

# The Validity of the Academic Rigor Index (ARI) for Predicting FYGPA<sup>1</sup>

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## Introduction

In an effort to identify predictors of college success, educators have focused on additional measures besides HSGPA and SAT® scores. One such measure is academic rigor: the difficulty or challenge associated with a student's high school curriculum. The College Board created the academic rigor index (ARI) to standardize and quantify this measure.<sup>2</sup>

## About the Research

The purpose of this report is to investigate the relationship between the ARI and first-year GPA (FYGPA). This report investigated the validity of the ARI for predicting FYGPA, its incremental validity when added to HSGPA and SAT scores,<sup>3</sup> whether the ARI exhibits differential prediction (e.g., over- or underpredicts FYGPA for groups<sup>4</sup> of students), and whether differential prediction is reduced when the ARI is included as a predictor along with SAT scores and HSGPA.

## Data and Methodology

College performance data were obtained from a partnership between the College Board and 129 four-year institutions that agreed to provide college performance data on their 2008 class of entering first-year students. The final sample included 145,131 students who had taken the SAT exam and provided their HSGPA and high school course work information.

To assess the validity of the ARI for predicting FYGPA, correlations were computed between the ARI, SAT scores, and HSGPA with FYGPA within each institution. All correlations were corrected for restriction of range<sup>5</sup> in the predictor variables (ARI, SAT, and HSGPA). Correlations were computed within each subgroup (e.g., gender) to examine differential validity.

The extent to which the ARI exhibited differential prediction was calculated by subtracting the predicted FYGPA (from the regression equation) from the earned FYGPA for each student to compute the average over- or underprediction by subgroup.

## Results and Conclusions

Table 1 indicates that the correlation of the ARI with FYGPA is 0.44, lower than that of SAT scores (0.55) and HSGPA (0.56), but considered a medium to large correlation.<sup>6</sup> However, the ARI did not provide any incremental validity over and above SAT scores and HSGPA. This can be seen by comparing the last two columns in Table 1: The multiple correlation of SAT scores and HSGPA with FYGPA is the same as the multiple correlation of SAT scores, HSGPA, and ARI with FYGPA, overall and by subgroups. A summary of the results is below:

- The ARI was predictive of FYGPA;
- Incremental validity was not increased by adding the ARI to HSGPA and SAT scores;
- The differential prediction of the ARI was more than that of SAT scores and similar to that of HSGPA; and
- Differential prediction was essentially unchanged when the ARI was added to HSGPA and SAT scores.

So the ARI is indicative of future performance as signified by its positive relationship with FYGPA, and it allows students to showcase their strengths and abilities via a new dimension: the rigor of high school courses completed.

Given the current movement toward a more holistic assessment of college applicants, a standardized measure of the academic rigor of a student's course load in high school suggests a promising additional measure to the assessment of a student's level of college readiness.

**Table 1.<sup>7</sup>**

Corrected (Observed) Correlations of ARI, SAT, and HSGPA with FYGPA by Demographic Characteristics

		<i>N</i>	ARI	SAT	HSGPA	SAT & HSGPA	SAT, HSGPA, ARI
<b>Gender</b>	Female	80,666	.45 (.24)	.58 (.41)	.56 (.37)	.65 (.48)	.65 (.48)
	Male	64,465	.43 (.25)	.53 (.35)	.54 (.37)	.61 (.45)	.61 (.46)
<b>Ethnicity</b>	American Indian	335	.42 (.25)	.45 (.33)	.44 (.29)	.51 (.40)	.52 (.40)
	Asian American	14,174	.43 (.19)	.54 (.33)	.54 (.30)	.61 (.42)	.61 (.42)
	African American	9,721	.39 (.21)	.47 (.28)	.46 (.31)	.53 (.38)	.53 (.39)
	Hispanic	12,564	.38 (.18)	.49 (.30)	.49 (.31)	.56 (.39)	.56 (.39)
	White	100,368	.44 (.25)	.54 (.35)	.58 (.40)	.64 (.47)	.64 (.47)
	Other	3,182	.39 (.20)	.51 (.36)	.49 (.30)	.58 (.43)	.58 (.43)
	No Response	2,690	.40 (.22)	.52 (.37)	.51 (.35)	.59 (.45)	.59 (.45)
<b>Household Income</b>	< \$20,000	5,056	.37 (.19)	.46 (.32)	.47 (.31)	.53 (.40)	.53 (.40)
	\$20,000–\$40,000	11,193	.40 (.22)	.49 (.34)	.51 (.36)	.58 (.44)	.58 (.44)
	\$40,000–\$60,000	14,002	.41 (.23)	.51 (.36)	.54 (.39)	.61 (.46)	.61 (.46)
	\$60,000–\$80,000	15,612	.43 (.25)	.52 (.36)	.56 (.40)	.62 (.47)	.62 (.47)
	\$80,000–\$100,000	15,291	.44 (.25)	.54 (.37)	.56 (.39)	.63 (.47)	.63 (.47)
	\$100,000–\$120,000	13,143	.43 (.25)	.53 (.36)	.58 (.40)	.64 (.47)	.64 (.47)
	\$120,000–\$140,000	6,513	.42 (.23)	.54 (.36)	.57 (.39)	.63 (.47)	.63 (.47)
	\$140,000–\$160,000	4,703	.45 (.27)	.55 (.37)	.58 (.40)	.65 (.49)	.65 (.49)
	\$160,000–\$200,000	5,575	.42 (.24)	.52 (.34)	.56 (.37)	.62 (.45)	.62 (.45)
	> \$200,000	9,229	.42 (.23)	.52 (.32)	.57 (.38)	.63 (.45)	.63 (.45)
No Response	42,579	.44 (.25)	.56 (.39)	.57 (.38)	.65 (.48)	.65 (.48)	
<b>Total</b>		145,131	.44 (.25)	.55 (.37)	.56 (.38)	.63 (.47)	.63 (.47)

Note: Correlations are computed within the institution. Correlations were corrected for range restriction using the Pearson–Lawley multivariate correction (Gulliksen, 1950; Lawley, 1943; Pearson, 1902). Average sample size weighted correlations are shown in parentheses. SAT is the multiple correlation for all three sections.

1. K. D. Mattern and J. N. Wyatt, *The Validity of the Academic Rigor Index (ARI) for Predicting FYGPA* (College Board Research Report No. 2012-5) (New York: The College Board, 2012). Click here for the full report: <http://professionals.collegeboard.com/profdownload/pdf/researchreport-2012-5.pdf>

2. J. N. Wyatt, A. Wiley, W. J. Camara, and N. Proestler, *The Development of an Index of Academic Rigor for College Readiness* (College Board Research Report 2011-11) (New York: The College Board, 2011). Click here for the full report: <http://professionals.collegeboard.com/profdownload/pdf/RR2011-11.pdf>

3. Incremental validity measures the added predictive validity that is attained when the ARI is added as a predictor to SAT scores and HSGPA.

4. For example, does it over- or underpredict FYGPA for females or males?

5. Since SAT scores are used — along with other measures — as an admission criterion at colleges and universities, the range of scores for admitted students will be smaller than in the general population of SAT takers. This restriction of range leads to artificially smaller correlations and must be adjusted for or “corrected” using a well-established statistical procedure. For further details on the statistical procedures, please see the full report.

6. A small positive correlation is approximately 0.1, a medium correlation is 0.3, and a large correlation is 0.5 or higher. For more information, see J. Cohen, *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.) (Hillsdale, NJ, Lawrence Erlbaum Associates, 1988).

7. Table 1 can be found on page 11 of the associated research report, where it is titled “Table 2.”

