
Statistical Report

Research and Development

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The Relationship between SAT Scores and Retention to the Third Year: 2006 Cohort

Krista D. Mattern & Brian F. Patterson

The College Board

Statistical Report

College Board

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 critical reading (SAT-CR), mathematics (SAT-M) and writing (SAT-W) for use in college admission. The first sample examined was the first-time, first-year students entering college in fall 2006, with 110 institutions providing students' first-year coursework, grades, and retention to the second year. Results from "Validity of the SAT for Predicting First-Year College Grade Point Average" (Kobrin et al., 2008) and "Differential Validity and Prediction of the SAT" (Mattern et al., 2008) and "Is Performance on the SAT Related to College Retention?" (Mattern & Patterson, 2009) provide evidence of the predictive validity of the SAT in terms of first year academic outcomes.

The following year, participating colleges and universities were invited to provide second-year performance data for these students. For the second year, a total of 66 of the original 110 institutions provided data. (Please see the Appendix for a list of participating institutions). Complete data (i.e., SAT scores, self-reported high school grade point average (HSGPA), retention to second and third year data) were available for 89,381 students. This report builds on previous work by examining second year outcomes, specifically the relationship of SAT scores with retention to third year.

Results show that SAT performance is related to third year retention rates. Even after controlling for student and institutional characteristics, returners had higher SAT total scores than non-returners, and the performance gap is not due to differences in the demographic makeup of the two groups. Furthermore, while differences in retention can be observed between various student and institutional subgroups, these differences are minimized and in some instances eliminated when controlling for SAT performance, especially for higher SAT score bands.

References

- College Board. (2006). *2006 College-bound seniors: Total group profile report*. New York, NY: The College Board.
- Kobrin, J. L., Patterson, B. F., Shaw, E. J., Mattern, K. D., & Barbuti, S. M. (2008). *Validity of the SAT® for predicting first-year college grade point average* (College Board Research Rep. No. 2008-5). New York, NY: The College Board.
- Mattern, K. D., Patterson, B. F., Shaw, E. J., Kobrin, J. L., & Barbuti, S. M. (2008). *Differential validity and prediction of the SAT®* (College Board Research Rep. No. 2008-4). 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-X). New York, NY: The College Board.

Table 1
Institutional Characteristics of the 2006 Sample with Second Year Data

Variable		Percentage
U.S. Region	Midwest	11%
	Mid-Atlantic	21%
	New England	21%
	South	12%
	Southwest	11%
	West	24%
Control	Public	39%
	Private	61%
Size	Small	20%
	Medium	41%
	Large	21%
	Very large	18%
Selectivity	Admits under 50%	18%
	Admits 50 to 75%	58%
	Admits over 75%	24%

Note. k = number of institutions = 66. 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.

- Of the 110 institutions from the original 2006 sample, 66 provided second-year data.
- The sample of 66 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

		Total	Return	Non-Return
Number of Students		89,381	70,600	18,781
Subgroup	Percentage of Students			
Gender	Female	54.9	55.1	54.2
	Male	45.1	44.9	45.8
Race/ Ethnicity	American Indian	0.6	0.5	0.8
	Asian	9.3	9.9	7.2
	Black /African-American	6.0	5.6	7.6
	Hispanic	6.6	6.4	7.5
	Other	2.9	2.9	3.0
	White	70.0	70.1	69.7
	No Response	4.5	4.5	4.3
Parental Income	Less than \$30,000	7.3	6.8	9.2
	\$30,000–\$50,000	9.5	8.9	11.4
	\$50,000–\$70,000	10.9	10.6	12.4
	\$70,000–\$100,000	17.1	17.1	17.3
	More than \$100,000	23.2	24.2	19.7
	No Response	32.0	32.5	30.0
Highest Parental Education	No High School Diploma	1.7	1.6	2.0
	High School Diploma	20.2	18.4	27.1
	Associate Degree	6.4	6.0	8.1
	Bachelor Degree	33.2	33.7	31.5
	Graduate Degree	33.7	35.6	26.7
	No Response	4.8	4.8	4.6
Control	Private	34.9	36.9	27.5
	Public	65.1	63.1	72.5
Size	Small	4.7	4.4	6.0
	Medium	20.9	21.1	20.1
	Large	31.7	30.2	37.5
	Very large	42.7	44.4	36.4
Selectivity	Under 50%	13.9	16.0	6.1
	50% to 75%	68.7	68.4	69.7
	over 75%	17.4	15.6	24.2
Performance Variables by Retention				
SAT – CR		562	570	532
SAT – M		578	587	544
SAT – W		556	564	523
HSGPA		3.61	3.66	3.42

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.

- As compared to the complete 2006 sample ($k = 106$), the second year retention rate was the same (86%) for this subsample of institutions ($k = 66$). As for third year retention rates, 79% of the students in this sample returned for their third year.

The remainder of this report will focus on retention to third year, so 'returners' and 'non-returners' will be used with reference to the third year of college.

- The percentage of non-returners that were American Indian, African-American, and Hispanic were slightly higher than for the total group.
- Students from lower socioeconomic status (SES) families—as measured by parental income and highest parental education level—made-up a greater percentage of the non-returners, as compared to the total group.
- For institutional control (i.e., public vs. private), 35% of the total group attended a private college; however, only 28% of non-returners attended a private college.
- 14% of the sample attended a selective institution (i.e., admits fewer than 50% of applicants); however, only 6% of non-returners attended a selective 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

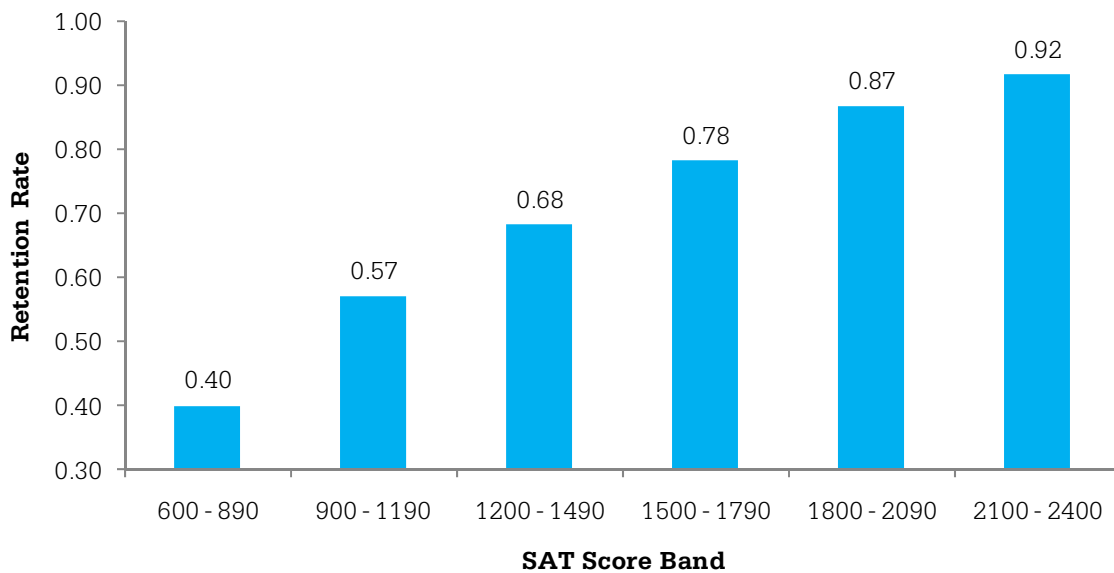
Subgroup		Return			Non-Return		
		n	Mean	SD	n	Mean	SD
Gender	Female	38,911	1705	246.9	10,173	1578	238.9
	Male	31,689	1743	246.3	8,608	1624	244.3
Race/ Ethnicity	American Indian	347	1661	236.8	149	1557	205.6
	Asian	6,981	1771	263.4	1,357	1657	256.6
	Black/African-American	3,987	1536	229.9	1,418	1420	228.3
	Hispanic	4,495	1627	234.3	1,413	1512	239.9
	Other	2,079	1712	251.4	555	1608	247.8
	White	49,518	1736	237.3	13,089	1618	230.6
	No Response	3,193	1780	263.8	800	1665	259.6
Parental Income	Less than \$30,000	4,774	1593	254.1	1,725	1489	251.7
	\$30,000–\$50,000	6,305	1654	242.5	2,147	1550	230.2
	\$50,000–\$70,000	7,461	1679	234.2	2,324	1578	226.4
	\$70,000–\$100,000	12,063	1709	239	3,245	1596	225.4
	More than \$100,000	17,062	1777	233.6	3,701	1667	236.4
	No Response	22,935	1747	248.8	5,639	1618	247.2
Highest Parental Education	No High School Diploma	1,118	1532	246.3	381	1438	224.6
	High School Diploma	12,966	1606	230.9	5,084	1513	221.3
	Associate Degree	4,217	1628	227.6	1,517	1534	217.5
	Bachelor Degree	23,771	1722	230.7	5,918	1618	226.7
	Graduate Degree	25,107	1805	236.1	5,012	1696	244.9
	No Response	3,421	1728	270.2	869	1600	255.6
HSGPA	≤C-	52	1485	289.4	75	1347	274.4
	C	310	1418	241.4	292	1383	227.2
	C+	786	1459	228.3	589	1439	228.5
	B-	2,316	1518	214.5	1,460	1477	218.4
	B	7,931	1580	218.7	3,602	1528	216.2
	B+	12,035	1648	225.7	3,954	1575	222.7
	A-	17,656	1724	230.5	4,064	1635	226.8
	A	20,574	1792	229.2	3,620	1698	236.1
	A+	8,940	1871	219.8	1,125	1777	223.5
Control	Private	26,029	1799	247.9	5,162	1685	260.4
	Public	44,571	1677	235.8	13,619	1567	227
Size	Small	3,074	1664	253.8	1,130	1533	239.2
	Medium	14,886	1753	267.3	3,770	1616	252.6
	Large	21,297	1670	243.5	7,046	1557	236.7
	Very large	31,343	1748	232.4	6,835	1644	233.4
Selectivity	Under 50%	11,304	1900	229.8	1,145	1834	249.7
	50% to 75%	48,300	1709	231.9	13,085	1610	228.3
	over 75%	10,996	1595	230.8	4,551	1509	233.9
Overall		70,600	1722	247.4	18,781	1599	242.5

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.
- 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 1593 as compared to 1489 for non-returners.
- In sum, the SAT performance gap between returners and non-returners is not due to differences in the demographic makeup of the two groups.

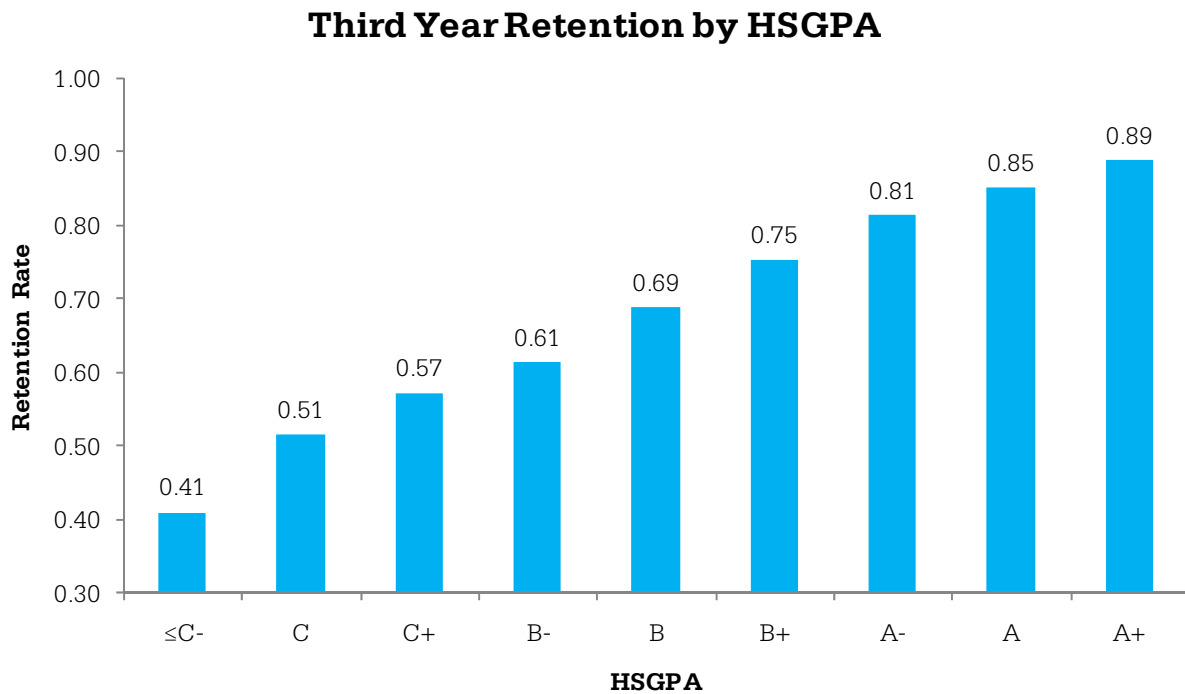
Figure 1

Third Year Retention Rate By SAT Score Band



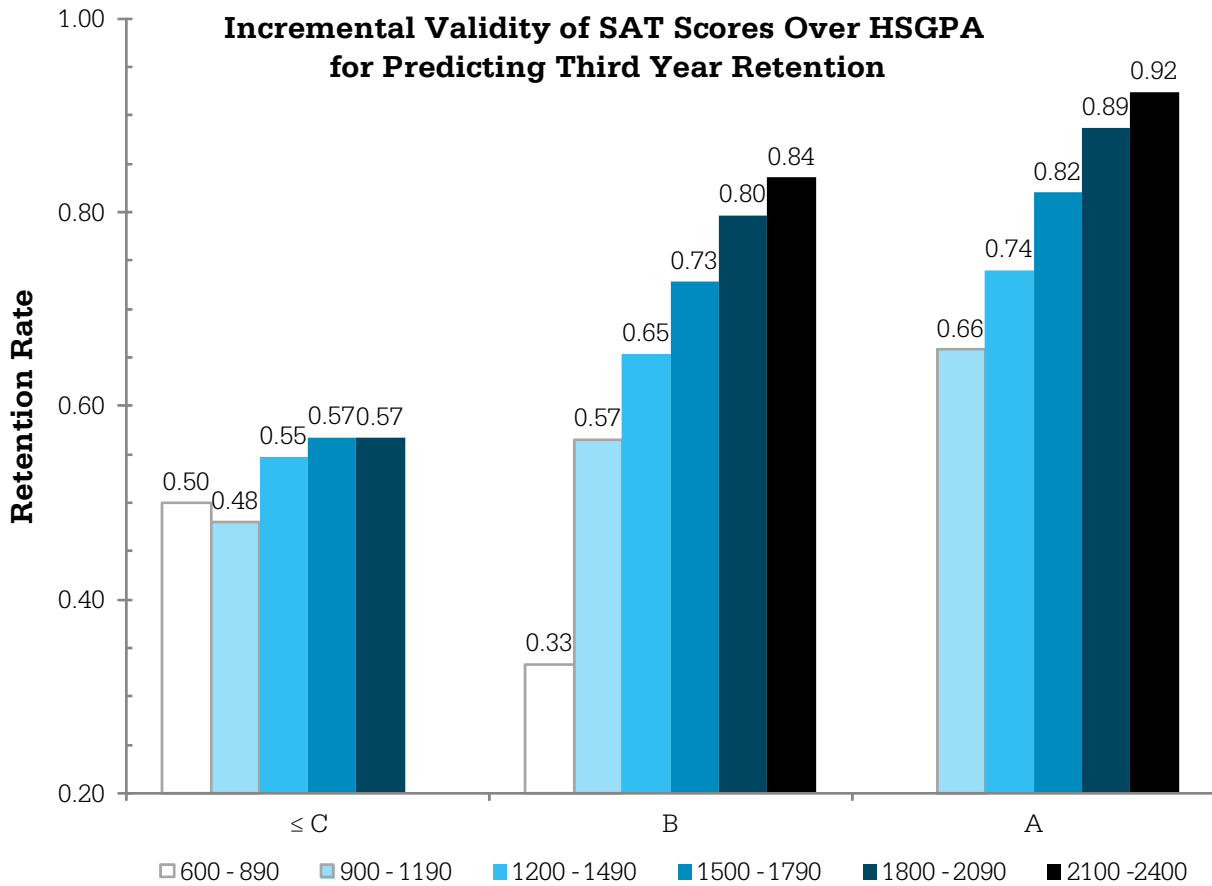
- Figure 1 presents the third year retention rate of students by SAT score band. This graphically demonstrates the positive relationship between SAT scores and retention. That is, as SAT composite scores increased, retention rates increased from a low of 40% for students with an SAT total score between 600 and 890 to a high of 92% for students with an SAT total score of 2100 or higher.
- Sample sizes (n) for each of the 6 SAT score bands from lowest total score to highest were $n = 60$, $n = 1,690$, $n = 18,140$, $n = 37,859$, $n = 26,347$, and $n = 5,285$ respectively.

Figure 2



- Similar to Figure 1, Figure 2 presents the third year retention rate of students by HSGPA letter grade. Again, the positive relationship between HSGPA and third year retention rate is evident. In other words, as HSGPA increased, retention rates increased from a low of 41% for students with a HSGPA of C minus or lower to a high of 89% for students with an A+ HSGPA
- Sample sizes (n) for each of the 9 HSGPA letter grades from lowest to highest were $n = 127$, $n = 602$, $n = 1,375$, $n = 3,776$, $n = 11,533$, $n = 15,989$, $n = 21,720$, $n = 24,194$, and $n = 10,065$, respectively.

Figure 3



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

- Figure 3 presents students' mean third year 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 third 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 66% as compared to 92% for students with an SAT total score between 2100 and 2400. See Table 5 for more details.

Table 4

Third Year Retention Rates by Student Demographic Characteristics

Subgroup	n	Retention		
		Mean	SD	
Gender	Female	49,084	0.79	0.41
	Male	40,297	0.79	0.41
Race/ Ethnicity	American Indian	496	0.70	0.46
	Asian	8,338	0.84	0.37
	Black/African-American	5,405	0.74	0.44
	Hispanic	5,908	0.76	0.43
	Other	2,634	0.79	0.41
	White	62,607	0.79	0.41
	No Response	3,993	0.80	0.40
Parental Income	Less than \$30,000	6,499	0.73	0.44
	\$30,000–\$50,000	8,452	0.75	0.44
	\$50,000–\$70,000	9,785	0.76	0.43
	\$70,000–\$100,000	15,308	0.79	0.41
	More than \$100,000	20,763	0.82	0.38
	No response	28,574	0.80	0.40
Highest Parental Education	No High School Diploma	1,499	0.75	0.44
	High School Diploma	18,050	0.72	0.45
	Associate Degree	5,734	0.74	0.44
	Bachelor Degree	29,689	0.80	0.40
	Graduate Degree	30,119	0.83	0.37
	No Response	4,290	0.80	0.40
Overall		89,381	0.79	0.41

- 79% of both females and males returned for their third year.
- As for ethnicity, third year retention rates ranged from a high of 84% for Asian students to a low of 70% for American Indian students.
- For socioeconomic status, as parental income and education increased, retention rates increased from a low of 73% to a high of 83%.

Table 5
Third Year Retention Rates (Sample Sizes) by SAT Score Band Within Student Subgroups

Subgroup	SAT Score Band						
	600-890	900-1190	1200-1490	1500-1790	1800-2090	2100-2400	
Gender	Female	0.42 (36)	0.56 (1,025)	0.69 (10,944)	0.79 (21,090)	0.88 (13,412)	0.92 (2,577)
	Male	0.38 (24)	0.58 (665)	0.67 (7,196)	0.77 (16,769)	0.86 (12,935)	0.91 (2,708)
Race/ Ethnicity	American Indian	■ (0)	■ (13)	0.60 (131)	0.69 (232)	0.83 (106)	■ (14)
	Asian	■ (4)	0.69 (121)	0.75 (1,404)	0.82 (3,052)	0.88 (2,897)	0.93 (860)
	Black	0.32 (25)	0.54 (445)	0.68 (2,205)	0.80 (2,114)	0.87 (591)	0.80 (25)
	Hispanic	■ (9)	0.52 (244)	0.67 (1,757)	0.79 (2,617)	0.87 (1,172)	0.89 (109)
	Other	■ (5)	0.60 (63)	0.71 (530)	0.77 (1,099)	0.86 (794)	0.88 (143)
	White	■ (14)	0.56 (731)	0.68 (11,484)	0.78 (27,329)	0.87 (19,322)	0.92 (3,727)
	No Response	■ (3)	0.75 (73)	0.67 (629)	0.78 (1,416)	0.85 (1,465)	0.91 (407)
	Parental Income	Less than \$30,000	0.41 (17)	0.54 (427)	0.68 (2,221)	0.77 (2,617)	0.83 (1,053)
\$30,000-50,000		■ (9)	0.57 (259)	0.67 (2,324)	0.75 (3,765)	0.84 (1,816)	0.90 (279)
\$50,000-70,000		■ (3)	0.58 (172)	0.67 (2,378)	0.76 (4,504)	0.85 (2,368)	0.90 (360)
\$70,000-100,000		■ (1)	0.59 (233)	0.69 (3,256)	0.78 (6,851)	0.88 (4,201)	0.90 (766)
More than \$100,000		■ (6)	0.64 (139)	0.69 (2,847)	0.80 (8,508)	0.87 (7,599)	0.92 (1,664)
No Response		0.38 (24)	0.57 (460)	0.69 (5,114)	0.79 (11,614)	0.87 (9,310)	0.93 (2,052)

Note. Shaded cells included fewer than 15 cases and are not reported.

Table 5 (continued)

Subgroup	SAT Score Band						
	600-890	900-1190	1200-1490	1500-1790	1800-2090	2100-2400	
Highest Parental Education	No High School Diploma	0.42 (5)	0.60 (128)	0.70 (621)	0.80 (565)	0.84 (157)	0.91 (23)
	High School Diploma	0.42 (26)	0.53 (713)	0.65 (5,980)	0.73 (8,032)	0.84 (3,021)	0.89 (278)
	Associate Degree	0.42 (5)	0.51 (166)	0.66 (1,751)	0.75 (2,659)	0.85 (1,049)	0.90 (104)
	Bachelor Degree	0.42 (7)	0.60 (366)	0.70 (5,426)	0.79 (13,586)	0.87 (8,857)	0.91 (1,447)
	Graduate Degree	0.42 (9)	0.64 (197)	0.70 (3,487)	0.81 (11,390)	0.88 (11,928)	0.92 (3,108)
	No Response	0.42 (8)	0.69 (120)	0.69 (875)	0.78 (1,627)	0.86 (1,335)	0.93 (325)
	HSGPA						
≤ C-	0.39 (4)	0.26 (27)	0.40 (50)	0.51 (35)	0.51 (9)	0.51 (2)	
C	0.39 (6)	0.49 (106)	0.51 (299)	0.52 (153)	0.58 (38)	0.58 (7)	
C+	0.39 (8)	0.51 (165)	0.58 (653)	0.59 (455)	0.57 (87)	0.57 (7)	
B-	0.39 (13)	0.52 (256)	0.59 (1,613)	0.64 (1,557)	0.68 (327)	0.68 (10)	
B	0.39 (18)	0.56 (411)	0.65 (4,147)	0.70 (5,243)	0.76 (1,612)	0.79 (102)	
B+	0.39 (5)	0.60 (348)	0.68 (4,263)	0.76 (7,539)	0.82 (3,484)	0.85 (350)	
A-	0.39 (3)	0.63 (209)	0.73 (3,895)	0.80 (9,845)	0.87 (6,675)	0.90 (1,093)	
A	0.39 (3)	0.69 (151)	0.75 (2,670)	0.83 (9,790)	0.89 (9,435)	0.92 (2,145)	
A+	0.39 (0)	0.76 (17)	0.79 (550)	0.85 (3,242)	0.91 (4,680)	0.95 (1,576)	
Overall	0.40 (60)	0.57 (1,690)	0.68 (18,140)	0.78 (37,859)	0.87 (26,347)	0.92 (5,285)	

Note. Shaded cells included fewer than 15 cases and are not reported.

- Differences in retention rates by student subgroups are reduced when controlling for SAT performance, especially for higher SAT score bands.

Table 6
Third Retention Rates by Institutional Characteristics

Variable		n	Retention	
			Mean	SD
Control	Private	31,191	0.83	0.37
	Public	58,190	0.77	0.42
Size	Small	4,204	0.73	0.44
	Medium	18,656	0.80	0.40
	Large	28,343	0.75	0.43
	Very large	38,178	0.82	0.38
Selectivity	Under 50%	12,449	0.91	0.29
	50% to 75%	61,385	0.79	0.41
	Over 75%	15,547	0.71	0.46
Overall		89,381	0.79	0.41

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 more likely to return for their third year (83% versus 77% at public institutions).
- As for institution size, retention was the highest for students at very large institutions (82%), followed by medium institutions (80%). Third year retention rates at large and small institutions were 75% and 73%, respectively.
- For institutional selectivity, institutions that admit fewer than 50% of applicants had the highest retention rate (91%) whereas institutions that admit over 75% of applicants had the lowest retention rate (71%).

Table 7
 Third Year Retention Rates (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	0.53 (15)	0.68 (394)	0.72 (3,988)	0.82 (11,220)	0.87 (12,263)	0.92 (3,311)
	Public	0.36 (45)	0.54 (1,296)	0.67 (14,152)	0.77 (26,639)	0.86 (14,084)	0.92 (1,974)
Size	Small	0.58 (4)	0.61 (151)	0.75 (1,187)	0.84 (1,771)	0.91 (912)	0.93 (179)
	Medium	0.61 (10)	0.69 (337)	0.78 (3,635)	0.86 (7,046)	0.92 (5,833)	0.93 (1,795)
	Large	0.31 (29)	0.54 (808)	0.66 (7,436)	0.76 (12,215)	0.85 (6,937)	0.90 (918)
	Very large	0.47 (17)	0.60 (394)	0.72 (5,882)	0.80 (16,827)	0.88 (12,665)	0.91 (2,393)
Selectivity	Admits under 50%	0.87 (3)	0.84 (71)	0.89 (645)	0.92 (3,081)	0.93 (6,170)	0.93 (2,479)
	Admits 50 to 75%	0.52 (21)	0.59 (852)	0.69 (12,366)	0.78 (27,847)	0.86 (17,697)	0.91 (2,602)
	Admits over 75%	0.31 (36)	0.52 (767)	0.65 (5,129)	0.73 (6,931)	0.81 (2,480)	0.83 (204)
Overall		0.40 (60)	0.57 (1,690)	0.68 (18,140)	0.78 (37,859)	0.87 (26,347)	0.92 (5,285)

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, especially for higher SAT score bands.

Appendix

Institutions Providing Third Year Retention Data on the 2006 Freshman Cohort

Institutions		
Austin College	Ohio State University	University of Puget Sound
Baldwin-Wallace College	Saint Anselm College	University of Rhode Island
Boston College	Saint Michael's College	University of Southern California
Brandeis University	Salve Regina University	University of Southern Indiana
California Lutheran University	Samford University	University of Texas, Austin
Chapman University	Schreiner University	University of the Pacific
Claremont McKenna College	Seattle University	Valdosta State University
Clemson University	Smith College	Vanderbilt University
Coastal Carolina University	Syracuse University	Washington State University, Pullman
Drew University	Temple University	Washington State University, Vancouver
Fordham University	Texas A&M University, Commerce	Western Washington University
Georgia Institute of Technology	Texas State University, San Marcos	Wheaton College
Iona College	Texas Tech University	Wilkes University
Kenyon College	Tufts University	Williams College
Keystone College	University of Cincinnati	Anonymous A
Kutztown University	University of Denver	Anonymous B
Lafayette College	University of Georgia	Anonymous C
Lasell College	University of Massachusetts, Dartmouth	Anonymous D
Loyola Marymount University	University of New Haven	Anonymous E
Lycoming College	University of North Texas	Anonymous F
Meredith College	University of Pittsburgh	Anonymous G
Millersville University of Pennsylvania	University of Portland	Anonymous H