# Validity of the SAT® for Predicting First-Year Grades: 2009 SAT Validity Sample

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## Executive Summary

In an effort to continuously monitor the validity of the SAT® for predicting first-year college grades, the College Board has continued its multiyear effort to recruit four-year colleges and universities (henceforth, "institutions") to provide data on the cohorts of first-time, first-year students entering in the fall semester beginning with 2006 through 2009. Its goal in doing so is to provide clear evidence for the use of the SAT in college admission. Prior research based on the same data collection effort has demonstrated a strong, linear relationship of the SAT section scores with first-year grade point average (FYGPA) in college across a variety of institutional and student characteristics (Kobrin, Patterson, Shaw, Mattern, & Barbuti, 2008; Mattern, Patterson, Shaw, Kobrin, & Barbuti, 2008; Patterson, Mattern, & Kobrin, 2009; Patterson & Mattern, 2011). This study serves as a replication of prior analyses for the most recent cohort of students: those who graduated from high school in the spring of 2009 and subsequently enrolled in a four-year college in the fall of 2009.

The present study examined the extent to which four predictors commonly used in college admission were linearly related to FYGPA; in particular, SAT critical reading (SAT-CR), mathematics (SAT-M), and writing (SAT-W), as well as high school grade point average (HSGPA), were considered. Overall FYGPA correlations were approximately equal for the combination of all three SAT sections and HSGPA ($r$ = .54, for both correlations). Combining these four predictors led to the strongest linear relationship with FYGPA ($r$ = .62), indicating that the SAT added substantially to predictions that relied solely on HSPGA. Among the three SAT sections, SAT-W tended to exhibit the strongest linear relationship with FYGPA ($r$ = .52). In addition, many of these patterns held true across institutional characteristics, such as control (i.e., public or private), size, and selectivity, and across student characteristics, such as gender, racial/ethnic identity, best spoken language, household income, and highest parental education level. Finally, analyses of differential prediction for the student characteristics showed that using the three SAT sections to predict FYGPA tended to result in smaller differential prediction in absolute magnitude than when using HSGPA alone. With the exception of a few student subgroups, the differential prediction of FYGPA was reduced the most when using the combination of SAT sections and HSGPA.

**Table 1.** Institutional Characteristics

| Institutional Characteristic | | % |
|---|---|---|
| **U.S. Region** | Midwest | 18 |
| | Mid-Atlantic | 21 |
| | New England | 12 |
| | South | 15 |
| | Southwest | 11 |
| | West | 22 |
| **Control** | Public | 46 |
| | Private | 54 |
| **Admittance Rate** | Under 50% | 21 |
| | 50 to 75% | 57 |
| | Over 75% | 22 |
| **Undergraduate Enrollment** | Small | 18 |
| | Medium | 40 |
| | Large | 18 |
| | Very Large | 24 |

Notes. *K*: total number of institutions = 131. Percentages may not sum to 100 due to rounding. Institution sizes were categorized by the number of undergraduates 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.

- The sample of 131 four-year institutions was diverse with respect to region of the U.S., control, size, and selectivity (College Board, 2009a).

**Table 2.** Descriptive Statistics on the Total Sample

| Variable | Mean | SD |
|---|---|---|
| HSGPA | 3.61 | 0.490 |
| SAT-CR | 556 | 95.7 |
| SAT-M | 576 | 97.8 |
| SAT-W | 550 | 96.9 |
| FYGPA | 2.96 | 0.763 |

Notes. *N*: number of students = 198,253.

- The 2009 sample performed very similarly to the previous samples in terms of mean HSGPA, SAT scores, and FYGPA (Kobrin et al., 2008; Patterson et al., 2009; Patterson & Mattern, 2011).
- Table 2 shows that the 2009 National SAT Validity Study Cohort consistently and substantially outperformed the total group of college-bound senior SAT takers for 2009, who had mean SAT-CR, SAT-M, and SAT-W scores of 501, 515, and 493, respectively (College Board, 2009b). Given that the population consists of all SAT takers expecting to graduate from high school in 2009 and that the sample was restricted to those who applied to and enrolled in four-year colleges, the differences in means are not unexpected.

**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** | (.23) | (.51) | | .74 |
| **SAT-W** | (.24) | (.71) | (.52) | |

Notes. *N*: number of students = 198,253. Pooled within-institution, restriction-of-range corrected correlations are presented. The raw correlations are shown in parentheses.

- As Table 3 demonstrates, the estimated intercorrelations are similar to what was observed in previous reports (Kobrin et al., 2008; Patterson et al., 2009; Patterson & Mattern, 2011).
- We also note that the multiple correlation of SAT sections and HSGPA is .53 (.27), to give a sense of the strength of the linear relationship between the SAT and HSGPA.

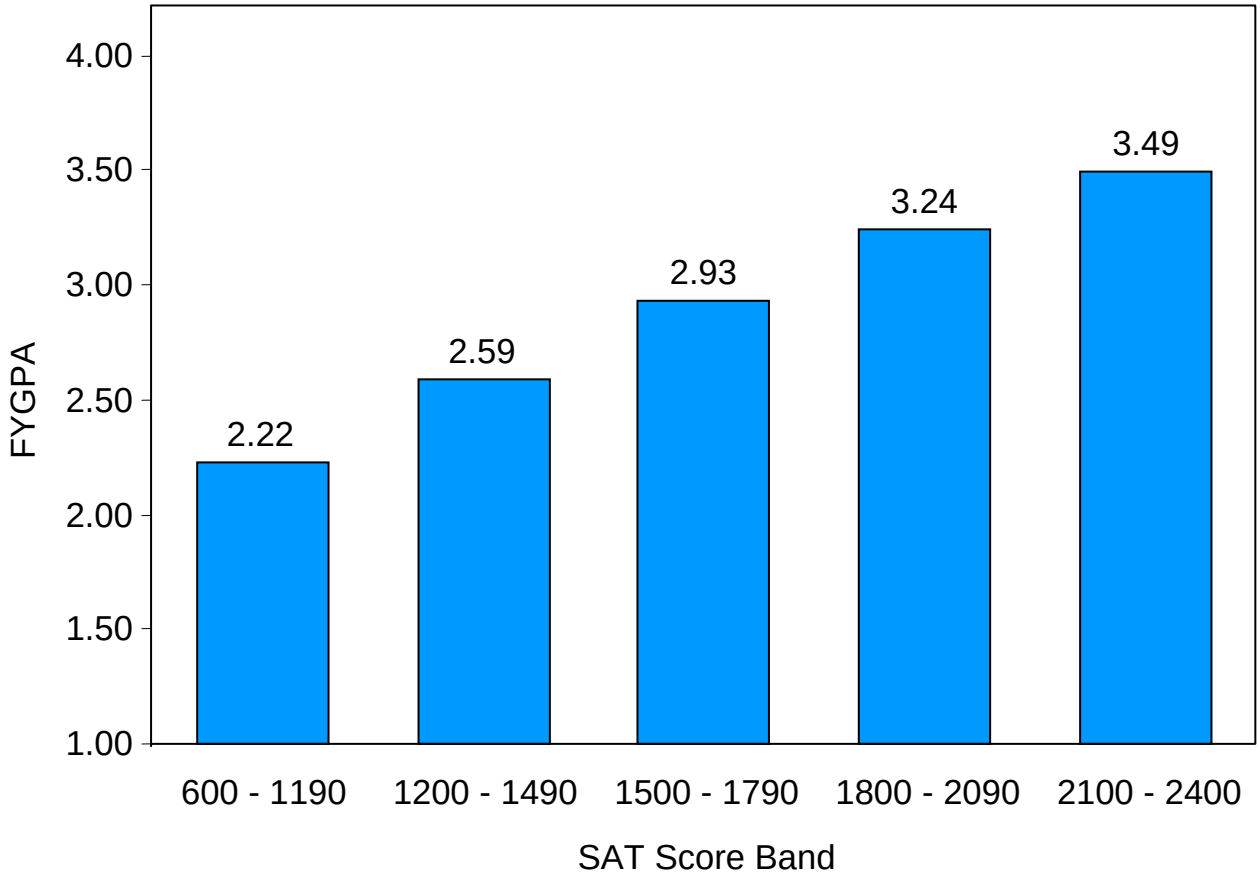
**Table 4.** Corrected (Raw) Correlations of Predictors with FYGPA

| Predictor(s) | Correlation |
|---|---|
| 1. HSGPA | .54 (.36) |
| 2. SAT-CR | .48 (.29) |
| 3. SAT-M | .48 (.27) |
| 4. SAT-W | .52 (.33) |
| 5. SAT-M, SAT-CR | .52 (.32) |
| 6. HSGPA, SAT-M, SAT-CR | .61 (.43) |
| 7. SAT-CR, SAT-M, SAT-W | .54 (.36) |
| 8. HSGPA, SAT-CR, SAT-M, SAT-W | .62 (.45) |

Notes. *N*: number of students = 198,253. Pooled within-institution, restriction-of-range corrected correlations are presented. The raw correlations are shown in parentheses.

- The bivariate correlations of predictors with FYGPA are very similar to estimates from prior reports (Kobrin et al., 2008; Patterson et al., 2009; Patterson & Mattern, 2011), as rows 1 through 4 of Table 4 show. In other words, the strength of the linear relationship with FYGPA has been quite stable across the cohorts that have been examined.
- As has been found in prior research (Kobrin et al., 2008; Patterson et al., 2009; Patterson & Mattern, 2011), the SAT writing section has the highest correlation with FYGPA among the three SAT sections (.52).
- The multiple correlation of the three SAT sections with FYGPA (row 7) was the same as the correlation of HSGPA and FYGPA (row 1; each equal .54). This finding has been fairly consistent with prior research (Kobrin et al., 2008; Patterson et al., 2009; Patterson & Mattern, 2011) and means that the strength of the linear relationship between the SAT and FYGPA is approximately as strong as the HSGPA–FYGPA relationship.
- The addition of the three SAT sections to HSGPA yields an increase in predictive validity (i.e., incremental validity, as measured by correlations) of .08, indicating that the SAT does add substantial incremental strength to a prediction that relies solely on HSGPA.

**Figure 1.** Mean FYGPA by SAT Score Band



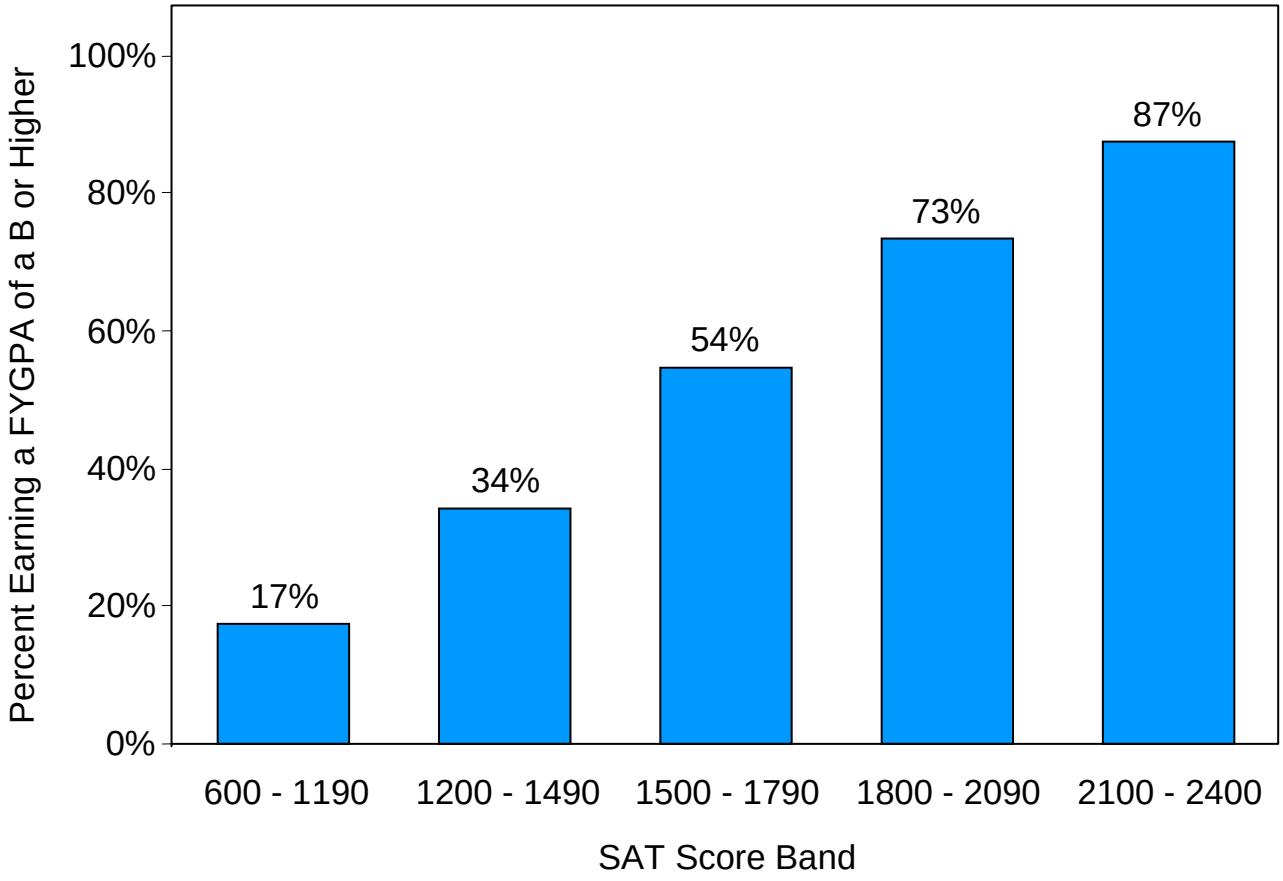

Notes. SAT score bands are based on the sum of SAT-CR, SAT-M, and SAT-W.

Sample sizes by SAT score band were as follows:

| **SAT** | ***n*** |
|---|---|
| 600–1190 | 6,064 |
| 1200–1490 | 41,923 |
| 1500–1790 | 82,368 |
| 1800–2090 | 56,989 |
| 2100–2400 | 10,917 |

- Figure 1 graphically depicts students' mean FYGPA by SAT score band. There is a clear, positive relationship between these variables, as evidenced by the increase in mean FYGPA that is expected of students in increasing SAT score bands.

**Figure 2.** Percent of Students Earning FYGPA of a B or Higher by SAT Score Band

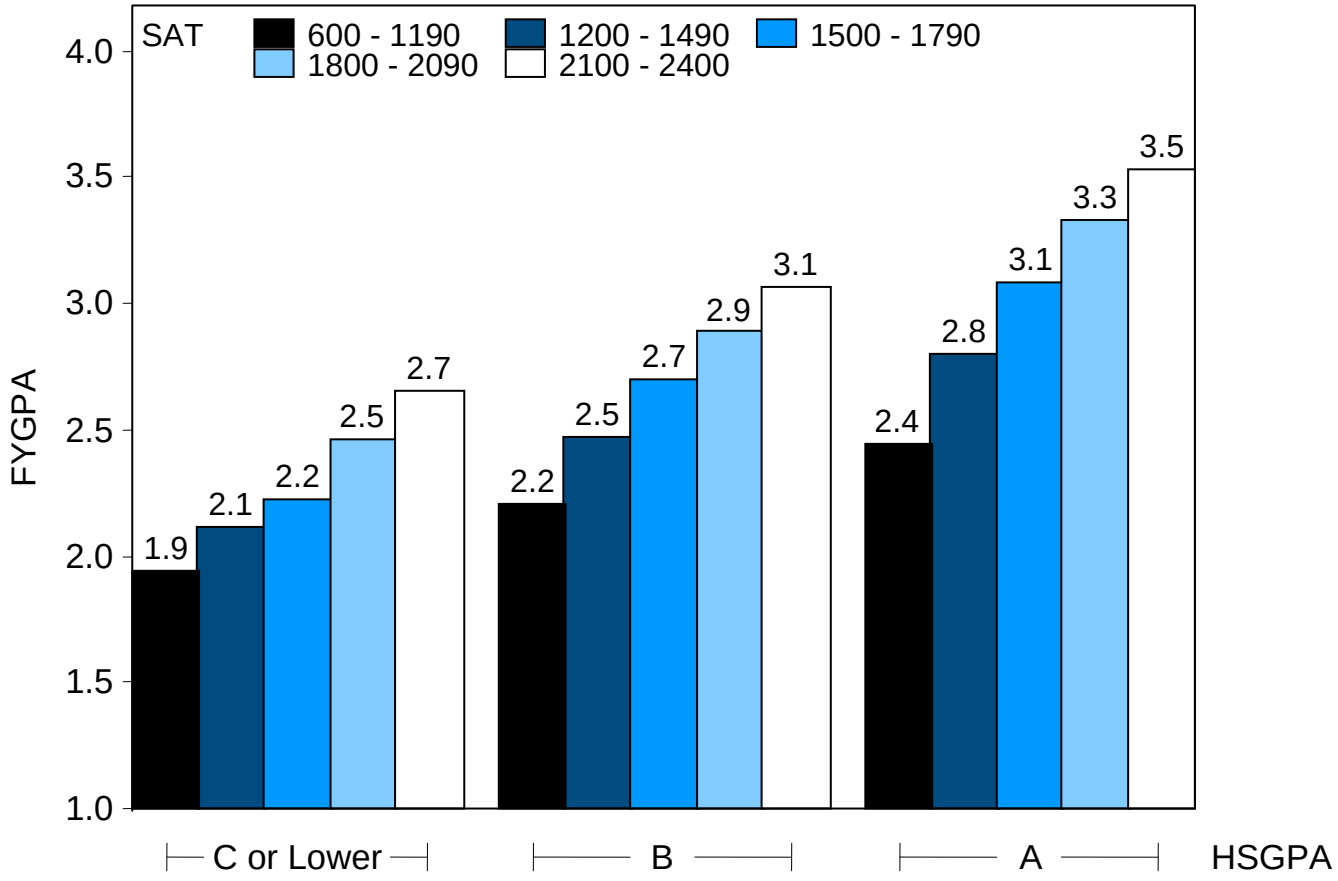



Notes. SAT score bands are based on the sum of SAT-CR, SAT-M, and SAT-W.
Students whose FYGPA was ≥ 3.00 were considered to have earned a B or better.
Sample sizes by SAT score band were as follows:

| **SAT** | ***n*** |
|---|---|
| 600–1190 | 6,064 |
| 1200–1490 | 41,923 |
| 1500–1790 | 82,368 |
| 1800–2090 | 56,989 |
| 2100–2400 | 10,917 |

- Just as Figure 1 shows a clear positive relationship between mean FYGPA and SAT score band, Figure 2 shows that as SAT score band increases, greater percentages of students earn at least a B (FYGPA ≥ 3.0).

**Figure 3.** Incremental Validity of the SAT: Mean FYGPA by SAT Score Band Controlling for HSGPA




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

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

| SAT | C or Lower | B | A |
|---|---|---|---|
| 600–1190 | 952 | 3,711 | 1,401 |
| 1200–1490 | 2,265 | 22,670 | 16,988 |
| 1500–1790 | 1,285 | 29,175 | 51,908 |
| 1800–2090 | 226 | 10,869 | 45,894 |
| 2100–2400 | 18 | 876 | 10,023 |

- Figure 3 presents graphically the incremental validity that was discussed in terms of correlations with reference to rows 1 and 8 of Table 4 and shows that the SAT retains a strong, positive relationship with FYGPA, even after conditioning on similar HSGPAs.
- For example, among students identifying as having earned a HSGPA equivalent to an A, those with an SAT total score between 600 and 1190 had a mean FYGPA of 2.4, while those whose composite SAT ranged from 2100 and 2400 had a mean FYGPA of 3.5.

**Table 5.** Descriptive Statistics of Study Variables by Institutional Characteristics

| | | | | SAT-CR | | SAT-M | | SAT-W | | HSGPA | | FYGPA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Institutional Characteristic** | | ***k*** | ***n*** | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** |
| **Control** | Private | 71 | 52,460 | 582 | 97.4 | 596 | 98.1 | 581 | 98.6 | 3.65 | 0.474 | 3.08 | 0.661 |
| | Public | 60 | 145,793 | 547 | 93.2 | 568 | 96.6 | 539 | 93.7 | 3.60 | 0.495 | 2.91 | 0.791 |
| **Admittance** | Under 50% | 27 | 35,414 | 611 | 93.6 | 634 | 92.5 | 613 | 94.4 | 3.81 | 0.401 | 3.13 | 0.645 |
| **Rate** | 50 to 75% | 75 | 129,442 | 548 | 91.1 | 568 | 93.6 | 541 | 91.7 | 3.59 | 0.484 | 2.93 | 0.777 |
| | Over 75% | 29 | 33,397 | 528 | 92.7 | 541 | 93.4 | 517 | 89.7 | 3.48 | 0.534 | 2.88 | 0.797 |
| **Undergraduate** | Small | 23 | 6,809 | 549 | 107.3 | 549 | 102.0 | 542 | 104.7 | 3.49 | 0.552 | 2.86 | 0.813 |
| **Enrollment** | Medium | 52 | 33,602 | 556 | 104.3 | 568 | 105.6 | 553 | 105.0 | 3.55 | 0.531 | 3.01 | 0.735 |
| | Large | 24 | 39,024 | 544 | 99.1 | 562 | 101.7 | 537 | 100.4 | 3.53 | 0.517 | 2.87 | 0.801 |
| | Very Large | 32 | 118,818 | 560 | 90.8 | 584 | 92.9 | 554 | 92.3 | 3.66 | 0.457 | 2.98 | 0.752 |
| **Total** | | 131 | 198,253 | 556 | 95.7 | 576 | 97.8 | 550 | 96.9 | 3.61 | 0.490 | 2.96 | 0.763 |

Notes. *k*: number of institutions; *n*: subgroup sample size. Institution sizes were categorized by the number of undergraduates 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.

- With respect to institutional control (i.e., public or private), Table 5 shows that students who attended private institutions tended to have higher SAT critical reading, mathematics, and writing section scores than those attending public institutions, with somewhat smaller performance differences on HSGPA and FYGPA.
- As institutional selectivity (proxied by undergraduate admittance rate) increased (i.e., as admittance rate decreased), mean performance on all predictors also increased.
- In terms of institution size, as measured by total undergraduate enrollment, there was no clear monotonic (either strictly increasing or decreasing) pattern. Very large institutions tended to have the highest means on all academic variables, generally followed by medium institutions, and small and large institutions tended to have the lowest means.

**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 | 71 | 52,460 | .52 | .51 | .55 | .58 | .57 | .66 |
| | Public | 60 | 145,793 | .46 | .47 | .50 | .52 | .53 | .61 |
| **Admittance** | Under 50% | 27 | 35,414 | .54 | .54 | .58 | .60 | .54 | .66 |
| **Rate** | 50 to 75% | 75 | 129,442 | .47 | .47 | .51 | .53 | .54 | .62 |
| | Over 75% | 29 | 33,397 | .45 | .44 | .49 | .51 | .55 | .61 |
| **Undergraduate** | Small | 23 | 6,809 | .52 | .52 | .56 | .59 | .60 | .68 |
| **Enrollment** | Medium | 52 | 33,602 | .49 | .50 | .53 | .55 | .56 | .64 |
| | Large | 24 | 39,024 | .47 | .47 | .51 | .53 | .54 | .61 |
| | Very Large | 32 | 118,818 | .47 | .47 | .51 | .53 | .54 | .62 |
| **Overall** | | 131 | 198,253 | .48 | .48 | .52 | .54 | .54 | .62 |

Notes. *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. Institution sizes were categorized by the number of undergraduates 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.

- Following the same general pattern as previous research (Kobrin et al., 2008; Patterson et al., 2009; Patterson & Mattern, 2011), Table 6 shows that FYGPA correlations with individual SAT sections and with the combination of all sections were generally:
  - greater for private, rather than public institutions;
  - greater as institutional selectivity increased (i.e., as admittance rate decreased); and
  - greater as institutional size decreased.
- Patterns of SAT section correlations and HSGPA were similar across control and size, but while the correlations of SAT with FYGPA increased with selectivity, correlations of HSGPA and FYGPA were fairly stable, if not favoring less selective institutions.
- The increase in the FYGPA correlation when adding the three SAT sections to HSGPA ranged from .06 (for institutions admitting more than 75% of applicants) to .12 (for institutions admitting fewer than 50% of applicants).

**Table 7.** Descriptive Statistics of Study Variables by Student Characteristics

| Student Characteristic | | *n* | SAT-CR | | SAT-M | | SAT-W | | HSGPA | | FYGPA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Mean | SD | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| **Gender** | Male | 91,088 | 562 | 96.1 | 600 | 96.5 | 546 | 97.7 | 3.57 | 0.506 | 2.86 | 0.801 |
| | Female | 107,165 | 551 | 95.0 | 555 | 94.3 | 553 | 96.0 | 3.65 | 0.472 | 3.04 | 0.719 |
| **Race/** | African American | 16,039 | 487 | 89.2 | 490 | 88.8 | 479 | 89.7 | 3.37 | 0.560 | 2.52 | 0.838 |
| **Ethnicity** | American Indian | 977 | 543 | 92.9 | 553 | 95.1 | 529 | 92.8 | 3.56 | 0.503 | 2.75 | 0.815 |
| | Asian American | 21,864 | 562 | 102.4 | 630 | 99.1 | 570 | 103.7 | 3.68 | 0.436 | 3.02 | 0.717 |
| | Hispanic | 18,541 | 518 | 91.4 | 532 | 91.1 | 511 | 90.7 | 3.57 | 0.494 | 2.74 | 0.794 |
| | Other | 5,194 | 560 | 100.2 | 573 | 100.7 | 558 | 101.4 | 3.59 | 0.496 | 2.93 | 0.778 |
| | White | 131,531 | 568 | 90.4 | 583 | 90.4 | 560 | 91.8 | 3.64 | 0.479 | 3.03 | 0.731 |
| | Not Stated | 4,107 | 584 | 101.2 | 586 | 98.9 | 571 | 100.2 | 3.62 | 0.506 | 3.02 | 0.751 |
| **Best** | English Only | 179,558 | 560 | 94.2 | 576 | 96.1 | 553 | 95.8 | 3.61 | 0.491 | 2.97 | 0.761 |
| **Language** | Engl. and Another Lang. | 14,131 | 525 | 97.8 | 561 | 107.2 | 531 | 101.5 | 3.61 | 0.473 | 2.82 | 0.778 |
| | Another Language | 3,217 | 475 | 101.8 | 634 | 118.2 | 504 | 107.6 | 3.67 | 0.455 | 3.00 | 0.741 |
| | Not Stated | 1,347 | 547 | 104.0 | 559 | 108.6 | 539 | 105.8 | 3.49 | 0.581 | 2.87 | 0.812 |
| **Household** | < $40,000 | 22,062 | 508 | 94.8 | 530 | 99.9 | 500 | 93.5 | 3.55 | 0.525 | 2.71 | 0.848 |
| **Income** | $40,000–$80,000 | 36,246 | 542 | 93.8 | 558 | 95.8 | 532 | 93.3 | 3.61 | 0.506 | 2.88 | 0.797 |
| | $80,000–$120,000 | 36,206 | 560 | 90.5 | 579 | 92.1 | 552 | 91.4 | 3.64 | 0.482 | 2.99 | 0.745 |
| | $120,000–$160,000 | 16,487 | 569 | 89.3 | 588 | 90.0 | 562 | 89.8 | 3.63 | 0.480 | 3.02 | 0.719 |
| | $160,000–$200,000 | 8,701 | 576 | 87.9 | 593 | 89.4 | 572 | 90.2 | 3.61 | 0.474 | 3.03 | 0.709 |
| | > $200,000 | 14,545 | 586 | 86.8 | 608 | 88.2 | 587 | 88.8 | 3.60 | 0.474 | 3.07 | 0.688 |
| | No Response | 64,006 | 566 | 97.5 | 587 | 99.6 | 562 | 98.9 | 3.62 | 0.478 | 3.01 | 0.735 |
| **Highest** | No High School Diploma | 4,800 | 483 | 87.8 | 518 | 98.6 | 481 | 89.1 | 3.53 | 0.511 | 2.67 | 0.814 |
| **Parental** | High School Diploma | 40,267 | 516 | 89.2 | 534 | 93.6 | 507 | 89.2 | 3.53 | 0.518 | 2.74 | 0.831 |
| **Education** | Associate Degree | 13,107 | 525 | 87.6 | 542 | 90.1 | 514 | 87.0 | 3.57 | 0.514 | 2.82 | 0.807 |
| **Level** | Bachelor's Degree | 64,831 | 561 | 89.1 | 580 | 91.2 | 555 | 90.0 | 3.63 | 0.481 | 3.00 | 0.725 |
| | Graduate Degree | 62,657 | 591 | 91.6 | 608 | 92.9 | 586 | 92.9 | 3.67 | 0.461 | 3.10 | 0.694 |
| | No Response | 12,591 | 550 | 103.7 | 578 | 106.5 | 549 | 104.9 | 3.57 | 0.504 | 2.93 | 0.778 |
| **Total** | | 198,253 | 556 | 95.7 | 576 | 97.8 | 550 | 96.9 | 3.61 | 0.490 | 2.96 | 0.763 |

Note. *n*: subgroup sample size.

- Table 7 contains descriptive statistics by student characteristics. The patterns, which were largely similar to previous findings (Mattern et al., 2008; Patterson et al., 2009; Patterson & Mattern, 2011), showed that:
  - Males outperformed females on mean SAT-CR and SAT-M, while females earned higher mean SAT-W, HSGPA, and FYGPA.
  - Among students identifying their race/ethnicity, Asian American and White students tended to have the highest means on all academic variables, while African American, Hispanic, and American Indian students (in that order) tended to exhibit the lowest mean performance.
  - Students whose best spoken language was English alone demonstrated the greatest mean performance on SAT-CR and SAT-W, while students who spoke another language alone as their best had the highest mean SAT-M, HSGPA, and FYGPA.
  - As household income increased, so too did all SAT section means and mean FYGPA.
  - As students' highest level of parental education increased, so did the means of all academic variables.

**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 | 128 | 91,087 | .45 | .47 | .48 | .51 | .53 | .60 |
| | Female | 131 | 107,165 | .53 | .54 | .55 | .59 | .54 | .65 |
| **Race/ Ethnicity** | African American | 103 | 15,815 | .41 | .42 | .45 | .47 | .45 | .53 |
| | American Indian | 18 | 539 | .42 | .40 | .46 | .47 | .45 | .53 |
| | Asian American | 100 | 21,663 | .46 | .48 | .48 | .51 | .50 | .58 |
| | Hispanic | 106 | 18,327 | .44 | .43 | .47 | .49 | .48 | .56 |
| | Other | 81 | 4,810 | .48 | .47 | .52 | .54 | .50 | .60 |
| | White | 128 | 131,520 | .47 | .47 | .51 | .53 | .56 | .63 |
| | Not Stated | 76 | 3,689 | .49 | .47 | .52 | .54 | .52 | .61 |
| **Best Language** | English Only | 131 | 179,558 | .48 | .48 | .52 | .55 | .55 | .63 |
| | English and Another Language | 99 | 13,868 | .42 | .44 | .45 | .48 | .46 | .54 |
| | Another Language | 48 | 2,866 | .34 | .37 | .37 | .40 | .38 | .44 |
| | Not Stated | 28 | 735 | .47 | .48 | .47 | .52 | .44 | .56 |
| **Household Income** | < $40,000 | 127 | 22,022 | .41 | .44 | .45 | .47 | .47 | .54 |
| | $40,000–$80,000 | 131 | 36,246 | .46 | .46 | .50 | .52 | .54 | .61 |
| | $80,000–$120,000 | 130 | 36,193 | .47 | .46 | .51 | .53 | .57 | .63 |
| | $120,000–$160,000 | 119 | 16,368 | .48 | .48 | .53 | .55 | .58 | .65 |
| | $160,000–$200,000 | 99 | 8,470 | .46 | .46 | .50 | .52 | .58 | .63 |
| | > $200,000 | 102 | 14,341 | .45 | .43 | .48 | .50 | .55 | .61 |
| | Not Stated | 131 | 64,006 | .50 | .50 | .53 | .56 | .55 | .63 |
| **Highest Parental Education Level** | No High School Diploma | 66 | 4,400 | .39 | .43 | .42 | .46 | .44 | .52 |
| | High School Diploma | 128 | 40,228 | .43 | .44 | .47 | .49 | .50 | .57 |
| | Associate Degree | 116 | 12,967 | .43 | .42 | .47 | .48 | .53 | .58 |
| | Bachelor's Degree | 131 | 64,831 | .48 | .48 | .52 | .54 | .56 | .63 |
| | Graduate Degree | 130 | 62,644 | .48 | .48 | .52 | .54 | .57 | .64 |
| | Not Stated | 117 | 12,453 | .47 | .48 | .51 | .53 | .49 | .59 |
| **Overall** | | 131 | 198,253 | .48 | .48 | .52 | .54 | .54 | .62 |

Notes. *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. Computations were made within institutions for subgroups with at least 15 members. For raw correlations by institutional characteristics, see Appendix C.

- Overall, SAT scores and HSGPA are approximately equally predictive of FYGPA, with corrected correlations of .54. Additional findings were consistent with previously published studies (Mattern et al., 2008; Patterson et al., 2009; Patterson & Mattern, 2011):
  - The correlation of SAT sections with FYGPA was higher than that of HSGPA for females, but HSGPA was higher for males.
  - SAT–FYGPA correlations were higher than HSGPA–FYGPA correlations for all non-White racial/ethnic groups.
  - For best language groups, the SAT sections had at least as high a correlation with FYGPA as HSGPA.
  - Across students' household income levels, HSGPA was at least as highly correlated with FYGPA as the SAT sections, except for students not reporting household income, for whom the SAT sections correlated more strongly than HSGPA.
  - HSGPA–FYGPA correlations exceeded those of the SAT for all levels of highest parental education that were above no high school diploma.
- Similar to previous results (Mattern et al., 2008; Patterson et al., 2009; Patterson & Mattern, 2011), of the three SAT sections, SAT-W scores were most predictive of FYGPA, overall and for all subgroups, except for students not stating their best spoken language and those for whom neither parent earned a high school diploma, in which case SAT-M was slightly more predictive.

**Table 9.** Average Over- (-) 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 | 129 | 91,088 | -0.113 | -0.150 | -0.086 | -0.114 | -0.069 | -0.081 |
| | Female | 131 | 107,165 | 0.096 | 0.127 | 0.073 | 0.096 | 0.058 | 0.069 |
| **Race/** | African American | 131 | 16,039 | -0.198 | -0.167 | -0.175 | -0.134 | -0.220 | -0.111 |
| **Ethnicity** | American Indian | 114 | 977 | -0.180 | -0.165 | -0.158 | -0.148 | -0.183 | -0.143 |
| | Asian American | 129 | 21,864 | 0.030 | -0.057 | 0.010 | -0.014 | 0.012 | -0.005 |
| | Hispanic | 131 | 18,541 | -0.099 | -0.087 | -0.085 | -0.061 | -0.147 | -0.062 |
| | Other | 131 | 5,194 | -0.041 | -0.027 | -0.047 | -0.037 | -0.029 | -0.027 |
| | White | 130 | 131,531 | 0.036 | 0.043 | 0.035 | 0.030 | 0.047 | 0.025 |
| | Not Stated | 130 | 4,107 | -0.009 | 0.030 | 0.004 | 0.001 | 0.038 | 0.007 |
| **Best** | English Only | 131 | 179,558 | 0.000 | 0.007 | 0.002 | 0.001 | 0.009 | 0.002 |
| **Language** | English and Another Language | 131 | 14,131 | -0.041 | -0.070 | -0.056 | -0.041 | -0.108 | -0.047 |
| | Another Language | 124 | 3,217 | 0.199 | -0.077 | 0.160 | 0.119 | -0.006 | 0.103 |
| | Not Stated | 127 | 1,347 | -0.056 | -0.038 | -0.042 | -0.032 | -0.020 | -0.001 |
| **Household** | < $40,000 | 131 | 22,062 | -0.094 | -0.100 | -0.076 | -0.059 | -0.164 | -0.077 |
| **Income** | $40,000–$80,000 | 131 | 36,246 | -0.025 | -0.019 | -0.014 | -0.011 | -0.054 | -0.031 |
| | $80,000–$120,000 | 131 | 36,206 | 0.021 | 0.022 | 0.021 | 0.016 | 0.018 | 0.006 |
| | $120,000–$160,000 | 131 | 16,487 | 0.030 | 0.030 | 0.026 | 0.020 | 0.053 | 0.027 |
| | $160,000–$200,000 | 131 | 8,701 | 0.012 | 0.017 | 0.001 | -0.001 | 0.063 | 0.026 |
| | > $200,000 | 130 | 14,545 | 0.001 | -0.003 | -0.017 | -0.019 | 0.070 | 0.028 |
| | Not Stated | 131 | 64,006 | 0.025 | 0.023 | 0.019 | 0.017 | 0.039 | 0.024 |
| **Highest** | No High School Diploma | 129 | 4,800 | -0.065 | -0.098 | -0.049 | -0.026 | -0.182 | -0.039 |
| **Parental** | High School Diploma | 131 | 40,267 | -0.086 | -0.087 | -0.071 | -0.060 | -0.135 | -0.076 |
| **Education** | Associate Degree | 131 | 13,107 | -0.045 | -0.044 | -0.029 | -0.022 | -0.093 | -0.047 |
| **Level** | Bachelor's Degree | 131 | 64,831 | 0.030 | 0.030 | 0.027 | 0.025 | 0.036 | 0.025 |
| | Graduate Degree | 131 | 62,657 | 0.040 | 0.047 | 0.030 | 0.022 | 0.085 | 0.035 |
| | Not Stated | 131 | 12,591 | -0.010 | -0.026 | -0.014 | -0.013 | -0.010 | -0.001 |
| **Overall** | | 131 | 198,253 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

Notes. *k*: number of institutions; *n*: subgroup sample size. *: SAT refers to the inclusion of all three sections in the relevant multiple correlation. 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 raw FYGPA.

- As has been shown in prior research (Mattern et al., 2008; Patterson et al., 2009; Patterson & Mattern, 2011):
  - SAT sections (and HSGPA, to a lesser extent) overpredicted males' FYGPAs and underpredicted females' FYGPAs.
  - HSGPA and to a lesser extent, the SAT, overpredicted non-White students' FYGPAs, except for HSGPA for Asian Americans.
  - SAT sections underpredicted FYGPAs of students whose best language was another language, and HSGPA overpredicted FYGPAs of students whose best spoken language was a combination of English and another language.
  - HSGPA overpredicted FYGPAs of students whose household income level was lower (≤ $80,000) and underpredicted for students with greater incomes, while SAT differential prediction was smaller in absolute magnitude for all levels and did not vary linearly with income.
  - HSGPA differential prediction (a) increased with highest parental education and (b) exceeded the absolute magnitude of SAT differential prediction for all levels of reported highest parental education.
- For all groups, differential prediction was minimized using either the SAT alone or the SAT and HSGPA, except for males and females and those whose best language was not English, in which case HSGPA alone led to the least differential prediction.

## References

College Board. (2009a). *The college handbook 2009* (46th ed.). New York: The College Board.

College Board. (2009b). *2009 college-bound seniors: Total group profile report*. New York: The College Board. Retrieved from http://professionals.collegeboard.com/profdownload/cbs-2009-national-TOTAL-GROUP.pdf

Kobrin, J. L., Patterson, B. F., Shaw, E. J., Mattern, K. D., & Barbuti, S. M. (2008). *Validity of the SAT for predicting first-year college grade point average* (College Board Research Report No. 2008-5). New York: The College Board. Retrieved from http://professionals.collegeboard.com/profdownload/pdf/08-1718_RDRR_081017_Web.pdf

Mattern, K. D., Patterson, B. F., Shaw, E. J., Kobrin, J. L., & Barbuti, S. M. (2008). *Differential validity and prediction of the SAT* (College Board Research Report No. 2008-4). New York: The College Board. Retrieved from http://professionals.collegeboard.com/profdownload/pdf/08-1717_RD_ResearchRpt_081017Web.pdf

Patterson, B. F., Mattern, K. D., & Kobrin, J. L. (2009). *Validity of the SAT for predicting FYGPA: 2007 SAT validity sample* (College Board Statistical Report No. 2009-1). New York: The College Board. Retrieved from http://professionals.collegeboard.com/profdownload/pdf/RD-SR-2009-1-Update.pdf

Patterson, B. F. & Mattern, K. D. (2011). *Validity of the SAT for predicting FYGPA: 2008 SAT validity sample* (College Board Statistical Rep. No. 2011-5). New York: The College Board. Retrieved from http://professionals.collegeboard.com/profdownload/pdf/SR2011-5.pdf

## **Appendix A.** Institutions Providing First-Year Outcomes Data for the 2009 Cohort

| Institution Name | | |
|---|---|---|
| Albany College of Pharmacy and Health Sciences | Messiah College | University of North Carolina at Greensboro |
| Arizona State University | Missouri State University | University of North Texas |
| Austin College | Moravian College | University of Oregon |
| Baldwin-Wallace College | Mount Ida College | University of Pittsburgh |
| Belmont University | Northern Arizona University | University of Portland |
| Binghamton University, SUNY | Northwestern University | University of Puget Sound |
| Boston College | Pepperdine University | University of Rhode Island |
| Boston University | Point Loma Nazarene University | University of San Francisco |
| Brandeis University | Purdue University | University of Scranton |
| Carleton College | Quinnipiac University | University of South Carolina |
| Chapman University | Rutgers, The State University of New Jersey | University of Southern California |
| Claremont McKenna College | Saint Anselm College | University of Southern Indiana |
| Clemson University | Saint Edward's University | University of Texas at Austin |
| Coastal Carolina University | Saint John Fisher College | University of Texas–Pan American |
| College of Charleston | Saint Mary's College of California | University of the Pacific |
| Cornell College | Saint Michael's College | University of Utah |
| Dominican University of California | Schreiner University | University of Washington, Bothell |
| Drew University | Seton Hill University | University of Washington, Seattle |
| Earlham College | Shenandoah University | Valdosta State University |
| East Stroudsburg University of Pennsylvania | Siena College | Vanderbilt University |
| Eastern Connecticut State University | Smith College | Washington State University, Pullman |
| Eastern Washington University | Spelman College | Washington State University, Vancouver |
| Florida State University | Stephen F. Austin State University | Western Washington University |
| Fordham University | Syracuse University | Wheaton College |
| Framingham State University | Temple University | Whitman College |
| Georgia Institute of Technology | Texas A&M International University | Whittier College |
| Georgia Southern University | Texas A&M University, College Station | Wilkes University |
| Gonzaga University | Texas Christian University | Williams College |
| Indiana University–Purdue University Indianapolis | Texas State University–San Marcos | Anonymous A |
| Indiana University, Bloomington | The Ohio State University | Anonymous B |
| Indiana University, East | The Pennsylvania State University, University Park | Anonymous C |
| Indiana University, Kokomo | Trinity University | Anonymous D |
| Indiana University, Northwest | University of California, Merced | Anonymous E |
| Indiana University, South Bend | University of California, Santa Barbara | Anonymous F |
| Indiana University, Southeast | University of Cincinnati | Anonymous G |
| Indiana Wesleyan University | University of Delaware | Anonymous H |
| Kenyon College | University of Denver | Anonymous I |
| Lafayette College | University of Georgia | Anonymous J |
| Lasell College | University of Houston | Anonymous K |
| Lincoln University | University of Illinois at Urbana–Champaign | Anonymous L |
| Linfield College | University of Mary Washington | Anonymous M |
| Lycoming College | University of Massachusetts, Dartmouth | Anonymous N |
| Marywood University | University of Michigan | Anonymous O |
| Meredith College | University of New Haven | |

**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 | 71 | 52,460 | .31 | .28 | .35 | .38 | .38 | .47 |
| | Public | 60 | 145,793 | .28 | .27 | .33 | .35 | .35 | .44 |
| **Admittance** | Under 50% | 27 | 35,414 | .34 | .31 | .37 | .41 | .29 | .45 |
| **Rate** | 50 to 75% | 75 | 129,442 | .27 | .26 | .33 | .35 | .37 | .45 |
| | Over 75% | 29 | 33,397 | .28 | .27 | .33 | .35 | .41 | .47 |
| **Undergraduate** | Small | 23 | 6,809 | .34 | .31 | .39 | .42 | .45 | .53 |
| **Enrollment** | Medium | 52 | 33,602 | .29 | .28 | .33 | .36 | .38 | .46 |
| | Large | 24 | 39,024 | .26 | .26 | .32 | .34 | .36 | .44 |
| | Very Large | 32 | 118,818 | .29 | .27 | .34 | .36 | .35 | .44 |
| **Overall** | | 131 | 198,253 | .29 | .27 | .33 | .36 | .36 | .45 |

Notes. *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 computed within institution and pooled. Institution sizes were categorized by the number of undergraduates 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.

**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 | 128 | 91,087 | .25 | .28 | .30 | .33 | .35 | .43 |
| | Female | 131 | 107,165 | .33 | .35 | .36 | .41 | .34 | .47 |
| **Race/** | African American | 103 | 15,815 | .21 | .21 | .25 | .27 | .30 | .37 |
| **Ethnicity** | American Indian | 18 | 539 | .25 | .21 | .33 | .34 | .30 | .40 |
| | Asian American | 100 | 21,663 | .24 | .25 | .27 | .31 | .28 | .39 |
| | Hispanic | 106 | 18,327 | .24 | .22 | .28 | .30 | .29 | .38 |
| | Other | 81 | 4,810 | .30 | .26 | .35 | .37 | .31 | .44 |
| | White | 128 | 131,520 | .26 | .24 | .32 | .34 | .38 | .45 |
| | Not Stated | 76 | 3,689 | .31 | .27 | .35 | .37 | .35 | .46 |
| **Best** | English Only | 131 | 179,558 | .29 | .28 | .34 | .36 | .37 | .46 |
| **Language** | English and Another Language | 99 | 13,868 | .24 | .25 | .28 | .30 | .27 | .38 |
| | Another Language | 48 | 2,866 | .13 | .19 | .19 | .23 | .20 | .29 |
| | Not Stated | 28 | 735 | .33 | .30 | .33 | .38 | .28 | .43 |
| **Household** | < $40,000 | 127 | 22,022 | .22 | .26 | .27 | .31 | .31 | .39 |
| **Income** | $40,000–$80,000 | 131 | 36,246 | .28 | .26 | .33 | .35 | .37 | .45 |
| | $80,000–$120,000 | 130 | 36,193 | .27 | .25 | .32 | .34 | .38 | .45 |
| | $120,000–$160,000 | 119 | 16,368 | .28 | .26 | .33 | .35 | .38 | .46 |
| | $160,000–$200,000 | 99 | 8,470 | .25 | .24 | .30 | .32 | .38 | .45 |
| | > $200,000 | 102 | 14,341 | .24 | .19 | .27 | .29 | .36 | .42 |
| | Not Stated | 131 | 64,006 | .30 | .28 | .35 | .37 | .35 | .46 |
| **Highest** | No High School Diploma | 66 | 4,400 | .19 | .26 | .23 | .29 | .27 | .36 |
| **Parental** | High School Diploma | 128 | 40,228 | .25 | .25 | .30 | .32 | .34 | .41 |
| **Education** | Associate Degree | 116 | 12,967 | .25 | .23 | .30 | .31 | .37 | .43 |
| **Level** | Bachelor's Degree | 131 | 64,831 | .27 | .26 | .32 | .35 | .38 | .45 |
| | Graduate Degree | 130 | 62,644 | .27 | .24 | .32 | .34 | .37 | .45 |
| | Not Stated | 117 | 12,453 | .29 | .29 | .34 | .36 | .31 | .43 |
| **Overall** | | 131 | 198,253 | .29 | .27 | .33 | .36 | .36 | .45 |

Notes. 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 computed within institution and pooled. Computations were made within institutions for subgroups with at least 15 members.