



# *The Predictive Validity of the New SAT Achievement test and High School Grades on Undergraduate Success*

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# Introduction

- Researchers have shown that SATs are good predictors of undergraduate student academic performance. Some prospective undergraduate students find the SAT test relatively easy, achieve a higher than average score, and get into a great undergraduate school. In 2006, a new SAT test based on measuring a student's achievement as opposed to a student's inherent ability was introduced. Many universities and colleges have adopted the new SAT Achievement test as part of the application materials for admitting students. Does the new SAT Achievement test have predictive validity in predicting undergraduate success? Is the new SAT Achievement test a better predictor of undergraduate success compared to the old SAT test or compared to high school grades?

## Standardized Tests

- Standardized test scores and prior grades measure overlapping but different aspects of educational attainment. Unlike grades, standardized test scores reflect performance on tasks that are common to all students. The SAT Achievement test is intended to measure only a portion of the individual characteristics that are important for success in undergraduate school: reasoning skills, critical thinking, and the ability to communicate effectively in writing.

## Current Study

- This study examines the predictive validity of high school grades and SAT scores, both the SAT Achievement test and the old SAT ability test, on school success as measured by grade point average. Further, this study also compares the predictive validity between the old SAT tests (both the SAT I and SAT II) and the new SAT test in predicting school success as measured by school grades. Correlations between high school grades, and the SAT Achievement tests and old SAT test are discussed.

## Research Question

- Which is a better predictor of college success, as measured by undergraduate grades, the new SAT Achievement tests or the old SAT tests and/or high school grades?

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## Theoretical Model

- Predictive validity
  - Approximate the future in the present
- Point-to-point theory, method overlap
  - Correspondence of predictor and criterion space improves strength of validity coefficient
- Curriculum vs. aptitude measure: Explanatory power should be enhanced by curriculum measure

## Theoretical Model

- What is predictive validity? How do we show evidence of predictive validity? An instrument is valid only to the extent that its scores permit appropriate inferences to be made about a specific group of people for a specific purpose. The predictive validity of SAT scores is the degree to which these test scores are appropriate to predict performance on a future criterion measure, i.e., undergraduate grades and units passed.



## Rationale for Testing

- Valid measure of preparation
- Adds to the prediction of student success
- Standardized measure: unaffected by grading variation and inflation
- Identify potential talent in students not achieving to their level in high school (diamond in the rough)



# Method

## Subjects

Subjects include a population of first-time freshmen who enrolled in a large public research institution in years 2001 and 2006. Scores from the SAT I (verbal and math sections) and SAT II tests (English, math and third achievement test) for the 2001 freshmen cohort and scores from the SAT I tests (verbal, math and new writing test) and the new SAT Achievement tests for the 2006 freshmen cohort are compared. Data also include the cumulative grade point average at the end of each student's first academic year attending the university, as measured on a scale ranging from 0.0 to 4.0, and each student's official high school grade point average.

# Sample Characteristics

## Gender

<i>Gender</i>	2001		2006	
	N	Percent	N	Percent
Female	2,152	54%	2,558	56%
Male	<u>1,829</u>	<u>46%</u>	<u>2,031</u>	<u>44%</u>
Total	3,981	100%	4,589	100%

# Sample Characteristics

## Ethnicity

<i>Ethnicity</i>	2001		2006	
	N	Percent	N	Percent
African American	33	1%	44	1%
Asian	1,654	42%	2,301	50%
Hispanic	322	8%	510	11%
Native American	9	<1%	22	<1%
Caucasian	1,472	37%	1,283	28%
Other/Missing	<u>491</u>	<u>12%</u>	<u>429</u>	<u>9%</u>
Total	3,981	100%	4,589	100%

# Sample Characteristics

## Disciplinary Area

<i>Disciplinary Area</i>	2001		2006	
	N	Percent	N	Percent
Arts	115	3%	105	2%
Humanities	102	3%	151	3%
Engineering	1,035	26%	872	19%
Science/Math	260	7%	465	10%
Biology	587	15%	807	18%
Social Science	697	18%	1,024	22%
Undeclared/Missing	<u>1,185</u>	<u>30%</u>	<u>1,165</u>	<u>25%</u>
<b>Total</b>	<b>3,981</b>	<b>100%</b>	<b>4,589</b>	<b>100%</b>

## Correlations of SAT I, SAT II, Achievement Tests and GPA Fall 2001 vs. Fall 2006

	<i>Correlations</i>						<i>Descriptive</i>			
	SAT I Math	SAT I Verbal	SAT II English	SAT II Math	SAT II Test 3	1st Year GPA	N	Mean	Standard Deviation	
<b>2001</b>										
HS GPA	-.041	-.010	-.030	-.028	-.077	.292	HS GPA	3,981	3.95	0.24
SAT I Math		.328	.343	.810	.377	.152	SAT I Math	3,981	657	73.94
SAT I Verbal			.732	.320	.290	.213	SAT I Verbal	3,981	607	82.53
SAT II English				.346	.274	.253	SAT II English	3,981	613	86.83
SAT II Math					.410	.195	SAT II Math	3,981	649	81.32
SAT II - Test 3						.173	SAT II - Test 3	3,981	645	92.18
							1st Year GPA	3,981	3.01	0.53
	<i>Correlations</i>						<i>Descriptive</i>			
	SAT I Math	SAT I Verbal	SAT I Writing	Achievement 1	Achievement 2	1st Year GPA	N	Mean	Standard Deviation	
<b>2006</b>										
HS GPA	.047	.057	.068	-.033	.046	.310	HS GPA	4,589	3.93	0.25
SAT I Math		.455	.488	.526	.689	.253	SAT I Math	4,589	646	83.29
SAT I Verbal			.734	.334	.540	.297	SAT I Verbal	4,589	597	87.91
SAT I Writing				.337	.528	.305	SAT I Writing	4,589	608	83.30
Achievement 1					.743	.209	Achievement 1	4,589	694	80.32
Achievement 2						.294	Achievement 2	4,589	626	85.73
							1st Year GPA	4,589	3.02	0.52

Note: Achievement 1 and 2 represent two highest scores on the SAT Achievement tests.

## Procedures

- Several linear regression analyses were conducted to determine which factors significantly accounted for the greatest amount of variability in predicting undergraduate success as measured by undergraduate grade point average at the end of three quarters. Subsequently, the beta weights of the significant factors were compared to determine the relative importance of each factor in predicting undergraduate success.
- Pearson correlation coefficients were also computed between scores on SAT ability and SAT Achievement tests, high school grades and undergraduate grades.

## Results

- For the 2001 cohort, accounting for 18% of the variability, results show that high school grade point average ( $\beta = .31$ ,  $p = .00$ ) was the best predictor of undergraduate success compared to all SAT I and SAT II tests (all SAT tests:  $\beta = .19$  or less,  $p = .00$ ). The next best predictor of undergraduate success was the old SAT II English test ( $\beta = .19$ ,  $p = .00$ ), followed by the old SAT II math test ( $\beta = .13$ ,  $p = .00$ ), and the old SAT II achievement test ( $\beta = .10$ ,  $p = .00$ ). The beta weights for both the SAT I verbal ( $\beta = .03$ ,  $p = .17$ ) and SAT I math test ( $\beta = .04$ ,  $p = .11$ ) were found to not be statistically significant. In running subsequent regression analyses, it was found that SAT II math scores only increased the variability accounted for in predicting undergraduate success by less than one percent.



## Results

- For the 2006 cohort, accounting for 21% of the variability, results show that, again, high school grade point average was the best overall predictor of undergraduate success compared to all SAT I and SAT Achievement tests, ( $p = .00$ ), i.e., when all factors were included in the regression analysis.
- The next best predictor of undergraduate success was the new SAT writing test followed by the SAT verbal test
- In running subsequent regression analyses, it was found that the two highest scores on the new SAT Achievement tests only increased the variability accounted for in predicting undergraduate success by approximately one percent.

## Results

- Results also indicate that the SAT I tests, including the verbal, math and writing tests, account for a slightly greater amount of variability ( $R^2 = .12$ ,  $p = .00$ ) in predicting undergraduate grades, compared to high school grades only ( $R^2 = .10$ ,  $p = .00$ ).
- Results for the 2006 freshmen cohort also show that scores on the SAT verbal and math tests are highly, positively correlated ( $R = .34$ ,  $p = .00$  to  $R = .84$ ,  $p = .00$ ) with the new SAT Achievement tests and the new SAT writing test. While high school grades show a small negative and positive correlations ( $R = -.03$ ,  $p = .03$  and  $R = .07$ ,  $p = .00$ ) with the new SAT Achievement tests and the new SAT writing test.

**Explained Variance (R-Square) in UCSD First-Year GPA  
Accounted for: by HSGPA, SAT I and SAT II Scores for 2001  
& by HSGPA, SAT I and Achievement Tests for 2006**

	2001	2006	
(1) <b>HSGPA</b>	0.086	0.096	(1) <b>HSGPA</b>
(2) <b>SAT I</b>	0.053	0.115	(2) <b>SAT I</b>
(3) <b>SAT II</b>	0.083	0.087 <sup>2</sup>	(3) <b>Achievement Test 1 and 2</b>
(4) <b>SAT I + SAT II</b>	0.084	0.124 <sup>2</sup>	(4) <b>SAT I + Achievement Test 1 and 2</b>
(5) <b>HSGPA + SAT I</b>	0.146	0.198	(5) <b>HSGPA + SAT I</b>
(6) <b>HSGPA + SAT II</b>	0.180	0.176 <sup>2</sup>	(6) <b>HSGPA + Achievement Test 1 and 2</b>
(7) <b>HSGPA + SAT I + SAT II</b>	0.181 <sup>1</sup>	0.209	(7) <b>HSGPA + SAT I + Achievement Test 1 and 2</b>
<b>SAT I increment: [(7)-(6)]</b>	<b>0.001</b>	<b>0.011</b>	<b>SAT I increment: [(7)-(5)]</b>

<sup>1</sup> SAT I (both Verbal and Math sections) not statistically significant in prediction equation ( $p \geq 0.05$ ).

<sup>2</sup> Achievement 1 Test not statistically significant in prediction equation ( $p \geq 0.05$ ).

Comparison of the Standardized Beta-Weights from Independent Factors in Linear Regression Analysis Predicting First Year Grade Point Average for 2001 and 2006 Cohorts

<b>Variables</b>	<b>2001</b>			<b>2006</b>		
	<b>Std. Beta</b>	<b>t</b>	<b>p-value</b>	<b>Std. Beta</b>	<b>t</b>	<b>p-value</b>
<b>HS GPA</b>	<b>0.31</b>	<b>20.13</b>	<b>0.00</b>	<b>0.30</b>	<b>21.83</b>	<b>0.00</b>
<b>SAT I Verbal</b>	<b>0.03</b>	<b>1.36</b>	<b>0.17*</b>	<b>0.10</b>	<b>4.83</b>	<b>0.00</b>
<b>SAT I Math</b>	<b>0.04</b>	<b>-1.58</b>	<b>0.11*</b>	<b>0.04</b>	<b>1.98</b>	<b>0.04</b>
<b>SAT I Writing</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>0.12</b>	<b>6.03</b>	<b>0.00</b>
<b>SAT II Math</b>	<b>0.13</b>	<b>4.71</b>	<b>0.00</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>SAT II English</b>	<b>0.19</b>	<b>8.13</b>	<b>0.00</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>SAT II Achievement Test 3</b>	<b>0.10</b>	<b>5.74</b>	<b>0.00</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>
<b>Achievement Test 1</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>0.06</b>	<b>2.68</b>	<b>0.01</b>
<b>Achievement Test 2</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>0.10</b>	<b>3.81</b>	<b>0.00</b>

## Discussion

- Overall, for both cohorts, these results suggest that high school grades may be a better predictor of undergraduate success as measured by grades compared to both the new and old SAT ability and achievement tests. Further these results provide some evidence of the predictive validity of the SAT writing test on undergraduate success as measured by undergraduate grade point average when used with high school grades.
- The scores from each student's first highest scoring SAT Achievement test was only found to be a significant factor in predicting undergraduate success in the regression analysis which included all SAT tests. The SAT Achievement test was not found to be a significant factor in the regression analyses that only included the SAT Achievement tests and did not include the SAT I tests as additional factors.

## Future Research

- An assessment of the predictive validity of the SAT tests on a group of students with a wider range of talent is important to remedy the possible restriction of range issue with the current data. Further, as many successful undergraduates head to graduate school upon graduation future research should be conducted to measure the predictive ability of the SAT tests on GRE scores.

# *The End*



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