# VALIDITY

# Validity of the SAT® for Predicting First-Year Grades: 2011 SAT Validity Sample

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## Executive Summary

The continued accumulation of validity evidence for the intended uses of educational assessments is critical to ensure that proper inferences will be made for those purposes. To that end, the College Board has continued to collect college outcome data to evaluate the relationship between SAT® scores and college success. This report provides updated validity evidence for using the SAT to predict first-year college grade point average (FYGPA) for the 2011 cohort.

Colleges and universities (henceforth, "institutions") provided data on the cohort of first-time, first-year students enrolling in the fall of 2011. The College Board combined those college outcomes data with official SAT scores and SAT Questionnaire response data. In particular, 149 institutions provided data on 276,829 students, 206,844 of whom had complete data on high school grade point average (HSGPA), which was obtained from students' responses to the SAT Questionnaire, SAT critical reading (SAT-CR), mathematics (SAT-M), and writing (SAT-W), and FYGPA. As has been shown in previous research (Kobrin, Patterson, Shaw, Mattern, & Barbuti, 2008; Patterson, Mattern, & Kobrin, 2009; Patterson & Mattern, 2011; 2012; 2013), the multiple correlation of SAT section scores and HSGPA with FYGPA was strong ($r = .62$). When compared with the correlation of HSGPA alone with FYGPA ($r = .53$), the addition of the SAT section scores to HSGPA represented a substantial increase ($\Delta r = .09$) in the correlation with FYGPA. The patterns of differential validity by institutional and student characteristics and differential prediction by student characteristics also follow the same general patterns, as has been shown in previous research (Mattern, Patterson, Shaw, Kobrin, & Barbuti, 2008; Patterson, et al., 2009; Patterson & Mattern, 2011; 2012; 2013).

**Table 1.**

Distribution of Institutional Characteristics

| Institutional Characteristic | | % |
|---|---|---|
| U.S. Region | Midwest | 18 |
| | Mid-Atlantic | 22 |
| | New England | 11 |
| | South | 19 |
| | Southwest | 12 |
| | West | 17 |
| Control | Public | 46 |
| | Private | 54 |
| Admittance Rate | Under 50% | 23 |
| | 50 to 75% | 56 |
| | Over 75% | 21 |
| Undergraduate Enrollment | Small | 20 |
| | Medium | 41 |
| | Large | 17 |
| | Very Large | 21 |

Note: Number of institutions ($K$) = 149. Percentages may not sum to 100 due to rounding. Undergraduate enrollment was categorized as follows: small: 750 to 1,999; medium: 2,000 to 7,499; large: 7,500 to 14,999; and very large: 15,000 or more.

- Table 1 shows that the sample of 149 four-year institutions was diverse with respect to region of the U.S., control, size, and undergraduate admittance rate (i.e., selectivity; College Board, 2011a).

**Table 2.**

Descriptive Statistics for Total Sample

| Variable | $M$ | $SD$ |
|---|---|---|
| HSGPA | 3.61 | 0.500 |
| SAT-CR | 551 | 97.3 |
| SAT-M | 570 | 98.3 |
| SAT-W | 544 | 98.7 |
| FYGPA | 3.00 | 0.723 |

Note: Number of students ($N$) = 206,844.

- When compared to the 2010 cohort, Table 2 shows similar mean performance for high school grade point average (HSGPA) and first-year grade point average (FYGPA) for the 2011 cohort, with means differing by at most 0.01. The mean SAT section scores are also quite similar, differing by no more than four points for any one section (Patterson & Mattern, 2013).

- When compared with the population of all college-bound SAT takers expecting to graduate in 2011 ($n$ = 1,647,123) — whose mean (standard deviation) SAT critical reading (SAT-CR), mathematics (SAT-M), and writing scores (SAT-W) were 497 (114), 514 (117), and 489 (113), respectively (College Board, 2011b) — the sample in this study tended to have performed better in terms of SAT section scores. Given that students in this subsample not only chose to take the SAT — as did the population of over 1.6 million college-bound seniors — but also applied to, enrolled at, and earned grades at a four-year institution, their higher mean SAT section scores followed the expected pattern.

**Table 3.**
Corrected (Raw) Correlation Matrix of SAT and HSGPA

| Variable | HSGPA | SAT-CR | SAT-M | SAT-W |
|---|---|---|---|---|
| HSGPA | | .45 | .49 | .49 |
| SAT-CR | (.20) | | .72 | .84 |
| SAT-M | (.22) | (.49) | | .74 |
| SAT-W | (.22) | (.69) | (.50) | |

Note: Number of students (*N*) = 206,844. Pooled within-institution, restriction of range corrected correlations are presented. The raw correlations are shown in parentheses.

- Table 3 shows the restriction of range corrected and raw correlations among the four predictors examined in this study: HSGPA, SAT-CR, SAT-M, and SAT-W. In general, SAT sections were more highly correlated with other sections than with HSGPA, and this is most prominent in the correlation of SAT-CR and SAT-W. A comparison to the study of the 2010 cohort shows that both the raw and corrected correlations are within .01 of what is reported here (Patterson & Mattern, 2013).

**Table 4.**
Corrected (Raw) Correlations of Predictors with FYGPA

| Predictor(s) | Correlation |
|---|---|
| 1. HSGPA | .53 (.34) |
| 2. SAT-CR | .49 (.28) |
| 3. SAT-M | .49 (.28) |
| 4. SAT-W | .53 (.34) |
| 5. SAT-M, SAT-CR | .53 (.32) |
| 6. HSGPA, SAT-M, SAT-CR | .61 (.42) |
| 7. SAT-CR, SAT-M, SAT-W | .55 (.36) |
| 8. HSGPA, SAT-CR, SAT-M, SAT-W | .62 (.45) |

Note: Number of students (*N*) = 206,844. Pooled within-institution, restriction of range corrected correlations are presented. The raw correlations are shown in parentheses.

- Similar to what was estimated in previous research, the bivariate correlations of each of the four predictors with first-year grade point average (FYGPA) are shown in the first four rows of Table 4 (Kobrin, et al., 2008; Patterson, et al., 2009; Patterson & Mattern, 2011; Patterson & Mattern, 2012; Patterson & Mattern, 2013).

- Consistent with prior research, the SAT writing section had the highest correlation with FYGPA among the three sections (Kobrin, et al., 2008; Patterson, et al., 2009; Patterson & Mattern, 2011; Patterson & Mattern, 2012; Patterson & Mattern, 2013).

- SAT-CR, SAT-M, and SAT-W jointly have a similar multiple correlation with FYGPA (.55) as does HSGPA with FYGPA (.53). It is, however, the inclusion of all four predictors that leads to the strongest linear relationship with FYGPA; namely a multiple correlation of .62.

**Figure 1.**
Mean FYGPA by SAT score band.
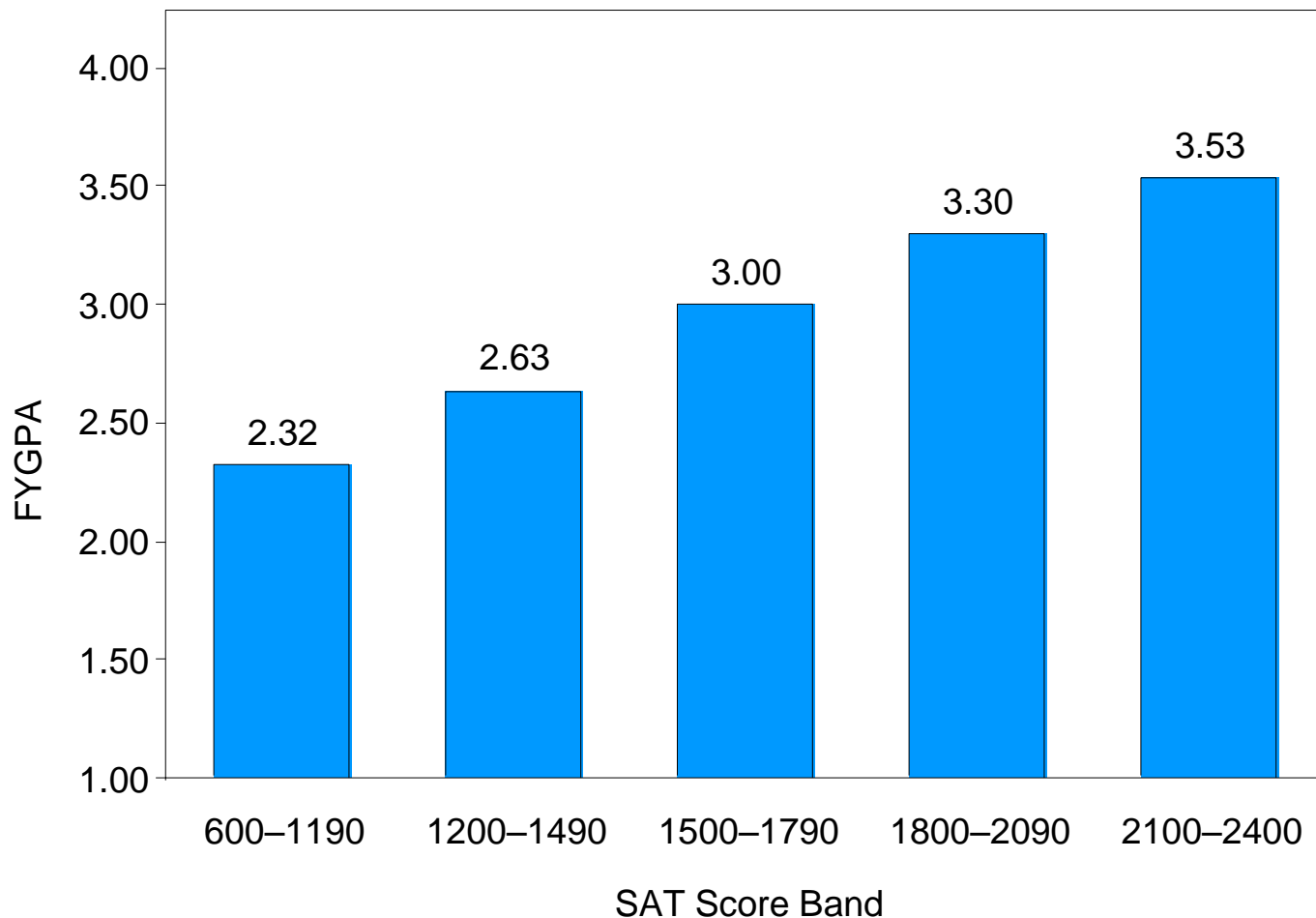


Note: SAT score bands are based on the sum of SAT-CR, SAT-M, and SAT-W.
Sample sizes by SAT score band were as follows:

| SAT | *n* |
|---|---|
| 600–1190 | 7,506 |
| 1200–1490 | 47,865 |
| 1500–1790 | 85,824 |
| 1800–2090 | 54,621 |
| 2100–2400 | 11,028 |

- Figure 1 shows graphically the positive relationship between the composite SAT score band (i.e., sum of SAT-CR, SAT-M, and SAT-W, grouped into meaningful categories) with mean FYGPA. In particular, the difference in mean FYGPA between the highest score band (2100–2400) and the lowest (600–1190) was over 1.2. In other words, students in the highest SAT score band earned, on average, an FYGPA of A- compared to students in the lowest SAT score band, who had an average FYGPA of C+.

**Figure 2.**

Percentage of students earning FYGPA of a B or higher by SAT score band.
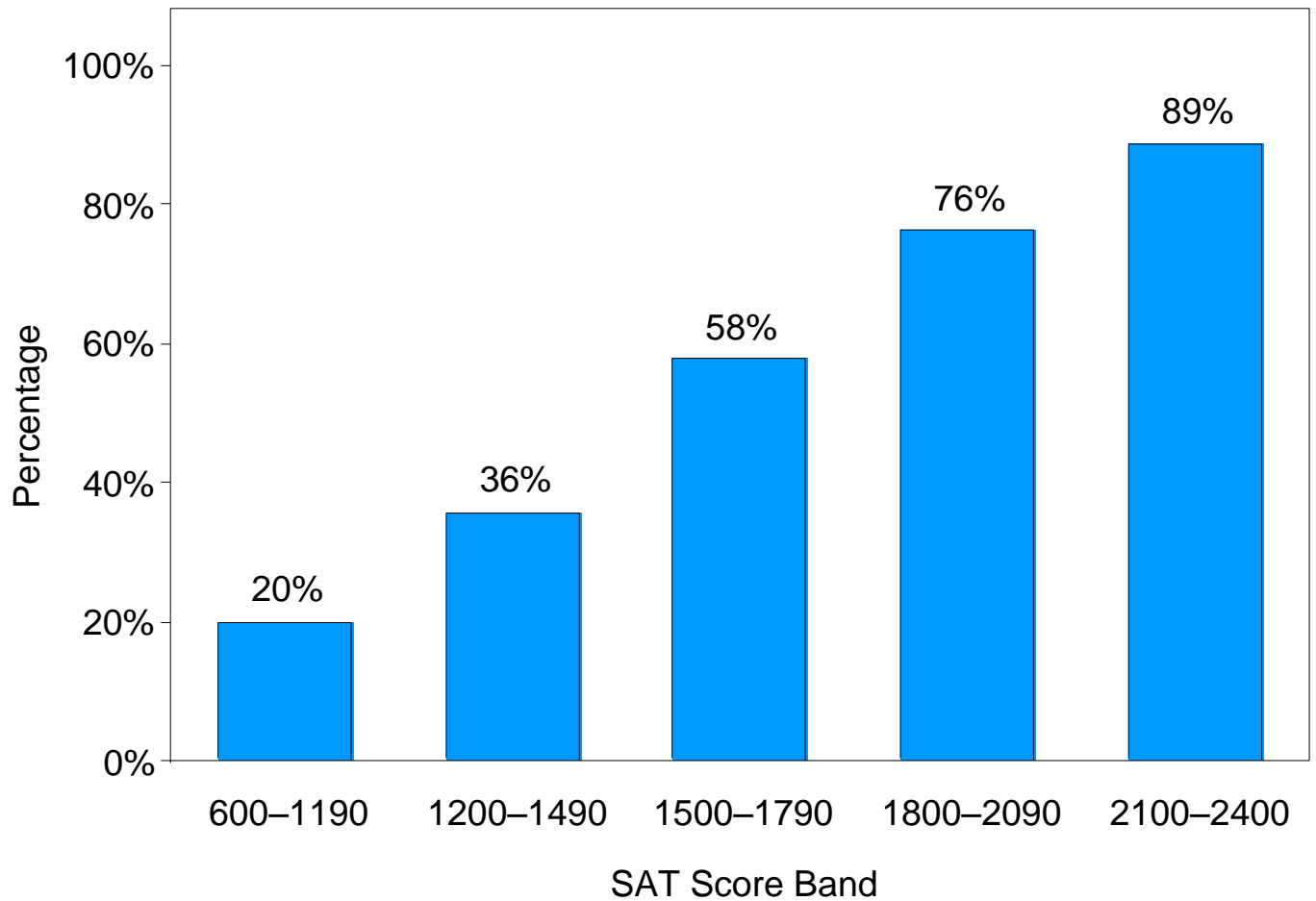


Note: SAT score bands are based on the sum of SAT-CR, SAT-M, and SAT-W.

Students whose FYGPA was ≥ 3.00 were considered to have earned a B or better.

Sample sizes by SAT score band were as follows:

| SAT | n |
|---|---|
| 600–1190 | 7,506 |
| 1200–1490 | 47,865 |
| 1500–1790 | 85,824 |
| 1800–2090 | 54,621 |
| 2100–2400 | 11,028 |

- Figure 2 shows graphically the positive relationship between the percentage of students earning at least a B (i.e., 2.0 FYGPA) in their first year of college with the composite SAT score band. In particular, almost four-and-a-half times the number of students in the highest SAT score band (2100–2400) earned at least a B, relative to those in the lowest (600–1190).

**Figure 3.**
Incremental validity of the SAT: Mean FYGPA by SAT score band controlling for HSGPA.
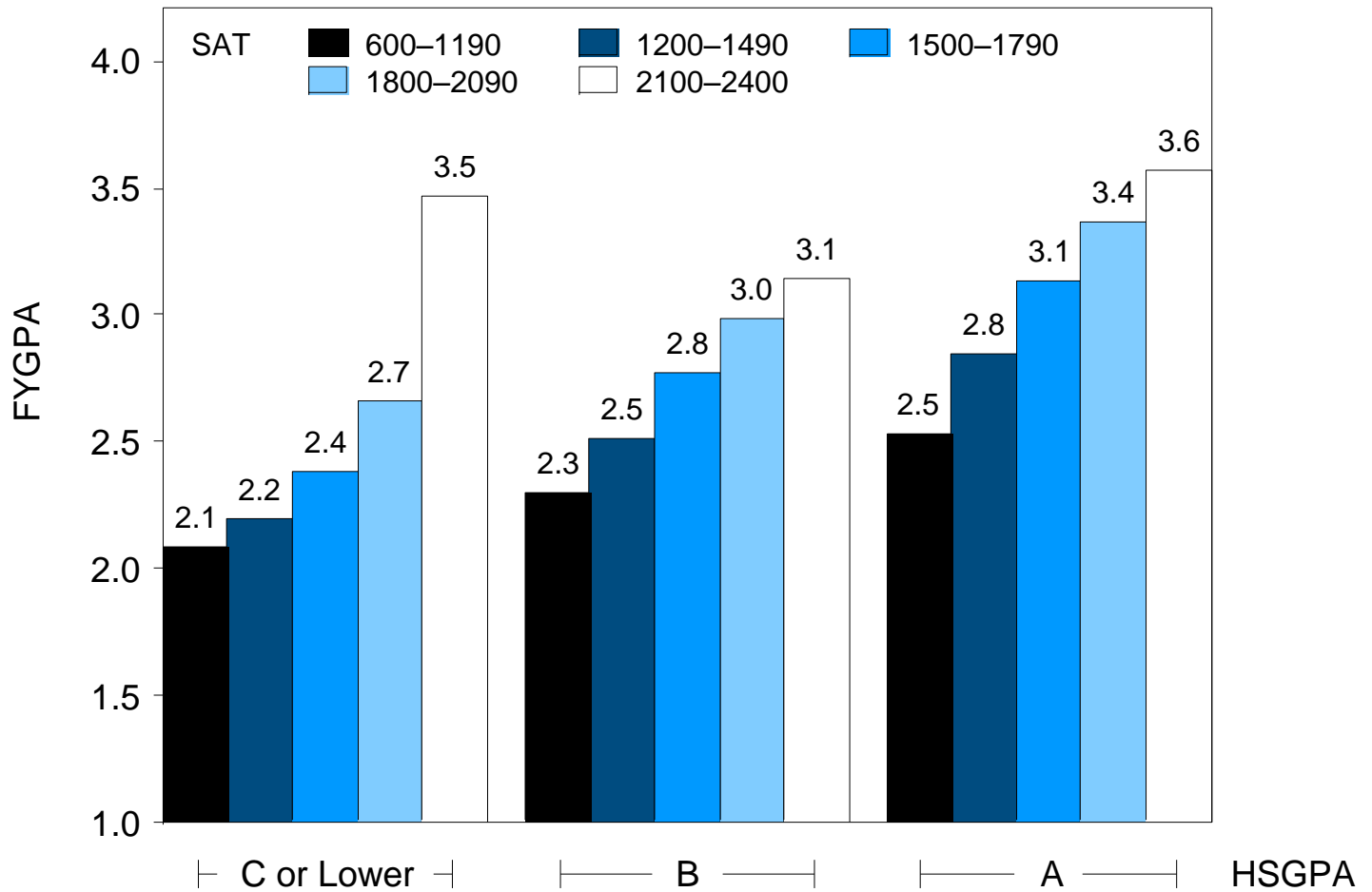


Note: SAT score bands are based on the sum of SAT-CR, SAT-M, and SAT-W.

HSGPA ranges were defined as follows:

"A" range: 4.33 (A+), 4.00 (A), and 3.67 (A-);

"B" range: 3.33 (B+), 3.00 (B), and 2.67 (B-); and

"C or Lower" range: 2.33 (C+) or lower.

Sample sizes by HSGPA and SAT score band were as follows:

| | HSGPA | | |
| --- | --- | --- | --- |
| SAT | C or Lower | B | A |
| 600–1190 | 1,046 | 4,790 | 1,670 |
| 1200–1490 | 2,678 | 25,823 | 19,364 |
| 1500–1790 | 1,406 | 29,270 | 55,148 |
| 1800–2090 | 337 | 9,523 | 44,761 |
| 2100–2400 | 34 | 867 | 10,127 |

- Figure 3 shows the relationship of composite SAT score band with mean FYGPA at different levels of HSGPA. For each level of HSGPA, higher composite SAT score bands are associated with higher mean FYGPAs, thus demonstrating the value of SAT above and beyond HSGPA in the prediction of FYGPA.

- Consider, for example, two students with HSGPAs in the A range; the one whose SAT composite was 600–1190 was expected to earn an FYGPA of 2.5, which translates to roughly a B-, while the other student, whose SAT composite was 2100–2400, was expected to earn an FYGPA of 3.6, which translates to roughly an A-.

**Table 5.**

Descriptive Statistics of Study Variables by Institutional Characteristics

| Institutional Characteristic | | *k* | *n* | SAT-CR | | SAT-M | | SAT-W | | HSGPA | | FYGPA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| **Control** | Private | 81 | 58,411 | 580 | 97.7 | 595 | 97.5 | 579 | 100.0 | 3.67 | 0.477 | 3.15 | 0.599 |
| | Public | 68 | 148,433 | 539 | 94.8 | 559 | 96.8 | 530 | 94.7 | 3.58 | 0.507 | 2.94 | 0.759 |
| **Admittance** | Under 50% | 34 | 49,522 | 595 | 95.0 | 616 | 94.6 | 597 | 98.8 | 3.74 | 0.435 | 3.16 | 0.602 |
| **Rate** | 50 to 75% | 84 | 131,711 | 542 | 93.6 | 561 | 94.9 | 532 | 92.7 | 3.59 | 0.504 | 2.97 | 0.742 |
| | Over 75% | 31 | 25,611 | 513 | 91.9 | 523 | 88.3 | 502 | 88.1 | 3.43 | 0.528 | 2.83 | 0.783 |
| **Undergraduate** | Small | 30 | 9,137 | 530 | 96.1 | 535 | 92.0 | 521 | 93.5 | 3.51 | 0.537 | 2.96 | 0.684 |
| **Enrollment** | Medium | 61 | 40,043 | 550 | 104.5 | 559 | 104.6 | 545 | 106.6 | 3.54 | 0.542 | 3.02 | 0.736 |
| | Large | 26 | 50,257 | 549 | 99.3 | 568 | 100.6 | 543 | 100.4 | 3.58 | 0.503 | 2.98 | 0.723 |
| | Very Large | 32 | 107,407 | 554 | 93.4 | 577 | 94.3 | 546 | 94.9 | 3.65 | 0.473 | 3.00 | 0.722 |
| **Total** | | 149 | 206,844 | 551 | 97.3 | 570 | 98.3 | 544 | 98.7 | 3.61 | 0.500 | 3.00 | 0.723 |

Note: *k*: number of institutions, *n*: subgroup sample size. Undergraduate enrollment was categorized as follows: small: 750 to 1,999; medium: 2,000 to 7,499; large: 7,500 to 14,999; and very large: 15,000 or more.

- Table 5 provides summary statistics on the key study variables by institutional characteristics.

- It shows that, in general, mean SAT section scores, HSGPA, and FYGPA were higher:

  o at private institutions, compared to public institutions; and

  o at increasingly selective institutions (i.e., those that admit fewer applicants).

- In terms of undergraduate enrollment (i.e., institution size):

  o small institutions had the lowest mean SAT section scores and HSGPAs, while very large institutions had the highest mean SAT section scores and HSGPAs; and

  o there is no discernable relationship between institution size and mean FYGPA.

**Table 6.**

Corrected Correlations of SAT and HSGPA with FYGPA by Institutional Characteristics

| Institutional Characteristic | | *k* | *n* | SAT-CR | SAT-M | SAT-W | SAT* | HSGPA | SAT*, HSGPA |
|---|---|---|---|---|---|---|---|---|---|
| **Control** | Private | 81 | 58,411 | .54 | .53 | .58 | .60 | .56 | .67 |
| | Public | 68 | 148,433 | .47 | .48 | .51 | .53 | .52 | .60 |
| **Admittance Rate** | Under 50% | 34 | 49,522 | .52 | .52 | .56 | .59 | .52 | .64 |
| | 50 to 75% | 84 | 131,711 | .47 | .49 | .52 | .54 | .54 | .62 |
| | Over 75% | 31 | 25,611 | .48 | .48 | .52 | .54 | .54 | .62 |
| **Undergraduate Enrollment** | Small | 30 | 9,137 | .55 | .55 | .59 | .62 | .58 | .69 |
| | Medium | 61 | 40,043 | .49 | .49 | .53 | .55 | .55 | .63 |
| | Large | 26 | 50,257 | .49 | .51 | .54 | .57 | .55 | .64 |
| | Very Large | 32 | 107,407 | .48 | .48 | .52 | .54 | .52 | .61 |
| **Overall** | | 149 | 206,844 | .49 | .49 | .53 | .55 | .53 | .62 |

Note: *k*: number of institutions, *n*: subgroup sample size. *: SAT refers to the inclusion of all three sections in the relevant multiple correlation. The correlations were corrected for restriction of range within institutions and pooled. Undergraduate enrollment was categorized as follows: small: 750 to 1,999; medium: 2,000 to 7,499; large: 7,500 to 14,999; and very large: 15,000 or more. For raw correlations by institutional characteristics, see Appendix B.

- Table 6 shows the correlations of various combinations of the predictors with FYGPA by key institutional characteristics.

- The correlations of the six combinations of predictors with FYGPA are generally:

  o Higher at private than public institutions

  o Highest at the most selective institutions (i.e., those that admit fewer than 50% of applicants), relative to less selective ones

  o Highest at small institutions, relative to larger ones

- Across institutional categories, the multiple correlation of SAT with FYGPA was at least as high as the correlation of HSGPA with FYGPA.

- For all institutional subgroups, the combination of SAT section scores and HSGPA represented an increase in at least .05 for the correlation with FYGPA over either predictor alone.

**Table 7.**

Descriptive Statistics of Study Variables by Student Characteristics

| Student Characteristic | | n | SAT-CR M | SAT-CR SD | SAT-M M | SAT-M SD | SAT-W M | SAT-W SD | HSGPA M | HSGPA SD | FYGPA M | FYGPA SD |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Gender** | Male | 92,780 | 558 | 97.3 | 592 | 97.3 | 540 | 99.1 | 3.57 | 0.517 | 2.90 | 0.758 |
| | Female | 114,064 | 545 | 96.9 | 551 | 95.2 | 547 | 98.2 | 3.64 | 0.484 | 3.07 | 0.685 |
| **Racial /** | African American | 18,121 | 483 | 90.3 | 487 | 88.1 | 470 | 88.8 | 3.38 | 0.556 | 2.56 | 0.810 |
| **Ethnic** | American Indian | 891 | 547 | 91.4 | 551 | 87.7 | 528 | 93.0 | 3.58 | 0.484 | 2.82 | 0.771 |
| **Identity** | Asian | 21,350 | 565 | 107.1 | 637 | 99.2 | 578 | 108.5 | 3.68 | 0.448 | 3.11 | 0.652 |
| | Hispanic | 21,939 | 511 | 95.0 | 527 | 93.8 | 505 | 93.2 | 3.54 | 0.511 | 2.81 | 0.748 |
| | Other | 5,324 | 562 | 99.8 | 573 | 102.1 | 558 | 102.4 | 3.57 | 0.512 | 2.97 | 0.730 |
| | White | 136,905 | 564 | 91.2 | 577 | 89.8 | 555 | 92.5 | 3.64 | 0.487 | 3.07 | 0.689 |
| | Not Stated | 2,314 | 549 | 98.6 | 559 | 99.2 | 540 | 97.1 | 3.53 | 0.556 | 2.94 | 0.744 |
| **Best** | English Only | 176,810 | 556 | 95.4 | 570 | 95.7 | 547 | 97.3 | 3.61 | 0.499 | 3.01 | 0.722 |
| **Language** | English and Another | 25,789 | 524 | 100.4 | 556 | 107.9 | 529 | 103.0 | 3.57 | 0.504 | 2.90 | 0.731 |
| | Another Language | 3,581 | 474 | 105.3 | 636 | 120.3 | 514 | 117.0 | 3.64 | 0.484 | 3.06 | 0.691 |
| | Not Stated | 664 | 549 | 105.9 | 576 | 112.4 | 542 | 104.4 | 3.58 | 0.634 | 2.98 | 0.735 |
| **Household** | < $40,000 | 23,399 | 503 | 97.0 | 525 | 100.2 | 494 | 95.6 | 3.53 | 0.531 | 2.77 | 0.811 |
| **Income** | $40,000–80,000 | 32,505 | 537 | 93.1 | 553 | 93.3 | 525 | 92.4 | 3.60 | 0.512 | 2.92 | 0.754 |
| | $80,000–120,000 | 32,523 | 554 | 91.7 | 571 | 91.5 | 544 | 91.9 | 3.63 | 0.496 | 3.02 | 0.697 |
| | $120,000–160,000 | 15,131 | 563 | 89.8 | 581 | 90.6 | 555 | 91.2 | 3.62 | 0.489 | 3.07 | 0.673 |
| | $160,000–200,000 | 8,235 | 569 | 90.5 | 588 | 90.8 | 565 | 91.4 | 3.60 | 0.496 | 3.08 | 0.671 |
| | > $200,000 | 13,902 | 588 | 88.4 | 609 | 88.0 | 590 | 91.1 | 3.62 | 0.472 | 3.14 | 0.614 |
| | Not Stated | 81,149 | 558 | 99.1 | 578 | 100.8 | 554 | 100.9 | 3.62 | 0.493 | 3.04 | 0.709 |
| **Highest** | No High School Diploma | 6,252 | 473 | 89.9 | 509 | 98.8 | 470 | 86.6 | 3.49 | 0.534 | 2.73 | 0.774 |
| **Parental** | High School Diploma | 43,266 | 511 | 90.4 | 529 | 93.6 | 501 | 90.0 | 3.52 | 0.523 | 2.79 | 0.793 |
| **Education** | Associate Degree | 14,109 | 520 | 87.5 | 536 | 89.4 | 508 | 87.4 | 3.55 | 0.521 | 2.85 | 0.777 |
| **Level** | Bachelor's Degree | 73,802 | 558 | 89.9 | 577 | 91.3 | 551 | 91.1 | 3.63 | 0.487 | 3.05 | 0.683 |
| | Graduate Degree | 63,041 | 589 | 93.9 | 605 | 94.3 | 585 | 96.1 | 3.67 | 0.471 | 3.15 | 0.644 |
| | Not Stated | 6,374 | 506 | 102.0 | 538 | 108.1 | 505 | 102.5 | 3.46 | 0.545 | 2.84 | 0.758 |
| **Total** | | 206,844 | 551 | 97.3 | 570 | 98.3 | 544 | 98.7 | 3.61 | 0.500 | 3.00 | 0.723 |

Note: *n*: subgroup sample size.

- Table 7 shows that female students tended to outperform males on SAT-W, HSGPA, and FYGPA, while the opposite was true for SAT-CR and SAT-M.

- Some differences exist across racial/ethnic identities, with white and Asian students having higher mean SAT section scores, HSGPA, and FYGPA relative to African American and Hispanic students.

- When considering best spoken language, students whose best language was English had the highest SAT-CR and SAT-W scores, whereas students whose best language was something other than English had the highest SAT-M scores and slightly higher HSGPA and FYGPA means.

- Students who reported higher household incomes had higher mean SAT section scores and FYGPA, but there was no apparent relationship with HSGPA.

- As with household-income level, mean SAT section scores and FYGPA increased as highest parental education level increased; with respect to mean HSGPA, there was a positive relationship with highest parental education level.

**Table 8.**

Corrected Correlation of SAT Scores and HSGPA with FYGPA by Student Subgroups

| Student Characteristic | | *k* | *n* | SAT-CR | SAT-M | SAT-W | SAT* | HSGPA | SAT*, HSGPA |
|---|---|---|---|---|---|---|---|---|---|
| **Gender** | Male | 145 | 92,780 | .46 | .49 | .50 | .53 | .52 | .60 |
| | Female | 149 | 114,064 | .53 | .54 | .56 | .59 | .53 | .65 |
| **Racial /** | African American | 124 | 17,927 | .42 | .41 | .46 | .47 | .44 | .53 |
| **Ethnic** | American Indian | 19 | 439 | .46 | .49 | .52 | .54 | .52 | .61 |
| **Identity** | Asian | 107 | 21,051 | .45 | .49 | .49 | .52 | .49 | .58 |
| | Hispanic | 124 | 21,765 | .44 | .45 | .48 | .50 | .47 | .56 |
| | Other | 90 | 4,904 | .48 | .48 | .51 | .54 | .49 | .59 |
| | White | 147 | 136,891 | .48 | .48 | .53 | .55 | .55 | .63 |
| | Not Stated | 55 | 1,681 | .40 | .38 | .41 | .44 | .46 | .51 |
| **Best** | English Only | 149 | 176,810 | .49 | .50 | .54 | .56 | .55 | .63 |
| **Language** | English and Another | 140 | 25,701 | .44 | .45 | .48 | .50 | .46 | .55 |
| | Another Language | 51 | 3,134 | .40 | .46 | .44 | .48 | .43 | .52 |
| | Not Stated | 6 | 117 | .32 | .37 | .27 | .39 | .35 | .43 |
| **Household** | < $40,000 | 143 | 23,341 | .44 | .46 | .48 | .51 | .47 | .56 |
| **Income** | $40,000–80,000 | 148 | 32,493 | .47 | .47 | .51 | .53 | .52 | .60 |
| | $80,000–120,000 | 148 | 32,511 | .47 | .48 | .52 | .54 | .55 | .63 |
| | $120,000–160,000 | 131 | 14,959 | .47 | .47 | .51 | .53 | .56 | .62 |
| | $160,000–200,000 | 103 | 7,895 | .47 | .48 | .52 | .54 | .58 | .64 |
| | > $200,000 | 102 | 13,572 | .48 | .48 | .51 | .53 | .56 | .63 |
| | Not Stated | 149 | 81,149 | .49 | .50 | .54 | .56 | .53 | .63 |
| **Highest** | No High School Diploma | 70 | 5,746 | .42 | .45 | .46 | .49 | .45 | .54 |
| **Parental** | High School Diploma | 145 | 43,219 | .44 | .46 | .49 | .51 | .49 | .57 |
| **Education** | Associate Degree | 132 | 13,976 | .46 | .47 | .51 | .53 | .53 | .61 |
| **Level** | Bachelor's Degree | 149 | 73,802 | .48 | .49 | .53 | .55 | .55 | .63 |
| | Graduate Degree | 149 | 63,041 | .49 | .49 | .53 | .55 | .56 | .64 |
| | Not Stated | 99 | 5,946 | .42 | .45 | .46 | .49 | .45 | .54 |
| **Overall** | | 149 | 206,844 | .49 | .49 | .53 | .55 | .53 | .62 |

Note: *k*: number of institutions, *n*: subgroup sample size.*: SAT refers to the inclusion of all three sections in the relevant multiple correlation. The correlations were corrected for restriction of range within institutions and pooled. Institutions with fewer than 15 students in any subgroup were excluded. For raw correlations by institutional characteristics, see Appendix C.

- Table 8 shows that predictive validity for all predictors and combinations of FYGPA was higher for:
  - Female students than for male students;
  - White students and lower for African American students, relative to the other racial/ethnic identities;
  - Students whose best spoken language was English as compared to the other language groups;
  - Students with a household income level of at least $80,000 than those with lower incomes; and
  - Students whose parents have higher education levels as compared to lower education levels.
- Across all student subgroups, predictive validity of FYGPA was maximized using the combination of SAT section scores and HSGPA.

**Table 9.**

Average Overprediction (-) and Underprediction (+) of FYGPA for SAT Scores and HSGPA

| Student Characteristic | | *k* | *n* | SAT-CR | SAT-M | SAT-W | SAT* | HSGPA | SAT*, HSGPA |
|---|---|---|---|---|---|---|---|---|---|
| **Gender** | Male | 145 | 92,780 | -0.113 | -0.144 | -0.085 | -0.112 | -0.073 | -0.083 |
| | Female | 149 | 114,064 | 0.092 | 0.117 | 0.069 | 0.091 | 0.060 | 0.067 |
| **Racial /** | African American | 148 | 18,121 | -0.194 | -0.162 | -0.164 | -0.127 | -0.216 | -0.111 |
| **Ethnic** | American Indian | 127 | 891 | -0.160 | -0.133 | -0.131 | -0.125 | -0.149 | -0.124 |
| **Identity** | Asian | 148 | 21,350 | 0.040 | -0.056 | 0.009 | -0.018 | 0.021 | -0.007 |
| | Hispanic | 149 | 21,939 | -0.076 | -0.067 | -0.065 | -0.045 | -0.115 | -0.045 |
| | Other | 148 | 5,324 | -0.065 | -0.048 | -0.066 | -0.059 | -0.035 | -0.043 |
| | White | 148 | 136,905 | 0.036 | 0.044 | 0.035 | 0.031 | 0.047 | 0.026 |
| | Not Stated | 149 | 2,314 | -0.061 | -0.044 | -0.052 | -0.048 | -0.034 | -0.034 |
| **Best** | English Only | 149 | 176,810 | 0.002 | 0.011 | 0.005 | 0.004 | 0.012 | 0.004 |
| **Language** | English and Another | 149 | 25,789 | -0.041 | -0.062 | -0.052 | -0.042 | -0.079 | -0.041 |
| | Another Language | 143 | 3,581 | 0.188 | -0.081 | 0.132 | 0.092 | 0.004 | 0.084 |
| | Not Stated | 125 | 664 | -0.011 | -0.026 | -0.007 | -0.014 | -0.016 | -0.016 |
| **Household** | < $40,000 | 149 | 23,399 | -0.077 | -0.082 | -0.060 | -0.047 | -0.137 | -0.064 |
| **Income** | $40,000–80,000 | 149 | 32,505 | -0.024 | -0.020 | -0.014 | -0.012 | -0.048 | -0.028 |
| | $80,000–120,000 | 149 | 32,523 | 0.021 | 0.022 | 0.023 | 0.019 | 0.020 | 0.013 |
| | $120,000–160,000 | 149 | 15,131 | 0.033 | 0.033 | 0.030 | 0.024 | 0.054 | 0.032 |
| | $160,000–200,000 | 148 | 8,235 | 0.019 | 0.020 | 0.011 | 0.007 | 0.060 | 0.029 |
| | > $200,000 | 148 | 13,902 | 0.008 | 0.006 | -0.007 | -0.010 | 0.069 | 0.028 |
| | Not Stated | 149 | 81,149 | 0.014 | 0.014 | 0.009 | 0.007 | 0.023 | 0.011 |
| **Highest** | No High School Diploma | 144 | 6,252 | -0.061 | -0.092 | -0.044 | -0.026 | -0.160 | -0.033 |
| **Parental** | High School Diploma | 149 | 43,266 | -0.073 | -0.075 | -0.061 | -0.052 | -0.115 | -0.065 |
| **Education** | Associate Degree | 147 | 14,109 | -0.042 | -0.040 | -0.029 | -0.024 | -0.080 | -0.044 |
| **Level** | Bachelor's Degree | 149 | 73,802 | 0.031 | 0.029 | 0.027 | 0.024 | 0.037 | 0.025 |
| | Graduate Degree | 149 | 63,041 | 0.034 | 0.042 | 0.025 | 0.018 | 0.076 | 0.031 |
| | Not Stated | 148 | 6,374 | -0.039 | -0.067 | -0.039 | -0.033 | -0.065 | -0.023 |
| **Overall** | | 149 | 206,844 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Note: *k*: number of institutions, *n*: subgroup sample size.*: SAT refers to the inclusion of all three sections in the relevant regression model. Negative and positive values indicate over- and underprediction, respectively. FYGPA regressions were estimated for each institution separately. Residuals were the difference of predicted and observed FYGPA.

- Table 9 shows that across all predictor sets, FYGPA was:
  - Overpredicted (i.e., observed FYGPA < predicted FYGPA) for males and underpredicted for females;
  - Generally overpredicted for African American, American Indian, and Hispanic students;
  - Generally underpredicted (except for SAT-M alone) for students whose best spoken language was not English; and
  - Overpredicted for students from lower socioeconomic status families (household income levels ≤ $80,000, highest parental education level of an associate degree or less).

- In terms of the relative differential prediction of HSGPA, SAT sections, and their combination:
  - Using HSGPA alone yielded the least differential prediction across genders and best spoken language groups;
  - Using HSGPA and SAT yielded the least differential prediction across racial / ethnic identities; and
  - Using SAT sections alone yielded the least differential prediction across household income and parental education levels.

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## Appendix A.

Institutions Providing First-Year Outcomes Data for the 2011 Cohort

| Institution Name | |
| --- | --- |
| Albany College of Pharmacy and Health Sciences | Indiana University-Purdue University, Indianapolis |
| Appalachian State University | Indiana Wesleyan University |
| Austin College | John Brown University |
| Baldwin Wallace University | John Carroll University |
| Barnard College | Lafayette College |
| Boston College | Lasell College |
| Boston University | Lawrence University |
| Brandeis University | Linfield College |
| Caldwell College | Long Island University, Brooklyn |
| Case Western Reserve University | Long Island University, C. W. Post |
| Chapman University | Longwood University |
| Claremont McKenna College | Lycoming College |
| Clemson University | Marywood University |
| Coastal Carolina University | Meredith College |
| Colorado Mesa University | Messiah College |
| Cornell College | Miami University, Oxford |
| Daemen College | Missouri State University |
| Dominican University of California | Moravian College |
| Drexel University | Mount St. Mary's University |
| Earlham College | Norfolk State University |
| East Carolina University | North Carolina A&T State University |
| Eastern Connecticut State University | North Carolina State University |
| Eastern University | North Georgia College & State University |
| Eastern Washington University | Northwestern University |
| Elms College | Pennsylvania College of Technology |
| Emory University | Pepperdine University |
| Florida State University | Philadelphia University |
| Fordham University | Portland State University |
| Framingham State University | Presbyterian College |
| Furman University | Purdue University |
| Georgia Institute of Technology | Quinnipiac University |
| Georgia Southern University | Randolph-Macon College |
| Gonzaga University | Rhode Island College |
| Grinnell College | Saint Anselm College |
| Indiana University, Bloomington | Seton Hill University |
| Indiana University, East | Shenandoah University |
| Indiana University, Kokomo | Siena College |
| Indiana University, Northwest | Smith College |
| Indiana University, South Bend | Southern Connecticut State University |
| Indiana University, Southeast | Southern Methodist University |

Note: The remaining 69 institutions are listed on the following page.

## Appendix A. (continued)

| Institution Name | |
| --- | --- |
| St. Edward's University | University of San Francisco |
| St. John Fisher College | University of Southern California |
| St. Michael's College | University of Southern Indiana |
| State University of New York, New Paltz | University of Texas at Austin |
| Stephen F. Austin State University | University of Texas at Dallas |
| Stetson University | University of Texas-Pan American |
| Stonehill College | University of Utah |
| Syracuse University | Vanderbilt University |
| Texas A&M International University | Virginia Wesleyan College |
| Texas A&M University | Washington State University, Pullman |
| Texas Christian University | Washington State University, Vancouver |
| Texas State University, San Marcos | West Chester University |
| Texas Woman's University | Western Washington University |
| The Ohio State University, Columbus Campus | Wheaton College (Illinois) |
| The Pennsylvania State University | Whittier College |
| Transylvania University | Wilkes University |
| University of California, Santa Cruz | Willamette University |
| University of Cincinnati | Wingate University |
| University of Dayton | Institution A |
| University of Delaware | Institution B |
| University of Denver | Institution C |
| University of Georgia | Institution D |
| University of Houston | Institution E |
| University of Illinois, Urbana-Champaign | Institution F |
| University of Iowa | Institution G |
| University of Mary Hardin-Baylor | Institution H |
| University of Mary Washington | Institution I |
| University of Massachusetts Dartmouth | Institution J |
| University of North Carolina at Greensboro | Institution K |
| University of North Texas | Institution L |
| University of Oregon | Institution M |
| University of Portland | Institution N |
| University of Puget Sound | Institution O |
| University of Rhode Island | Institution P |
| University of Richmond | |

Note: The remaining 80 institutions are listed on the previous page. There were 16 institutions that wished to remain anonymous, hence the listing of Institutions A through P.

## Appendix B.
Raw Correlations of SAT and HSGPA with FYGPA by Institutional Characteristics

| Institutional Characteristic | | *k* | *n* | SAT-CR | SAT-M | SAT-W | SAT* | HSGPA | SAT*, HSGPA |
|---|---|---|---|---|---|---|---|---|---|
| **Control** | Private | 81 | 58,411 | .33 | .30 | .37 | .40 | .37 | .49 |
| | Public | 68 | 148,433 | .26 | .27 | .32 | .34 | .33 | .43 |
| **Admittance Rate** | Under 50% | 34 | 49,522 | .31 | .28 | .35 | .38 | .30 | .44 |
| | 50 to 75% | 84 | 131,711 | .27 | .27 | .33 | .35 | .35 | .44 |
| | Over 75% | 31 | 25,611 | .29 | .28 | .35 | .37 | .40 | .47 |
| **Undergraduate Enrollment** | Small | 30 | 9,137 | .37 | .34 | .42 | .45 | .44 | .54 |
| | Medium | 61 | 40,043 | .28 | .26 | .34 | .36 | .37 | .46 |
| | Large | 26 | 50,257 | .28 | .28 | .33 | .36 | .35 | .45 |
| | Very Large | 32 | 107,407 | .28 | .27 | .33 | .35 | .32 | .43 |
| **Overall** | | 149 | 206,844 | .28 | .28 | .34 | .36 | .34 | .45 |

Note: *k*: number of institutions, *n*: subgroup sample size. *: SAT refers to the inclusion of all three sections in the relevant multiple correlation. The correlations were corrected for restriction of range within institutions and pooled. Undergraduate enrollment was categorized as follows: small: 750 to 1,999; medium: 2,000 to 7,499; large: 7,500 to 14,999; and very large: 15,000 or more. For restriction of range corrected correlations by institutional characteristics, see Table 6.

## Appendix C.
Raw Correlation of SAT Scores and HSGPA with FYGPA by Subgroups

| | Student Characteristic | *k* | *n* | SAT-CR | SAT-M | SAT-W | SAT* | HSGPA | SAT*, HSGPA |
|---|---|---|---|---|---|---|---|---|---|
| **Gender** | Male | 145 | 92,780 | .26 | .29 | .30 | .34 | .33 | .43 |
| | Female | 149 | 114,064 | .32 | .34 | .35 | .40 | .34 | .46 |
| **Racial /** | African American | 124 | 17,927 | .21 | .19 | .27 | .28 | .28 | .36 |
| **Ethnic** | American Indian | 19 | 439 | .27 | .32 | .35 | .38 | .31 | .44 |
| **Identity** | Asian | 107 | 21,051 | .22 | .25 | .27 | .31 | .26 | .38 |
| | Hispanic | 124 | 21,765 | .23 | .23 | .28 | .30 | .27 | .37 |
| | Other | 90 | 4,904 | .28 | .27 | .32 | .35 | .29 | .41 |
| | White | 147 | 136,891 | .26 | .25 | .32 | .34 | .36 | .45 |
| | Not Stated | 55 | 1,681 | .25 | .22 | .26 | .29 | .35 | .40 |
| **Best** | English Only | 149 | 176,810 | .29 | .28 | .34 | .37 | .36 | .46 |
| **Language** | English and Another | 140 | 25,701 | .23 | .25 | .29 | .31 | .26 | .38 |
| | Another Language | 51 | 3,134 | .15 | .24 | .22 | .28 | .24 | .35 |
| | Not Stated | 6 | 117 | .24 | .21 | .19 | .28 | .33 | .38 |
| **Household** | < $40,000 | 143 | 23,341 | .23 | .27 | .30 | .33 | .30 | .40 |
| **Income** | $40,000–80,000 | 148 | 32,493 | .27 | .25 | .32 | .34 | .35 | .43 |
| | $80,000–120,000 | 148 | 32,511 | .27 | .26 | .33 | .35 | .37 | .45 |
| | $120,000–160,000 | 131 | 14,959 | .26 | .25 | .31 | .34 | .38 | .45 |
| | $160,000–200,000 | 103 | 7,895 | .25 | .25 | .31 | .33 | .39 | .46 |
| | > $200,000 | 102 | 13,572 | .24 | .22 | .28 | .31 | .36 | .43 |
| | Not Stated | 149 | 81,149 | .29 | .28 | .34 | .37 | .34 | .45 |
| **Highest** | No High School Diploma | 70 | 5,746 | .20 | .24 | .25 | .29 | .25 | .36 |
| **Parental** | High School Diploma | 145 | 43,219 | .25 | .26 | .31 | .33 | .32 | .41 |
| **Education** | Associate Degree | 132 | 13,976 | .26 | .26 | .32 | .34 | .37 | .44 |
| **Level** | Bachelor's Degree | 149 | 73,802 | .26 | .26 | .32 | .35 | .36 | .44 |
| | Graduate Degree | 149 | 63,041 | .28 | .25 | .32 | .35 | .36 | .45 |
| | Not Stated | 99 | 5,946 | .23 | .27 | .29 | .32 | .29 | .40 |
| **Overall** | | 149 | 206,844 | .28 | .28 | .34 | .36 | .34 | .45 |

Note: *k*: number of institutions, *n*: subgroup sample size.*: SAT refers to the inclusion of all three sections in the relevant multiple correlation. The correlations were corrected for restriction of range within institutions and pooled. Institutions with fewer than 15 students in any subgroup were excluded. For restriction of range corrected correlations by student characteristics, see Table 8.