Score Trends, SAT Validity and Subgroup Differences

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Excellence

Equity

Access

TODAY

- SAT Validity
  - Previous SAT vs Current SAT
  - SAT Total, HSGPA, Writing
  - Differential Validity by Subgroup
  - Differential Prediction by Subgroup
- Fairness and Subgroup Impact
- ACT-SAT Concordance

Validity of the SAT

University of California Validity Study

- Examined the predictive validity of the new SAT for 33,356 students who
  - Completed the new SAT
  - Enrolled in a UC campus in the fall of 2006
  - *http://www.cair.org/conferences/CAIR2007/pres/Agronow.pdf*
- Results compared to previous UC study using the old SAT in 2004
- Comparisons based on how well each measure predicted Freshman GPA at UC
  - SAT Critical Reading and Math slightly more predictive in 2006 than in 2004
  - SAT Writing slightly more predictive than the other SAT sections
  - SAT Writing (in 2006) slightly more predictive than Writing Subject Test had been (in 2004)
  - In 2004 study, High School GPA was slightly more predictive than SAT V+M
  - In 2006 study, SAT CR+M+W was slightly more predictive than High School GPA

Correlations between SAT and HSGPA with First Year College GPA at UC (see p. 4, 12, 15 of *First Look*) *°

	2004	2006	2006-2004
HSGPA	0.43	0.44	0.02
SAT-CR	0.38	0.41	0.03
SAT-M	0.30	0.33	0.03
SAT-W	0.40	0.43	0.03
SAT-CR + SAT-M	0.39	0.42	0.03
SAT-CR + SAT-M + SAT-W	0.41	0.45	0.03
HSGPA + SAT-CR + SAT-M	0.50	0.52	0.02
HSGPA + SAT-CR + SAT-M + SAT-W	0.51	0.53	0.02

Note. In 2004, the SAT Subject Test in Writing was examined.

*Multiple correlations computed from adj R^2 values

°Correlations presented are not adjusted for restriction of range.

From Page 8 of Latest UC Validity Study…

EVALUATION OF RESULTS

In reviewing the results presented in Figures 1 – 4 the following is observed:

1) In one-to-one comparisons, each predicator variable set in 2006 accounted for more variance in UC GPA than in 2004.

2) Relative to the other variables in the models, High School GPA accounts for less variance in the prediction of UC GPA in 2006 than it did in 2004. Also of note, in 2004 High School GPA (.182) compared with the SAT I Math + Verbal +SAT II Writing (.172) accounted for more variance in UC GPA. In contrast, in 2006 the combination of SAT Critical Reading + Math + Writing explained a little *more* variance (.200) in UC GPA than High School GPA (.196). This difference was even larger for Engineering students in 2006.

3) SAT Critical Reading + Math accounted for more variance in most models in 2006 than in the SAT I Verbal + Math did in 2004.

4) SAT Reasoning Writing accounted for more variance in most models in 2006 than in the SAT II Writing did in 2004 for all students, but not for Engineering students.

5) The combination of SAT Critical Reading + Math + Writing in 2006 contributed more than SAT Verbal + Math + SAT II Writing did to the prediction of UC GPA in 2004.

6) For Engineering students, the SAT Math Subject test in 2006 accounted for more variance in UC GPA than the SAT II Math test did in 2004. There was, however, little difference in this comparison for ALL students.

Background on Recruitment for SAT Validity Study

- Recruitment took place between 2005-2007
- Data files were due to the Admitted Class Evaluation Service (ACES) system on 10/15/2007
  - Included 1st year performance data and retention to 2nd year on the entering class of Fall 2006
- College Board aggregated files as they came in from ACES
- Results of preliminary analyses (based on half of the sample) presented at College Board regional forums in Jan./Feb. 2008
- Full research report published in June 2008

College Board SAT Validity Study —

- 110 colleges participating in Validity Study (N = 196,364)
  - Schools provided first year performance data for Fall 2006 cohort through the Admitted Class Evaluation Service™ (ACES ™) portal
- Restrict sample to students who completed the New SAT and submitted self reported High School GPA (N=151,316)
  - Additional analysis using actual HS GPA will be conducted. The institutional characteristics of the sample, as well as the total group, are presented on the next slide by key variables:
  - Region, Selectivity, Size, Control

Institutional Characteristics - DRAFT

Variable		Sample	Population
Region	MRO	15%	16%
	MSRO	24%	18%
	NERO	22%	13%
	SRO	11%	25%
	SWRO	11%	10%
	WRO	17%	18%
Selectivity	under 50%	24%	20%
	50 to 75%	54%	44%
	over 75%	23%	36%
Size	Small: 750 to 1,999 undergrads	20%	18%
	Medium to Large: 2,000 to 7,499 undergrads	39%	43%
	Large: 7,500 to 14,999 undergrads	21%	20%
	Very large: 15,000 or more undergrads	20%	19%
Control	Public	43%	57%
	Private	57%	43%

SAT Validity Study — Descriptive Statistics (N=151,316) - DRAFT

Predictor	Mean	SD	National Mean
HSGPA	3.60	0.50	3.33
SAT CR	560	95.7	503
SAT M	579	96.7	518
SAT W	554	94.3	497
FGPA	2.97	0.71	NA

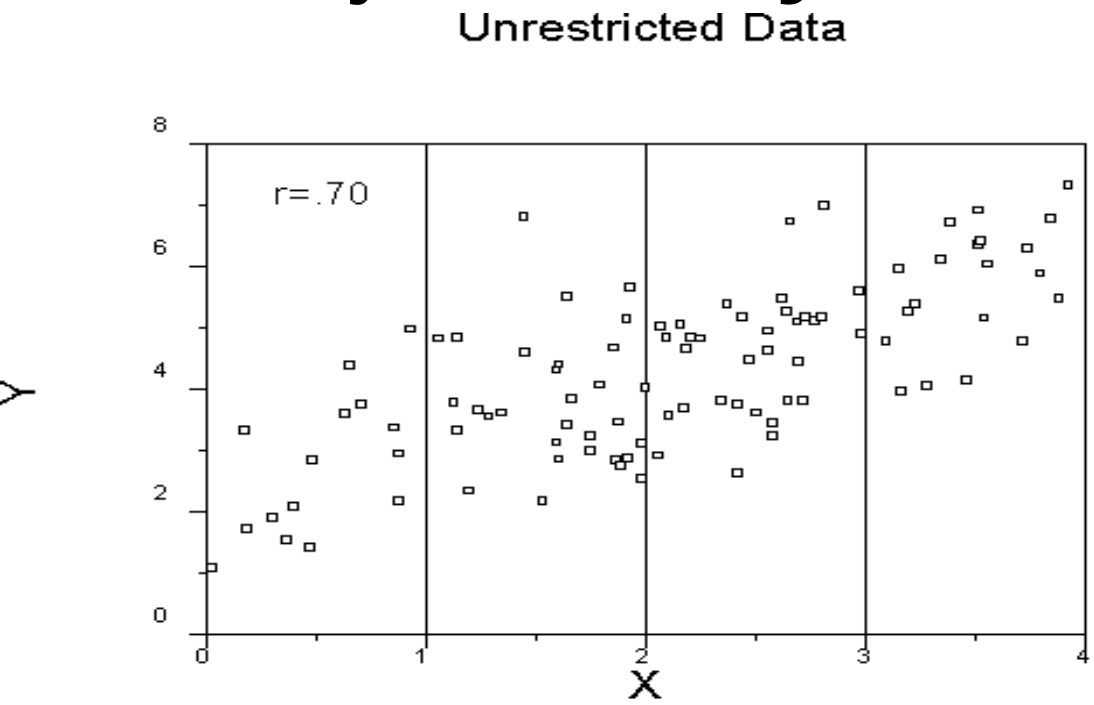
SAT Validity Study — Correlations between Predictors – Raw (adjusted)

Predictors	HSGPA	SAT M	SAT CR	SAT W
HSGPA				
SAT W	.23 (.49)			
SAT CR	.21 (.45)	.50 (.72)		
SAT M	.25 (.49)	.50 (.72)	.71 (.84)	
SAT CR+M+W	.28 (.53)			

SAT Validity Study — Correlations for Predictors (N=151,316) - DRAFT

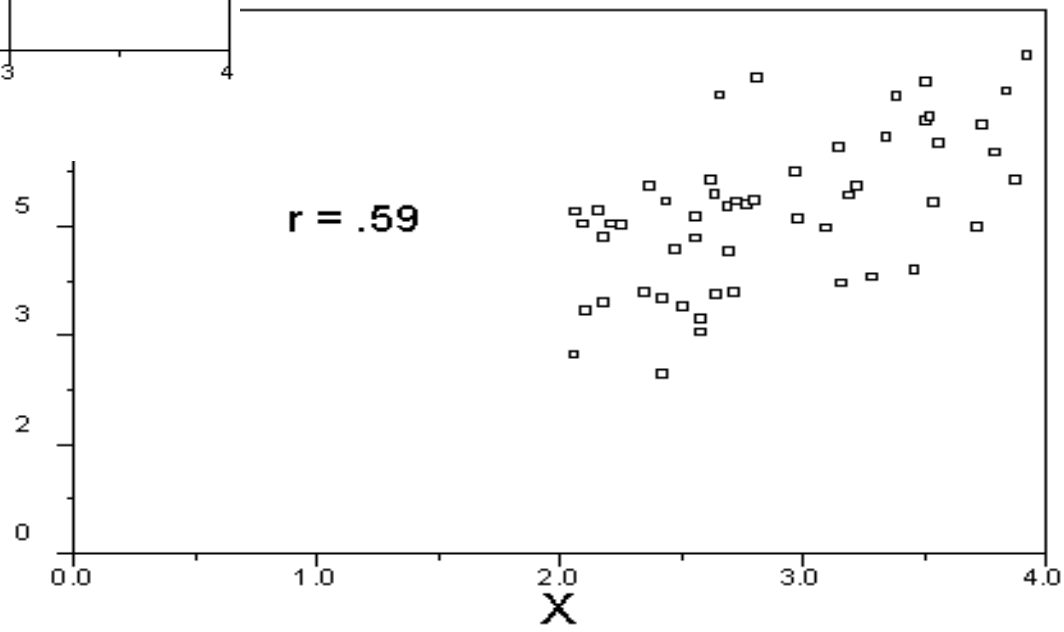
Predictors	Unadjusted R	R*	R^{*2}
HSGPA	0.36	0.54	0.29
SAT W	0.33	0.51	0.26
SAT CR	0.29	0.48	0.23
SAT M	0.26	0.47	0.22
SAT CR+M	0.32	0.51	0.26
SAT CR+M+W	0.35	0.53	0.26
HSGPA + SAT	0.46	0.62	0.38

So why do we adjust a correlation?



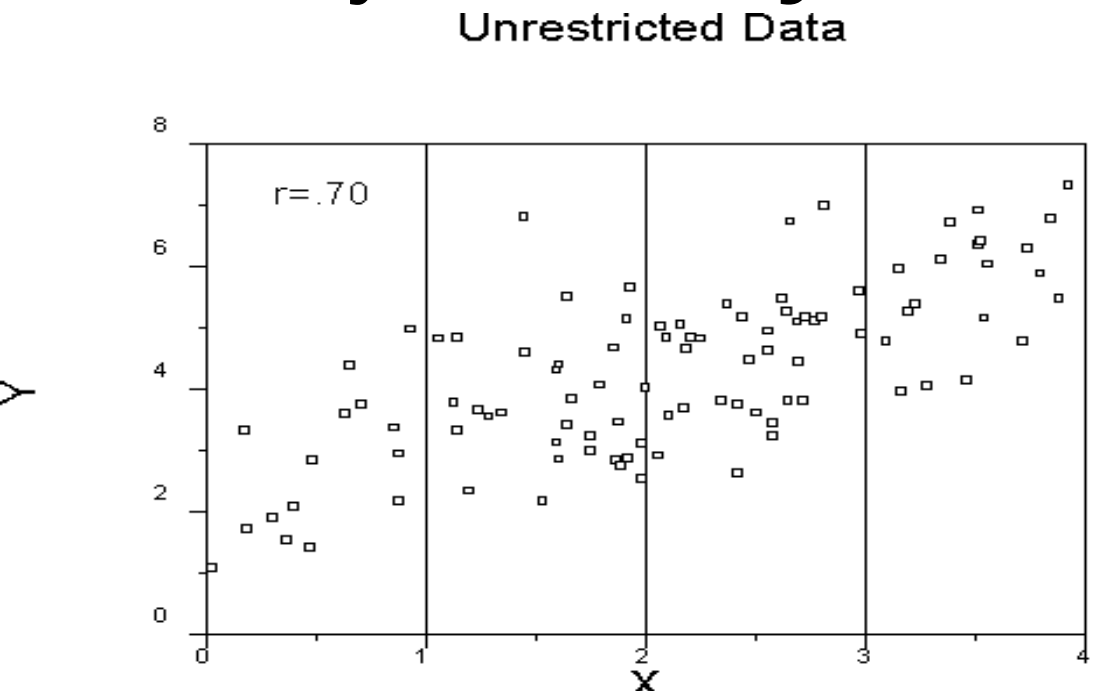
Below- the more selective the college, the less likely they admit students with low SAT scores – and they have far less students with low FGPA than in a population.

irect Range Restriction on X



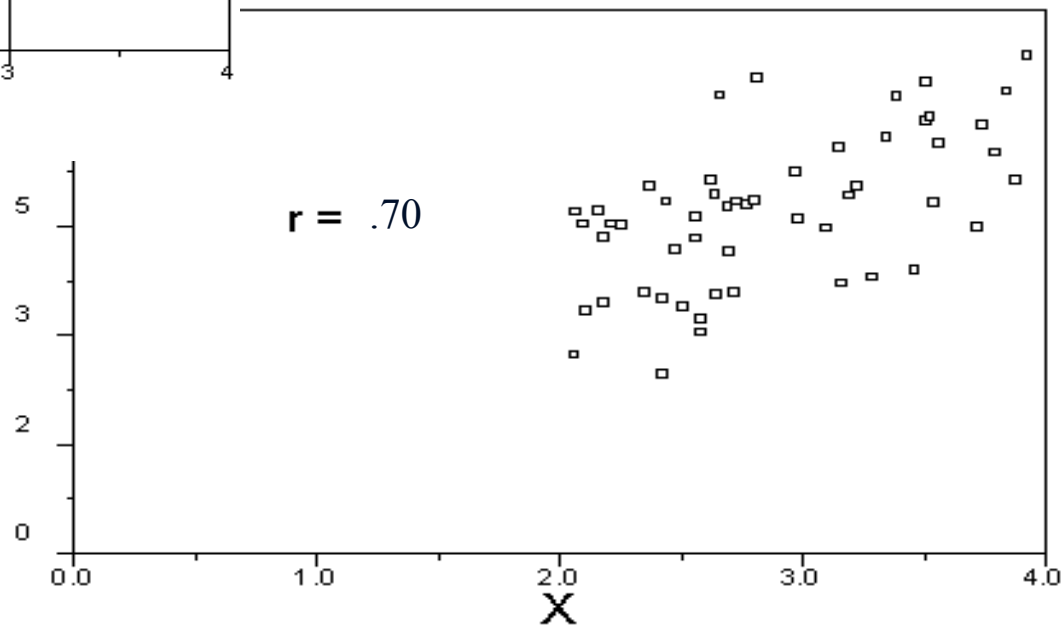
Above – if a college admitted all students irrespective of SAT scores you would find a normal distribution of scores and FGPA and a high r

So why do we adjust a correlation?



Below-We adjust a raw correlation to account for this restriction and to get us an estimate of the true validity of any measure. The same thing occurs anytime we restrict one variable in selection.

irect Range Restriction on X



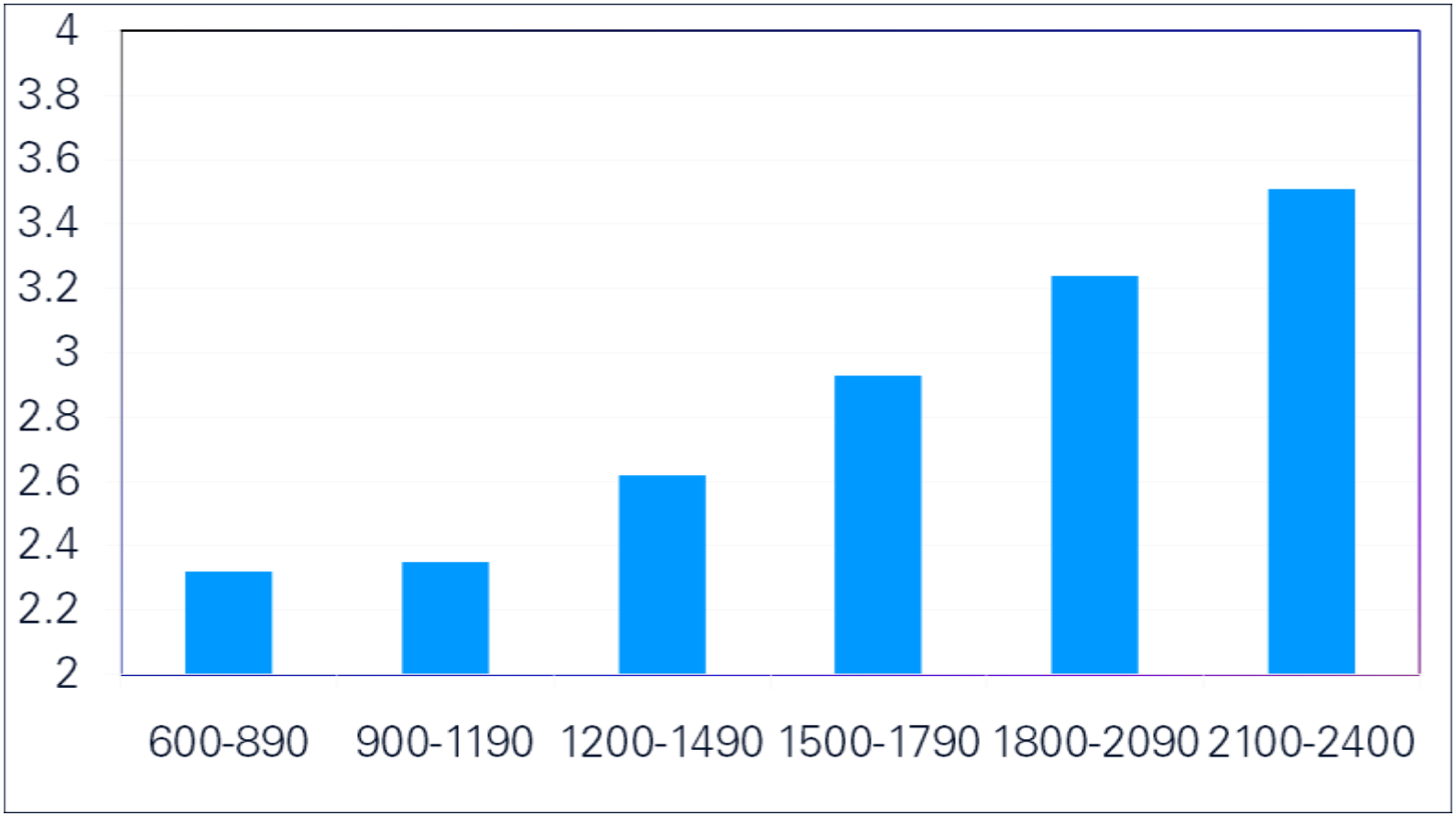
The Result (right) is that the entering class is restricted (to higher scoring students) which makes the correlation lower than it is in a representative population.

SAT Validity Study — Incremental Validity (N=151,316)

Predictors	R*	ΔR
HSGPA (Add SAT CR + SAT M)	.61	.07
HSGPA (Add SAT CR + SAT M + SAT W)	.62	.08
SAT CR + M (Add W)	.53	.02

* Correlations corrected for restriction of range, pooled within-institution correlations

So what does a validity of .53 mean?



SAT Validity Study — Incremental Validity (N=151,316) (correlations adjusted for restriction of range and pooled within inst.)

	N	SAT	HSGPA	SAT+HS GPA
CONTROL				
Private	45,786	.57	.55	.65
Public	105,530	.52	.53	.61
SELECTIVE				
Under 50%	27,272	.58	.55	.65
50-75%	84,433	.53	.54	.62
>75%	39,611	.51	.54	.60

What do past validity studies say?

- UC – In 2006, the SAT accounted for more variance than HS grades, and more variance than the SAT II's with writing or the former SAT V+M+SAT II W
- Hezlett et. al., (2001) Meta-analysis of 3,000 validity studies – SAT predict grades in all 4 yrs of college and cumulative GPA
    - SAT V .50, SAT M .48 HS GPA .61, HS Rank .56
- Bridgeman et. al., (2000) – SAT better than HSGPA in predicting college grades at most competitive colleges. Overall, SAT and HSGPA have greatest utility in more selective colleges.
- Ramist et. al., (1993) – SAT better than HSGPA in predicting grades in many individual college courses (math, science, social science).

SAT Validity Study — Future Directions

- December 2008
  - SAT Validity Placement Report
    - How well does the SAT predict individual course grades in English composition, math, and other first-year courses?
- 2009
  - Retention - How well does the SAT predict retention to the second year?
  - Differential Validity by Socio-Economic Status, Academic Rigor.
  - Impact of SAT above and beyond HSGPA in predicting college grades.

Summary of Results

- SAT Writing has the highest correlation with FYGPA among the three individual SAT sections (*Adj. r* = 0.51).
- As expected, the best combination of predictors of FYGPA is HSGPA and SAT scores (Adj. *r* =0.62), reinforcing the recommendation that colleges use both HSGPA and SAT scores to make the best predictions of student success.
- The adjusted correlation of HSGPA and FYGPA is 0.54, which is only slightly higher than the multiple correlation of the SAT (Critical Reading, Math, and Writing combined) with FYGPA (Adj. *r* = 0.53).
- The SAT is slightly better in predicting FGPA than unweighted HS grades at colleges admitting <50% of students, about even at colleges admitting 50%-75%, and less predicting at colleges admitting over 75% of students.

Summary of Results (continued)

- The increment in predictive validity attributable to the SAT when HSGPA is taken into account is 0.08.
- The increment in validity attributable to the Writing section over and above the Critical Reading and Math sections is 0.02. When HSGPA is also considered, the increment in validity attributable to the Writing section is 0.01.

Differential Validity and Prediction Report

- Descriptive Statistics
  - Sample size by subgroups
  - Means by subgroups
- Differential Validity
  - Correlation of SAT scores and HSGPA with FYGPA by Subgroups
- Differential Prediction
  - Average Overprediction (-) and Underprediction (+) of FYGPA for SAT Scores and HSGPA by Subgroups

Sample size and mean of admission criteria by subgroups

Subgroup		n	SAT-CR	SAT-M	SAT-W	HSGPA
Gender	Male	69,765	564	602	550	3.55
	Female	81,551	557	559	557	3.65
Race/ Ethnicity	American Indian	798	544	555	529	3.52
	Asian	14,296	562	624	562	3.66
	African-American	10,304	506	503	498	3.39
	Hispanic	10,659	524	537	520	3.59
	No Response	6,738	587	590	576	3.63
	Other	4,497	558	572	553	3.57
	White	104,024	567	584	560	3.62
Best Language	English	140,559	563	579	556	3.60
	English and Another	7,458	531	570	534	3.61
	Another Language	1,718	462	605	478	3.61
	Not Stated	1,581	544	559	536	3.53
Total		151,316	560	579	554	3.60

Correlation of SAT scores and HSGPA with FYGPA by Gender

Subgroup	Gender	
	Male	Female
k (institutions)	107	110
N	69,765	81,551
SAT-CR	0.44	0.52
SAT-M	0.45	0.53
SAT-W	0.47	0.54
SAT	0.50	0.58
HSGPA	0.52	0.54
SAT, HSGPA	0.59	0.65

Note- HSGPA and SAT are stronger predictors for females . Research on many tests consistently demonstrates grades and tests are slightly better in predicting female performance than male performance in college.

Correlation of SAT scores and HSGPA with FYGPA by Ethnicity

Subgroup	Race/Ethnicity				
	American Indian	Asian	African-American	Hispanic	White
k (inst.)	16	82	83	86	109
N	384	14,109	10,096	10,486	104,017
SAT-CR	0.41	0.41	0.40	0.43	0.48
SAT-M	0.41	0.43	0.40	0.41	0.46
SAT-W	0.42	0.44	0.43	0.46	0.51
SAT	0.54	0.48	0.47	0.50	0.53
HSGPA	0.49	0.47	0.44	0.46	0.56
SAT, HSGPA	0.63	0.56	0.54	0.57	0.63

Previous research has shown tests and grades are slightly less effective in predicting performance of African American students.

Correlation of SAT scores and HSGPA with FYGPA by Best Language

Subgroup	Best Language		
	English	English & Another	Another Language
k	110	79	28
n	140,559	7,237	1,292
SAT-CR	0.49	0.41	0.28
SAT-M	0.47	0.43	0.34
SAT-W	0.52	0.45	0.32
SAT	0.54	0.50	0.42
HSGPA	0.55	0.42	0.35
SAT, HSGPA	0.63	0.55	0.48

SAT and HSGPA have less power in predicting FGPA of ELL students

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

Subgroup	Gender	
	Male	Female
k	107	110
n	69,765	81,551
SAT-CR	-0.14	0.12
SAT-M	-0.20	0.17
SAT-W	-0.11	0.10
SAT	-0.15	0.13
HSGPA	-0.08	0.07
SAT, HSGPA	-0.10	0.09

- means over predicting (Predicted FGPA for males is .10 higher than actual GPA for males when SAT and HSGPA are used). + means under prediction (Predicted FGPA for females that is .09 below actual FGPA. Consistent with past studies.

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

Subgroup	Race/Ethnicity				
	American Indian	Asian	African-American	Hispanic	White
k	103	109	108	110	110
n	798	14,296	10,304	10,659	104,024
SAT-CR	-0.26	0.05	-0.30	-0.17	0.04
SAT-M	-0.25	-0.07	-0.26	-0.16	0.05
SAT-W	-0.22	0.04	-0.26	-0.16	0.04
SAT	-0.22	0.01	-0.20	-0.11	0.03
HSGPA	-0.25	0.02	-0.32	-0.27	0.06
SAT, HSGPA	-0.20	0.02	-0.17	-0.12	0.03

Also consistent with past research – The actual FGPA of under represented minorities average about .1 to .2 below predicted GPAs from SAT. HS grades consistent overpredict grades at a higher rate than tests. Over and underprediction are consistently reduced using both.

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

Subgroup	Best Language		
	English	English & Another	Another Language
k	110	110	102
n	140,559	7,458	1,718
SAT-CR	0.00	-0.03	0.40
SAT-M	0.01	-0.09	0.00
SAT-W	0.00	-0.04	0.37
SAT	0.00	-0.02	0.33
HSGPA	0.01	-0.13	0.06
SAT, HSGPA	0.00	-0.03	0.30

Summary of Results

Similar to previous findings…

- Differential Validity
  - SAT and HSGPA are more predictive of FYGPA for females, white students, and students who indicate English as their best language (larger correlations)
- Differential Prediction
  - SAT and HSGPA tend to underpredict FYGPA for females; however, the magnitude is larger for the SAT
  - SAT and HSGPA tend to overpredict FYGPA for minority students; however, the magnitude is larger for HSGPA
  - SAT- CR & SAT- W tend to underpredict FYGPA for students whose best language is not English. SAT-M accurately predicts their FYGPA.
  - SAT & HSGPA both tend to overpredict FYGPA for students whose best language is English and another language; however, the magnitude is larger for HSGPA.
  - These Results are no different than what has been reported for other standardized tests used in high schools, college and graduate admissions, as well as other data on group differences in college performance

Concordances: ACT and SAT

- They are DONE! Expected to be posted on Collegeboard Ed professionals web site tomorrow!!
  http://professionals.collegeboard.com/data-reports-research
- SAT Range to ACT Composite to SAT Single Score
- Allow users to go from ACT to SAT or SAT to ACT
- ACT Composite to SAT CR+W+M
- ACT Composite to SAT CR+M
- ACT Plus Writing to SAT W
- Colleges wanting to compare SAT to ACT Plus Writing need to apply two concordance tables:
  - ACT Composite to SAT CR+M
  - ACT Writing to SAT Writing
- We will also provide concordances between ACT Sum and SAT for NCAA and other users (more precision).

Concordance: ACT and SAT

- Sample:
  - 300,437 students who took both tests between 9/04 (for ACT) or 3/05 (for SAT) and 6/06 – first High School graduating cohort since the revised tests were released. Students completed both tests.
  - Slightly more able SAT CR 523 (502), M 534 (518) W 518 (497).
  - Sample of students taking ACT Plus Writing was only 190,148 students and differed substantially in terms of ability and other factors.
  - If multiple scores, used closet to a Jr Spring Sr Fall Match.
- A research report describing the sample, methodology and results will be jointly published by ACT, CB and ETS researchers this year.
- Cautions – SAT has more score points than ACT – use of a range is most accurate.
- Correlations: ACT Composite to SAT CR+M+W (.92) ACT W to SAT W (.85)

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