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Student Ranking Differences Within Institutions Using Old and New SAT Scores

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Introduction

Admission offices at colleges and universities often use SAT® scores to make decisions about applicants for their incoming class. Many institutions use prediction models to quantify a student's potential for success using various measures, including SAT scores (NACAC, 2016). In March 2016, the College Board introduced a redesigned SAT that better reflects the work that students do in college. The new test focuses on the core knowledge and skills that evidence shows to be critical in preparing for college and career. This is the overall difference between the tests and the most important one. However, in order for us to more clearly present our findings in this comparison study, we would like to note the following specific differences in format and scoring. The old SAT had three sections: critical reading, mathematics, and writing. The new SAT has two sections, Evidence-Based Reading and Writing, and Math. It also offers an optional essay. The new test reports additional scores (e.g., test scores, cross-test scores, and subscores). The old SAT had a total scale range of 600–2400. The new SAT has a total scale range of 400–1600.

Following the release of the redesigned SAT, institutions are especially interested in learning if and how the use of new SAT scores impacts decision-making methods, and studies have been undertaken to address this interest (e.g., Marini, Shaw, Young, & Walker, 2016; Marini, Shaw, & Young, in press). The current study explores whether old and new SAT scores rank students within an institution in a similar way. If the rankings of students produced by the two different SAT scores from the old and new exam are preserved, then the decisions based on performance on the old exam would be essentially identical to decisions based on performance when the new exam is used instead. Conversely, if the rankings of students are markedly different, then decisions would not be consistent across the old and new exams. Ranking students by standardized test scores is not something that admission offices necessarily do. However, this study design can provide insight into whether or not scores on the old and new SAT place students within the same relative position among all students applying to an institution. This can signal whether to expect large, small, or essentially no changes to processes, policies, and procedures incorporating SAT scores on campus.

The purpose of this study is not to validate a method of admitting students based on test score ranking within an institution. Rather, the aim is to examine whether the new and old test scores similarly rank-order applicants within an institution to better understand if any broad changes would be expected in the interpretation of student test scores received within an institution.

Method

To answer the question of whether the new and old SAT scores are similarly rank-ordering applicants within an institution, students were ranked by old and new SAT section and test scores within an institution from highest to lowest. Then the corresponding old and new

score pairs (e.g., old SAT Writing compared to new SAT Writing and Language) were compared to see if significant ranking differences existed. Ties in ranking could be computed in three different ways[1] (highest rank, lowest rank, or mean rank), and all three methods were investigated. In the highest rank method, ties are given the rank of the highest position that they fall in sequence, and then the ranking continues with the position of the next value in order. The lowest rank method is like the highest, but in reverse. Here ties are given the rank of the lowest position that they fall in sequence, and then the ranking continues with the position of the next value in order. The mean rank method finds the average position of the tied values and assigns that mean value as the rank for those tied values. The ranking then continues with the position of the next value in order.

Sample

The data analyzed in this study are from the pilot predictive validity study of the new SAT (see Shaw et al., 2016) and include 2,050 students from 15 four-year institutions (see Table 1). Compared to the 2014 College-Bound Seniors Cohort[2] (the population), this study sample was relatively representative of African American students (13% for both), Hispanic students (17% sample, 18% population), and white students (46% sample, 49% population). However, this study sample had more Asian students (20% sample, 12% population) and female students (64% sample, 53% population) than the College-Bound Seniors 2014 cohort (College Board, 2014). Please see Shaw et al. (2016) for in-depth information regarding sample selection and data-cleaning procedures.

Table 1: Characteristics of Sample

Student Characteristics (*n* = 2,050)		**%**
Gender	Female	64%
	Male	36%
Race/Ethnicity	American Indian or Alaska Native	<1%
	Asian, Asian American, or Pacific Islander	20%
	Black or African American	13%

[1] Ties can also be computed using the sequential method where all tied scores are given the same rank, and then the next score is ranked in sequential order with no ranks being skipped. This method was not employed due to the number of tied scores within a section or test within an institution. Further, the scale of the tests in the new SAT (10–40) had fewer score points than all sections combined. Using the sequential method for ties on data with many ties and small scales causes significant differences to be identified when they are actually functions of the tie method rather than actual differences within the data.

[2] The cohort includes college-bound students in the class of 2014 who took the SAT or SAT Subject Tests™ at any time during high school.

	Hispanic	17%
	White	46%
	Other	3%
	No Response	<1%
Institutional Characteristic (*n* = 15)		**%**
Control	Private	33%
	Public	67%
Admittance Rate	Under 50%	40%
	50% to 75%	40%
	Over 75%	20%
Undergraduate Enrollment	Small	0%
	Medium	33%
	Large	13%
	Very Large	53%

Measures

Old SAT Scores. The most recent scores from the old SAT were obtained from the College Board for each student in this sample. The old SAT has three sections: critical reading (CR), mathematics (M), and writing (W). Each section has a 200–800 scale range. Ranks were created for each of the three sections independently, as well as for the sum of the CR and W sections.

New SAT Scores. New SAT scores were obtained for each student in the study sample in a special administration of a pilot form of the new SAT in fall 2014. The new SAT has two section scores, three test scores, two cross-test scores, and seven subscores. For this study, we were interested in the following scores:

- Two section scores (200–800 scale each)—Evidence-Based Reading and Writing (ERW) and Math (MSS).
- Two test scores (10–40 scale each)—Reading (R) and Writing and Language (WRLA).

Analyses and Results

Research question: How does student ranking differ when old versus new SAT section and/or test scores are used to rank students within an institution?

Before the analyses could begin, students needed to be ranked based on old SAT scores and new SAT scores within an institution. As described earlier, three methods for handling

ranking ties were employed. Therefore, a student could have three different ranks for each score. Students were ranked by the following scores within institutions and are listed below by their comparative ranking pairs.

Old SAT Scores	New SAT Scores
Mathematics Section (SAT-M)	Math Section (MSS)
Critical Reading Section (SAT-CR)	Reading Test (R)
Writing Section (SAT-W)	Writing and Language Test (WRLA)
Critical Reading Section + Writing Section (SAT-CR+W)	Evidence-Based Reading and Writing Section (ERW)

Student ranks were compared within an institution and by the tie-ranking method in pairs of corresponding sections and/or tests on the old and new SAT. These comparisons were done three times, one for each method of ranking ties. Rank pairs were analyzed using the Wilcoxon signed-rank test, which tests for significant differences in ranks when ranks assigned from old and new SAT scores are compared. Tables 2–4 show the results of the Wilcoxon signed-rank test for each method of ranking ties.

Table 2: Wilcoxon Signed-Rank Test Results for Ties Using the Mean Method

Institution	*n*	Rank of MSS compared to rank of SAT-M	Rank of ERW compared to rank of SAT-CR+W	Rank of WRLA compared to rank of SAT-W	Rank of R compared to rank of SAT-CR
1	175	-0.62	-0.27	-0.55	-0.05
2	157	-0.56	-0.52	-0.20	-0.36
3	137	-0.13	-0.62	-0.22	-0.31
4	146	-0.49	-0.77	-0.19	-0.53
5	68	-0.18	-0.55	-0.21	-0.13
6	107	-0.07	-0.21	-0.35	-0.20
7	123	-0.23	-0.62	-0.05	-0.67
8	113	-0.11	-0.13	-0.44	-0.07
9	136	-0.33	-0.06	-0.06	-0.11
10	83	-0.13	-0.49	-0.43	-0.43
11	224	-0.26	-0.40	-0.23	-0.13
12	103	-0.44	-0.55	-0.49	-0.44
13	182	-0.25	-0.95	-0.51	-1.02

14	96	-0.48	-0.31	-0.19	-0.30
15	200	-0.51	-0.71	-0.05	-0.36

Table 3: Wilcoxon Signed-Rank Test Results for Ties Using the Low Method

Institution	*n*	Rank of MSS compared to rank of SAT-M	Rank of ERW compared to rank of SAT-CR+W	Rank of WRLA compared to rank of SAT-W	Rank of R compared to rank of SAT-CR
1	175	-0.84	-0.81	-1.65	-1.32
2	157	-0.47	-1.37	-1.40	-2.01*
3	137	-0.21	-1.10	-1.09	-0.77
4	146	-0.32	-1.08	-1.10	-1.15
5	68	-0.24	-0.81	-0.82	-0.59
6	107	-0.15	-0.81	-1.34	-0.66
7	123	-0.21	-1.38	-1.13	-1.67
8	113	-0.11	-0.78	-1.38	-0.93
9	136	-0.29	-0.59	-0.98	-0.86
10	83	-0.29	-0.98	-1.19	-0.80
11	224	-0.14	-0.94	-1.23	-1.13
12	103	-0.40	-0.92	-0.88	-1.42
13	182	-0.39	-1.37	-1.29	-1.81
14	96	-0.57	-0.96	-0.80	-1.00
15	200	-0.38	-1.65	-1.49	-1.57

* $p < 0.05$

Table 4: Wilcoxon Signed-Rank Test Results for Ties Using the High Method

Institution	*n*	Rank of MSS compared to rank of SAT-M	Rank of ERW compared to rank of SAT-CR+W	Rank of WRLA compared to rank of SAT-W	Rank of R compared to rank of SAT-CR
1	175	-0.37	-0.25	-0.76	-1.22
2	157	-0.62	-0.39	-1.06	-1.31
3	137	-0.02	-0.10	-0.70	-0.21
4	146	-0.66	-0.37	-0.77	-0.16
5	68	-0.19	-0.28	-0.42	-0.34
6	107	-0.05	-0.36	-0.69	-0.38

7	123	-0.28	-0.10	-1.06	-0.46
8	113	-0.12	-0.43	-0.53	-0.76
9	136	-0.34	-0.53	-1.03	-0.67
10	83	-0.01	-0.04	-0.44	-0.03
11	224	-0.35	-0.16	-0.68	-0.83
12	103	-0.48	-0.20	-0.01	-0.56
13	182	-0.09	-0.52	-0.26	-0.16
14	96	-0.37	-0.24	-0.50	-0.53
15	200	-0.57	-0.24	-1.36	-0.78

Almost all results of the Wilcoxon signed-rank test showed that the differences in ranks between old and new SAT section/test score pairs were not significant. Out of 180 comparisons, only one significant difference in rank was found. This significant difference was found within Institution 2 (of 15) when the rank of the old SAT critical reading section was compared with the rank of the new SAT Reading test. In light of the fact that there was no adjustment to our overall alpha level (each test used an alpha of .05) finding, at least one significant result by chance was a virtual certainty.

Discussion and Conclusion

The findings from this study suggest that if students were ranked within an institution using old and new SAT scores, their relative position within an institution (among applicants or enrolled students) would not change in any meaningful way. Of the 180 comparisons of student rank by old and new SAT scores, only one comparison indicated a statistical difference in student ranking between old and new scores (at one institution, comparing SAT critical reading section scores to SAT Reading test scores). The overwhelming preponderance of evidence indicates that admission professionals can continue to rely on the new SAT for making admission decisions and can expect few if any major disruptions or changes in the use of scores with regard to academically rank-ordering applicants. These results are in keeping with other pilot research studies examining new SAT scores. Previous results indicate that the new test scores maintain their strong predictive validity with regard to the first-year grade point average (Shaw et al., 2016) and that the use of old SAT scores, new SAT scores, and concorded SAT scores can all serve institutions well during the transition period from using old SAT scores to using new SAT scores (Marini et al., 2016; Marini et al., in press).

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