

Does College Readiness Translate to College Completion?

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VALIDITY

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Executive Summary

The current study examines the relationship between the SAT® College Readiness Benchmark with the outcome of graduation from college in either four or six years. The results indicate that the SAT benchmark is indeed differentiating between those students who graduate within four years and those who do not, as well as between those who graduate within six years and those who do not. The data were further disaggregated by student characteristics of gender, ethnicity, best spoken language, household income, and highest parental education. Even within student subgroups, differences in graduation rates for students who were college ready versus those who did not meet the SAT benchmark persisted. The results from the current study provide additional validity evidence for the use of the benchmark as a measure of college readiness and as a crucial tool in guiding educational interventions and policy that promote college success for all students.

Introduction

The College Board developed the SAT College Readiness Benchmark in recent years to assist educators and policymakers in evaluating and monitoring the college readiness of students across the country (Wyatt, Kobrin, Wiley, Camara, & Proestler, 2011). Contrary to what may be a popularly held belief, a student who has graduated from high school is not necessarily prepared to attend college. In fact, research has shown that while about 70% of students in a cohort may have graduated with a regular high school diploma, a little more than one third of those students are actually leaving high school with the skills and qualifications needed to enter to a four-year college (Greene & Winters, 2005). This disconnect, primarily the result of having much lower minimum standards for earning a high school diploma than those needed to enter a four-year institution, has received a great deal of attention by both policymakers and the popular press.

The New York City Department of Education, for example, has decided to address this problem by including college readiness metrics, in addition to graduation rates, in school progress reports so that schools can track how their graduates are doing in city colleges (Martinez, 2011). The goal is that these metrics will provide valuable information to the high schools and point out areas of deficiency that need to be addressed in order to make improvements in closing this readiness gap. In particular, colleges and universities find that a substantial number of students who have graduated from high school are unprepared for even introductory course work and require extensive remediation in mathematics and English — which entails taking (and paying for) college course work that will typically not result in college credit (Porter & Polikoff, 2012). While it's difficult to estimate the precise number of students requiring remediation in college, a little more than one-third of undergraduates reported having taken a remedial course in college (Aud, Hussar, Kena, Bianco, Frohlich, Kemp, & Tahan, 2011). When focusing solely on underrepresented minority students and first-generation college-going students, that remediation estimate is even higher (Chen & Carroll, 2005; Wirt, Choy, Rooney, Provasnik, Sen, & Tobin, 2004). In addition, students who take remedial course work in college are less likely to graduate from college, though this is not necessarily a direct result of taking remedial course work (Adelman, 2006; Camara, 2003). The need for and interest in reducing the number of students requiring remediation in college has made college readiness benchmarks a highly valued tool in tracking educational improvements and progress.

The value and current popularity of college and career readiness benchmarks are likely linked to the goals of the American Recovery and Reinvestment Act of 2009 (ARRA), which incorporate the need for tracking student achievement and progress on four reforms from the Elementary and Secondary Education Act and the America Competes Act of 2007. These reforms include making progress toward rigorous college- and career-ready standards and high-quality assessments that are valid and reliable for all students. In order to track student achievement and progress toward college and career readiness, many policy groups including the National Governors Association, the Council of Chief State School Officers, and Achieve have been advocating for the identification of such benchmarks on state and/or national assessments (Dougherty, 2008; Porter & Polikoff, 2012). Both the College Board and ACT have developed college- and career-ready benchmarks based on their admission exams and the two consortia developing assessments for the Common Core State Standards (CCSS) initiative will also be developing benchmarks to support local, state, and national education goals promoting readiness and success (Camara & Quenemoen, 2012).

When the College Board developed its SAT College Readiness Benchmark (Wyatt et al., 2011), important considerations for the measure included empirical and philosophical

questions about how to precisely define college readiness and what criterion to choose for the benchmark. There are many different definitions of college readiness in the literature, ranging from those focused on the combination of academic and noncognitive factors that are associated with college success to more simply beginning at an institution without the need to enroll in any remedial course work (for a more comprehensive review of definitions see Kobrin, Patterson, Wiley, & Mattern, 2012). Others have pursued a more data-based definition whereby a model-based approach is used to determine the score or benchmark that corresponds to a particular probability of a particular criterion (e.g., a 65% probability of achieving a 2.67 first-year grade point average or higher). This approach, as Kobrin et al. noted, has the advantage of being empirically validated but can result in cut scores that may be unacceptably high or low, and therefore, may not meet face validity requirements. There is even disagreement as to whether college “readiness” is the appropriate term for the measure, as the National Assessment Governing Board has suggested that “preparedness” is specific to academic factors and is a subset of readiness, which would also include behavioral factors such as time management or persistence (Loomis, 2010).

Due to the absence of reliable and standardized noncognitive measures related to college success at the national level, the College Board’s SAT College Readiness Benchmark is solely based on students’ SAT scores, represented by a critical reading section score + mathematics section score + writing section score of 1550 or higher. The criterion for the benchmark, a 65% probability of obtaining a first-year grade point average (FYGPA) of a B- (2.67) or higher was largely determined using standard-setting methods with a panel comprising experts in the field of education. The criterion of FYGPA was chosen because students take courses that are more similar to one another in the first year, making the measure less variable and more comparable across students than it would be in the later years of college when they delve more deeply into their varied major field course work. In addition, FYGPA is more reliable than a course grade because it includes several measures or grades, rather than just one grade. Standard-setting panelists did, express the desire to evaluate the outcome of graduation within six years; however, these data were not available at the time of the meeting and would not be available for another five years.¹ The decision regarding the probability level of achieving the particular FYGPA was a more nuanced one based on empirical data presented on the percentages of students at different SAT score bands that had achieved different FYGPAs. The panelists’ median rating for the appropriate FYGPA was a 2.67 and their median rating for the appropriate probability was 70%, ranging from 60% to 75%. Based on other college readiness benchmark research, including work on the National Assessment of Educational Progress (NAEP), it was determined that a 65% probability level would be most appropriate (Wyatt et al., 2011).

Based on a data set of more than 65,000 students across 110 four-year colleges and universities, Wyatt et al. (2011) conducted logistic regression analyses within each institution to determine the SAT composite (critical reading + mathematics + writing) score associated with a 65% probability of achieving a FYGPA of a B- or higher, which were then averaged and weighted by the institution-level sample sizes. After computing the SAT benchmark score, it

1. The revised SAT that included the writing section was introduced in March 2005, and the first cohort to take this test was the fall 2006 entering class, which completed their first full year of college in the spring of 2007. The College Board collected college performance information on these students in the fall of 2007, and the data were first available for this standard setting session in the spring of 2008.

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was rounded down to the nearest score scale value, resulting in the SAT College Readiness Benchmark of 1550. Wyatt et al. then validated this benchmark with two additional national samples of students to determine whether students meeting or exceeding this benchmark did indeed enroll in college at higher rates, return to college at higher rates, and participate in a more rigorous high school curriculum at higher rates, among other key variables. The results of their study supported the use of this benchmark in assessing and monitoring college readiness across groups.

The current study examines the relationship between the SAT College Readiness Benchmark with the outcome of graduation from college in either four or six years. The panel of educators and policymakers who informed the SAT College Readiness Benchmark had wanted graduation to be the measure of college success, but six-year graduation data had not been available previously. To fill this research gap, the current study examines whether students who met or exceeded the benchmark had higher four- and six-year graduation rates than students who did not meet the benchmark. Additional analyses were

conducted controlling for relevant student characteristics of gender, ethnicity, best spoken language, household income, and highest parental education.

Method

Sample

Sample 1. Two national data sets were used in this study. The first data set included the sample of students entering college in 2007, which was used to set the SAT College Readiness Benchmark. Of the original 110 participating colleges and universities, 76 continued to provide college performance data through the fourth-year, enabling us to track these students longitudinally and examine four-year graduation rates. Specifically, fourth-year outcome data were available for 165,558 students. Unlike the original benchmark report, which restricted the sample to students who had a valid HSGPA, SAT score, and had completed the SAT Questionnaire items on course taking, the current study only required students to have SAT scores. This reduced the sample to 136,789 students across the 76 institutions, which is substantially larger than the original sample of 67,644 students across 110 institutions. To ensure comparability of this less restrictive sample, logistic regression analyses were run within institutions to re-estimate the SAT score associated with a 65% probability of earning a FYGPA of 2.67. The results mirrored the original findings with an SAT benchmark of 1550.

Sample 2. Because six-year graduation information was not currently available for Sample 1, a second data set, obtained from the National Student Clearinghouse (NSC), based on the 2006 cohort of students, was analyzed. NSC tracks student enrollment and degree attainment for more than 3,100 two- and four-year colleges and universities in the United States, equivalent to 93% of the U.S. college-going population. NSC enrollment data were matched to the College Board's 2006 cohort database of 2,377,202 students, which contains AP® Exam scores, SAT, and PSAT/NMSQT® test scores, self-reported high school grade point average (HSGPA), and demographic information for students who graduated from high school in the spring of 2006. Given the outcome of interest — six-year graduation rates, the data set used in this study was restricted to those students who first enrolled in a four-year institution after high school and those with SAT scores. This resulted in a final sample size of 898,517. Table 1 provides information on the student characteristics of the two samples.

Table 1.				
Student Characteristics of Sample 1 and Sample 2				
Subgroup	Sample 1 (<i>N</i> = 136,789)		Sample 2 (<i>N</i> = 898,517)	
	<i>n</i>	%	<i>n</i>	%
Female	73,265	54%	493,478	55%
Male	63,524	46%	405,039	45%
American Indian or Alaska Native	728	1%	5,091	1%
Asian, Asian American or Pacific Islander	12,442	9%	84,916	9%
Black or African American	8,388	6%	93,008	10%
Hispanic	11,203	8%	80,057	9%
White	92,211	67%	592,558	66%
Other	3,805	3%	32,264	4%
No Response	8,012	6%	10,623	1%
English Only	124,312	91%	791,188	88%
English and Another Language	7,368	5%	54,826	6%
Another Language	1,273	1%	13,403	1%
No Response	3,836	3%	39,100	4%
Less than \$30K	9,816	7%	89,588	10%
\$30K–\$50K	11,884	9%	94,392	11%
\$50K–\$70K	13,577	10%	97,960	11%
\$70K–\$100K	21,791	16%	139,630	16%
More than \$100K	31,318	23%	169,861	19%
No Response	48,403	35%	307,086	34%
No High School Diploma	2,892	2%	24,087	3%
High School Diploma	27,997	20%	213,706	24%
Associate Degree	8,597	6%	63,279	7%
Bachelor's Degree	44,805	33%	264,673	29%
Graduate Degree	43,608	32%	256,068	28%
No Response	8,890	6%	76,704	9%

Measures

SAT® Scores. For the two samples, SAT scores were obtained from the respective College Bound seniors cohorts (i.e., 2006 and 2007), which included students who graduated from high school in either 2006 or 2007 and had taken an SAT test. The SAT consists of three sections: critical reading, mathematics, and writing, each with a score scale ranging from 200 to 800 with 10-point increments. The SAT composite score is the sum of all three section scores and therefore has a score scale range of 600 to 2400.

Gender. Students provided their gender when they completed the SAT Questionnaire (SAT-Q).

Ethnicity. Students indicated their race/ethnicity on the SAT-Q. The categories include (1) Native American or Alaska Native; (2) Asian, Asian American, or Pacific Islander; (3) Black or African American; (4) Mexican or Mexican American; (5) Puerto Rican; (6) Other Hispanic, Latino, or Latin American; (7) White; and (8) Other. In this report, categories 4, 5, and 6 were combined into a single category titled “Hispanic.”

Best Spoken Language. Best spoken language was obtained from self-reported data on the SAT-Q. Response options included: English, English and Another Language, or Another Language.

Household Income. Household income was obtained from self-reported data on the SAT-Q.

Highest Parental Education. Parental education was also derived from self-reported data obtained from responses on the SAT-Q. Student responses were provided for both mother’s and father’s highest educational level. The highest degree (i.e., No High School Diploma, High School Diploma, Associate Degree, Bachelor’s Degree, or Graduate Degree) of either parent was used to create this variable.

Graduation. Four-year graduation data were available for Sample 1 directly from the students’ institutions. Six-year graduation data were available for Sample 2 from the National Student Clearinghouse (NSC) database. Note that for Sample 1, four-year graduation rates were based on graduating from the first institution a student attended since persistence data were provided by the institution. However, for Sample 2, six-year graduation rates were based on any institution the student attended.

Analyses

The analyses were purely descriptive in nature. Four- and six-year graduations rates for students who met the SAT College Readiness Benchmark (i.e., SAT total ≥ 1550) were computed and compared to graduation rates for students who failed to meet the SAT College Readiness Benchmark (i.e., SAT total < 1550). Results are presented overall and by student characteristics of gender, ethnicity, best spoken language, highest parental education, and household income.

Results

Four-Year Graduation Rates

Half of the students in Sample 1 graduated within four years, which is higher than the national four-year graduation rate of 36% for four-year institutions (Horn, 2010). Of the students who met the SAT College Readiness Benchmark of 1550, 58% graduated within four years compared to 31% of students who were not considered college ready (i.e., SAT total < 1550). That is, students who met or exceeded the benchmark were nearly twice as likely to graduate in four years as those who failed to meet the benchmark. The percentage of students graduating within four years by college readiness was further parsed by student characteristics of gender, ethnicity, best spoken language, household income, and parental education. Such analyses were conducted to determine whether students who were considered college ready had higher graduation rates than students who were not considered college ready regardless of their student characteristics (e.g., gender, ethnicity).

... students who met or exceeded the benchmark were nearly twice as likely to graduate in four years as those who failed to meet the benchmark.

Figure 1 provides the percentage of males and females considered college ready who graduated within four years as compared to their peers who were not considered college ready. Even though females were more likely than males to graduate within four years, a similar pattern emerged for both males and females when compared by college readiness. Namely, females who met the SAT benchmark were nearly twice as likely to graduate within four years as females who were not considered college ready (64% versus 35%). Similarly, 50% of males who met or exceeded the SAT benchmark graduated within four years as compared to 24% who were not considered college ready.

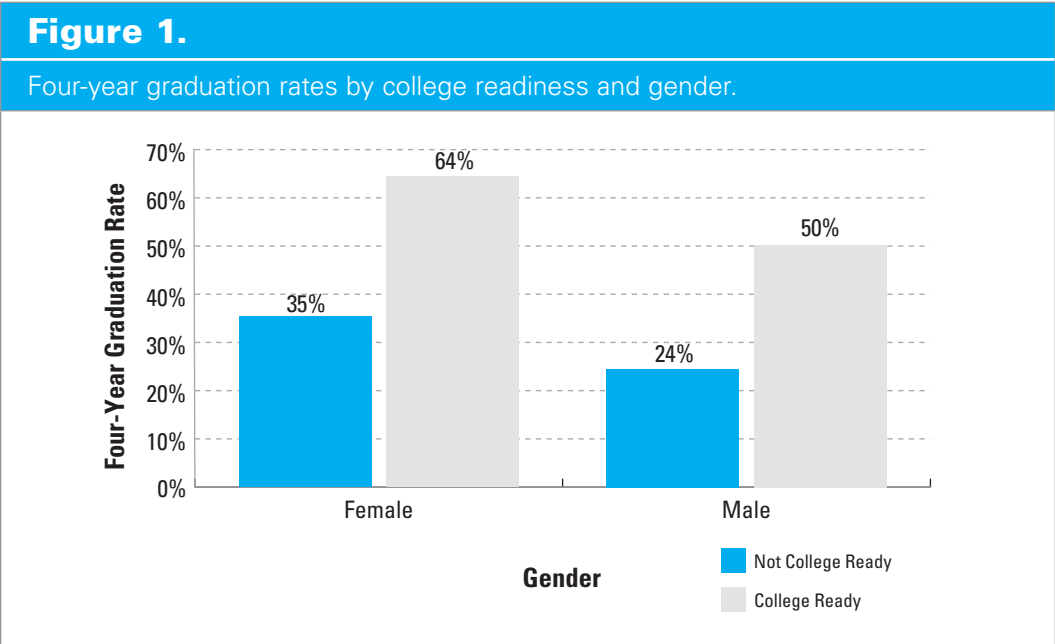
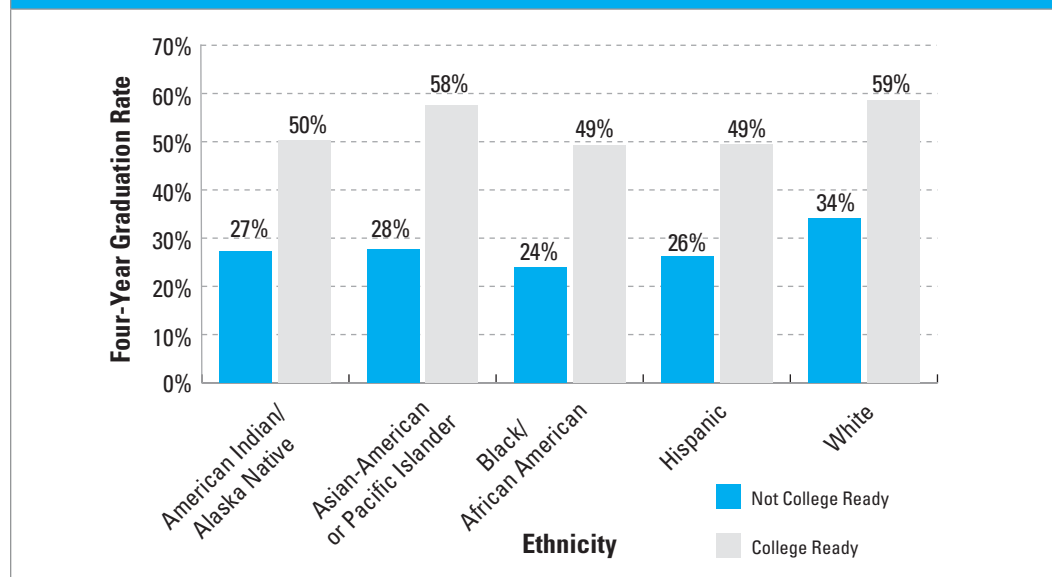


Figure 2 shows a similar trend for ethnicity with those attaining the SAT benchmark graduating at higher rates than those who did not meet the benchmark. Again, it becomes evident that college-ready students are roughly twice as likely to graduate in four years compared to their peers who are not considered college ready. Moreover, differences in graduation rates that are typically found in the literature are largely reduced when controlling for college readiness. For each racial/ethnic group, those meeting the SAT benchmark had four-year graduation rates ranging from 49% to 59% compared to 24% to 34% for those who were not college ready. Note that differences in graduation rates would be further reduced if actual SAT performance was controlled for rather than a crude dichotomy of the score scale (i.e., SAT composite <1500 versus ≥ 1550).

Figure 2.

Four-year graduation rates by college readiness and ethnicity.



Again, the same trend is echoed in Figure 3, which presents four-year graduation rates by college readiness for best spoken language subgroups. Graduation rates for the students meeting the SAT benchmark ranged from 51 % to 58 % as compared to 28 % to 34 % for those not meeting the SAT benchmark. Regardless of a student’s best spoken language, those who were deemed college ready had a similar likelihood of graduating in four years, just as those who were not considered college ready had a similar likelihood of graduating in four years.

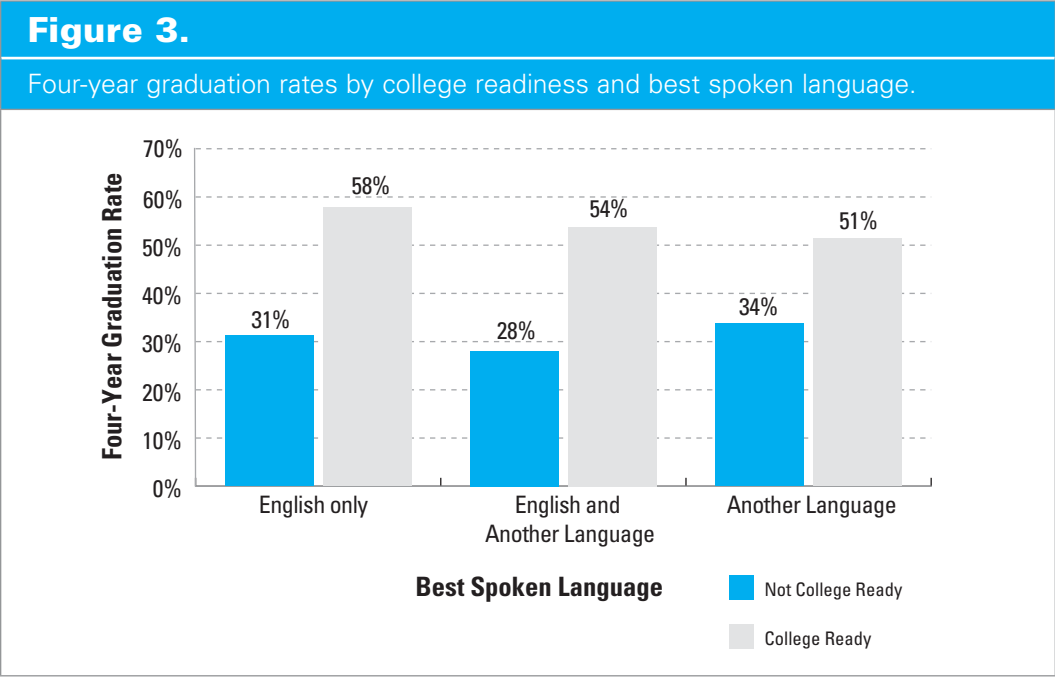
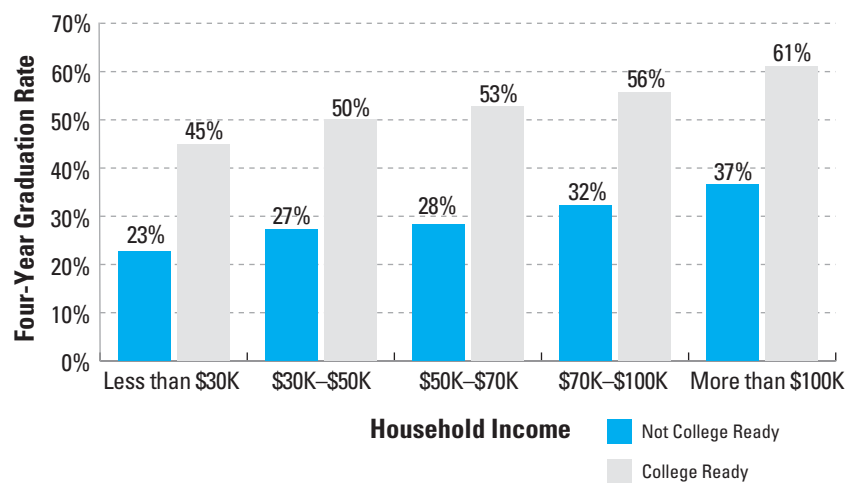


Figure 4 presents the four-year graduation rates by college readiness for household income subgroups. For those students considered college ready, graduation rates ranged from 45% for the lowest income level to 61% for the highest. For those not considered college ready, graduation rates ranged from 23% to 37% for the same respective income levels. That is, students who are college ready are roughly twice as likely to graduate in four years compared to their non-college-ready peers, regardless of household income. A positive relationship remains between income and graduation rates, even controlling for college readiness; however, note that the average SAT score for each of the income bands was not the same.

Figure 4.

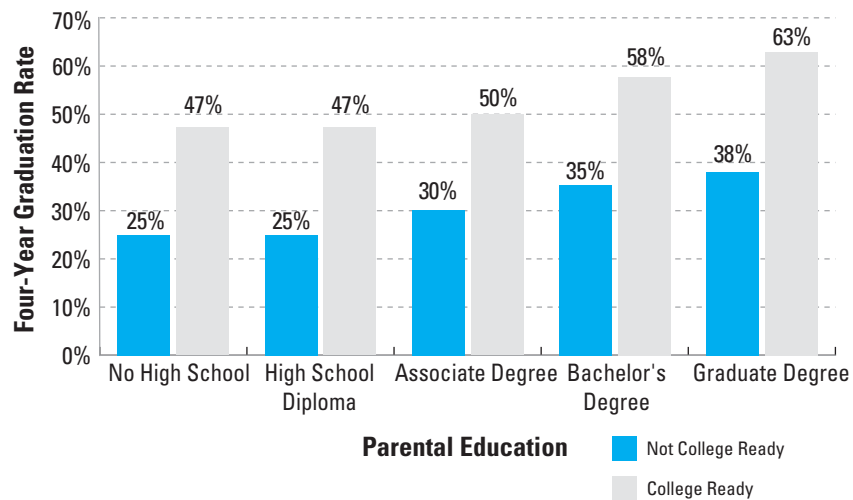
Four-year graduation rates by college readiness and household income.



A final point illustrating this trend is the relationship between four-year graduation rate and college readiness by highest parental education level, as displayed in Figure 5. For all levels of parental education, four-year graduation rates were higher for those who meet the SAT benchmark than they are for those who do not meet the benchmark. For the college-ready group, graduation rates ranged from 47% to 63% compared to 25% to 38% for the group that was not deemed college ready.

Figure 5.

Four-year graduation rates by college readiness and parental education.



Six-Year Graduation Rates

Based on the NSC sample of 898,517 students, 67% graduated within six years, which is higher than the national six-year graduation rate of 58% across four-year institutions (Horn, 2010). Note that the national statistics of 58% is based on a student's first institutions, not any institution. Comparatively, 59% of the sample had graduated from their first institution within six years. Of the students who met the SAT benchmark of 1550, 69% graduated within six years compared to 45% of students who were not considered college ready. In sum, the majority of students who were considered college ready had obtained a bachelor's degree six years later, whereas less than half of students who were not college ready obtained the same level of educational success.

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As was the case with Sample 1 and four-year graduation rates, the results were further parsed by student characteristics of gender, ethnicity, best spoken language, household income, and highest parental education to determine whether college readiness was indicative of future success for specific subgroups of students and not just for the overall sample. The trends by student subgroups were similar to that of the four-year graduation sample. In terms of gender (Figure 6), 81% of females who were considered college ready graduated within six years compared to the 57% who graduated within six years but were not considered college ready. Similarly for males, 73% of those meeting the SAT benchmark graduated in six years compared to the 48% graduating in six years who were not considered college ready. As was the case with four-year graduation rates, overall females had higher six-year graduation rates than males.

Figure 6.

Six-year graduation rates by college readiness and gender.

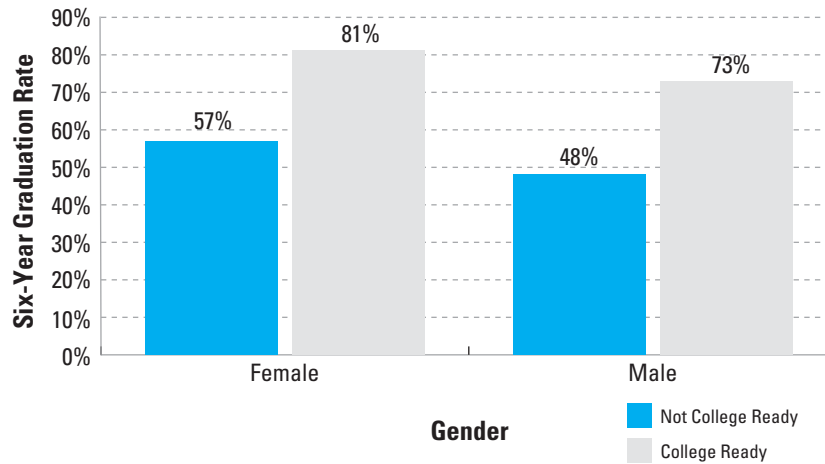
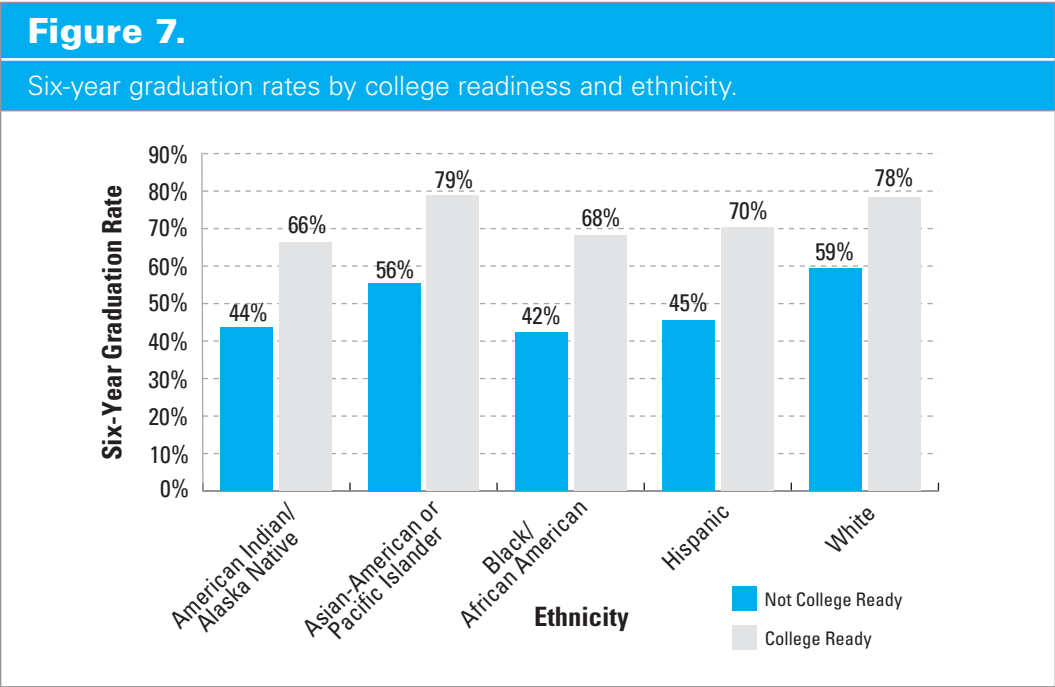


Figure 7 shows the six-year graduation rates by ethnicity. Regardless of one’s ethnicity, students who were college ready were more likely to graduate within six years with graduation rates ranging from 66% to 79% while those not meeting the SAT benchmark had graduation rates that ranged from 42% to 59%. The pattern of results is similar to those of four-year graduation rates by ethnicity.



In terms of best spoken language, those meeting the benchmark had six-year graduation rates ranging from 63% to 78% compared to 48% to 54% for those who did not meet the benchmark as displayed in Figure 8. Students who were considered college ready were more likely to graduate within six years than those who failed to meet the benchmark; however, students who indicated that their best spoken language was something other than English had the smallest difference in graduation rates by college readiness.

Figure 8.

Six-year graduation rates by college readiness and best spoken language.

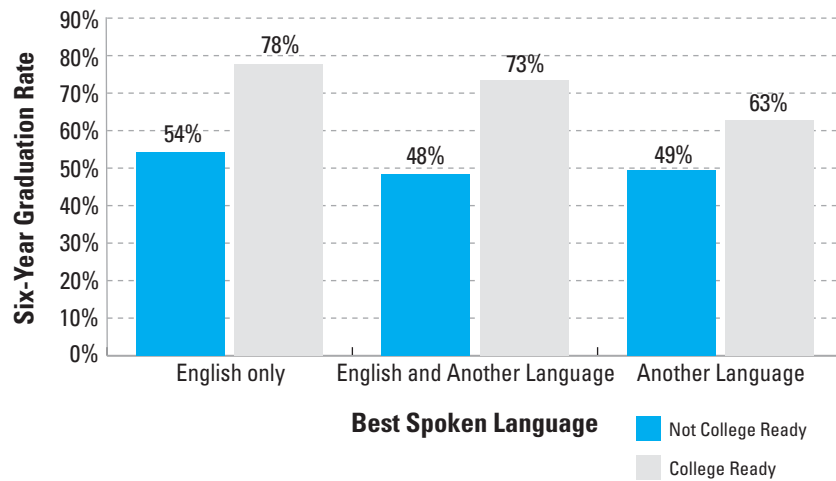
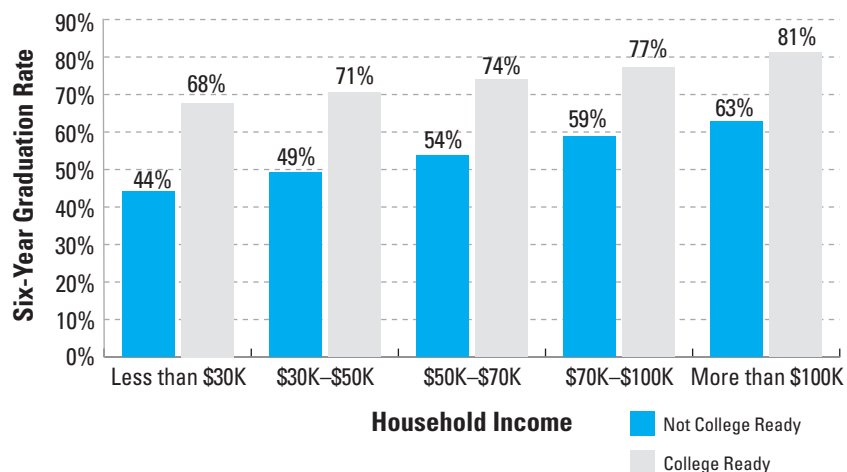


Figure 9 depicts the six-year graduation rates by college readiness for household income subgroups. For those students considered college ready, graduation rates ranged from 68% for the lowest income level to 81% for the highest. For those not considered college ready, graduation rates ranged from 44% to 63% for the same respective income levels. As was the case with four-year graduation results, a positive relationship remains between income and graduation rates, even controlling for college readiness; however, note that the average SAT score for each income band was not the same.

Figure 9.

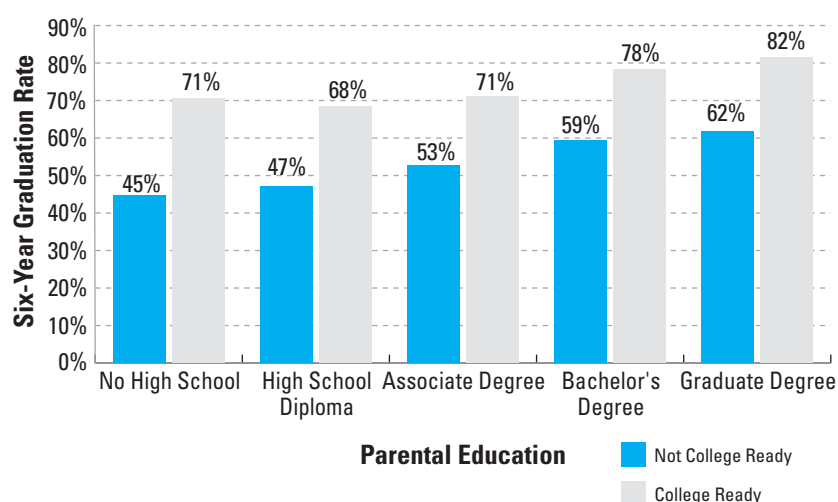
Six-year graduation rates by college readiness and household income.



Finally, in terms of highest parental education level, the six-year college graduation rates ranged from a low of 68% for the high school diploma category to a high of 82% for the graduate degree category for those meeting the benchmark, as displayed in Figure 10. The graduation rates for students not considered college ready were markedly lower with rates ranging from 45% for the lowest education category to 62% for the highest education category. As was the case with household income, a positive relationship between highest parental education level and graduation persisted even after controlling for college readiness. This can be partially explained by the fact that college readiness is based simply on a dichotomy of the SAT score scale; however, differences in SAT performance still persisted.

Figure 10.

Six-year graduation rates by college readiness and parental education.



Discussion

The purpose of the current study was to determine whether students who were initially considered college ready, based on the SAT College Readiness Benchmark, had long term educational success as evidenced by college graduation. When the SAT benchmarks were first developed in 2011, longitudinal data on the students in that study sample were not available. Analyses were conducted to examine how these students performed in their first year of college; however, data were not available to examine whether they had long term success represented by graduating from college with a bachelor's degree. With six years of data now available for students who took the SAT with the writing section (launched in March 2005), the opportunity presented itself to study both four- and six-year graduation rates for students who were considered college ready compared to those not considered college ready.

Based on the results for both four- and six-year graduation rates, students who scored a 1550 or higher on the SAT had a higher probability of graduating from college in four- or six-years compared to their non-college-ready peers. For the four-year graduation results, college-ready students were nearly twice as likely to graduate in that time frame as their peers who were not college ready. This was true even controlling for relevant student characteristics such as gender, ethnicity, best spoken language, household income, and highest parental education. Differences in graduation rates persisted for the longer time frame of six years. The results indicate that the SAT benchmarks are indicative of not only whether students perform well in their first year of college (65% probability of a B- or higher) but also of long term success such as graduation (either within four or six years), and graduation in a timely manner (graduation within four years).

When conducting research related to setting college readiness benchmarks, great care should be given to defining college readiness and the criterion used to set the benchmarks. The College Board chose FYGPA as the criterion and defined college readiness as having at least a 65% probability of earning a B-. However, interest in longer-term outcomes was a main impetus for conducting the current study. Namely, experts in the field of education and policy who participated in the original standard-setting panel for the SAT benchmarks offered college graduation as a possible and important criterion. With the availability of these graduation data, we could examine whether the students who were identified as college ready based on the empirical relationship between SAT performance and FYGPA were more likely to graduate from college, and furthermore, determine if they graduated in a timelier manner than those who were not considered college ready. The results of the current study indicated that this is the case. College-ready students have markedly higher four- and six-year graduation rates than their non-college-ready peers, providing further validity evidence for the SAT benchmark as an indicator of who is likely to be successful in college.

College-ready students have markedly higher four- and six-year graduation rates than their non-college-ready peers, providing further validity evidence for the SAT benchmark as an indicator of who is likely to be successful in college.

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The Research department actively supports the College Board's mission by:

- Providing data-based solutions to important educational problems and questions
- Applying scientific procedures and research to inform our work
- Designing and evaluating improvements to current assessments and developing new assessments as well as educational tools to ensure the highest technical standards
- Analyzing and resolving critical issues for all programs, including AP[®], SAT[®], PSAT/NMSQT[®]
- Publishing findings and presenting our work at key scientific and education conferences
- Generating new knowledge and forward-thinking ideas with a highly trained and credentialed staff

Our work focuses on the following areas

Admission	Measurement
Alignment	Research
Evaluation	Trends
Fairness	Validity

