Research Report No. 2002-6

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I. Introduction

The validity of the SAT® I for predicting college performance has been widely studied (see, for example, Bridgeman, McCamley-Jenkins, and Ervin, 2000; and Ramist, Lewis, and McCamley-Jenkins, 1993). A recent meta-analysis of approximately 3,000 studies of the predictive validity of the SAT involving over one million students found that the SAT is a valid predictor of performance early in college, with validity coefficients ranging from .44 to .62 (Hezlett, Kuncel, Vey, Ahart, Ones, Campbell, and Camara, 2001). This same study found that the SAT is also a valid predictor of academic performance later in college (e.g., graduation, cumulative grade-point average) with validity coefficients ranging from the mid-thirties to the mid-forties.

While the SAT I has been the focus of thousands of validity studies, the SAT II: Subject Tests (hence referred to as the SAT II tests) have not enjoyed this same amount of attention. Approximately 60 institutions require the SAT II for admissions in addition to the SAT I. About 100 additional institutions highly recommend the SAT II for admissions and/or placement of incoming students. The majority of these institutions are highly competitive or competitive institutions; and therefore, students taking the SAT II tests are typically more able (e.g., they have higher high school grades, take more rigorous high school courses, and have higher SAT I scores and higher freshman grades) than the average student completing the SAT I. The largest institution using the SAT II is the University of California (UC), which currently requires all applicants to submit three SAT II scores, including the Writing Test, a math test, and a third test of the applicant's choice.

The SAT I is a three-hour test that measures verbal and mathematical reasoning abilities that students develop over time, both in and out of school. The test's content and format reflect accepted educational standards and practices, which emphasize critical thinking and problem-solving skills that are essential for college-level work. The SAT II tests are one-hour tests designed to measure knowledge in specific subject areas and the student's ability to apply that knowledge. There are 22 SAT II tests that cover English, history/social studies, mathematics, science, and foreign languages. These tests are independent of particular textbooks or methods of instruction, but the content evolves to reflect current trends in high school curricula.

In the year 2000, as few as 465 and as many as 217,179 college-bound seniors took each of the 22 SAT II tests. During that same year, more than four times as many students (1,072,577) took the SAT I (The College Board, 2000). Because a smaller and more able group of students take the SAT II tests, the means on these tests are higher than the SAT I, with means ranging from 576 (Writing) to 745 (Chinese Listening).

A report published in 2001 (Ramist, Lewis, and McCamley-Jenkins, 2001) examined the predictive validity of 14 of the SAT II tests in predicting college grades alone and in combination with high school grade-point average (HSGPA) and SAT I for entering freshmen at 39 colleges.[1] Approximately 50 percent of the SAT I takers at these 39 colleges took at least one SAT II test in 1985. Males and females were equally likely to take the SAT II. The results indicated that HSGPA was a relatively better predictor of first-year college grade-point average (FGPA), while the SAT I was a relatively better predictor of individual college course grades. The correlations with FGPA, corrected for shrinkage, restriction of range, and criterion unreliability, were about the same for HSGPA (.63), SAT II average (.62) and SAT I (.60). The multiple correlation of SAT I and SAT II average with FGPA was .63, the multiple correlation of HSGPA and SAT I with FGPA was .71, and the multiple correlation of HSGPA and SAT II average with FGPA was .69. Females generally had higher correlations than males. Among the ethnic groups, white and Asian American students had higher correlations and American Indian students had lower correlations. Among the three main predictors, HSGPA had the highest correlation for American Indian, Hispanic, and white students, and the SAT II average had the highest correlation for Asian American and African American students.

The study also looked at the predictive validity of the SAT II and the over- and underprediction of FGPA by subgroups, including gender, language, and ethnicity. The correlation of the SAT II test average with FGPA was very similar for females and males (.59 and .58). The correlation across tests was higher for students for whom English was their best language (.58 versus .50). Among ethnic groups, the correlation was higher for Asian Americans (.58) and whites (.56), compared to African Americans (.46), Hispanics (.42), and American Indians (.35). Using the average SAT II score as the predictor of FGPA, females were slightly underpredicted (-.05) and males were slightly overpredicted (.06). Underprediction occurred for Asian Americans (-.05) and whites (-.02), while overprediction occurred for American Indians (.23), African Americans (.26), and Hispanics (.23). However, these findings differ, sometimes substantially, across the different SAT II tests.

[1]At the time of the study, the SAT II tests were called "Achievement Tests."

II. Predictive Validity of SAT® I Versus SAT II

A question frequently asked is whether the SAT I and SAT II provide similar predictive information, that is, do the two tests contribute uniquely to the prediction of college achievement? This question has been addressed to some degree, but there is a need for additional research. Geiser and Studley (2001) analyzed the relative contribution of high school grade-point average (HSGPA), SAT I, and SAT II scores for predicting college success for freshmen who entered the University of California from fall 1996 to fall 1999. They found that SAT II scores were the single best predictor of FGPA, and that SAT I scores added little to the prediction once SAT II scores and HSGPA were already considered.

Geiser and Studley (2001) report only uncorrected correlations between individual tests, or composite tests (i.e., SAT I verbal and mathematical, or three SAT II tests), and FGPA for students at the University of California (UC). Several corrections are often used when reporting correlations between predictors and college grades or a similar criterion. For example, corrections for restriction of range are most essential in highly selective environments, and failure to make such corrections substantially reduces the magnitude of the correlations of all predictors with FGPA and result in overly conservative and biased estimates of validity (Kuncel, Campbell, and Ones, 1998; Linn, Harnisch, and Dunbar, 1981). While the unadjusted correlations between predictors and FGPA systematically underestimate the levels of validity and utility afforded by using each predictor (i.e., SAT I, SAT II), it should not affect their general findings relative to comparisons between predictors because the restriction of range on SAT I and SAT II is likely to be quite similar since both tests are required of all applicants at UC. However, this approach would not be appropriate when there is greater restriction of range on one predictor, which could be the case in colleges that do not require SAT II.

Ramist, Lewis, and McCamley-Jenkins (2001), who did correct for restriction in range as well as shrinkage and criterion unreliability, reached similar conclusions as Geiser and Studley (2001), finding that the SAT I and SAT II each added little incremental validity when HSGPA and the SAT I or SAT II were used. In addition, the incremental validity of the SAT II over HSGPA was similar to that of the SAT I over HSGPA (.09 versus .08).

Geiser and Studley (2001) also combined three or more SAT II scores as a single composite variable in the prediction of FGPA, which weights each SAT II test equally. While applicants to UC are all required to submit scores from the SAT II: Writing Test, they may choose to submit scores from either of the two SAT II: Mathematics Tests (Mathematics Level IC or Mathematics Level IIC), and any third SAT II test. The two SAT II: Math Tests differ in content coverage and test difficulty (Math IIC is more difficult than Math IC). Among other SAT II tests[2] that may be submitted as the third test, differences in subject, content, test-taking populations, and difficulty are even more substantial. There are also differences in incremental validity associated with different SAT II tests, and these differences may appear across students with different backgrounds (e.g., ethnicity/race, socioeconomic status). When student choice is involved in selecting tasks within a test or among available tests, differences between students or groups of students may not only be due to differences in achievement, but also may be due to the ability to accurately select among tasks or tests on which one is most likely to succeed. Ramist, Lewis, and McCamley-Jenkins (2001) reported correlations of each individual SAT II test with FGPA ranging from .17 (German or Spanish) to .58 (Math IIC or Chemistry), showing that the predictive effectiveness of the various SAT II tests varies greatly, with some of the language tests showing the least predictive validity for predicting FGPA.

Bridgeman, Burton, and Cline (2001) also compared the predictive efficacy of SAT I and SAT II. They note that the SAT II increment over HSGPA is slightly larger than the increment from the SAT I because it is the composite of three distinct tests while SAT I is the composite of only two tests. Using data from four UC campuses employed in the present study, they compared regression results from three SAT II tests to the two SAT I tests and the third SAT II test. They report that with just two SAT II tests in the model (in addition to HSGPA),

> predictions are virtually the same whether the two tests are SAT I Verbal and Math or SAT II Writing and Math (the R-squares are .236 and .237 respectively). The increment for the third test is also essentially the same (.007 and .008 respectively), p. 4.

They found similar results for six non-UC campuses and concluded that from a purely predictive perspective, SAT I verbal and mathematical scores are about as effective as SAT II: Writing and Mathematics scores, and including a third SAT II test is responsible for the slight increase in prediction.

[2] The SAT II: Subject Tests accepted by UC include: Writing, English Literature, U.S. History, World History, Math Level IC, Math Level IIC, Biology E/M, Chemistry, Physics, Chinese with Listening, French, French with Listening, German, German with Listening, Japanese with Listening, Korean with Listening, Latin, Modern Hebrew, Spanish, and Spanish with Listening.

Finally, research has simulated the effects of making college selection decisions using SAT II scores in place of SAT I scores. While success rates in terms of freshman grade-point average were virtually identical whether SAT I or SAT II scores were used, slightly more Latino students were selected with the model that used SAT II scores in place of SAT I scores (Bridgeman, Burton, and Cline, 2001).

III. The Relationship of Socioeconomic Status to SAT I and SAT II Scores

Researchers studying the predictive validity of the SAT I and SAT II for predicting college performance have also examined the relationship of socioeconomic status to these admissions tests. Geiser and Studley (2001) conducted multiple regression analyses using HSGPA, SAT I and SAT II scores, and socioeconomic variables (family income and parents' education) as predictors of FGPA. They found that SAT I scores were more sensitive to students' socioeconomic status than were SAT II scores, and that after controlling for socioeconomic status, the power of the SAT I to predict FGPA at the University of California was diminished, while the predictive power of the SAT II remained strong.

Brent Bridgeman (personal communication, October 15, 2001) replicated the Geiser and Studley (2001) analyses and conducted additional analyses to determine the relationship of family income and parental education to various composites of SAT I and SAT II scores. The sample for these analyses consisted of California students who took the SAT I and either two SAT II tests (Writing and Math) or three SAT II tests (Writing, Math, and a varying third). Tables 1a and 1b show that there are indeed slightly stronger relationships between family income and parental education with SAT I scores than between either of these two demographic variables and the SAT II: composites. However, the overall correlation between the SAT II composite and socioeconomic factors differs greatly depending on the third SAT II test. For students taking only the SAT II: Writing and Math tests, the correlations of both family income and parental education with the SAT I and SAT II tests differ by only .03. However, for those students taking the SAT II: Spanish Test as their third test, the correlations between the demographic variables and the SAT I are substantially higher than the correlation of these variables and the SAT II.

TABLE 1A

Selected Correlation Coefficients for Family Income and SAT I and SAT II Scores (California Only)

SAT II Test Taken	*N*	*SAT I*	*SAT II*
Writing and Math	47,646	.38	.35
Writing, Math, and Biology	2,430	.25	.21
Writing, Math, and U.S. History	15,915	.31	.27
Writing, Math, and Spanish	7,129	.55	.30
Writing, Math, and Physics	4,094	.30	.24
Writing, Math, and Chemistry	7,622	.36	.31

Note: From B. Bridgeman (personal communication, October 15, 2001).

TABLE 1B

Selected Correlation Coefficients for Parental Education and SAT I and SAT II Scores (California Only)

SAT II Tests Taken	*N*	*SAT I*	*SAT II*
Writing and Math	54,626	.43	.40
Writing, Math, and Biology	2,849	.28	.27
Writing, Math, and U.S. History	18,277	.35	.33
Writing, Math, and Spanish	7,977	.58	.31
Writing, Math, and Physics	4,900	.34	.31
Writing, Math, and Chemistry	8,825	.39	.36

Note: From B. Bridgeman (personal communication, October 15, 2001).

Therefore, the choice of the third SAT II test has a substantial effect on the magnitude of any correlations between SAT II composite test score and parental education and family income. For example, the correlations for Mexican American students on the SAT II: Spanish with Listening Test and parental education and family income are -.28 and -.27, respectively, indicating that students from less educated and less affluent families actually perform better on this test, a pattern that is not repeated with any nonlanguage SAT II tests. Actually, the correlations between parental education and family income are generally substantially lower for all ethnic groups on the language tests than they are on other SAT II tests. Thus, comparing correlations between SAT I and SAT II on socioeconomic factors can be very misleading when not reporting differences related to choice of the third SAT II test. The differences found by Geiser and Studley (2001) in how the SAT I and SAT II composites relate to these factors is largely, but not totally, attributed to lack of control for the third SAT II test.

The purpose of the current study was to comprehensively examine the relative utility and predictive validity of the SAT I and SAT II for various subgroups both in California and the nation. There is a special focus on California because this state has a very large population of non-native English speaking students applying to college, and this state is the largest user of the SAT II in college admissions, thus providing a wealth of SAT II data.

IV. Methods

Two data sets were used in this study. Data Set 1 included SAT I scores, SAT II scores, and Student Descriptive Questionnaire (SDQ) data for all college-bound students in the nation in the year 2000. Data Set 2 included SAT I scores, SAT II scores, SDQ data, and first-year college grade-point average (FGPA) for students from 23 colleges in 1995 who participated in a validity study of the recentered SAT I (Bridgeman, McCamley-Jenkins, and Ervin, 2000). Data Set 1 was used to examine the descriptive statistics and correlations, and Data Set 2 was used to examine the relationship between the SAT I, SAT II, HSGPA, and FGPA.

The following analyses were performed: (1) an investigation of racial/ethnic group differences (test impact) in raw and standardized SAT I and SAT II scores (Data Set 1); (2) an examination of the relationship between performance on the SAT I and related SAT II tests by racial/ethnic group (Data Set 1); (3) an examination of the characteristics of students in terms of gender, racial/-ethnic group, family income, citizenship status, first language, and high school class rank based on whether their SAT I and SAT II scores were similar, their SAT I score was greater than their SAT II score, or their SAT II score was greater than their SAT I score (Data Set 1); and (4) an investigation of the predictive validity of the SAT I, SAT II, and HSGPA, the over- and underprediction of FGPA, and the incremental validity of the SAT I and SAT II over HSGPA by racial/ethnic group (Data Set 2).

Most of the analyses presented in this report look at students who took both the SAT I and three SAT II tests (Writing, Math IC or Math IIC, and a third test of the student's choice). The exceptions are the first set of analyses on test impact, which look at test impact on each SAT I subtest and each SAT II test separately, as well as different combinations of the two tests; and some of the correlational, predictive validity, and over- and underprediction analyses.

V. Results

Test Impact

The first set of analyses was performed to determine the extent of test impact by racial/ethnic group using various combinations of SAT I and SAT II scores. Test impact is defined in this study as the standardized difference in mean performance between the majority group (whites) and each minority group. Tables 2a through 2c present the means and standard deviations of SAT I and SAT II scores for the nation and Tables 3a through 3c present this information for California by racial/ethnic group. The tables also show the raw mean differences and standardized mean differences (the raw mean difference divided by the standard deviation of the majority group[3]) for each group. Because SAT I and SAT II tests are on the same 200–800 scale, raw differences are appropriate for making comparisons between individual tests.

In the nation, the impact of the SAT I is greatest for African Americans, with a standardized difference of .94 for the verbal test and 1.01 for the math test. Whites score higher than Hispanics on both the verbal and math tests by slightly more than two-thirds of a standard deviation, and higher than American Indians by almost one-half of a standard deviation. On the verbal test, whites score higher than Asian Americans by slightly less than a third of a standard deviation. However, on the math test, Asian Americans score higher than whites by about a third of a standard deviation. When verbal and math scores are combined, the level of impact remains virtually the same for American Indians, and increases slightly for African Americans and Hispanics. There is virtually no impact for Asian Americans on the combined SAT I score.

On the SAT II: Writing Test (Table 2b), the impact for African Americans and Hispanics is .86 and .94 standard deviation, respectively, and the impact for American Indians and Asian Americans is similar at slightly more than .5 standard deviation. On the SAT II: Math IC Test, the impact for African Americans and Hispanics is of similar magnitude as on the Writing test, and the impact for American Indians is slightly reduced. However, there is no impact for Asian Americans on the Math IC Test, as Asian Americans score on average six points higher than whites on this test. On the SAT II: Math IIC Test, the impact is reduced even further for American Indians, and is also reduced for African Americans and Hispanics. Asian Americans score higher than whites on this test by about one-fifth of a standard deviation.

When scores on the SAT II: Writing Test, Math Test (Math IC or IIC) and a third test are combined, the impact for American Indians was about the same as that on the SAT I. The impact is slightly higher for Asian Americans compared to the SAT I, and the impact is reduced slightly (less than .10) for African Americans and Hispanics. When scores on the SAT I and SAT II (Writing, Math, and a third test) are combined (Table 2c), the impact remains about the same for American Indians and African Americans as on the SAT I only, the impact for Asian Americans increases slightly, and the impact for Hispanics increases from .74 to .92.

[3] The standardized differences for tables 2a–2c are computed using the standard deviation for college-bound seniors in the nation in 2000. The standardized differences for tables 3a–3c are computed using the standard deviation for college-bound seniors in California in 2000.

TABLE 2A

SAT I Means, Raw Differences, and Standardized Differences for All College-Bound Students in 2000

		SAT I Verbal				*SAT I Math*				*SAT I Verbal + Math*			
Ethnic Group	*N*	*Mean*	*SD*	*Raw Diff*	*Std. Diff*	*Mean*	*SD*	*Raw Diff*	*Std. Diff*	*Mean*	*SD*	*Raw Diff*	*Std. Diff*
African Amer.	119,591	434	100	94	0.94	426	98	104	1.01	860	183	198	1.05
Amer. Indian	7,658	482	107	46	0.46	481	106	49	0.48	963	198	95	0.51
Asian Amer.	96,717	499	124	29	0.29	565	122	-35	-0.34	1064	224	-6	-0.03
Hispanic	97,872	457	104	71	0.71	461	103	69	0.67	918	192	140	0.74
White	712,105	528	100	—	—	530	103	—	—	1058	188	—	—
Other	38,634	508	119	20	0.20	515	116	15	0.15	1022	217	36	0.19
Total	1,072,577	507	109	—	—	515	112	—	—	1022	205	—	—

TABLE 2B

SAT II Means, Raw Differences, and Standardized Differences for All College-Bound Students in 2000

	SAT II: Writing					*SAT II: Math IC*					*SAT II: Math IIC*					*SAT II: W + (M IC or M IIC) + 3rd highest*				
Ethnic Group	*N*	*Mean*	*SD*	*Raw Diff*	*Std. Diff*	*N*	*Mean*	*SD*	*Raw Diff*	*Std. Diff*	*N*	*Mean*	*SD*	*Raw Diff*	*Std. Diff*	*N*	*Mean*	*SD*	*Raw Diff*	*Std. Diff*
Afr. Am.	9,201	536	102	82	0.86	6,902	515	96	80	0.93	2,021	590	92	68	0.79	7,068	1612	280	241	0.96
Amer. Indian	914	567	100	51	0.54	698	558	96	37	0.43	261	626	101	32	0.37	760	1713	272	140	0.56
Asian Am	37,696	568	113	50	0.53	26,795	601	100	-6	-0.07	17,442	677	93	-19	-0.22	35,179	1814	300	39	0.16
Hispanic	15,443	529	104	89	0.94	12,416	518	96	77	0.90	3,249	603	96	55	0.64	13,436	1686	258	167	0.67
White	109,142	618	95	—	—	71,574	595	86	—	—	39,198	658	86	—	—	89,316	1853	251	—	—
Other	9,124	593	106	25	0.26	6,627	576	97	19	0.22	3,097	659	93	-1	-0.01	7,940	1798	285	55	0.22
Total	181,520	595	106	—	—	125,012	583	96	—	—	65,268	658	91	—	—	153,699	1815	275	—	—

TABLE 2C

SAT I and SAT II Means, Raw Differences, and Standardized Differences for All College-Bound Students in 2000

	SAT I + SAT II: W + (SAT II: M IC or M IIC) + 3rd highest				
Ethnic Group	*N*	*Mean*	*SD*	*Raw Diff*	*Std. Diff*
African Amer.	6,784	2731	441	392	1.03
Amer. Indian	714	2905	424	218	0.57
Asian Amer.	34,738	3033	470	90	0.24
Hispanic	13,010	2773	425	350	0.92
White	87,928	3123	382	—	—
Other	7,779	3019	445	104	0.27
Total	150,953	3048	431	—	—

TABLE 3A

SAT I Means, Raw Differences, and Standardized Differences for California College-Bound Students in 2000

		SAT I Verbal				*SAT I Math*				*SAT I Verbal + Math*			
Ethnic Group	*N*	*Mean*	*SD*	*Raw Diff*	*Std. Diff*	*Mean*	*SD*	*Raw Diff*	*Std. Diff*	*Mean*	*SD*	*Raw Diff*	*Std. Diff*
African Amer.	9,299	433	103	103	1.03	428	103	116	1.14	860	192	220	1.19
Amer. Indian	1,180	487	106	49	0.49	493	106	51	0.50	980	195	100	0.54
Asian Amer.	30,660	488	122	48	0.48	552	123	-8	-0.08	1040	225	40	0.22
Hispanic	27,999	444	102	92	0.92	454	101	90	0.88	898	187	182	0.98
White	56,745	536	100	—	—	544	102	—	—	1080	185	—	—
Other	7,812	511	115	25	0.25	523	114	21	0.21	1034	213	46	0.25
Total	133,695	497	114	—	—	517	117	—	—	1014	213	—	—

TABLE 3B

SAT II Means, Raw Differences, and Standardized Differences for California College-Bound Students in 2000

Ethnic Group	SAT II: Writing					SAT II: Math IC					SAT II: Math IIC					SAT II: W + (M IC or M IIC) + 3rd highest				
	N	Mean	SD	Raw Diff	Std. Diff	N	Mean	SD	Raw Diff	Std. Diff	N	Mean	SD	Raw Diff	Std. Diff	N	Mean	SD	Raw Diff	Std. Diff
Afr. Am.	2,483	501	96	90	0.93	2,260	480	90	92	1.03	357	569	95	75	0.86	2,286	1495	260	267	1.05
Amer. Indian	382	539	94	52	0.54	342	540	98	32	0.36	79	600	103	44	0.51	363	1635	253	127	0.50
Asian Am.	18,526	537	111	54	0.56	14,946	577	101	-5	-0.06	6,633	654	96	-10	-0.11	18,114	1727	296	35	0.14
Hispanic	9,160	501	95	90	0.93	8,121	495	90	77	0.87	1,505	568	89	76	0.87	8,647	1624	235	138	0.54
White	24,114	591	97	—	—	19,821	572	89	—	—	6,611	644	87	—	—	23,296	1762	254	—	—
Other	3,753	571	104	20	0.21	3,165	553	96	19	0.21	996	640	93	4	0.05	3,632	1717	279	45	0.18
Total	58,418	554	107	—	—	48,655	555	99	—	—	16,181	639	95	—	—	56,338	1715	275	—	—

TABLE 3C

SAT I and SAT II Means, Raw Differences, and Standardized Differences for California College-Bound Students in 2000

Ethnic Group	SAT I + SAT II: W + (SAT II: M IC or M IIC) + 3rd highest				
	N	Mean	SD	Raw Diff	Std. Diff
African American	2,187	2520	428	444	1.12
Amer. Indian	345	2759	404	205	0.52
Asian American	17,940	2880	470	84	0.21
Hispanic	8,336	2649	385	315	0.80
White	23,000	2964	395	—	—
Other	3,575	2880	445	84	0.21
Total	55,383	2865	442	—	—

TABLE 4A

Mean SAT I and SAT II Composite for Students Taking Both Tests: All College-Bound Students in 2000

Ethnic Group	SAT I Mean*			SAT II Mean**			SAT II Mean w/ Lang. Test			SAT II Mean w/o Lang. Test		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
African American	6,784	555	91	6,784	544	88	931	554	86	5,853	542	88
American Indian	714	590	86	714	578	87	76	593	75	638	576	88
Asian American	34,738	608	95	34,738	608	96	7,853	631	83	26,885	602	98
Hispanic	13,010	540	98	13,010	566	82	6,359	577	72	6,651	556	90
White	87,928	634	74	87,928	621	80	10,618	620	80	77,310	621	80
Other	7,779	608	89	7,779	603	91	1,005	607	87	6,774	603	91
Total	150,953	615	88	150,953	609	88	26,842	610	83	124,111	609	89

* SAT I Mean is the average of SAT I verbal and SAT I math.
** SAT II Mean is the average of SAT II: Writing, the higher of SAT II: Math IC or Math IIC, and the highest third SAT II score (computed for only those students with three or more SAT II scores).

TABLE 4B

Mean SAT I and SAT II Composite for Students Taking Both Tests: California College-Bound Students in 2000

Ethnic Group	SAT I Mean*			SAT II Mean**			SAT II Mean w/ Lang. Test			SAT II Mean w/o Lang. Test		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
African American	2,187	508	92	2,187	503	84	257	524	85	1,930	501	83
American Indian	345	560	85	345	549	81	32	575	82	313	546	81
Asian American	17,940	575	96	17,940	578	96	4,893	618	83	13,047	563	96
Hispanic	8,336	509	91	8,336	545	76	4,449	560	66	3,887	528	82
White	23,000	600	77	23,000	589	83	2,312	602	85	20,688	588	83
Other	3,575	580	90	3,575	574	91	470	580	89	3,105	574	91
Total	55,383	573	93	55,383	574	89	12,413	591	83	42,970	569	91

* SAT I Mean is the average of SAT I verbal and SAT I math.
** SAT II Mean is the average of SAT II: Writing, the higher of SAT II: Math IC or Math IIC, and the highest third SAT II score (computed for only those students with three or more SAT II scores).

One important trend that emerges from these data is that group differences are reduced as selectivity of the test-taking population increases. For example, the raw and standardized differences are largest on the SAT I math and are reduced slightly among students taking the SAT II: Math IC Test and reduced even further for students taking the SAT II: Math IIC Test. Over one million students took the SAT I math test, while the number of students taking the SAT II: Math IC and Math IIC are approximately 49,000 and 16,000 respectively, and students completing the SAT II tests demonstrate higher academic ability across a range of indicators. Because the number of students taking each test is reduced and the ability level of test-takers is increasing, any reduction in group differences cannot be attributed solely to the characteristics or content of the specific tests, but is more likely to be attributed to differences among the populations of students taking each test. The resulting group differences reported for the SAT II tests will not necessarily reflect the differences that would result if a more heterogeneous group of students were to take SAT II in place of SAT I. Therefore, extreme caution is needed in generalizing results from a more selective group of students taking the SAT II tests to a more heterogeneous and nationally representative population of test-takers, such as all college-bound seniors.

The picture changes slightly when looking only at the college-bound students in California. There is a greater impact for Asian Americans, African Americans, and Hispanics on the SAT I verbal test, and a greater impact for African Americans and Hispanics on the SAT I math test in California than in the nation. In addition, Asian Americans score higher than whites on the SAT I math to a greater extent in the nation than in California. The impact for the different ethnic groups is similar on the SAT II: Writing Test in the nation and in California. There is slightly less impact for American Indians and slightly more impact for African Americans on the SAT II: Math IC Test in California. The impact for Hispanics decreases considerably (from .67 to .54) when the three SAT II tests (Writing, Math IC or IIC, and a third test) are considered. When SAT I and SAT II scores are combined, the impact is virtually the same as on the SAT I alone for all ethnic groups except for Hispanics, where the impact decreases from .98 to .80.

Similar to the trends reported for the nation, standardized differences appear to decrease for underrepresented minorities as the selectivity of the test-taking population increases. To reiterate, when comparing group differences across tests it is important to remember that differences in the score gap may be more related to variations in the academic preparation and characteristics of students taking each test than they are to the underlying content or characteristics of each test. California students taking the SAT II: Math IIC Test are generally better prepared academically than students completing the SAT II: Math IC Test, and both groups appear more academically prepared than the typical student in California only taking the SAT I.

Tables 4a and 4b show the SAT I means and standard deviations of verbal and math and the SAT II means for Writing, Math, and third highest SAT II score for each racial/ethnic group in the nation and in California. The means reported in these tables actually represent the grand mean and are computed by averaging the mean of individual tests for each student, summing across students, and computing a grand mean on the SAT 200–800 scale. In this way, mean scores on two SAT I tests can be compared to means across three SAT II tests. The last two columns of the tables show the SAT II means and standard deviations when the third test is a language test and when the third test is not a language test.

In the nation, whites, African Americans, and American Indians tend to score higher on the SAT I than on the SAT II, by an average of 11 to 13 points. Asian Americans score the same on both tests, and Hispanics score higher on the SAT II than on the SAT I by 26 points on average. When the third SAT II test is a language test, all groups except whites and African Americans score higher on the SAT II than on the SAT I, from three points (American Indians) to 37 points (Hispanics). On the other hand, when the third SAT II test is not a language test, all groups except for Hispanics score lower on the SAT II than on the SAT I. In California, all ethnic groups except whites score significantly higher on the SAT II when the third test is a language test. When the third test is not a language test, African Americans score about the same on the SAT I and SAT II, while American Indians, Asian Americans, and whites score higher on the SAT I, and Hispanics still score higher on the SAT II.

The Relationship Between the SAT I and SAT II

To determine the extent to which the SAT I and SAT II measure the same constructs, correlations were computed between SAT I verbal and SAT II: Writing and Literature, and between SAT I math and SAT II: Math IC and IIC. These correlation coefficients for the nation and for California are shown in Tables 5 and 6.

Nearly all of the correlation coefficients are above .75, indicating a high degree of relationship between the tests. The correlations are equally strong across all

TABLE 5

Correlation of SAT I Verbal with SAT II: Writing and Literature

	National			
	SAT II: Writing		*SAT II: Literature*	
Ethnic Group	*N*	*R*	*N*	*R*
African American	8,737	0.78	2,292	0.84
American Indian	857	0.78	234	0.81
Asian American	37,136	0.82	6,494	0.84
Hispanic	14,882	0.81	2,599	0.85
White	107,246	0.74	24,337	0.80
Other	8,891	0.78	2,266	0.84
Total	211,553	0.79	46,638	0.83
	California			
African American	2,359	0.78	845	0.79
American Indian	362	0.78	104	0.75
Asian American	18,322	0.82	3,937	0.83
Hispanic	8,785	0.79	1,582	0.83
White	23,766	0.76	7,218	0.80
Other	3,686	0.79	1,065	0.84
Total	65,519	0.81	17,045	0.83

TABLE 6

Correlation of SAT I Math with SAT II: Math IC and Math IIC

	National			
	SAT II: Math IC		*SAT II: Math IIC*	
Ethnic Group	*N*	*R*	*N*	*R*
African American	6,507	0.85	1,937	0.81
American Indian	651	0.84	242	0.76
Asian American	26,325	0.85	17,009	0.78
Hispanic	11,912	0.86	3,146	0.82
White	70,198	0.81	38,486	0.75
Other	6,425	0.85	2,989	0.78
Total	146,470	0.84	76,186	0.77
	California			
African American	2,146	0.84	346	0.81
American Indian	323	0.84	73	0.76
Asian American	14,733	0.86	6,597	0.80
Hispanic	7,771	0.84	1,471	0.81
White	19,521	0.82	6,556	0.75
Other	3,098	0.85	986	0.80
Total	54,473	0.86	18,444	0.79

ethnic groups. Table 7 shows the correlation of SAT I verbal and math with SAT II: Writing and Math IC by ethnic group. The correlation between SAT I verbal and SAT II: Writing is .79, and the correlations between SAT I math and SAT II: Math Levels IC and IIC are .84 and .77, respectively. However, because of differential range restriction for SAT II: Math IC and Math IIC (i.e., a greater amount of range restriction occurs on SAT II: Math IIC), the correlation of SAT I math and SAT II: Math IIC is likely to be lower than that reported.

The ACT Math test actually has a higher correlation with the SAT I math test (.89), and the math domains of these two tests are highly related (Dorans, 1999; Maxey, 1998). SAT I verbal and ACT Reading and English subtests each correlate .83. "Such correlations are considered high…(but) are too low to merit concordance tables and are unacceptable if the goal is to establish exchangeability of scores, according to Dorans (1999, p. 5)." The SAT I verbal and mathematical scores have a stronger correlation with the ACT Composite than they do with the SAT II: Writing and Math tests (.92 to .87); however, these analyses were conducted with different samples of test-takers and a greater amount of range restriction occurs on SAT II than on SAT I. Both the College Board and ACT support the use of concordance tables between the SAT I verbal and mathematical scores and the ACT Composite because of conditions for justifying a concordance have been met.

TABLE 7

Correlation of SAT I Verbal and Math with SAT II: Writing and Math IC

	National	
Ethnic Group	*N*	*R*
African American	6,030	0.873
American Indian	611	0.868
Asian American	25,190	0.881
Hispanic	11,340	0.888
White	66,456	0.836
Other	6,086	0.871
Total	138,954	0.871
	California	
African American	2,054	0.870
American Indian	6,698	0.866
Asian American	14,459	0.881
Hispanic	7,542	0.874
White	19,045	0.846
Other	3,022	0.878
Total	53,132	0.880

VI. Characteristics of Students Based on the Relationship Between Their SAT I and SAT II Scores

The next set of analyses are restricted to students completing both the SAT I and three or more SAT II tests. Tables 8 and 9 show the relationship between student

characteristics and scores on these two tests. Three score comparisons were examined: (1) SAT I versus SAT II: Writing and Math (either IC or IIC), (2) SAT I versus SAT II (Writing, Math, and any third test), and (3) SAT I versus SAT II (Writing, Math, and a third language test). For all college-bound students in the nation, a difference score was computed (SAT II minus SAT I) and the distribution of those difference scores was determined (See Table 10). If the difference score was within one standard deviation of the mean difference score, scores on the SAT I and SAT II were considered approximately comparable (SAT I = SAT II). If the difference score was greater than one standard deviation below the mean, SAT I was considered greater than SAT II (SAT I > SAT II), and if the difference score was greater than one standard deviation above the mean, SAT II was considered greater than SAT I (SAT II > SAT I). Students were classified into one of these three groups based on these rules. The distribution of the three score discrepancy groups was examined across gender, ethnic group, parental income, citizenship status, first language spoken, and high school class rank.

As noted above, extreme caution is needed when interpreting data about group differences between the SAT I

TABLE 8

Characteristics of All College-Bound Students* Based on Relationship Between Their SAT I and SAT II Scores in 2000

	SAT II: Writing and Math Only				*Took Any 3rd SAT II Test*			*Took SAT II: Language Test*			
	N	% *SAT I= SAT II*	% *SAT I> SAT II*	% *SAT II> SAT I*	% *SAT I= SAT II*	% *SAT I> SAT II*	% *SAT II> SAT I*	*N*	% *SAT I= SAT II*	% *SAT I> SAT II*	% *SAT II> SAT I*
Gender											
Female	94,281	71.8	12.5	15.7	67.3	16.7	16.0	20,265	58.9	12.8	28.3
Male	82,231	69.2	18.4	12.4	65.1	17.1	17.8	11,169	57.9	13.2	28.9
Ethnic Group											
African American	6,615	69.5	17.5	12.9	61.4	32.6	6.0	928	55.7	35.0	9.3
American Indian	703	71.4	17.5	11.1	66.1	25.9	8.0	76	65.8	19.7	14.5
Asian American	34,020	70.2	14.0	15.8	60.9	17.6	21.4	7,830	50.2	8.9	41.0
Hispanic	12,809	70.4	13.3	16.3	60.7	16.5	22.8	6,334	56.5	4.4	39.2
White	86,681	71.2	15.7	13.2	69.6	15.9	14.6	10,599	65.2	19.4	15.4
Other	7,633	70.4	14.4	15.2	67.9	16.8	15.4	1,003	66.9	14.7	18.4
Parents' Combined Income											
<$10,000	4,013	66.7	11.8	21.5	56.6	22.5	20.9	959	53.1	8.4	38.5
$10,000–25,000	11,858	69.2	13.5	17.3	60.2	21.1	18.7	3,441	49.9	6.9	43.2
$25,000–40,000	14,974	70.0	15.3	14.7	64.5	20.1	15.3	3,508	56.0	10.5	33.5
$40,000–60,000	19,466	70.4	16.2	13.4	66.6	19.3	14.0	3,316	58.4	15.9	25.7
$60,000–80,000	19,408	71.2	15.9	12.9	68.0	17.9	14.2	2,922	60.3	17.1	22.5
$80,000–100,000	16,107	71.4	15.9	12.8	67.7	17.1	15.2	2,279	60.4	17.0	22.6
>$100,000	39,604	71.4	14.9	13.7	67.9	14.3	17.7	6,255	62.8	13.7	23.4
Citizenship Status											
U.S. Citizen or National	134,136	71.2	15.6	13.2	67.9	17.7	14.4	22,221	62.4	15.3	22.4
U.S. Perm. Resident/Refugee	9,699	68.6	12.3	19.1	56.1	14.7	29.2	3,332	41.6	3.8	54.7
Citizen of another country	6,844	66.2	10.3	23.5	53.4	7.7	38.9	1,245	38.7	3.1	58.2
Other or unknown	523	63.1	15.1	21.8	56.0	13.8	30.2	220	44.5	5.0	50.5
First Language Spoken											
English only	106,512	71.4	15.9	12.6	69.1	17.8	13.2	13,621	64.8	20.7	14.5
English and other language	22,405	70.3	14.1	15.6	63.4	17.0	19.6	5,694	60.8	7.8	31.4
Another language	22,399	68.2	12.2	19.5	56.8	13.7	29.5	7,796	45.9	3.9	50.2
High School Class Rank											
Highest 10th	66,058	71.8	13.1	15.1	67.2	10.0	22.8	10,489	58.6	10.5	30.9
Second 10th	37,167	70.2	16.1	13.6	68.5	18.6	13.0	6,886	58.6	13.8	27.5
Second 5th	22,954	70.1	17.1	12.7	64.3	26.2	9.6	4,521	57.7	16.3	25.9
Mid 5th	8,562	69.4	16.6	14.0	58.3	33.0	8.7	1,897	55.8	16.0	28.2
Fourth 5th	703	66.4	15.9	17.6	54.1	35.7	10.2	174	58.6	10.9	30.5
Lowest 5th	147	58.5	18.4	23.1	50.3	39.5	10.2	30	33.3	20.0	46.7

* The students in this table took the SAT I and at least three SAT II tests, including Writing and Math.

TABLE 9

Characteristics of California College-Bound Students* Based on Relationship Between Their SAT I and SAT II Scores in 2000

	SAT II: Writing and Math Only				*Took Any 3rd SAT II Test*			*Took SAT II: Language Test*			
	N	% *SAT I= SAT II*	% *SAT I> SAT II*	% *SAT II> SAT I*	% *SAT I= SAT II*	% *SAT I> SAT II*	% *SAT II> SAT I*	*N*	% *SAT I= SAT II*	% *SAT I> SAT II*	% *SAT II> SAT I*
Gender											
Female	35,185	71.9	11.1	17.0	67.1	14.9	17.9	8,927	52.6	7.0	40.3
Male	27,449	69.0	17.6	13.4	65.9	16.7	17.4	5,037	53.4	7.5	39.1
Ethnic Group											
African American	2,149	70.9	13.8	15.4	64.7	30.8	4.5	257	59.9	26.8	13.2
American Indian	339	73.7	15.9	10.3	72.6	20.9	6.5	32	59.4	12.5	28.1
Asian American	17,753	70.0	13.2	16.7	62.6	16.4	21.0	4,883	46.9	6.1	47.0
Hispanic	8,230	70.3	11.4	18.4	59.2	12.7	28.0	4,431	49.9	2.5	47.5
White	22,813	71.4	14.6	13.9	71.9	14.9	13.2	2,308	67.1	14.6	18.3
Other	3,548	71.6	13.1	15.3	70.8	15.5	13.7	469	68.2	13.4	18.3
Parents' Combined Income											
<$10,000	2,302	67.5	10.8	21.6	61.0	20.4	18.6	726	47.2	5.6	47.1
$10,000–25,000	7,073	68.9	11.8	19.2	59.8	17.0	23.2	2,614	43.6	3.9	52.5
$25,000–40,000	7,345	70.0	13.4	16.6	64.6	16.6	18.8	2,257	49.4	5.6	45.0
$40,000–60,000	7,953	70.6	14.4	15.0	68.3	17.0	14.6	1,681	54.3	9.9	35.9
$60,000–80,000	6,953	72.1	14.0	13.9	70.4	16.1	13.5	1,129	61.9	9.2	28.9
$80,000–100,000	5,378	72.1	14.3	13.6	70.1	15.4	14.5	772	59.6	11.9	28.5
≥$100,000	10,971	71.7	13.8	14.4	68.1	13.4	18.5	1,712	60.9	8.3	30.8
Citizenship Status											
U.S. Citizen or National	49,109	71.3	14.0	14.8	68.8	16.2	14.9	9,333	59.4	8.9	31.6
U.S. Perm. Resident/Refugee	5,395	67.8	10.9	21.3	52.7	11.9	35.4	2,406	34.0	2.2	63.8
Citizen of another country	948	65.5	12.6	21.9	46.3	10.1	43.6	501	29.7	1.4	68.9
Other or unknown	289	63.7	13.8	22.5	47.8	13.1	39.1	175	37.7	4.0	58.3
First Language Spoken											
English only	33,145	71.9	14.5	13.5	71.4	16.9	11.7	3,745	67.0	15.9	17.2
English and other language	10,764	70.3	13.0	16.8	64.9	15.7	19.5	3,443	58.1	4.9	37.0
Another language	11,928	68.1	11.8	20.1	55.4	12.4	32.3	5,308	39.7	2.6	57.7
High School Class Rank											
Highest 10th	18,839	71.2	11.9	17.0	66.5	8.5	24.9	3,758	51.0	4.2	44.8
Second 10th	14,710	70.8	13.9	15.4	68.7	15.6	15.7	3,380	52.5	7.7	39.9
Second 5th	11,010	70.7	15.3	14.0	66.4	21.8	11.7	2,577	55.0	9.1	35.9
Mid 5th	4,881	70.0	13.6	16.4	61.7	26.3	11.9	1,289	51.4	10.3	38.2
Fourth 5th	415	68.2	12.0	19.8	58.3	27.7	14.0	132	52.3	7.6	40.2
Lowest 5th	91	57.1	15.4	27.5	56.0	30.8	13.2	24	37.5	12.5	50.0

* The students in this table took the SAT I and at least three SAT II tests, including Writing and Math.

and SAT II tests because of differences in background characteristics and academic preparation of students selecting to take SAT II tests. While analyses in this section are restricted to students who took both the SAT I and three SAT II tests, the findings should not be generalized to all college-bound seniors. If a more homogeneous group of test-takers (e.g., all students in California applying to all public institutions) were to take three SAT II tests, the overall performance of students would likely be affected and group differences would also likely change in ways that cannot be specified.

As would be expected given the moderately high correlation between the SAT I and SAT II, it is important to note that more than two-thirds of the students in this study performed comparably on the SAT I and II, meaning the difference between their scores on the two tests were within one standard deviation of the mean. The following analyses focus only on the approximately one-third of students who attained noticeably higher scores on one of these two tests.

SAT I Versus SAT II (Writing and Math). The first finding is that approximately 72 percent of students have

TABLE 10

Descriptive Statistics for SAT I, SAT II, and Difference Scores

Score	*Minimum*	*Maximum*	*Mean*	*SD*
SAT I (Verbal + Math)	400	1600	1235	175
SAT II (Writing + Math only)	570	1600	1218	182
SAT II (Writing + Math + 3rd Test)	880	2400	1833	262
Difference Score				
SAT II (Writing + Math only) – SAT I (Verbal + Math)	-800	720	-17	87
SAT II (Writing + Math + 3rd Test) – SAT I (Verbal + Math)	-380	1470	598	144

SAT I and SAT II composite scores that are comparable, indicating a high degree of consistency in performance across tests. Of the remaining 28 percent of students with discrepant scores, females, Asian Americans, Hispanics, non-U.S. citizens, and those with a first language other than English tend to do better on the SAT II, while males, American Indians, African Americans, whites, U.S. citizens, and English-only speakers tend to do better on the SAT I. With regard to parental income, students in the lower income brackets ($25,000/year or less) are more likely to do better on the SAT II than the SAT I, while those with incomes of $25,000/year or more do better on the SAT I. With regard to high school class rank, students in the top 10 percent of their class tend to do better on the SAT II, while students at the 60th–90th percentiles of their class do better on the SAT I. The relatively small percent of students at the bottom levels of class rank (850 students and less than 2 percent of college-bound seniors) do better on the SAT II. However, in most instances, these differences are small and are not likely to have practical significance.

SAT I Versus SAT II (Writing, Math, and Any Third SAT II Test). When three SAT II tests are considered, the percentage of students performing relatively equivalent across the SAT I and SAT II tests decreases from about 72 percent when SAT II: Writing and Math are used as the comparison, to about 66 percent. Yet, there is virtually no difference in the percentage of females and males in the SAT I > SAT II and SAT II > SAT I groups, and the same pattern of ethnic group, citizenship, and first language differences is found. However, when three SAT II tests are used as a comparison, African Americans with disparate scores are more than 5.5 times as likely to have higher SAT I scores. With regard to parental income, students in all income brackets tend to do better on the SAT I, with the exception of students in the highest income bracket (> $100,000/year), who do better on the SAT II. With regard to high school class rank, students in the highest tenth of their class tend to do better on the SAT II, while all other students tend to do better on the SAT I. Students with disparate scores who are not in the top 20 percent of class rank in high school are about three times more likely to have higher SAT I scores than SAT II scores. Nearly 40 percent of students who report being citizens of another country are more likely to have higher SAT II scores, as opposed to less than 8 percent who have higher SAT I scores.

SAT I Versus SAT II (Writing, Math, and Language Test). This sample of students who selected a foreign language test as their third SAT II test is a subsample of students used in the above analyses. This sample includes 31,434 students (18 percent) of the students taking the SAT I and three SAT II tests. In this sample overall, more students have higher SAT II scores, and few subgroups show any pattern of higher SAT I scores. Hispanics (about 50 percent), students whose first language spoken is other than English (35 percent), and Asian Americans (23 percent) are more likely to select a language test as their third SAT II than other groups. Therefore, students in this group differ from other groups in meaningful ways. When the third SAT II test is a language test, approximately 58 percent of students perform comparably on the SAT I and SAT II. Females and males, all income groups, U.S. and non-U.S. citizens, and students in all categories of high school class rank are more likely to attain high SAT II scores. Yet, a larger percentage of American Indians, African Americans, whites, and students whose first language was English still do comparably better on the SAT I. About 40 percent of Hispanic students and 41 percent of Asian American students have higher scores on the SAT II, as opposed to only 4 percent and 9 percent of students who have higher SAT I scores, respectively. More than 50 percent of U.S. permanent residents or refugees, citizens of other countries, and students whose first language was not English have SAT II scores that are greater than their SAT I scores.

SAT I Versus SAT II Differences in California. California test-takers represent about 35 percent of all college-bound seniors nationally who take both the SAT I and three or more SAT II tests (including Writing and Math), so it is not surprising that the trends reported in the analyses described above are replicated with California students. Again, over 70 percent of students performed similarly on the SAT I and SAT II when only SAT II: Writing and Math were considered and about 67 percent of students performed comparably when any third SAT II test was added. Among national test-takers,

a slightly greater proportion of African Americans tend to do better on the SAT I in all instances. However, in California, African Americans are slightly more likely to do better on the SAT II when only Writing and Math are considered. Similar to national trends, when any third SAT II is included, African Americans with discrepant scores are more likely to do better on the SAT I.

California test-takers account for nearly 45 percent of all national college-bound seniors who took the SAT I and three or more SAT II tests (including Writing and Math) and a foreign language test. Within this sample of students, only 53 percent of students had comparable scores across SAT I and SAT II when the third test was a language test. Of the 47 percent of students with disparate scores, as found in the national sample, nearly every subgroup is substantially more likely to attain higher SAT II scores. When any third SAT II test is included, Hispanic students in California are even more likely than national students to attain higher SAT II scores than SAT I scores in all three SAT II configurations. Overall these data suggest that when performance across SAT I and SAT II does vary, it is more likely to result in higher test scores on SAT II for nearly all subgroups of California test-takers than those reflected in the nation, and that there are often substantial differences between these two groups of students.

Predictive Validity of the SAT I and SAT II

Perhaps the most frequently asked question regarding the SAT II is, "Is the SAT II a valid measure for predicting college performance?" Other questions regarding the predictive validity of the SAT II include, "Can the SAT II be used without the SAT I in admissions without losing a substantial amount of predictive power?" and "Are there differences in the predictive validity of the SAT II across racial and ethnic groups?" In order to address these questions, single and multiple correlations of HSGPA, SAT I (verbal and math tests), two SAT II tests (Writing and Math IC or Math IIC), and three SAT II tests (Writing, Math IC or Math IIC, and a third test) with FGPA were calculated using data collected in 1995 from 23 universities and colleges participating in the first comprehensive validity study after the revision of the SAT I in the mid-nineties (Bridgeman, McCamley-Jenkins, and Ervin, 2000). Correlations for California were computed using a subset of four institutions from the University of California system that participated in the 1995 validity study. There were 20,417 students in the national sample and 10,281 students in the UC sample; thus approximately half of the sample of 23 institutions is comprised of UC students.

Table 11 shows the extent to which the data used in this study are representative of the 1995 SAT population who took the SAT I and three SAT II tests with regard to gender, ethnic group, first language, citizenship status, mean SAT I score, mean SAT II: Writing and Math IIC score, and HSGPA. The table compares the percentages for the 23 institutions used in this study with the percentages from the 1995 SAT population, and compares the percentages for the four UC institutions used in this study

TABLE 11

Representativeness of Sample Used in Predictive Validity Analyses to 1995 SAT Population*

	23 Institutions N=20,417	*1995 Population N=149,405*	*4 UC Institutions N=10,281*	*CA 1995 Population N=47,673*
Gender				
Male	46.6	46.3	45.6	44.1
Female	53.4	53.7	54.4	55.9
Ethnic Group				
African American	3.8	4.6	3.1	4.2
American Indian	0.7	0.7	0.9	1.1
Asian American	31.0	20.6	43.1	31.2
Hispanic	5.5	8.4	8.7	15.3
White	54.6	61.9	38.5	42.5
Other	4.4	3.9	5.7	5.7
First Language				
English Only	63.4	71.2	51.9	59.3
English and Other Language	16.1	11.9	20.4	16.6
Another Language	18.4	14.1	26.3	22.1
No Response	2.1	2.8	1.4	2.1
Citizenship Status				
U.S. Citizen	85.1	85.5	80.2	81.9
Permanent Resident or Refugee	11.1	7.3	16.3	13.2
Citizen of Another Country	1.4	3.9	1.8	2.2
Other/Unknown	0.2	0.3	0.3	0.5
No Response	2.2	3.0	1.5	2.3
SAT Verbal (Mean and SD)	606 (95)	601 (102)	568 (90)	555 (107)
SAT Math (Mean and SD)	630 (84)	617 (93)	605 (82)	581 (100)
SAT I Total (Mean and SD)	1236 (157)	1218 (175)	1173 (148)	1136 (186)
SAT II: Writing (Mean and SD)**	522 (101)	516 (105)	485 (92)	473 (104)
SAT II: Math IIC (Mean and SD)	663 (83)	662 (89)	638 (81)	636 (97)
HSGPA (Mean and SD)	3.79 (.41)	3.66 (.49)	3.76 (.40)	3.59 (.50)

*The 1995 College-Bound Seniors who took the SAT I and the SAT II: Writing, Math, and a third test.
** The means for the SAT II: Writing Test are not recentered.

with the percentages from the 1995 SAT population from California. The results reveal that the samples used to examine predictive validity in this study are very similar to the 1995 population in terms of gender. However, the samples comprise a larger percentage of Asian American students and fewer African American, Hispanic, and white students; a larger percentage of permanent residents or refugees and a smaller percentage of citizens from other countries; and a smaller percentage of students who speak English as a first language. Finally, the samples have higher mean SAT scores (except for SAT II: Math IIC which is similar to the population mean) and a higher mean high school GPA. These differences should be taken into account when interpreting the results that follow.

Tables 12 and 13 show the correlations between HSGPA, SAT I, three SAT II tests, and FGPA across different racial and ethnic groups. These correlations constitute coefficients of predictive validity and are labeled as such from herein. In order to provide a less biased validity coefficient estimate, the correlations were corrected for both restriction in range and shrinkage. The correlations were adjusted for restriction in range using either the univariate or multivariate Pearson-Lawley correction formula (Dunbar and Linn, 1991; Gulliksen, 1950). The Pearson-Lawley corrections are the most common procedures for adjusting correlations for the effects of sample selection (Dunbar and Linn, 1991). The corrections are necessary because the range of SAT scores for students in the samples was narrower than the range of scores typically found in the national population of SAT test-takers. This restriction in range underestimates the true validity of the predictors (Camara and Echternacht, 2000) and can often result in attenuated estimates of validity.

The validity coefficients were also corrected for shrinkage, using the formula used by Ramist, Lewis, and McCamley-Jenkins (2001). It was necessary to correct for shrinkage because it is likely that capitalization on chance factors produced validity coefficients in the current study that will not be as large in future studies using different samples. The equations used for making the corrections as well as their rationale are described in more detail in the appendix. The appendix also includes tables showing the unstandardized regression coefficients and mean square errors that resulted from the analyses used to determine the validity coefficients presented in Tables 12 and 13. In this report, the correlations corrected for both range restriction and shrinkage are the values that are compared and interpreted.

Table 12 provides validity coefficients for HSGPA, SAT I, and SAT II across racial and ethnic groups for students from the 23 institutions considered in the current study. Table 12 allows for comparison of validity coefficients among combinations of predictors or among predictors considered separately. When comparing the predictive validity of HSGPA versus the SAT I (verbal and math tests combined) versus the SAT II (Writing, Math, and a third test combined), the results revealed that the three SAT II tests combined provided the best prediction of FGPA for students from all ethnic groups except for American Indians and African Americans (see rows 1, 7, and 9). For American Indian students, HSGPA had the highest validity coefficient; for African American students, the validity coefficients for HSGPA and the three SAT II tests were equal. A comparison of the predictive validity of the SAT II composite with only the Writing and Math tests (see row 8) with the SAT II composite including the third test showed that the addition of the third test increased the predictive validity for all ethnic groups except for American Indian.

When HSGPA was used in combination with either the SAT I or SAT II to predict FGPA (see rows 12 and 14 in Table 12), the SAT II and HSGPA combination provided a slightly stronger prediction than the SAT I and HSGPA combination by about .01 to .04 for each ethnic group except for American Indian and African American groups. However, when two SAT II tests were considered, the SAT I and HSGPA provided equal or stronger prediction of FGPA for all groups except for Hispanic students.

Surprisingly, the multiple correlation between HSGPA, SAT I, three SAT II tests and FGPA did not provide the highest validity coefficient across all ethnic groups (see rows 15 and 16 in Table 12). For example, the predictive validity of HSGPA combined with three SAT II tests for Asian American students (.56) was just as large as the predictive validity coefficient of HSGPA, SAT I, and three SAT II tests. In addition, the validity coefficient for HSGPA and SAT I for African American students (.44) was .01 higher than it was for HSGPA, SAT I, and SAT II (either with or without the third test). On the other hand, the validity coefficient for HSGPA and three SAT II tests for Hispanic students (.46) was .01 higher than the validity coefficient for HSGPA, SAT I, and three SAT II tests. Please note that the uncorrected multiple correlations including three variables—HSGPA, SAT I, and three SAT II tests—were always greater than or equal to those including two variables in every ethnic group. It was only when the validity coefficients were corrected for range restriction and shrinkage that different patterns emerged.

Table 12 also provides information on the extent of improvement in predictive validity offered by the SAT I over and above that offered by the SAT II and HSGPA, by comparing the coefficients in rows 13 or 14 with those in row 16. Similarly, the data allow an examination of the extent of improvement offered by the SAT II over and

TABLE 12

Predictive Effectiveness by Student Ethnic Group for 23 Institutions* in 1995

	Ethnic Group					
FGPA Correlations	*African American*	*American Indian*	*Asian American*	*Hispanic*	*White*	*Other*
1. HSGPA						
Uncorrected	0.35	0.37	0.34	0.27	0.33	0.27
Corrected for range restriction **	0.35	0.40	0.41	0.30	0.40	0.32
Corrected for range restriction and shrinkage	0.35	0.39	0.41	0.30	0.40	0.32
2. SAT I Verbal						
Uncorrected	0.29	0.27	0.34	0.27	0.30	0.29
Corrected for range restriction	0.32	0.33	0.34	0.30	0.37	0.33
Corrected for range restriction and shrinkage	0.32	0.32	0.34	0.30	0.37	0.33
3. SAT I Math						
Uncorrected	0.26	0.11	0.36	0.22	0.26	0.29
Corrected for range restriction	0.27	0.14	0.39	0.24	0.31	0.34
Corrected for range restriction and shrinkage	0.27	0.11	0.39	0.24	0.31	0.34
4. SAT II: Writing						
Uncorrected	0.30	0.30	0.35	0.28	0.31	0.30
Corrected for range restriction	0.32	0.33	0.35	0.33	0.35	0.33
Corrected for range restriction and shrinkage	0.32	0.32	0.35	0.33	0.35	0.33
5. SAT II: Math						
Uncorrected	0.25	0.17	0.38	0.23	0.28	0.32
Corrected for range restriction	0.27	0.21	0.43	0.26	0.33	0.37
Corrected for range restriction and shrinkage	0.27	0.19	0.43	0.26	0.33	0.37
6. SAT II: Third Test						
Uncorrected	0.27	0.19	0.38	0.11	0.28	0.35
Corrected for range restriction	0.30	0.22	0.38	0.11	0.32	0.38
Corrected for range restriction and shrinkage	0.30	0.20	0.38	0.11	0.32	0.38
7. SAT I Combined						
Uncorrected	0.31	0.28	0.40	0.28	0.32	0.33
Corrected for range restriction	0.34	0.34	0.44	0.31	0.39	0.38
Corrected for range restriction and shrinkage	0.34	0.32	0.44	0.31	0.39	0.38
8. SAT II: Writing and Math						
Uncorrected	0.32	0.30	0.43	0.30	0.35	0.36
Corrected for range restriction	0.34	0.34	0.46	0.36	0.41	0.40
Corrected for range restriction and shrinkage	0.34	0.32	0.46	0.36	0.41	0.40
9. SAT II: Writing, Math, and Third Test						
Uncorrected	0.33	0.30	0.45	0.31	0.37	0.39
Corrected for range restriction	0.36	0.34	0.48	0.38	0.43	0.43
Corrected for range restriction and shrinkage	0.35	0.31	0.48	0.39	0.43	0.43
10. SAT I Combined and SAT II: Writing and Math						
Uncorrected	0.33	0.33	0.43	0.31	0.36	0.36
Corrected for range restriction	0.35	0.39	0.47	0.37	0.43	0.41
Corrected for range restriction and shrinkage	0.34	0.35	0.47	0.37	0.43	0.41
11. SAT I Combined and SAT II: Writing, Math, and Third Test						
Uncorrected	0.34	0.33	0.45	0.32	0.37	0.39
Corrected for range restriction	0.36	0.41	0.48	0.40	0.43	0.43
Corrected for range restriction and shrinkage	0.35	0.37	0.48	0.39	0.43	0.42
12. HSGPA and SAT I Combined						
Uncorrected	0.41	0.45	0.47	0.35	0.40	0.38
Corrected for range restriction	0.44	0.53	0.55	0.42	0.50	0.46
Corrected for range restriction and shrinkage	0.44	0.51	0.55	0.42	0.50	0.46

(Continued on page 15)

TABLE 12 *(Continued from page 14)*

Predictive Effectiveness by Student Ethnic Group for 23 Institutions* in 1995

	Ethnic Group					
FGPA Correlations	*African American*	*American Indian*	*Asian American*	*Hispanic*	*White*	*Other*
13. HSGPA and SAT II: Writing and Math						
Uncorrected	0.41	0.43	0.48	0.36	0.42	0.39
Corrected for range restriction	0.42	0.50	0.55	0.43	0.50	0.46
Corrected for range restriction and shrinkage	0.42	0.48	0.55	0.43	0.50	0.46
14. HSGPA and SAT II: Writing, Math, and Third Test						
Uncorrected	0.41	0.43	0.50	0.36	0.43	0.42
Corrected for range restriction	0.43	0.50	0.56	0.46	0.51	0.47
Corrected for range restriction and shrinkage	0.42	0.48	0.56	0.46	0.51	0.47
15. HSGPA, SAT I Combined, and SAT II: Writing and Math						
Uncorrected	0.42	0.46	0.48	0.37	0.42	0.40
Corrected for range restriction	0.44	0.53	0.56	0.44	0.51	0.47
Corrected for range restriction and shrinkage	0.43	0.50	0.56	0.44	0.51	0.47
16. HSGPA, SAT I Combined, and SAT II: Writing, Math, and Third Test						
Uncorrected	0.42	0.46	0.50	0.37	0.43	0.42
Corrected for range restriction	0.44	0.56	0.56	0.46	0.52	0.47
Corrected for range restriction and shrinkage	0.43	0.53	0.56	0.45	0.52	0.46

* Institutions include Northwestern University, Vanderbilt, Barnard College, SUNY Stony Brook, New York University, Pennsylvania State University, Bowdoin College, Colby College, Harvard University, University of Connecticut, Washington State University, Clemson University, Georgia Institute of Technology, University of North Carolina-Chapel Hill, Young Harris College, Prairie View A&M University, St. Edwards University, SW Texas State University, University of Texas-Austin, University of California (UC)-Davis, UC-San Diego, UC-Los Angeles, and UC-Irvine.

**The range restriction corrections for single predictors used the standard deviations based on all college-bound students in 1995. One overall standard deviation was used for all ethnic groups.

above that provided by the SAT I and HSGPA (by comparing the coefficients in row 12 with those in row 16). For this sample of college students, adding the SAT I to HSGPA and three SAT II tests increased the corrected validity coefficient for American Indian (.05), African American (.01), and white (.01) students. The corrected validity coefficient did not change, however, for Asian American students, and decreased by .01 for Hispanic and "other" students. When only two SAT II tests were used as predictors along with HSGPA, the SAT I added between .01 to .05 to the corrected validity coefficient for all ethnic groups except for students in the "other" ethnic category.

The incremental validity of three SAT II tests over HSGPA and the SAT I was positive, ranging from .01 to .03, for all but two ethnic groups. For African American students, adding the SAT II decreased the predictive validity by .01, and for "other" students, the SAT II did not increase the validity coefficient. When only two SAT II tests were considered with HSGPA and the SAT I, the validity coefficient increased by .01 to .02 for Asian American, Hispanic, white, and "other" students, but decreased by .01 for American Indian and African American students.

For the most part, the same patterns found in the validity coefficients for the 23 institutions are found for the four California institutions, as shown in Table 13. For example, when considering HSGPA, SAT I and SAT II separately, three SAT II tests provided the best prediction of FGPA for UC students from all ethnic groups except American Indian and African American. HSGPA had the highest separate validity coefficient for American Indian and African American students. The SAT I had the second largest validity coefficient for Asian American, Hispanic, white and "other" students while the SAT II (three tests) had the second highest validity coefficient for American Indian and African American students.

When multiple predictors were considered, HSGPA and the SAT II (either two tests or three tests) had higher validity coefficients with FGPA than HSGPA and the SAT I for all ethnic groups except American Indian. As found for the 23 institutions, the use of all three predictors (HSGPA, SAT I, and SAT II) did not increase the predictive validity over the use of two predictors for students from some ethnic groups. For example, the addition of the three SAT II tests to HSGPA and the SAT I actually decreased the corrected validity coefficient by .03 for American Indian students. However, when the SAT I was added to the HSGPA and three SAT II tests, the validity coefficients increased or remained unchanged for all ethnic groups.

TABLE 13

Predictive Effectiveness by Student Ethnic Group for Four UC Institutions* in 1995

	Ethnic Group					
FGPA Correlations	*African American*	*American Indian*	*Asian American*	*Hispanic*	*White*	*Other*
1. HSGPA						
Uncorrected	0.42	0.45	0.31	0.22	0.29	0.27
Corrected for range restriction**	0.47	0.47	0.33	0.25	0.31	0.31
Corrected for range restriction and shrinkage	0.47	0.46	0.33	0.25	0.31	0.31
2. SAT I Verbal						
Uncorrected	0.25	0.24	0.30	0.23	0.31	0.29
Corrected for range restriction	0.30	0.26	0.36	0.28	0.32	0.35
Corrected for range restriction and shrinkage	0.30	0.24	0.36	0.28	0.32	0.35
3. SAT I Math						
Uncorrected	0.29	0.27	0.33	0.19	0.27	0.27
Corrected for range restriction	0.34	0.28	0.33	0.23	0.25	0.28
Corrected for range restriction and shrinkage	0.34	0.26	0.33	0.23	0.25	0.28
4. SAT II: Writing						
Uncorrected	0.31	0.26	0.33	0.24	0.32	0.32
Corrected for range restriction	0.37	0.27	0.40	0.31	0.34	0.38
Corrected for range restriction and shrinkage	0.37	0.25	0.40	0.31	0.34	0.38
5. SAT II: Math						
Uncorrected	0.30	0.36	0.35	0.21	0.27	0.29
Corrected for range restriction	0.33	0.37	0.36	0.25	0.25	0.29
Corrected for range restriction and shrinkage	0.33	0.36	0.36	0.25	0.25	0.29
6. SAT II: Third Test						
Uncorrected	0.27	0.24	0.35	0.08	0.25	0.36
Corrected for range restriction	0.31	0.25	0.36	0.08	0.26	0.37
Corrected for range restriction and shrinkage	0.31	0.23	0.36	0.07	0.26	0.37
7. SAT I Combined						
Uncorrected	0.32	0.30	0.38	0.24	0.33	0.33
Corrected for range restriction	0.34	0.33	0.39	0.26	0.38	0.37
Corrected for range restriction and shrinkage	0.33	0.30	0.39	0.26	0.38	0.37
8. SAT II: Writing and Math						
Uncorrected	0.37	0.38	0.41	0.27	0.36	0.37
Corrected for range restriction	0.42	0.41	0.44	0.33	0.41	0.42
Corrected for range restriction and shrinkage	0.41	0.39	0.44	0.33	0.41	0.42
9. SAT II: Writing, Math, and Third Test						
Uncorrected	0.38	0.38	0.44	0.28	0.37	0.40
Corrected for range restriction	0.43	0.41	0.46	0.36	0.43	0.44
Corrected for range restriction and shrinkage	0.42	0.37	0.46	0.36	0.43	0.43
10. SAT I Combined and SAT II: Writing and Math						
Uncorrected	0.37	0.39	0.42	0.28	0.37	0.37
Corrected for range restriction	0.46	0.43	0.45	0.33	0.43	0.42
Corrected for range restriction and shrinkage	0.45	0.38	0.45	0.32	0.43	0.41
11. SAT I Combined and SAT II: Writing, Math, and Third Test						
Uncorrected	0.38	0.39	0.44	0.29	0.38	0.40
Corrected for range restriction	0.43	0.42	0.46	0.36	0.44	0.44
Corrected for range restriction and shrinkage	0.41	0.36	0.46	0.35	0.44	0.43
12. HSGPA and SAT I Combined						
Uncorrected	0.49	0.50	0.45	0.31	0.41	0.39
Corrected for range restriction	0.51	0.55	0.49	0.35	0.48	0.45
Corrected for range restriction and shrinkage	0.50	0.53	0.49	0.35	0.48	0.45

(Continued on page 17)

TABLE 13 *(Continued from page 16)*

Predictive Effectiveness by Student Ethnic Group for Four UC Institutions* in 1995

	Ethnic Group					
FGPA Correlations	*African American*	*American Indian*	*Asian American*	*Hispanic*	*White*	*Other*
13. HSGPA and SAT II: Writing and Math						
Uncorrected	0.50	0.50	0.47	0.32	0.42	0.40
Corrected for range restriction	0.53	0.51	0.51	0.38	0.49	0.46
Corrected for range restriction and shrinkage	0.52	0.48	0.51	0.38	0.49	0.46
14. HSGPA and SAT II: Writing, Math, and Third Test						
Uncorrected	0.51	0.50	0.49	0.32	0.43	0.44
Corrected for range restriction	0.54	0.51	0.53	0.40	0.50	0.48
Corrected for range restriction and shrinkage	0.53	0.47	0.53	0.39	0.50	0.47
15. HSGPA, SAT I Combined, and SAT II: Writing and Math						
Uncorrected	0.50	0.52	0.47	0.32	0.43	0.41
Corrected for range restriction	0.54	0.55	0.52	0.39	0.51	0.48
Corrected for range restriction and shrinkage	0.53	0.51	0.52	0.38	0.51	0.47
16. HSGPA, SAT I Combined, and SAT II: Writing, Math, and Third Test						
Uncorrected	0.51	0.52	0.49	0.33	0.43	0.44
Corrected for range restriction	0.54	0.55	0.53	0.41	0.51	0.48
Corrected for range restriction and shrinkage	0.53	0.50	0.53	0.40	0.51	0.47

* Institutions include University of California (UC)-Davis, UC-San Diego, UC-Los Angeles, and UC-Irvine.
** The range restriction corrections used the standard deviations based on students attending the University of California who took both the SAT I and the SAT II: Writing, Math (IC or IIC), and a third SAT II test in 1995. Separate standard deviations are used for each ethnic group.

Tables 12 and 13 also allow comparison of single subtests, although such an analysis is typically not very informative since no college or university uses a single test (e.g., SAT I verbal or SAT I math, or only one SAT II test) in admissions. Still there may be some curiosity about comparisons of the predictive validity of single components of tests. When the predictive validity of the SAT I verbal and SAT II: Writing tests were compared for the 23 institutions (see rows 2 and 4 in Table 12), the SAT I verbal test had validity coefficients that were greater than or equal to those for the SAT II: Writing Test for American Indian, African American, white, and "other" ethnic group students. The SAT II: Writing Test had greater predictive validity for Asian American and Hispanic students. In contrast to the national sample, for students at UC the SAT II: Writing Test had higher validity coefficients than the SAT I verbal test for all ethnic groups (see Table 13). In both samples of institutions, the SAT II: Math Test had greater or equal predictive validity than the SAT I math test for students from all ethnic groups, with the exception of African American students from the UC sample.

If one rank orders all six single predictors by their corrected correlations, there are substantial differences in relative predictive validity among these measures for the various ethnic groups. For the 23 institutions, HSGPA is the best predictor of FGPA for American Indian, African American, and white students. For Asian American students, the SAT II: Math Test is the best predictor, for Hispanic students, the SAT II: Writing Test is the best single predictor, and for "other" students, the third SAT II test is the best predictor of FGPA. The SAT I verbal test is the second best predictor for all groups except for Asian American and "other" students. The SAT I math test, the SAT II: Math Test, and the third SAT II test generally rank fourth, fifth, or sixth among the six single predictors for most groups. A very different pattern emerges for the four UC institutions. HSGPA is the best single predictor for only American Indian and African American students, while the SAT II: Writing Test is the best predictor for Asian American, Hispanic, white, and "other" students. The SAT I verbal test is the second best predictor for Hispanic and white students and is tied with the SAT II: Math Test and the third SAT II test as the second best predictor for Asian American students. The SAT I and SAT II: Math tests rank either third, fourth, or fifth for many student groups. The third SAT II ranks fourth, fifth, or sixth for four of the ethnic groups, but ranks second for Asian American and "other" students.

In summary, the combination of HSGPA, SAT I, and SAT II provided the largest validity coefficients for most ethnic groups. The predictive validity using all three measures was usually higher across ethnic groups than the predictive validity using only two measures—HSGPA and the composite of three SAT II tests. These results suggest that the SAT I offers an important increase in predictive validity over and above HSGPA

and three SAT II tests. Differences in validity coefficients across ethnic groups were found when different sets of predictor variables were used, but these differences were slight overall. One instance where there was a difference in validity coefficients across ethnic groups was when the third SAT II test was considered separately. In this instance, Hispanic students had a substantially lower validity coefficient than the other ethnic groups. This may be due to the fact that Hispanic students tend to choose a Spanish language exam as their third SAT II test. If an Hispanic student does very well on the SAT II: Spanish Test primarily because Spanish is his/her native language, performance on the exam may not be strongly linked to success in college.

At this point, the three questions presented at the outset of this section can be addressed. First, it seems that the SAT II tests can be considered valid measures for predicting college performance. Second, since the SAT I adds to the validity coefficients for HSGPA and three SAT II tests for most ethnic groups, this suggests that it is better from a purely predictive validity standpoint to consider all three of these measures when making admissions decisions, although in some cases a second test may not have a practical effect in admissions. Third, there are differences between validity coefficients for the SAT II across ethnic groups. Most notable is the fact that validity coefficients for American Indian and Hispanic students are lower than those for Asian American, African American, white and "other" students. Finally, choice of the third SAT II test introduces additional complexities and can have significant impact on subgroup differences in comparing test composites. These findings suggest that the SAT II is not an equally strong predictor for all groups, and that differences across ethnic groups should be taken into account when making admissions decisions using the SAT II.

Tables 14 and 15 show the over- and underprediction of FGPA based on various combinations of predictors (SAT I, SAT II, and HSGPA), both in the nation and at the four UC institutions. Figures 1 and 2 display these data graphically. Consistent with other research, results show that HSGPA and all tests are more likely to overpredict college performance for males than females irrespective of ethnicity. In both samples, HSGPA results in the greatest overprediction for Hispanic students (.27-.28) When the SAT I is used as the only predictor, males' FGPA is overpredicted for American Indians, African Americans, and Hispanics by at least .20. In comparison, when three SAT II tests are used the overprediction is slightly reduced for American Indian males (by .06) and African Americans males (by .04) and slightly increases for Hispanic males (by .02). Overprediction appears most serious for Hispanics (.31 for males and .28 for females) on the third SAT II test, but most admissions test scores and high school grades do result in substantial overprediction for males for this ethnic group. However, this overprediction is reduced when multiple measures are combined (e.g., SAT I and HSGPA). Only a slight overprediction (less than .10) occurs for Asian American, white, and "other" ethnic group males on the third SAT II test. Asian American and white females are underpredicted when the SAT I is used as the only predictor. Yet, the underprediction for Asian American females is only -.05, while for white females it is -.11. When three SAT II tests are used to predict FGPA, the same pattern in over- and underprediction occurs. However, the overprediction for Hispanic females and males increases over that which occurs when the SAT I is used as the sole predictor. In California, the same pattern of results occurs as in the nation.

The last three columns of these tables present what may be more informative comparisons of over- and underprediction resulting from combining two or more predictors. These data suggest little difference among combinations of predictors—the one consistent finding appears to be that SAT II and HSGPA produce a slightly greater overprediction for Hispanic students and SAT I and HSGPA result in a slightly greater overprediction for African Americans and American Indians.

VII. Conclusions

This study examined the relative utility and predictive validity of the SAT I and SAT II for various subgroups in both California and the nation. The effect of eliminating the SAT I on the test impact and on the over- and underprediction of various gender and racial/ethnic subgroups was examined. The following salient findings emerged from the study:

- The impact (i.e., difference between the mean score for white students and the mean score for each minority group) for both the SAT I and SAT II is greatest for African American students. If the SAT II (Writing, Math, and at third test) was to be used without the SAT I, the impact would be slightly reduced for African American, Hispanic, and Asian American students in this sample. The greatest reduction in impact is for Hispanic students. These findings are more pronounced in California than in the nation, and occur whether or not the third test is a language test.
- Absolute score differences in composite means between SAT I and SAT II are quite small for all

TABLE 14

Over- and Underprediction of FGPA for Students at 23 Institutions*

	Predictors																					
	SAT I Verbal		*SAT I Math*		*SAT I V+M*		*HSGPA*		*SAT II W*		*SAT II M*		*SAT II 3rd*		*SAT II (W+M+3rd)*		*SAT I + HSGPA*		*SAT II + HSGPA*		*SAT I + SAT II + HSGPA*	
Ethnic Group	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*
African Amer	721	0.14	721	0.07	721	0.08	715	0.13	721	0.14	721	0.09	707	0.11	707	0.06	715	0.05	701	0.04	701	0.04
Female	474	0.09	474	-0.02	474	0.01	470	0.09	474	0.10	474	0.01	468	0.05	468	0	470	-0.01	464	-0.02	464	-0.02
Male	247	0.24	247	0.23	247	0.22	245	0.20	247	0.21	247	0.24	239	0.21	239	0.18	245	0.16	237	0.14	237	0.14
American Indian	132	0.20	132	0.17	132	0.17	131	0.18	132	0.18	132	0.14	132	0.14	132	0.12	131	0.15	131	0.12	131	0.12
Female	77	0.11	77	0.05	77	0.06	76	0.13	77	0.12	77	0.03	77	0.05	77	0.02	76	0.07	76	0.04	76	0.04
Male	55	0.31	55	0.33	55	0.32	55	0.24	55	0.27	55	0.29	55	0.26	55	0.26	55	0.28	55	0.23	55	0.24
Asian Amer.	5,877	-0.01	5,877	0.07	5,877	0.01	5,849	0.05	5,877	-0.02	5,877	0.08	5,819	0.03	5,819	0.01	5,849	0.02	5,792	0.01	5,792	0.01
Female	3,122	-0.05	3,122	-0.01	3,122	-0.05	3,106	0.03	3,122	-0.04	3,122	0	3,097	-0.02	3,097	-0.04	3,106	-0.03	3,081	-0.03	3,081	-0.03
Male	2,755	0.03	2,755	0.15	2,755	0.08	2,743	0.08	2,755	0	2,755	0.17	2,722	0.09	2,722	0.07	2,743	0.07	2,711	0.06	2,711	0.06
Hispanic	1,033	0.17	1,033	0.13	1,033	0.10	1,027	0.27	1,033	0.18	1,033	0.15	1,023	0.31	1,023	0.14	1,027	0.11	1,017	0.15	1,017	0.14
Female	585	0.11	585	0.05	585	0.03	581	0.23	585	0.14	585	0.07	581	0.28	581	0.09	581	0.04	577	0.10	577	0.08
Male	448	0.24	448	0.25	448	0.20	446	0.31	448	0.22	448	0.25	442	0.36	442	0.22	446	0.20	440	0.22	440	0.21
White	10,379	-0.02	10,379	-0.06	10,379	-0.03	10,296	-0.07	10,379	-0.02	10,379	-0.07	10,281	-0.06	10,281	-0.03	10,296	-0.02	10,199	-0.03	10,199	-0.02
Female	5,505	-0.08	5,505	-0.15	5,505	-0.11	5,451	-0.11	5,505	-0.06	5,505	-0.16	5,465	-0.13	5,465	-0.10	5,451	-0.09	5,411	-0.08	5,411	-0.08
Male	4,874	0.04	4,874	0.05	4,874	0.06	4,845	-0.03	4,874	0.01	4,874	0.04	4,816	0.01	4,816	0.05	4,845	0.05	4,788	0.04	4,788	0.05
Other	843	-0.05	843	-0.06	843	-0.06	837	-0.03	843	-0.04	843	-0.05	836	-0.05	836	-0.05	837	-0.04	830	-0.04	830	-0.04
Female	448	-0.10	448	-0.15	448	-0.13	444	-0.09	448	-0.07	448	-0.15	443	-0.11	443	-0.12	444	-0.12	439	-0.11	439	-0.11
Male	395	0.10	395	0.05	395	0.03	393	0.04	395	0.01	395	0.06	393	0.03	393	0.03	393	0.04	391	0.04	391	0.04

* Institutions include Northwestern University, Vanderbilt, Barnard College, SUNY Stony Brook, New York University, Pennsylvania State University, Bowdoin College, Colby College, Harvard University, University of Connecticut, Washington State University, Clemson University, Georgia Institute of Technology, University of North Carolina-Chapel Hill, Young Harris College, Prairie View A&M University, St. Edwards University, SW Texas State University, University of Texas-Austin, University of California (UC)-Davis, UC-San Diego, UC-Los Angeles, and UC-Irvine.

TABLE 15

Over- and Underprediction of FGPA for Students at Four UC Campuses*

	Predictors																					
	SAT I Verbal		*SAT I Math*		*SAT I V+M*		*HSGPA*		*SAT II W*		*SAT II M*		*SAT II 3rd*		*SAT II (W+M+3rd)*		*SAT I + HSGPA*		*SAT II + HSGPA*		*SAT I + SAT II + HSGPA*	
Ethnic Group	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*	*N*	*Mean*
African Amer	300	0.09	300	0.01	300	-0.01	300	0.15	300	0.10	300	0.04	298	0.08	298	-0.02	300	-0.02	298	-0.03	298	-0.04
Female	200	0.04	200	-0.07	200	-0.07	200	0.11	200	0.07	200	-0.04	199	0.02	199	-0.08	200	-0.08	199	-0.08	199	-0.09
Male	100	0.18	100	0.17	100	0.13	100	0.22	100	0.16	100	0.20	99	0.19	99	0.10	100	0.09	99	0.07	99	0.07
American Indian	91	0.09	91	0.17	91	0.16	90	0.18	91	0.16	91	0.14	91	0.13	91	0.09	90	0.14	90	0.08	90	0.09
Female	55	0.12	55	0.06	55	0.06	54	0.15	55	0.11	55	0.05	55	0.06	55	0.01	54	0.06	54	0.02	54	0.02
Male	36	0.31	36	0.33	36	0.32	36	0.22	36	0.25	36	0.27	36	0.25	36	0.22	36	0.25	36	0.18	36	0.20
Asian Amer.	4,172	0.01	4,172	0.10	4,172	0.03	4,158	0.12	4,172	0.01	4,172	0.12	4,143	0.07	4,143	0.02	4,158	0.04	4,129	0.03	4,129	0.02
Female	2,231	-0.03	2,231	0.02	2,231	-0.04	2,222	0.08	2,231	-0.02	2,231	0.03	2,218	0.01	2,218	-0.04	2,222	-0.02	2,209	-0.02	2,209	-0.03
Male	1,941	0.06	1,941	0.20	1,941	0.11	1,936	0.15	1,941	0.04	1,941	0.22	1,925	0.14	1,925	0.09	1,936	0.10	1,920	0.09	1,920	0.08
Hispanic	840	0.17	840	0.13	840	0.09	835	0.28	840	0.18	840	0.15	836	0.35	836	0.14	835	0.09	831	0.14	831	0.12
Female	496	0.12	496	0.06	496	0.03	493	0.24	496	0.15	496	0.08	493	0.31	493	0.09	493	0.03	490	0.10	490	0.07
Male	344	0.23	344	0.24	344	0.19	342	0.32	344	0.22	344	0.25	343	0.39	343	0.21	342	0.18	341	0.21	341	0.19
White	3,722	-0.03	3,722	-0.05	3,722	-0.04	3,703	-0.01	3,722	-0.02	3,722	-0.06	3,715	-0.03	3,715	-0.04	3,703	-0.03	3,696	-0.03	3,696	-0.03
Female	2,041	-0.08	2,041	-0.14	2,041	-0.12	2,028	-0.04	2,041	-0.05	2,041	-0.15	2,039	-0.09	2,039	-0.11	2,028	-0.10	2,026	-0.09	2,026	-0.09
Male	1,681	0.04	1,681	0.06	1,681	0.05	1,675	0.04	1,681	0.02	1,681	0.05	1,676	0.05	1,676	0.04	1,675	0.05	1,670	0.04	1,670	0.04
Other	551	-0.06	551	-0.05	551	-0.07	550	0.02	551	-0.04	551	-0.04	548	-0.04	548	-0.07	550	-0.04	547	-0.04	547	-0.05
Female	279	-0.11	279	-0.16	279	-0.15	278	-0.03	279	-0.08	279	-0.15	276	-0.11	276	-0.14	278	-0.11	275	-0.11	275	-0.12
Male	272	-0.01	272	0.06	272	0.01	272	0.07	272	-0.01	272	0.06	272	0.02	272	0.01	272	0.03	272	0.03	272	0.03

* Institutions include University of California (UC)-Davis, UC-San Diego, UC-Los Angeles, and UC-Irvine.

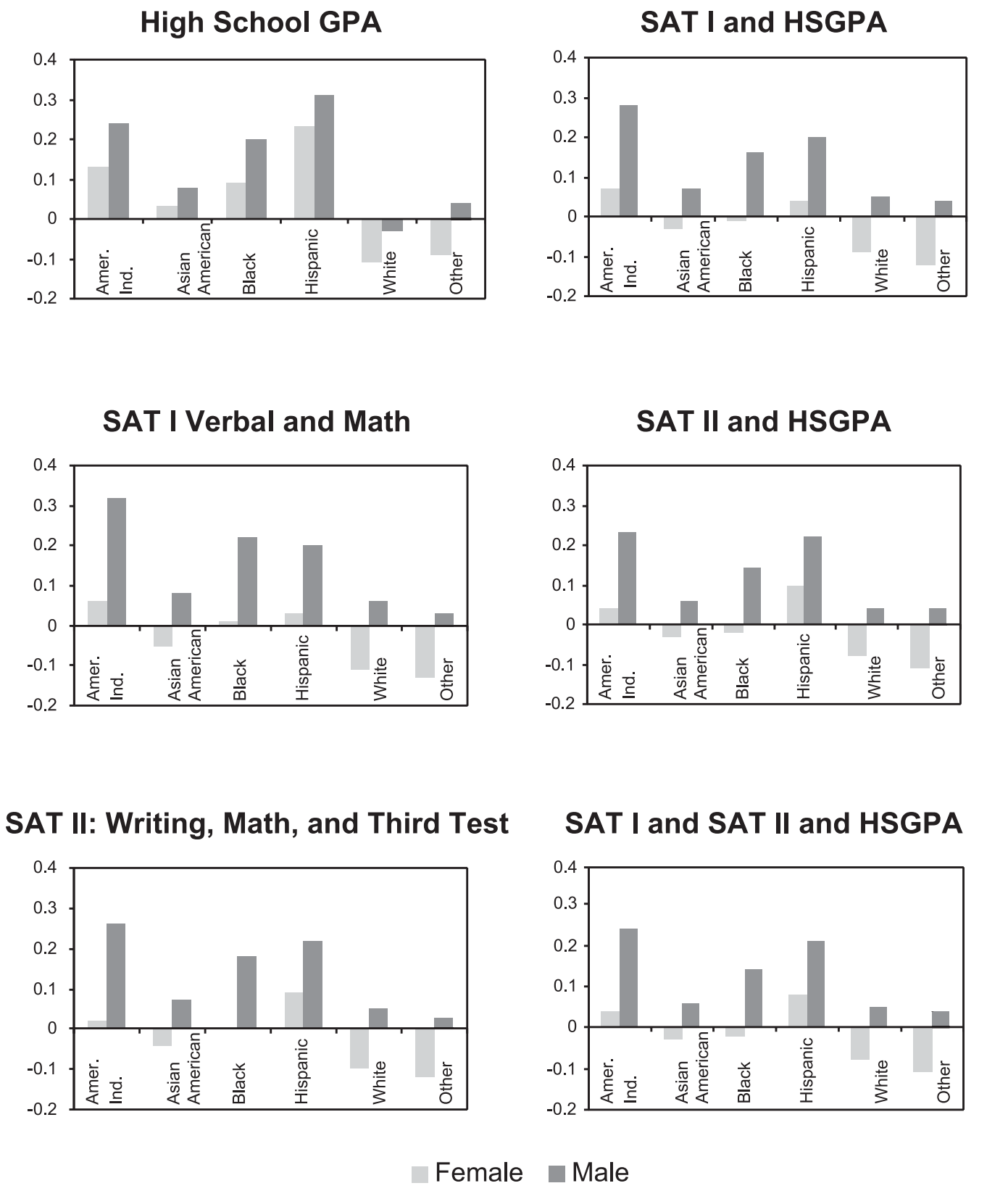

Figure 1. Over- and underprediction of first-year college GPA with various predictors for 23 institutions in 1995.

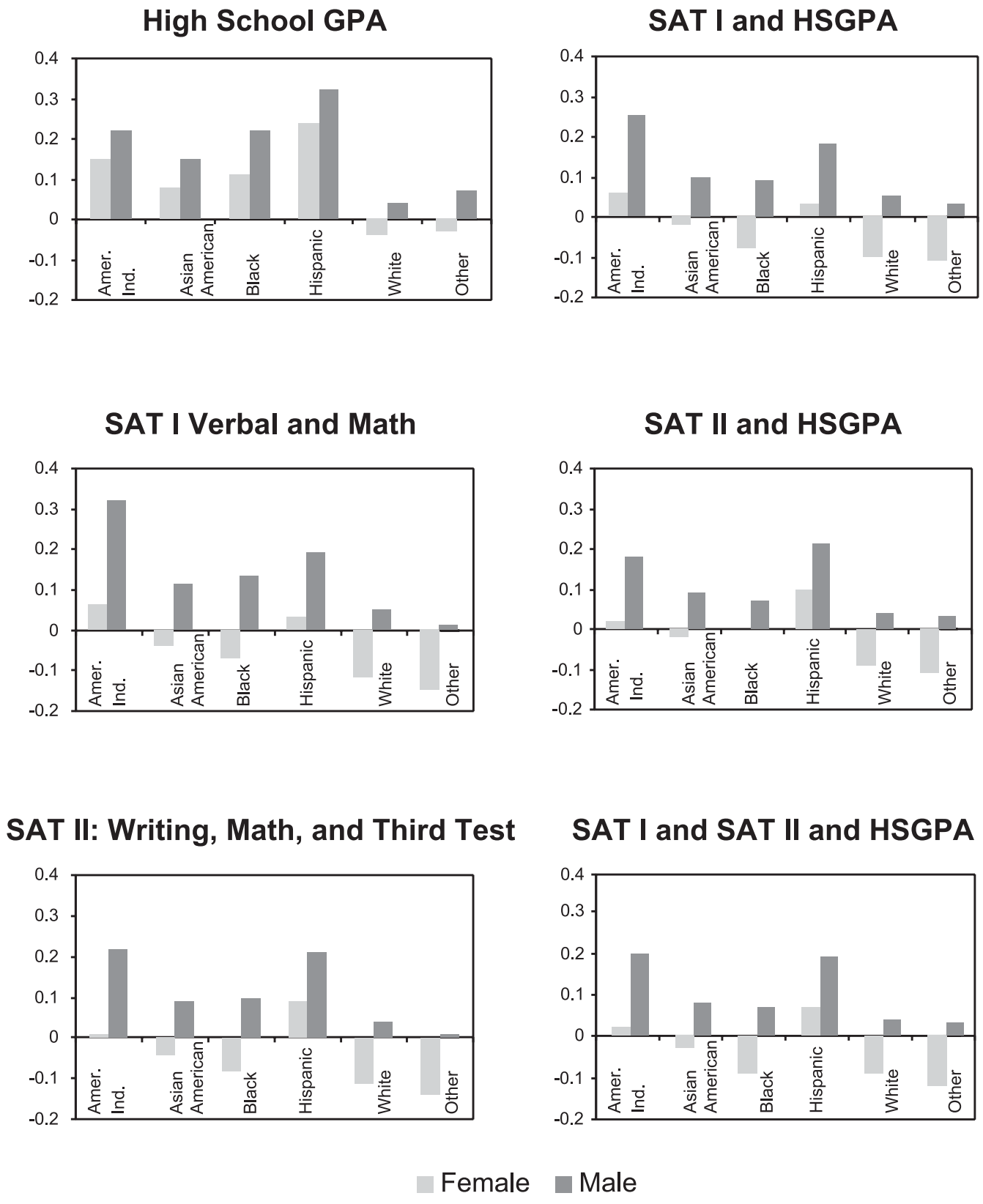

Figure 2. Over- and underprediction of first-year college GPA with various predictors for four UC campuses in 1995.

groups. On average, white and African American students score slightly higher on SAT I than SAT II (13 and 11 points on a 200 to 800 scale, respectively), Hispanic students score higher on three SAT II tests than on the SAT I (26 points), and there is no difference among Asian American students. However, SAT II tests fare better among California students than is found nationally. In California the SAT I advantage for white and African Americans is reduced and Hispanics and Asian Americans score higher on SAT II tests. When the third SAT II test taken is not a language test, Hispanic students still score comparably higher on the SAT II tests, while this is not the case for the other racial/ethnic groups.

- In the nation, whites, African Americans, and English-speakers are more likely to score higher on the SAT I than on the SAT II tests (Writing, Math, and any third test) when differences in test performance occur, while Asian Americans, Hispanics, and non-English speakers score comparably higher on the SAT II tests.
- The SAT II tests have marginally greater predictive validity for predicting first-year college GPA than the SAT I for ethnic groups other than American Indian and African Americans, both in a larger sample of institutions across the nation and in four University of California institutions. Similarly, the combination of HSGPA and three SAT II tests has slightly greater predictive validity than the combination of HSGPA and the SAT I for all ethnic groups except American Indians and African Americans, although Bridgeman, Burton, and Cline (2001) show that this may be attributed to comparing three SAT II tests to two SAT I tests. The SAT I had a positive incremental validity over HSGPA and the SAT II tests for three out of the six ethnic groups, and the SAT II tests added to the predictive validity of HSGPA and the SAT I for all ethnic groups.
- In the UC sample, the predictive validity of the SAT II for Hispanic students is lower than that for any of the other racial/ethnic groups. Furthermore, the third SAT II test has very low predictive validity for Hispanic students in both the national and California samples. Similarly, HSGPA and SAT I had lower validity coefficients than found for most other ethnic groups in both samples. In the national sample, when SAT I, SAT II, and HSGPA were used, the predictive validity for Hispanic students was comparable to that found for other ethnic groups. However, that was not the case at the four UC institutions where multiple predictors still resulted in lower validities for Hispanics than other ethnic groups (ranging from .09 lower than that of American Indian students to .18 lower than that found for African American students).
- When the SAT II (Writing, Math, and a third test) is used to predict first-year college GPA, Hispanic students are overpredicted to a greater extent than when the SAT I is used as a predictor. The pattern of prediction remains similar for the other racial/ethnic groups whether the SAT I and/or the SAT II are used.
- Results of predictive validity studies show some differences across the national and UC samples in this study, and results also differ as a function of the degree of restriction of range in the sample and choice of the third SAT II test. Institutions interested in comparing the incremental validity, predictive power, differential prediction, and subgroup differences associated with SAT I and SAT II need to use results from similar institutions or conduct their own validity studies and be extremely cautious in generalizing results from this study or any other study to their situation if differences in the degree of restriction in range for scores on SAT I and SAT II tests exists among samples used in validation studies.

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Appendix

In order to more accurately report the relative utility and predictive validity of the SAT I, SAT II, and HSGPA for predicting FGPA, two different statistical adjustments were made to the raw correlation coefficients. All correlation coefficients were corrected both for restriction in range in the predictor and for shrinkage using procedures that conform with accepted practices in the field (Ramist, Lewis, and McCamley-Jenkins, 2001).[4]

Corrections for Restriction in Range. Restriction in range is a statistical phenomenon that results in an attenuated correlation coefficient. In the case of range restriction, the magnitude of the relationship between one or more predictor variables and the criterion is underestimated. This phenomenon occurs when applicants with low values on the predictors (e.g., SAT scores and/or HSGPA) are not admitted to a particular university or college, and conversely, when students with high values on the predictors choose not to attend a particular university. In this situation, the correlation between the predictor(s) and criterion is artificially lowered because students become more alike on the predictor variable(s), thus reducing its practical usefulness in prediction (Donlon, 1984). Chernyshenko and Ones (1998) note the importance of such corrections in reviewing results from a GRE validity study, because in selective colleges little information is available for students with low scores in admissions tests or low grades in courses since these students are not admitted at nearly the same rate as higher scoring students. Linn, Harnisch, and Dunbar (1981) state that corrections that treat the predictor as the sole explicit selection variable are often too small and that such undercorrection still results in estimates that are overly conservative. That is, rather than overestimating validity, the correction typically still is an underestimate of true validity because the correction assumes the predictor is the sole selection variable. They state:

> in light of evidence that simple corrections for correlations for reduced standard deviations are conservative, it is suggested that ignoring the corrections because of concern that they may be too large (as when assumptions required for corrections are violated), that is overcorrection, is undesirable. The latter stance appears unduly cautious. Thus it seems desirable to routinely compute and report corrected correlations along with their uncorrected counterparts (p. 662).

The method for correcting for this form of attenuation involves using information from the full SAT I–SAT II-taking group to more accurately estimate the observed correlations (Ramist, Lewis, and McCamley-Jenkins, 2001). In the case of one predictor, the following formula (Donlon, 1984) provides a correction for predictor restriction in range:

[4]Another statistical adjustment can be made to the correlation coefficients to correct for measurement error, or unreliability, in the criterion (in this case, FGPA). Because an estimate of the reliability of the criterion was not available for the data used in this study, this correction was not applied. However, if applied, this correction would increase the magnitude of the correlation coefficients by an equal amount for all subgroups, and would not affect any of the subgroup comparisons reported in this study.

(1)

$$R_{SF} = \frac{r_{SF} = \left(\frac{S_S}{s_S}\right)}{\sqrt{1 = r_{SF}^2\left[\left(\frac{S_S}{s_S}\right)^2 - 1\right]}}$$

where r_{SF} = the restricted correlation

S_S = the full range standard deviation of the predictor

s_S = the restricted standard deviation of the predictor

R_{SF} = the corrected correlation between the predictor and criterion

The formula above is only appropriate for a simple correlation. When dealing with a multiple correlation, the Pearson-Lawley multivariate correction accounts for range restriction in multiple predictors. The formula used for this multivariate correction is provided below:

(2)

$$R_{Y \cdot X_1 A X_p} = \sqrt{\frac{\mathbf{b'S_{xx}b}}{\mathbf{b'S_{xx}b} + Var(E)}}$$

where $\mathbf{b}$ = the vector of restricted unstandardized regression weights

$\mathbf{b'}$ = the transposed vector of restricted unstandardized regression weights

$\mathbf{S_{XX}}$ = the unrestricted variance-covariance matrix among predictors

$Var(E)$ = the mean square error

$R_{y \cdot X_a \cdots X_p}$ = the multiple correlation corrected for predictor restriction in range

(C. Lewis, personal communication, November 9, 2001.)

Correction for Shrinkage. Shrinkage is a phenomenon that results in correlation coefficients that are disattenuated. Shrinkage refers to "the tendency for the strength of prediction in a regression or correlation study to decrease in subsequent studies" (Vogt, 1999). In the case of disattenuation due to shrinkage, observed correlation coefficients are inappropriately high because the correlation is reduced when a derived prediction equation is applied on a different sample. The following formula provides a correction for shrinkage:

(3)

$$\hat{r} = \sqrt{\frac{((N-1)R^2)-P}{N-1-P}}$$

where N = the number of students
R = the original correlation
P = the number of predictors
$\hat{r}$ = correlation corrected for shrinkage (Ramist et al., 2001.)

Tables A1 and A2 present the unstandardized regression coefficients and mean square errors (MSE) that resulted from the predictive validity analyses presented in Tables 12 and 13 of this research report. The unstandardized regression coefficients are measures of how much the dependent variable (FGPA) changes as a result of a one-unit change in the predictor variable. The unstandardized regression coefficients for different variables cannot be compared directly because of differing units of measurements and different variances for each of the predictor variables. The MSE is "a measure of the degree of variability of the points around a regression line" (Vogt, 1999) and can be used as an indicator of the strength of the relationship between predictors and criterion. The smaller the MSE, the stronger the relationship between predictor(s) and criterion.

TABLE A1

Unstandardized Regression Coefficients and Mean Square Errors for Multiple Regressions for 23 Institutions in 1995

	Ethnic Group					
FGPA Correlations	*African American*	*American Indian*	*Asian American*	*Hispanic*	*White*	*Other*
SAT I Combined						
b1 (SAT I Verbal)	0.0014380	0.0024270	0.0012650	0.0014950	0.0016330	0.0011880
b2 (SAT I Math)	0.0009442	-0.0001970	0.0019150	0.0006961	0.0011380	0.0013100
MSE	0.350	0.435	0.323	0.372	0.331	0.289
SAT II: Writing and Math						
b1 (SAT II: Writing)	0.0015190	0.0019990	0.0013540	0.0016270	0.0015750	0.0011670
b2 (SAT II: Math)	0.0007703	0.0004066	0.0017850	0.0008665	0.0011590	0.0013410
MSE	0.348	0.428	0.316	0.366	0.323	0.282
SAT II: Writing, Math, and Third Test						
b1 (SAT II: Writing)	0.0012620	0.0020190	0.0010370	0.0016220	0.0013310	0.0007445
b2 (SAT II: Math)	0.0004975	0.0004215	0.0012760	0.0007901	0.0009186	0.0009163
b3 (SAT II: Third Test)	0.0007021	-0.0000405	0.0010160	0.0004036	0.0006936	0.0010530
MSE	0.344	0.431	0.308	0.362	0.317	0.272
SAT I Combined and SAT II: Writing and Math						
b1 (SAT I Verbal)	0.00080620	0.00121000	0.00047000	0.00749400	0.00074050	0.00047070
b2 (SAT I Math)	0.00041750	-0.00154000	0.00061880	-0.00026400	0.00002989	0.00008146
b3 (SAT II: Writing)	0.00096430	0.00145400	0.00096140	0.00119700	0.00116600	0.00086250
b4 (SAT II: Math)	0.00035670	0.00124700	0.00130300	0.00086540	0.00100200	0.00121300
MSE	0.346	0.427	0.314	0.365	0.322	0.281
SAT I Combined and SAT II: Writing, Math, and Third Test						
b1 (SAT I Verbal)	0.00064650	0.00158700	0.00018730	0.00071510	0.00047520	0.00001676
b2 (SAT I Math)	0.00032610	-0.00150000	0.00036990	-0.00027600	0.00001231	0.00001152
b3 (SAT II: Writing)	0.00091790	0.00151200	0.00088920	0.00121700	0.00110600	0.00073460
b4 (SAT II: Math)	0.00024240	0.00137500	0.00103500	0.00080460	0.00085690	0.00090840
b5 (SAT II: Third Test)	0.00048260	-0.00054700	0.00094720	0.00039850	0.00059270	0.00104800
MSE	0.344	0.429	0.308	0.361	0.317	0.273
HSGPA and SAT I Combined						
b1 (HSGPA)	0.359	0.584	0.381	0.333	0.388	0.275
b2 (SAT I Verbal)	0.0012250	0.0024730	0.0010730	0.0014330	0.0013860	0.0011750
b3 (SAT I Math)	0.0004108	-0.0012100	0.0016000	0.0002921	0.0007065	0.0008954
MSE	0.324	0.378	0.301	0.353	0.308	0.278
HSGPA and SAT II: Writing and Math						
b1 (HSGPA)	0.34	0.54	0.35	0.30	0.36	0.23
b2 (SAT II: Writing)	0.0017400	0.0018670	0.0011380	0.0014470	0.0013250	0.0010690
b3 (SAT II: Math)	0.0003413	-0.0005870	0.0014890	0.0005406	0.0007657	0.0010460
MSE	0.326	0.384	0.298	0.352	0.305	0.274
HSGPA and SAT II: Writing, Math, and Third Test						
b1 (HSGPA)	0.334	0.543	0.344	0.285	0.353	0.215
b2 (SAT II: Writing)	0.00097140	0.00186900	0.00083750	0.00145000	0.00110000	0.00066140
b3 (SAT II: Math)	0.00012200	-0.00058600	0.00100300	0.00048510	0.00053940	0.00065190
b4 (SAT II: Third Test)	0.00061050	-0.00000318	0.00096970	0.00036530	0.00066110	0.00100300
MSE	0.324	0.387	0.291	0.349	0.300	0.266
HSGPA, SAT I Combined, and SAT II: Writing and Math						
b1 (HSGPA)	0.344	0.561	0.346	0.303	0.356	0.237
b2 (SAT I Verbal)	0.00083260	0.00164800	0.00049200	0.00083850	0.00069500	0.00060710
b3 (SAT I Math)	0.00312700	-0.00140000	0.00653300	-0.00026900	0.00001076	-0.00000278
b4 (SAT II: Writing)	0.00062070	0.00105700	0.00072470	0.00095490	0.00094500	0.00068610
b5 (SAT II: Math)	-0.00000858	0.00007022	0.00098060	0.00051350	0.00063130	0.00094040
MSE	0.324	0.379	0.296	0.350	0.304	0.274

(Continued on page 27)

TABLE A1 *(Continued from page 26)*

Unstandardized Regression Coefficients and Mean Square Errors for Multiple Regressions for 23 Institutions in 1995

	Ethnic Group					
FGPA Correlations	*African American*	*American Indian*	*Asian American*	*Hispanic*	*White*	*Other*
HSGPA, SAT I Combined, and SAT II: Writing, Math, and Third Test						
b1 (HSGPA)	0.335	0.569	0.345	0.292	0.352	0.218
b2 (SAT I Verbal)	0.000715500	0.002176000	0.000225700	0.000798600	0.000448900	0.001701000
b3 (SAT I Math)	0.000213800	-0.001340000	0.000420500	-0.000280000	-0.000000919	-0.000057500
b4 (SAT II: Writing)	0.000609700	0.001134000	0.000660700	0.000986600	0.000890200	0.000578800
b5 (SAT II: Math)	-0.000069800	0.000229100	0.000728400	0.000474500	0.000489500	0.000681600
b6 (SAT II: Third Test)	0.000377000	-0.000756000	0.000889100	0.000360300	0.000566800	0.009627000
MSE	0.323	0.380	0.290	0.347	0.299	0.267

TABLE A2

Unstandardized Regression Coefficients and Mean Square Errors for Multiple Regressions for Four University of California Institutions in 1995

	Ethnic Group					
FGPA Correlations	*African American*	*American Indian*	*Asian American*	*Hispanic*	*White*	*Other*
SAT I Combined						
b1 (SAT I Verbal)	0.0010740	0.0010420	0.0012960	0.0012690	0.0017270	0.0014690
b2 (SAT I Math)	0.0016780	0.0016230	0.0018330	0.0007379	0.0011240	0.0013090
MSE	0.311	0.332	0.306	0.355	0.295	0.281
SAT II: Writing and Math						
b1 (SAT II: Writing)	0.0016570	0.0009595	0.0014900	0.0015160	0.0017500	0.0016220
b2 (SAT II: Math)	0.0013650	0.0021470	0.0018200	0.0009213	0.0011140	0.0012580
MSE	0.298	0.311	0.296	0.349	0.289	0.273
SAT II: Writing, Math, and Third Test						
b1 (SAT II: Writing)	0.00140300	0.00094360	0.00119900	0.00150600	0.00152000	0.00106600
b2 (SAT II: Math)	0.00117900	0.00213600	0.00137100	0.00091170	0.00093570	0.00078670
b3 (SAT II: Third Test)	0.00062110	0.00003201	0.00095120	0.00033710	0.00067700	0.00118500
MSE	0.297	0.315	0.289	0.348	0.286	0.265
SAT I Combined and SAT II: Writing and Math						
b1 (SAT I Verbal)	0.00018970	0.00037570	0.00045200	0.00056370	0.00088670	0.00055670
b2 (SAT I Math)	0.00016120	-0.00084200	0.00042400	-0.00022200	0.00016320	0.00025230
b3 (SAT II: Writing)	0.00151400	0.00087260	0.00113200	0.00119400	0.00123500	0.00124800
b4 (SAT II: Math)	0.00124100	0.00272900	0.00147900	0.00930300	0.00086540	0.00101300
MSE	0.300	0.317	0.295	0.348	0.287	0.273
SAT I Combined and SAT II: Writing, Math, and Third Test						
b1 (SAT I Verbal)	-0.00012700	0.00038140	0.00016790	0.00053970	0.00062920	-0.00003910
b2 (SAT I Math)	-0.00000598	-0.00094100	0.00017200	-0.00016900	0.00021630	0.00022420
b3 (SAT II: Writing)	0.00146400	0.00087430	0.00107800	0.00118800	0.00118200	0.00106500
b4 (SAT II: Math)	0.00118900	0.00273100	0.00125500	0.00089330	0.00072810	0.00065170
b5 (SAT II: Third Test)	0.00065830	-0.00001020	0.00090690	0.00033590	0.00055550	0.00118500
MSE	0.299	0.325	0.289	0.348	0.285	0.266
HSGPA and SAT I Combined						
b1 (HSGPA)	0.484	0.602	0.375	0.281	0.353	0.300
b2 (SAT I Verbal)	0.00097690	0.00150900	0.00119100	0.00128500	0.00161100	0.00144000
b3 (SAT I Math)	0.00118100	0.00291100	0.00154300	0.00045460	0.00079980	0.00092460
MSE	0.265	0.272	0.284	0.342	0.275	0.269

(Continued on page 28)

TABLE A2 *(Continued from page 27)*

Unstandardized Regression Coefficients and Mean Square Errors for Multiple Regressions for Four University of California Institutions in 1995

	Ethnic Group					
FGPA Correlations	*African American*	*American Indian*	*Asian American*	*Hispanic*	*White*	*Other*
HSGPA and SAT II: Writing and Math						
b1 (HSGPA)	0.452	0.507	0.332	0.242	0.325	0.255
b2 (SAT II: Writing)	0.00122000	0.00089540	0.00131500	0.00139000	0.00159200	0.00147500
b3 (SAT II: Math)	0.00108300	0.00100300	0.00154200	0.00068570	0.00079180	0.00099590
MSE	0.260	0.273	0.279	0.340	0.273	0.265
HSGPA and SAT II: Writing, Math, and Third Test						
b1 (HSGPA)	0.454	0.511	0.331	0.241	0.325	0.258
b2 (SAT II: Writing)	0.00101000	0.00075610	0.00103600	0.00138300	0.00136400	0.00089910
b3 (SAT II: Math)	0.00090590	0.00089910	0.00111400	0.00068080	0.00061280	0.00051110
b4 (SAT II: Third Test)	0.00543300	0.00027890	0.00090810	0.00030200	0.00067140	0.00119600
MSE	0.258	0.275	0.277	0.340	0.270	0.257
HSGPA, SAT I Combined, and SAT II: Writing and Math						
b1 (HSGPA)	0.456	0.540	0.337	0.251	0.326	0.263
b2 (SAT I Verbal)	0.00420200	0.00121500	0.00053950	0.00072270	0.00090390	0.00070110
b3 (SAT I Math)	0.00006522	-0.00075000	0.00047150	-0.00017700	0.00021250	0.00014680
b4 (SAT II: Writing)	0.00095910	0.00031150	0.00088760	0.00095060	0.00106100	0.00101900
b5 (SAT II: Math)	0.00098210	0.00126900	0.00115500	0.00062350	0.00050870	0.00078730
MSE	0.261	0.274	0.277	0.339	0.270	0.264
HSGPA, SAT I Combined, and SAT II: Writing, Math, and Third Test						
b1 (HSGPA)	0.455	0.541	0.334	0.250	0.326	0.258
b2 (SAT I Verbal)	0.00017520	0.00126700	0.00027480	0.00069790	0.00065020	0.00010530
b3 (SAT I Math)	-0.00009420	-0.00073900	0.00023970	-0.00013000	0.00026770	0.00011700
b4 (SAT II: Writing)	0.00094180	0.00326500	0.00084070	0.00095040	0.00100800	0.00083470
b5 (SAT II: Math)	0.00095110	0.00128400	0.00094940	0.00059490	0.00037000	0.00432300
b6 (SAT II: Third Test)	0.00049870	-0.00009070	0.00083920	0.00030250	0.00054540	0.00116500
MSE	0.260	0.278	0.272	0.339	0.269	0.258