writing (ERW) Section Score (200 to 800 scale)—increments of 10, sample mean of 621 (SD=81).

SAT Math Section Score (200 to 800 scale)—increments of 10, sample mean of 621 (SD=98).

Digital SAT Scores. A special administration of the digital SAT was given as part of the first concordance study. Digital SAT scores were obtained from College Board records and matched to every student who participated in the study. The Digital SAT scores included in this study are

SAT Total Score (400 to 1600 scale)—increments of 10, sample mean of 1241 (SD=145)

SAT Reading and Writing Section Score (200 to 800 scale)—increments of 10, sample mean of 621 (SD=71).

SAT Math Section Score (200 to 800 scale)—increments of 10, sample mean of 620 (SD=88).

High School GPA (HSGPA). Students' self-reported HSGPA was obtained from the SAT Questionnaire when they registered for the SAT and is reported on a 12-point scale, ranging from 0.00 (F) to 4.33 (A+). The HSGPA measure in the current study has a sample mean of 3.90 (SD=0.41)

PSAT/NMSQT Total Score (320 to 1520) —increments of 10. PSAT/NMSQT Total scores were obtained from College Board's database and matched to each student that participated in the special administration of the digital SAT. The PSAT/NMSQT Total score had a sample mean of 1178 (SD=159) in this study.

Average AP Exam Score. AP Exam scores were obtained for each student in the sample, and Average AP Exam score is the average score for all of the AP Exams that a student took. This ranged from 1 to 5, with a sample mean of 3.2 (SD=1.0).

Table 2 includes descriptive statistics for all measures of interest in this study. The descriptive statistics for HSGPA, PSAT/NMSQT Total Score, and Average AP Exam score reflect the values for the measure-specific sample and not the full SAT Sample. See Table A 2 in the Appendix for descriptive statistics for each sample in this study.

Table 2: Descriptive Statistics for Measures of Interest, Overall Sample

	N	M	SD	Min	Max
Current SAT Total Score	6,373	1242	166	600	1600
Current SAT ERW Section Score	6,373	621	81	310	800
Current SAT Math Section Score	6,373	621	98	260	800
Digital SAT Total Score	6,373	1241	145	670	1600
Digital SAT Reading and Writing Section Score	6,373	621	71	310	800
Digital SAT Math Section Score	6,373	620	88	270	800
HSGPA	6,160	3.90	0.41	1.67	4.33
PSAT/NMSQT Total Score	5,638	1178	159	510	1520
Average AP Exam Score	5,171	3.2	1.0	1	5

Methods

As this is a study to gather convergent validity evidence, we conducted correlational analyses using both current SAT and digital SAT scores. First, we examined the strength of the relationships between students' section and total scores on the current SAT and the digital SAT. Next, we examined the strength of the relationships between students' current SAT and digital SAT scores with three other measures of interest: HSGPA, PSAT/NMSQT Total score, and Average AP Exam score. Although all students had both current SAT and digital SAT scores (n=6,373), not all students had HSGPAs or PSAT/NMSQT Total and AP Exam scores. To maximize sample sizes, we conducted separate analyses for each of the three measures of interest: HSGPA (n=6,160), PSAT/NMSQT Total score (n=5,638), and Average AP Exam score (n=5,171).

Results

Current SAT and Digital SAT Relationships

Observed correlations between digital and current SAT scores are presented in Table 3[2]. The strongest correlation for the digital SAT Total score was a correlation of .92, with the current SAT Total score, as expected. For the digital SAT Reading and Writing section score, the strongest correlation was with the current SAT ERW section score, a correlation of .86. For the digital SAT Math section score, the strongest correlation was with the current SAT Math section score, a correlation of .90. These correlations provide strong evidence of convergent validity for the digital SAT scores. Moreover, these correlations are consistent with test-retest correlations found between current SAT scores for examinees who tested more than one time.[3] This indicates that students are scoring as similarly on the digital SAT and current SAT as they are when they sit for two different administrations of the current SAT.

Table 3: Correlations and 95% Confidence Intervals between Digital SAT and Current SAT Scores

Current SAT	Digital SAT	Correlation and 95% Confidence Intervals
Total Score	Total Score	.92 [.92-.93]
ERW Section Score	Reading and Writing Section Score	.86 [.85-.86]
Math Section Score	Math Section Score	.90 [.89-.90]

Note. N=6,373.

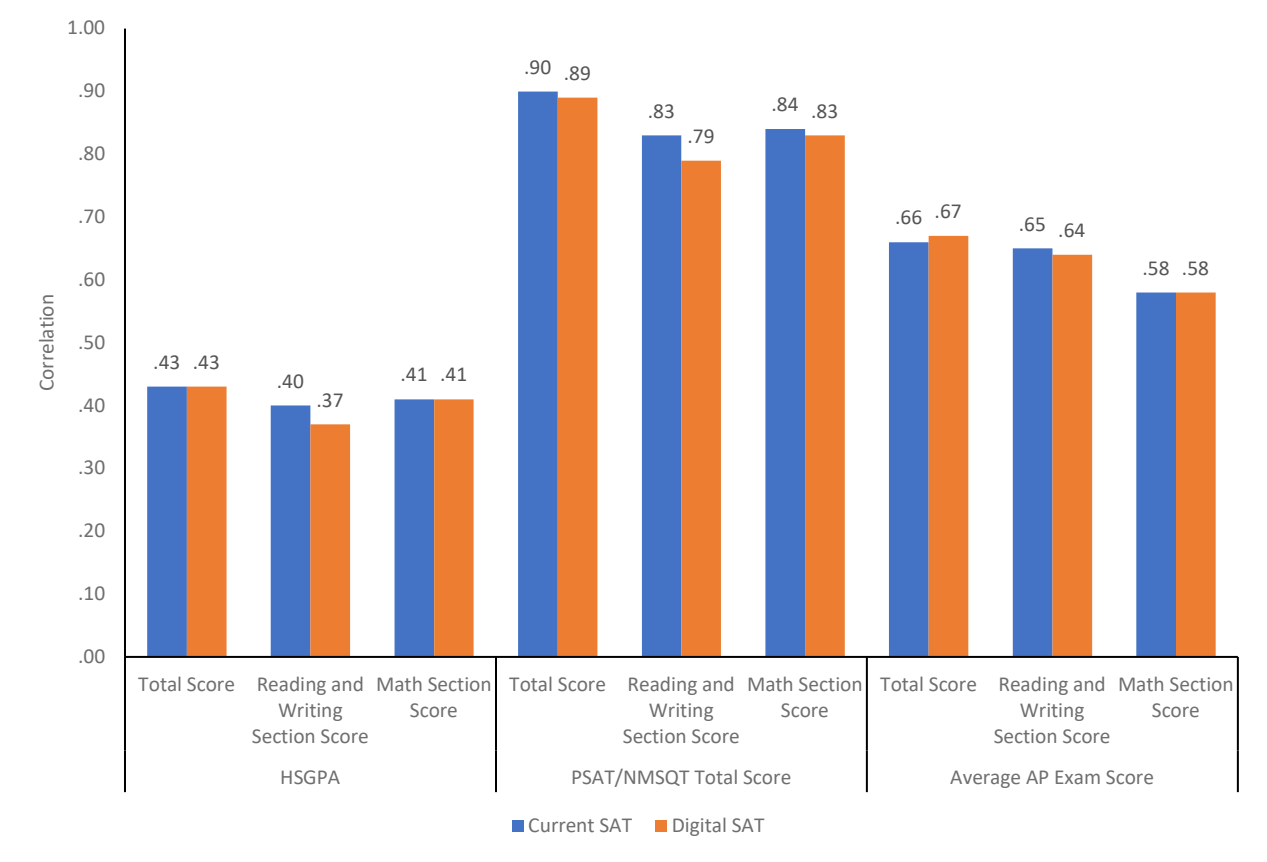
Current and Digital SAT Relationships with Related Measures

Figure 1 illustrates the strength of the relationships between digital and current SAT scores and the three relevant educational measures of interest: HSGPA, PSAT/NMSQT Total score, and Average AP Exam score. Here we can see that the differences between the digital and current SAT Total scores with the three other measures were relatively minor, varying from .00 or .01. The same was true for the SAT Math section scores. Differences between current SAT ERW and digital SAT Reading and Writing section score correlations with the other three measures ranged from .01 (Average AP Exam scores) to .04 (PSAT/NMSQT).

[2] Mean values for the academic variables studied are higher for this study sample than the general SAT taking population, with smaller standard deviations. The smaller standard deviations denote a restriction of range in this sample. Therefore, we would likely expect that a sample that more closely resembled the general population would have correlations that are slightly higher than those found in this study.

[3] For a sample (N=41,120) of students who took the current SAT in both March and May 2022, the test-retest reliability estimates for SAT Total, ERW section, and Math section scores were .93, .88, and .90, respectively.

Figure 1: Digital SAT and Current SAT Correlations with HSGPA, PSAT/NMSQT, and Average AP Exam Score



Note. For the current SAT, Reading and Writing is the ERW section.

Table 4 presents the correlations with the 95% confidence intervals. With one exception, the 95% confidence intervals overlap. [4] This suggests that going forward, the relationships between the digital SAT and these three measures of educational achievement will be as strong as those found with the current SAT today.

Table 4: Digital SAT and Current SAT Correlations with HSGPA, PSAT/NMSQT, and Average AP Exam Score

		N	**Current SAT** *r* [95% confidence interval]	**Digital SAT** *r* [95% confidence interval]
HSGPA	**Total Score**	6,160	.43 [.41, .45]	.43 [.41, .45]
	Reading and Writing Section Score	6,160	.40 [.38, .42]	.37 [.35, .39]
	Math Section Score	6,160	.41 [.39, .43]	.41 [.39, .43]
PSAT/NMSQT Total Score	**Total Score**	5,638	.90 [.89, .90]	.89 [.89, .90]
	Reading and Writing Section Score	5,638	.83 [.82, .84]	.79 [.78, .80]
	Math Section Score	5,638	.84 [.83, .85]	.83 [.82, .84]
Average AP Exam Score	**Total Score**	5,171	.66 [.65, .68]	.67 [.65, .68]
	Reading and Writing Section Score	5,171	.65 [.63, .66]	.64 [.62, .65]
	Math Section Score	5,171	.58 [.56, .60]	.58 [.56, .59]

[4] Note. For the current SAT, Reading and Writing is the ERW section. Note that the scores used in this study were from the current paper and pencil PSAT/NMSQT, and not the forthcoming digital PSAT/NMSQT. We would expect the digital SAT scores to be more strongly correlated with the digital PSAT/NMSQT.

Conclusion

This study is the first in a series of research projects to gather evidence for the validity and utility of digital SAT scores as a measure of college readiness. Results from the current study indicate that students' digital SAT scores are strongly related to their scores on the current SAT. Moreover, the strength of the relationships of the digital SAT with other measures of academic achievement—HSGPA, PSAT/NMSQT, and Average AP Exam score-- parallel the strength of the relationships found between the current SAT and these measures. Given the convergent validity evidence presented in this report, we expect digital SAT relationships with student outcomes such as first-year GPA to parallel those found with the current SAT, which should give current SAT score users confidence in the value of digital SAT scores for understanding student readiness for college and for use in predicting students' college outcomes, course placement decisions, scholarship decisions, and identifying students needing academic support.

A digital SAT pilot predictive validity study is currently underway to examine digital SAT score relationships with college performance in the first year. Results will be reported in 2023, as soon as college outcome data are available for students who participated in the digital SAT pilot exam.

References

American Educational Research Association, American Psychological Association, & National Council on Measurement in Education. (2014). *Standards for educational and psychological testing*. Washington, D.C.: American Educational Research Association.

College Board. (2022). The Digital SAT Suite of Assessments Specifications Overview. Retrieved from: https://satsuite.collegeboard.org/media/pdf/digital-sat-test-spec-overview.pdf.

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Appendix

Table A 1: Student Demographics of Each Sample

		Overall Sample (n=6,373)	Sample with HSGPA (n=6,160)	Sample with PSAT/NMSQT Total Score (n=5,638)	Sample with Average AP Exam Score (n=5,171)
Gender	Male	40%	40%	40%	40%
	Female	59%	59%	60%	59%
	Another/No Response	<1%	<1%	1%	1%
Race/Ethnicity	American Indian or Alaska Native	<1%	<1%	<1%	<1%
	Asian	24%	24%	25%	26%
	Black or African American	7%	7%	7%	7%
	Hispanic or Latino	21%	21%	21%	21%
	Native Hawaiian or Other Pacific Islander	<1%	<1%	<1%	<1%
	White	28%	28%	29%	27%
	Two or More Races	4%	4%	4%	4%
	Not Stated	16%	15%	15%	15%
Highest Parental Education Level	No High School Diploma	4%	4%	4%	4%
	High School Diploma	13%	14%	13%	14%
	Associate Degree	4%	4%	4%	4%
	Bachelor's Degree	36%	36%	36%	36%
	Graduate Degree	38%	38%	38%	38%
	Not Stated	5%	4%	5%	5%
Best Language	English Only	68%	68%	70%	70%
	English and Another Language	29%	29%	27%	28%
	Another Language	3%	3%	2%	2%
	Not Stated	1%	1%	1%	1%

Table A 2: Descriptive Statistics for Measures of Interest, by Study Samples

	Overall Sample (n=6,373)				Sample with HSGPA (n=6,160)				Sample with PSAT/NMSQT Total Score (n=5,638)				Sample with Average AP Exam Score (n=5,171)			
	M	**SD**	**Min**	**Max**	**M**	**SD**	**Min**	**Max**	**M**	**SD**	**Min**	**Max**	**M**	**SD**	**Min**	**Max**
Current SAT Total Score	1242	166	600	1600	1242	166	670	1600	1248	165	600	1600	1264	155	690	1600
Current SAT ERW Section Score	621	81	310	800	621	81	310	800	625	80	330	800	632	76	340	800
Current SAT Math Section Score	621	98	260	800	621	98	270	800	623	97	260	800	632	93	330	800
Digital SAT Total Score	1241	145	670	1600	1241	144	670	1600	1247	143	720	1600	1261	134	780	1600
Digital SAT Reading and Writing Section Score	621	71	310	800	621	71	310	800	624	70	350	800	630	66	390	800
Digital SAT Math Section Score	620	88	270	800	620	88	270	800	622	87	320	800	631	83	350	800
HSGPA	3.90	0.41	1.67	4.33	3.90	0.41	1.67	4.33	3.91	0.40	1.67	4.33	3.93	0.37	2	4.33
PSAT/NMSQT Total Score	1178	159	510	1520	1178	158	510	1520	1178	159	510	1520	1199	150	510	1520
Average AP Exam Score	3.2	1.0	1	5	3.2	1.0	1	5	3.2	1.0	1	5	3.2	1.0	1	5