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The Relationship between SAT Scores and Retention to the Second Year: 2007 SAT Validity Sample

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The College Board

The College Board

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Executive Summary

The College Board formed a research consortium with four-year colleges and universities to build a national higher education database with the primary goal of validating the revised SAT, which consists of three sections: critical reading (SAT-CR), mathematics (SAT-M) and writing (SAT-W), for use in college admission. A study by Mattern and Patterson (2009) examined the relationship between SAT scores and retention to the second year. The sample included first-time, first-year students entering college in fall 2006, with 106 of the original 110 participating institutions providing data on retention to the second-year. The study found that SAT scores were a good indicator of students' likelihood of returning for a second-year. (Detailed results from that study and other studies can be found on the College Board Research & Development department's homepage: www.collegeboard.com/research).

The following year, participating as well as new colleges and universities were invited to provide first-year performance data on the first-time, first-year students that began in the fall of 2007. For the 2007 sample, a total of 72 of the original 110 institutions and 38 new institutions provided data. The 110 institutions in the 2007 sample contained 216,081 students. See Patterson, Mattern, and Kobrin (2009) for more details on the 2007 sample and initial findings.

This report presents the findings from a replication of the analyses from the report, "Is Performance on the SAT Related to College Retention?" (Mattern & Patterson, 2009). The tables below are based on the 2007 sample and the findings are largely the same as those presented in the original report, and show SAT scores are related to second-year retention. Even after controlling for student and institutional characteristics, returners had higher SAT total scores than non-returners, by an average of 116 points. This held true even within each subgroup analyzed, meaning the SAT performance gap is not due to differences in the demographic characteristics of the two groups. Also, this report finds that differences in retention rates by student subgroups are minimized and in some instances eliminated when controlling for SAT performance. This is particularly noticeable with respect to differences in retention rates by ethnicity.

Note: One institution did not provide retention data and was removed from the analyses. Furthermore, students without new SAT scores, self-reported high school grade point average (HSGPA), or retention data were removed from the analyses, resulting in a final sample size of 164,362 students.

References

- College Board. (2007). 2007 College-Bound Seniors: Total Group Profile Report. New York, NY: The College Board.
- Mattern, K. D. & Patterson, B. F. (2009). Is Performance on the SAT® Related to College Retention? (College Board Research Rep. No. 2009-7). New York, NY: The College Board.
- Patterson, B. F., Mattern, K. D., & Kobrin, J. L. (2009). Validity of the SAT for Predicting FYGPA: 2007 SAT Validity Sample (College Board Statistical Report). New York, NY: The College Board.

Table 1
Institutional Characteristics of the 2007 Sample

	Variable	Percentage
U.S. Region	Midwest	17%
	Mid-Atlantic	20%
	New England	18%
	South	14%
	Southwest	13%
	West	18%
Control	Public	47%
	Private	53%
Size	Small	21%
	Medium	38%
	Large	17%
	Very large	24%
Selectivity	Admits under 50%	19%
	Admits 50 to 75%	57%
	Admits over 75%	24%

Note. Number of institutions =109. Percentages may not sum to 100 due to rounding. Institution sizes are categorized by the number of undergraduates as follows: small = 750 to 1,999; medium = 2,000 to 7,499; large = 7,500 to 14,999; and very large = 15,000 or more.

- The sample of 109 institutions was diverse with respect to region of the U.S., control, size, and selectivity.

Table 2
Returning versus Non-returning Students by Student and Institutional Characteristics

Number of Students		Total	Return	Non-Return
		164,362	141,963	22,399
Subgroup	Percentage of Students			
Gender	Female	53.9	54.0	53.5
	Male	46.1	46.0	46.5
Race/Ethnicity	American Indian	0.5	0.5	0.8
	Asian	9.1	9.5	6.3
	Black /African-American	6.5	6.2	8.0
	Hispanic	8.2	7.8	10.5
	Other	2.8	2.8	2.7
	White	68.5	68.7	67.3
	No Response	4.5	4.5	4.3
Parental Income	Less than \$30,000	7.2	6.7	10.4
	\$30,000–\$50,000	8.8	8.4	10.9
	\$50,000–\$70,000	10.1	9.9	11.6
	\$70,000–\$100,000	16.3	16.2	16.5
	More than \$100,000	23.6	24.3	19.7
	No Response	34.0	34.5	30.9
Highest Parental Education	No High School Diploma	2.1	2.0	2.9
	High School Diploma	20.8	19.4	29.9
	Associate Degree	6.4	6.1	8.2
	Bachelor Degree	33.1	33.6	29.8
	Graduate Degree	32.7	34.0	24.0
	No Response	4.9	4.8	5.1
Selectivity	Admits under 50%	11.5	12.4	5.8
	Admits 50% to 75%	68.6	69.0	65.7
	Admits over 75%	19.9	18.6	28.4
Size	Small	4.6	4.4	5.7
	Medium	18.3	17.9	20.9
	Large	20.6	20.1	24.2
	Very large	56.5	57.6	49.2
Control	Private	26.3	27.0	21.9
	Public	73.7	73.0	78.1
Mean Values by Academic Indicators				
SAT – CR		558	563	521
SAT – M		572	579	531
SAT – W		551	557	510
HSGPA		3.61	3.64	3.38

Note. Column percentages may not sum to 100, due to rounding. Institution sizes are categorized by the number of undergraduates as follows: small = 750 to 1,999; medium = 2,000 to 7,499; large = 7,500 to 14,999; and very large = 15,000 or more.

- The same basic pattern of results was found for the 2007 sample as the 2006 sample.
- Specifically, 86% of the students returned for their second year.
- The percentage of non-returners that were American Indian, African-American, and Hispanic were slightly higher than for the total group.
- Students from lower SES families made-up a greater percentage of the non-returners, as compared to the total group.
- For institutional control (i.e., public vs. private), 26.3% of the total group attended a private college; however, only 21.9% of non-returners attended a private college.
- 11.5% of the sample attended an institution admitting fewer than 50% of applicants; however, only 5.8% of non-returners attended such an institution.
- The average SAT section score and HSGPA was higher for returners than for non-returners.

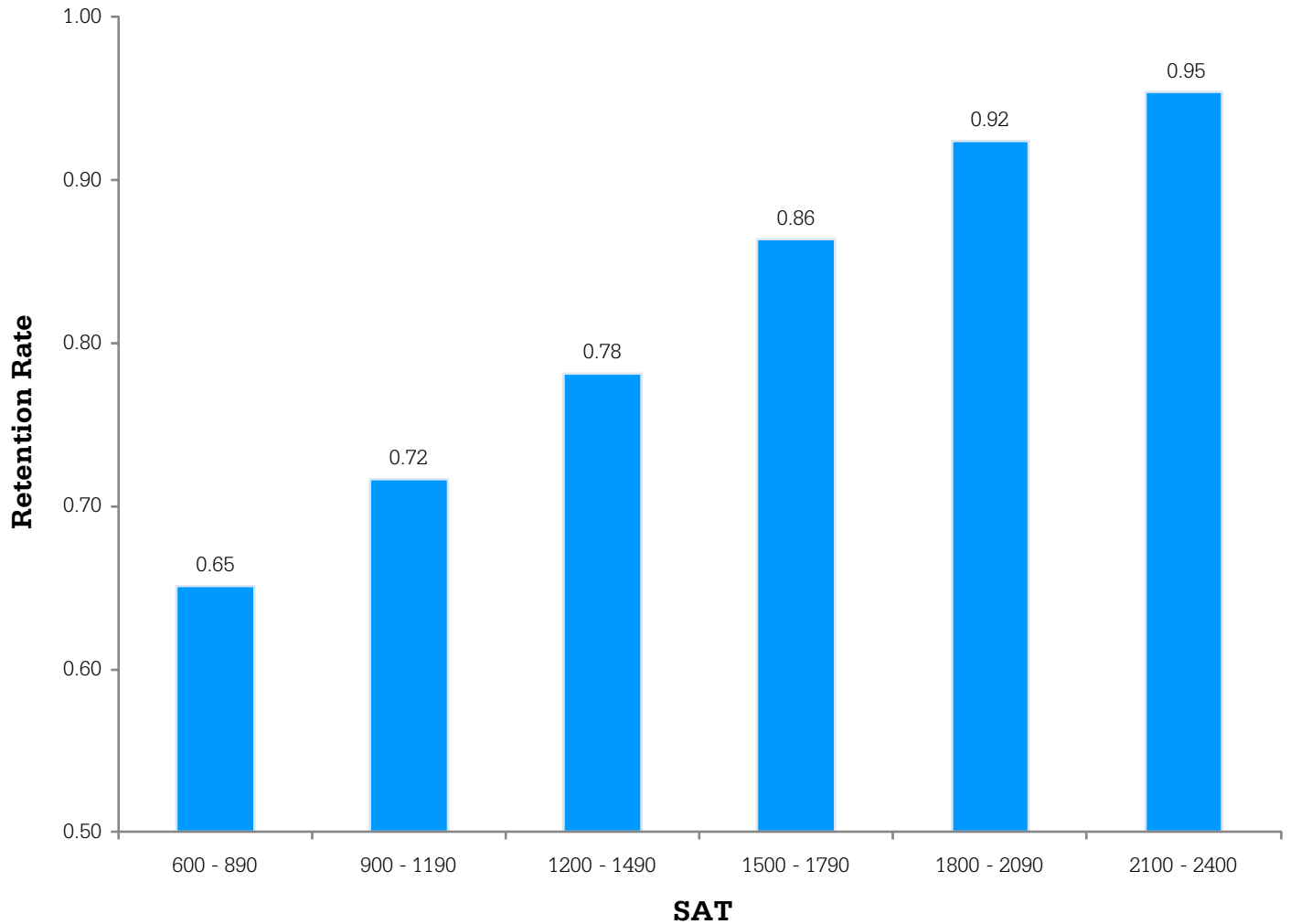
Table 3
SAT Scores for Returners and Non-Returners by Student and Institutional Characteristics

	Subgroup	Return			Non-Return		
		n	Mean	SD	n	Mean	SD
Gender	Female	76,619	1679	254	11,993	1539	244
	Male	65,344	1723	255	10,406	1587	249
Race/ Ethnicity	American Indian	687	1642	242	173	1502	248
	Asian	13,474	1770	271	1,404	1618	268
	Black/African-American	8,838	1482	243	1,800	1374	227
	Hispanic	11,065	1573	246	2,357	1470	238
	Other	4,022	1701	255	612	1556	256
	White	97,496	1720	240	15,085	1591	233
	No Response	6,381	1754	267	968	1605	273
Parental Income	Less than \$30,000	9,576	1542	263	2,326	1431	244
	\$30,000-50,000	11,967	1613	251	2,442	1506	230
	\$50,000-70,000	13,993	1655	245	2,606	1538	235
	\$70,000-100,000	23,048	1691	243	3,696	1567	229
	More than \$100,000	34,437	1762	239	4,402	1645	237
	No Response	48,942	1723	255	6,927	1578	252
Highest Parental Education	No High School Diploma	2,822	1484	244	660	1409	238
	High School Diploma	27,505	1572	240	6,702	1473	225
	Associate Degree	8,674	1602	232	1,846	1513	218
	Bachelor Degree	47,768	1706	235	6,674	1593	233
	Graduate Degree	48,335	1797	241	5,371	1672	245
	No Response	6,859	1689	273	1,146	1542	263
HSGPA	≤C-	157	1402	274	105	1318	262
	C	793	1368	234	459	1349	228
	C+	1,883	1429	232	884	1390	227
	B-	4,995	1478	226	1,895	1444	225
	B	16,353	1551	228	4,533	1502	223
	B+	24,814	1621	233	4,663	1542	229
	A-	35,230	1708	234	4,731	1612	227
	A	40,495	1778	231	3,943	1665	239
	A+	17,243	1862	226	1,186	1745	239
Control	Private	38,399	1794	258	4,900	1630	275
	Public	103,564	1664	246	17,499	1542	236
Size	Small	6,261	1679	299	1,268	1489	281
	Medium	25,404	1702	274	4,681	1541	255
	Large	28,499	1682	267	5,425	1548	243
	Very large	81,799	1706	242	11,025	1585	239
Selectivity	Admits under 50%	17,634	1885	257	1,305	1688	332
	Admits 50 to 75%	97,970	1695	242	14,723	1580	238
	Admits over 75%	26,359	1592	235	6,371	1493	230
Overall		141,963	1699	256	22,399	1562	247

Note. Institution sizes are categorized by the number of undergraduates as follows: small = 750 to 1,999; medium = 2,000 to 7,499; large = 7,500 to 14,999; and very large = 15,000 or more.

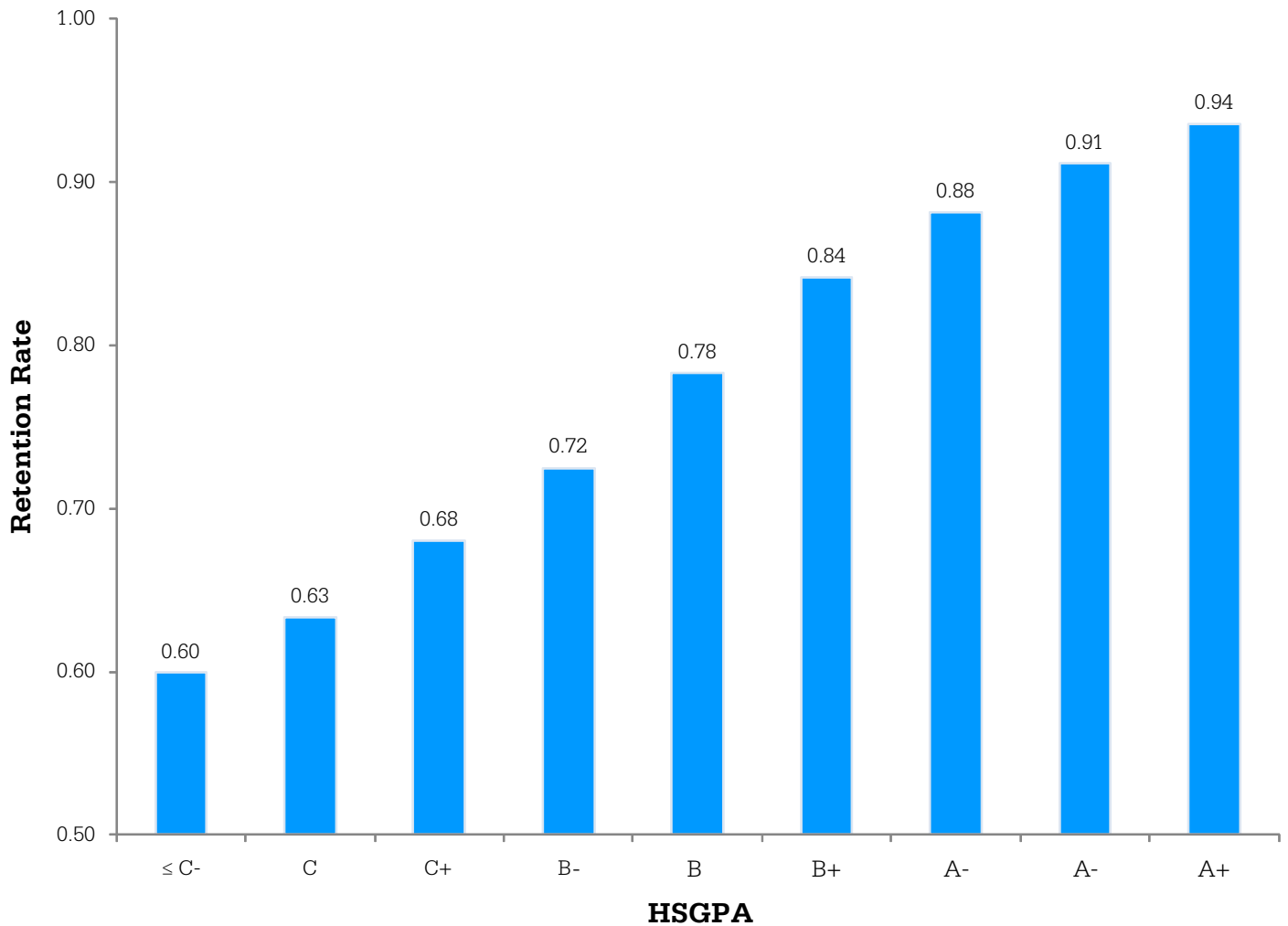
- Even after controlling for student and institutional characteristics, returners had higher SAT total scores than non-returners.
- On average, returners had an SAT total score that was 116 points higher as compared to non-returners.
- This held true even within each subgroup analyzed. For example, for students whose parental income was less than \$30,000, the average SAT score for returners was 1542 as compared to 1421 for non-returners.
- In sum, the SAT performance gap between returners and non-returners is not due to differences in the demographic characteristics of the two groups.

Figure 1.
Second Year Retention Rate by SAT Score Band



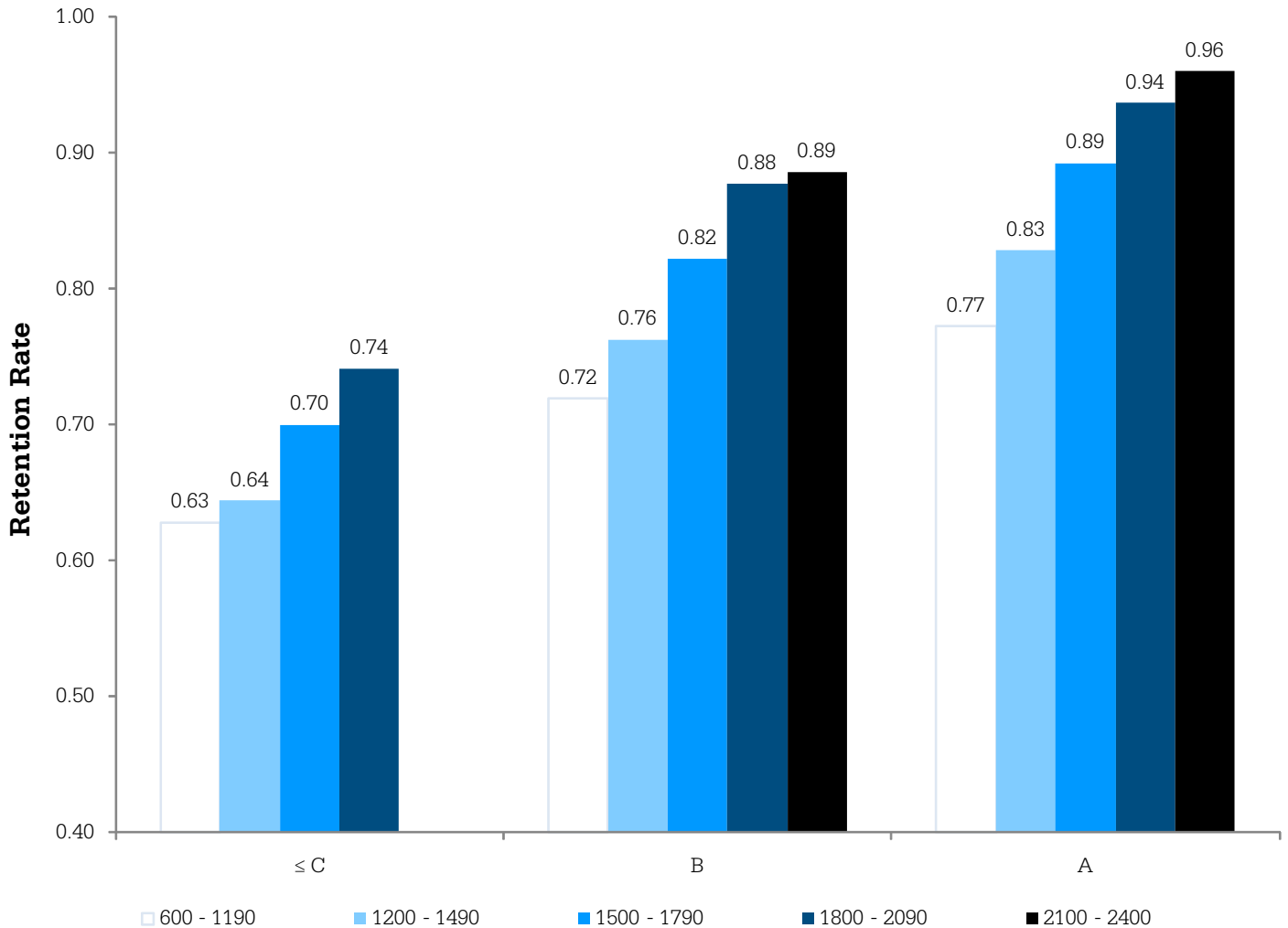
- Figure 1 presents the second year retention rate of students by SAT score band. This graphically demonstrates the positive relationship between SAT scores and retention. That is, as SAT total scores increased, retention rates increased from a low of 65% for students with an SAT total score between 600 and 890 to a high of 95% for students with an SAT total score of 2100 or higher.
- Sample size (n) for each of the 6 SAT score bands from lowest total score to highest was $n = 189$, $n = 4,616$, $n = 35,365$, $n = 68,243$, $n = 46,919$, and $n = 9,030$ respectively.

Figure 2.
Second Year Retention Rate by High School GPA (HSGPA)



- Similar to Figure 1, Figure 2 presents the second year retention rate of students by HSGPA letter grade. Again, the positive relationship between HSGPA and second year retention rate is evident. In other words, as HSGPA increased, retention rates increased from a low of 60% for students with a HSGPA of C minus or lower to a high of 95% for students with an A+ HSGPA.
- Sample size (n) for each of the 9 HSGPA letter grades from lowest to highest was $n = 262$, $n = 1,252$, $n = 2,767$, $n = 6,890$, $n = 20,886$, $n = 29,477$, $n = 39,961$, $n = 44,438$, and $n = 18,429$ respectively.

Figure 3.
Incremental Validity of SAT Scores over HSGPA for Predicting Second Year Retention



Note. Categories with fewer than 15 cases are not reported.

- Figure 3 presents students' mean retention rate by SAT score band, controlling for HSGPA. Figure 3 graphically displays the unique information provided by SAT, above and beyond high school grades. Even within HSGPA levels, there is still a positive relationship between SAT scores and second year retention rates. For example, of students who had an A HSGPA, those who had an SAT total score between 900 and 1190 had a mean retention rate of 61% as compared to 96% for students with an SAT total score between 2100 and 2400. See Table 5 for more details.

Table 4
Retention Rates by Student Demographic Characteristics

	Subgroup	n	Retention	
			Mean	SD
Gender	Female	88,612	0.86	0.34
	Male	75,750	0.86	0.34
Race/ Ethnicity	American Indian	860	0.80	0.40
	Asian	14,878	0.91	0.29
	Black/African-American	10,638	0.83	0.37
	Hispanic	13,422	0.82	0.38
	Other	4,634	0.87	0.34
	White	112,581	0.87	0.34
	No Response	7,349	0.87	0.34
Parental Income	Less than \$30,000	11,902	0.80	0.40
	\$30,000-50,000	14,409	0.83	0.38
	\$50,000-70,000	16,599	0.84	0.36
	\$70,000-100,000	26,744	0.86	0.35
	More than \$100,000	38,839	0.89	0.32
	No Response	55,869	0.88	0.33
Highest Parental Education	No High School Diploma	3,482	0.81	0.39
	High School Diploma	34,207	0.80	0.40
	Associate Degree	10,520	0.82	0.38
	Bachelor Degree	54,442	0.88	0.33
	Graduate Degree	53,706	0.90	0.30
	No Response	8,005	0.86	0.35
Overall		164,362	0.86	0.34

- For both males and females, 86% returned for their second year.
- As for ethnicity, second year retention rates ranged from a high of 91% for Asian students to a low of 80% for American Indian students.
- For socio-economic status, as parental income and education increased, retention rates increased from around 80% to 90%.

Table 5
Second Year Retention Rates (and sample sizes) by SAT Score Band by Student Subgroups

		SAT Score Band					
		600- 890	900- 1190	1200- 1490	1500- 1790	1800- 2090	2100- 2400
Gender	Female	0.63 (99)	0.71 (2,822)	0.79 (20,857)	0.87 (37,445)	0.93 (23,225)	0.96 (4,164)
	Male	0.68 (90)	0.72 (1,794)	0.77 (14,508)	0.86 (30,798)	0.92 (23,694)	0.95 (4,866)
Race/ Ethnicity	American Indian	██████████ (2)	0.58 (38)	0.70 (236)	0.83 (375)	0.89 (189)	0.90 (20)
	Asian	██████████ (14)	0.78 (282)	0.83 (2,444)	0.89 (5,269)	0.94 (5,136)	0.96 (1,733)
	Black	0.72 (74)	0.72 (1,269)	0.80 (4,754)	0.88 (3,507)	0.92 (956)	0.94 (78)
	Hispanic	0.43 (37)	0.74 (907)	0.78 (4,577)	0.84 (5,554)	0.90 (2,164)	0.93 (183)
	Other	██████████ (4)	0.71 (128)	0.79 (1,017)	0.87 (1,878)	0.93 (1,365)	0.95 (242)
	White	0.79 (43)	0.69 (1,780)	0.77 (21,130)	0.86 (48,960)	0.92 (34,547)	0.95 (6,121)
	No Response	0.73 (15)	0.73 (212)	0.77 (1,207)	0.86 (2,700)	0.92 (2,562)	0.94 (653)
Parental Income	Less than \$30,000	0.56 (68)	0.71 (1,145)	0.76 (4,480)	0.83 (4,344)	0.90 (1,642)	0.95 (223)
	\$30,000-50,000	0.85 (20)	0.71 (704)	0.77 (4,424)	0.84 (6,105)	0.91 (2,786)	0.96 (370)
	\$50,000-70,000	0.73 (15)	0.70 (518)	0.77 (4,371)	0.85 (7,283)	0.91 (3,826)	0.94 (586)
	\$70,000-100,000	0.63 (19)	0.73 (534)	0.78 (5,870)	0.86 (12,014)	0.92 (7,043)	0.96 (1,264)
	More than \$100,000	██████████ (7)	0.73 (382)	0.80 (5,596)	0.87 (15,888)	0.92 (14,011)	0.95 (2,955)
	No Response	0.65 (60)	0.72 (1,333)	0.79 (10,624)	0.87 (22,609)	0.93 (17,611)	0.95 (3,632)
Highest Parental Education	No High School Diploma	0.39 (23)	0.78 (400)	0.78 (1,534)	0.84 (1,167)	0.91 (325)	0.79 (33)
	High School Diploma	0.63 (95)	0.69 (2,015)	0.75 (12,120)	0.83 (14,398)	0.90 (5,147)	0.95 (432)
	Associate Degree	██████████ (14)	0.74 (427)	0.77 (3,283)	0.84 (4,794)	0.90 (1,850)	0.93 (152)
	Bachelor Degree	0.80 (25)	0.73 (932)	0.80 (10,421)	0.88 (24,430)	0.93 (16,259)	0.95 (2,375)
	Graduate Degree	██████████ (11)	0.75 (493)	0.81 (6,198)	0.88 (20,384)	0.93 (21,057)	0.96 (5,563)
	No Response	0.67 (21)	0.72 (349)	0.78 (1,809)	0.86 (3,070)	0.92 (2,281)	0.96 (475)

Table 5 (continued)

		SAT Score Band					
Subgroup		600-890	900-1190	1200-1490	1500-1790	1800-2090	2100-2400
HSGPA	≤ C-		0.52	0.61	0.62	0.84	
		(7)	(71)	(100)	(65)	(19)	(0)
	C	0.50	0.65	0.60	0.68	0.74	
		(24)	(275)	(593)	(317)	(43)	(0)
	C+	0.63	0.64	0.67	0.72	0.73	
		(24)	(441)	(1,334)	(792)	(170)	(6)
	B-	0.63	0.67	0.71	0.75	0.77	0.86
		(35)	(720)	(3,082)	(2,498)	(527)	(28)
	B	0.79	0.73	0.75	0.80	0.85	0.82
		(34)	(1,202)	(7,856)	(8,915)	(2,716)	(163)
B+	0.73	0.75	0.79	0.85	0.90	0.91	
	(37)	(969)	(8,482)	(13,494)	(5,942)	(553)	
A-	0.63	0.79	0.82	0.88	0.92	0.95	
	(16)	(552)	(7,500)	(18,039)	(12,057)	(1,797)	
A		0.75	0.84	0.90	0.94	0.96	
	(10)	(330)	(5,276)	(18,206)	(16,996)	(3,620)	
A+		0.79	0.84	0.92	0.95	0.97	
	(2)	(56)	(1,142)	(5,917)	(8,449)	(2,863)	
Overall		0.65	0.72	0.78	0.86	0.92	0.95
		(189)	(4,616)	(35,365)	(68,243)	(46,919)	(9,030)

- Differences in retention rates by student subgroups are minimized and in some instances eliminated when controlling for SAT performance.
- Recall from Table 4 that 80% of students whose parental incomes was less than \$30,000 returned compared to 89% of students returning whose parental incomes was \$100,000 or more. Within each SAT score band, the difference in retentions rates between the two groups dropped to 4% or less except for the lowest performing students (SAT score band = 600 - 890); however, those percentages are based on very small samples sizes and should be interpreted with caution. A similar pattern of findings was found for parental education.
- With the exception of results for American Indian students, which are based on very small sample sizes, differences in retention rates by ethnicity are practically eliminated when controlling for SAT performance.

Table 6
Retention Rates by Institutional Characteristics

	Subgroup	n	Retention	
			Mean	SD
Control	Private	43,299	0.89	0.32
	Public	121,063	0.86	0.35
Size	Small	7,529	0.83	0.37
	Medium	30,085	0.84	0.36
	Large	33,924	0.84	0.37
	Very large	92,824	0.88	0.32
Selectivity	Admits under 50%	18,939	0.93	0.25
	Admits 50 to 75%	112,693	0.87	0.34
	Admits over 75%	32,730	0.81	0.40
Overall		164,362	0.86	0.34

Note. Institution sizes are categorized by the number of undergraduates as follows: small = 750 to 1,999; medium = 2,000 to 7,499; large = 7,500 to 14,999; and very large = 15,000 or more.

- For control, students at private institutions were slightly more likely to return for their second year (89% versus 86% at public institutions).
- As for institution size, retention was the highest for students at very large institutions (88%). Retention rates are fairly constant for the other size categories.
- For institutional selectivity, institutions that admit fewer than 50% of applicants had the highest retention rate (93%) whereas institutions that admit over 75% of applicants had the lowest retention rate (81%).

Table 7
Second Year Retention Rates (and sample sizes) by SAT Score Band Within Institutional Subgroups

		SAT Score Band					
		600-890	900-1190	1200-1490	1500-1790	1800-2090	2100-2400
Control	Private	0.62 (39)	0.67 (780)	0.78 (5,928)	0.87 (14,923)	0.93 (16,817)	0.96 (4,812)
	Public	0.66 (150)	0.73 (3,836)	0.78 (29,437)	0.86 (53,320)	0.92 (30,102)	0.95 (4,218)
Size	Small	0.52 (23)	0.65 (495)	0.74 (1,916)	0.85 (2,644)	0.91 (1,860)	0.95 (591)
	Medium	0.64 (56)	0.68 (1,049)	0.75 (7,061)	0.84 (11,415)	0.92 (8,451)	0.96 (2,053)
	Large	0.85 (34)	0.73 (1,162)	0.76 (8,528)	0.84 (13,338)	0.92 (8,995)	0.95 (1,867)
	Very large	0.61 (76)	0.75 (1,910)	0.81 (17,860)	0.88 (40,846)	0.93 (27,613)	0.95 (4,519)
Selectivity	Admits under 50%	0.60 (15)	0.72 (426)	0.83 (1,422)	0.92 (4,205)	0.95 (9,144)	0.97 (3,727)
	Admits 50 to 75%	0.74 (91)	0.75 (2,569)	0.79 (23,275)	0.87 (49,536)	0.92 (32,431)	0.95 (4,791)
	Admits over 75%	0.57 (83)	0.67 (1,621)	0.75 (10,668)	0.83 (14,502)	0.89 (5,344)	0.94 (512)
Overall		0.65 (189)	0.72 (4,616)	0.78 (35,365)	0.86 (68,243)	0.92 (46,919)	0.95 (9,030)

Note. Institution sizes are categorized by the number of undergraduates as follows: small = 750 to 1,999; medium = 2,000 to 7,499; large = 7,500 to 14,999; and very large = 15,000 or more.

- Differences in retention rates by institutional subgroups are minimized and in some instances eliminated when controlling for SAT performance.
- Differences in retention rates for private and public institutions are practically eliminated when controlling for SAT performance.
- Recall from Table 6 that 81% of students who attended an institution that admitted over 75% of applicants returned compared to 93% of students who attended an institution that admitted under 50% of applicants. Within each SAT score band, the difference in retention rates between the two groups was reduced substantially. Differences in retention rates among institutional selectivity subgroups ranged from a low of 3% to a high of 9% across SAT score bands.