CollegeBoard

Research Evidence on the Relationship Between SAT® Scores and Postsecondary STEM Success

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Executive Summary

Recent research demonstrates that SAT® scores are valuable at many points of the enrollment cycle, including post-admission, when colleges are making critical decisions on student majors, advising and course selection, and looking for early indicators that students may be at-risk and in need of additional academic support. These early indicators may be helpful before the first academic term begins as well as early in that first term, before course grades are available to provide relevant feedback. In particular, SAT scores provide valuable data to inform student readiness for STEM majors, for the thoughtful implementation of academic advising and support in STEM, and for course placement decisions. The latest body of evidence shows:

- Among all college majors examined, SAT scores add the most predictive value for understanding college performance in STEM subjects, including math, engineering, and physical sciences.
- SAT scores can help institutions target academic support resources to students who need them most to be successful in STEM coursework in the first year of college.
- SAT Math scores provide unique information beyond HSGPA, to predict first-semester and first-year math performance.
- SAT score value for predicting college STEM outcomes hold for institutions of all selectivity levels and under test-optional admission policies. Notably with test optional admissions, institutions lose STEM readiness visibility among the very students who need the most care in major selection, advising, support, and placement.

Introduction

There is a growing body of research demonstrating the value of SAT scores for understanding student readiness for college level work in science, technology, engineering, and math (STEM) fields. This evidence builds on studies showing that SAT scores predict performance through each year of college (Marini et al., 2024) as well as on-time degree completion (Westrick et al., 2022), and the SAT has predictive value over and above the information provided by students' high school GPAs.

College admissions and grading policies and practices have changed in recent years, necessitating a fresh look at the evidence on how to support student success. Although college grades increased, on average, after the pandemic relative to before (Westrick et al., 2024; Bloem et al., 2025), measures of college readiness tell contradictory tales about student preparation. While high school grades are generally increasing among incoming college students during the early years of the pandemic, SAT scores are generally decreasing over the same time period. College faculty report that student readiness is aligned with decreasing SAT scores rather than increasing HSGPAs, and affirm that the declining trend in academic preparation is particularly concerning when evaluating readiness for STEM coursework, and especially math coursework.

Recent research also clearly demonstrates how weaker performance in the first year of college has lasting consequences for students (Westrick et al., 2023a). For example, among students with first year college GPAs (FYGPAs) between 2.00 and 2.49, only 28% graduated within four years and just 18% had a fourth-year cumulative GPA of 3.00 or higher, which can open doors for graduate programs and employer recruiting opportunities. Students with FYGPAs below 3.00 are more likely to be first-generation college students, underrepresented minority students, and students from more challenging neighborhood environments. Institutions with a desire to support all students through a successful college completion journey, particularly in the STEM fields, find SAT scores are a useful tool to support student success. Regardless of admission test policy, SAT scores can be used at other points in the enrollment cycle for:

(1) evaluating **student readiness for particular majors** such as those in the STEM fields,

(2) **academic advising** conversations and possible supplemental supports, and

(3) **course placement** decisions.

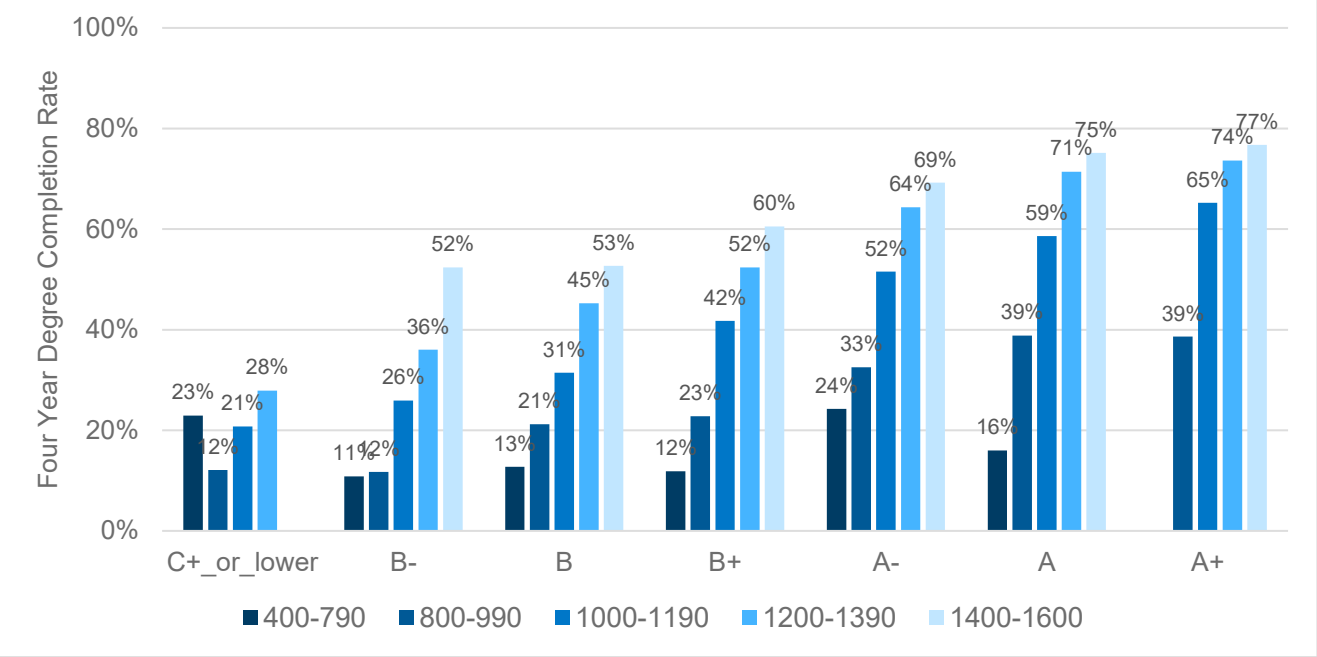
SAT scores provide valuable information to inform these campus conversations for all institution types, ensuring opportunities for all students throughout the college experience and beyond (Marini et al., 2019; Westrick et al., 2025).

SAT and Readiness for STEM Majors

Among all college majors examined, SAT scores add the most predictive value for understanding college performance in STEM subjects, including math, engineering, and physical sciences (Westrick et al., 2021). The SAT is useful for evaluating student readiness for STEM majors, particularly for campuses that admit directly to major, and for feeling confident that students can manage the rigors of STEM coursework in college.

Figure 1 shows on-time STEM degree completion rates at moderately selective four-year institutions for students with different HSGPAs and SAT scores. The Appendix contains analogous figures for more and less selective institutions, which display similar patterns to those in the figure below. There are notable differences in STEM degree completion rates among students with the same HSGPA, but with different SAT scores. For example, among college students with an "A" HSGPA, 71% of those with SAT scores between 1200 and 1390 complete their STEM degree in four years compared to only 59% of those with an SAT score between 1000 and1190. Strong high school performance measured by HSGPA is not enough information to accurately predict STEM readiness or the likelihood of on-time degree completion in STEM fields. SAT scores provide additional, critical information to institutions that admit students directly to STEM majors/colleges.

Figure 1: STEM Major Degree Completion Rates in Four Years at Institutions with Admit Rates of 25-50 Percent, by SAT Score and HSGPA



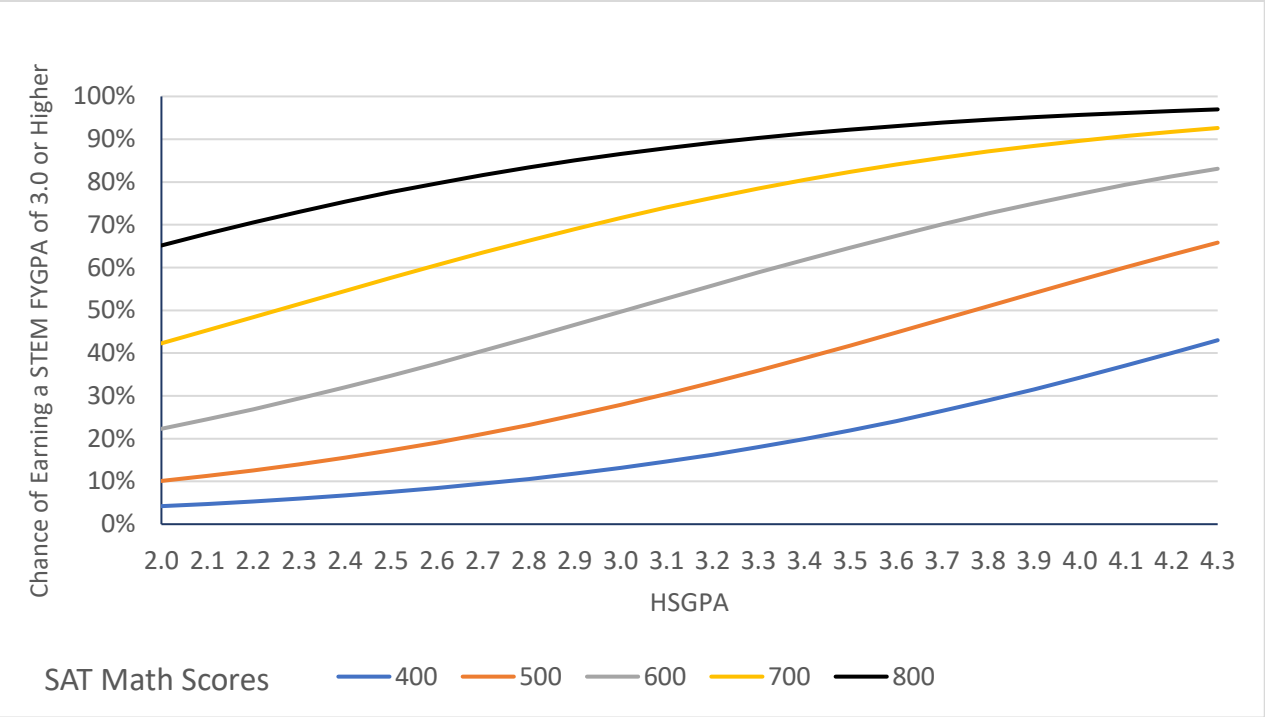
Note: Data represent students in the 2017 entering college cohort with SAT scores and self-reported HSGPAs who indicate majoring in a STEM field in the first or second year of college.

SAT Math and Academic Advising & Student Support in STEM

SAT scores help institutions target academic advising and support resources to students who need them most to be successful in STEM coursework in the first year of college. Some students may need additional academic support or advising services to be successful in early college STEM coursework and the SAT is a useful tool for identifying which students may benefit from additional support. With so many high school students earning very strong HSGPAs (Goldhaber and Young, 2024; College Board, 2024), it can be difficult to ascertain student readiness for the rigors of STEM coursework in the first year. Recent research shows a 38% improvement in the prediction of first-year college performance for STEM majors (versus 22% for overall sample) when the SAT and HSGPA are used together by colleges, instead of using HSGPA alone (Westrick et al., 2023b).

Figure 2 demonstrates usefulness of SAT math scores for distinguishing between stronger and weaker predicted STEM performance among college students with the same HSGPA (Westrick et al., 2023b). At every point along the HSGPA scale on the horizontal axis, students with higher SAT math scores have higher chances of earning a GPA of 3.0 or higher within their first-year STEM coursework (e.g., Calculus, Chemistry, Biology, Computer Science, etc.). For example, among college students with a HSGPA of 4.0, a student with an SAT Math score of 600 has a 77% chance of earning a STEM FYGPA of 3.0 or higher compared to only a 57% chance for a student with an SAT Math score of 500. SAT math scores, along with HSGPA, can help institutions efficiently target costly academic advising support resources upon enrollment to those students who will need them most and appropriately scaffold their first-year experience (Westrick et al., 2020).

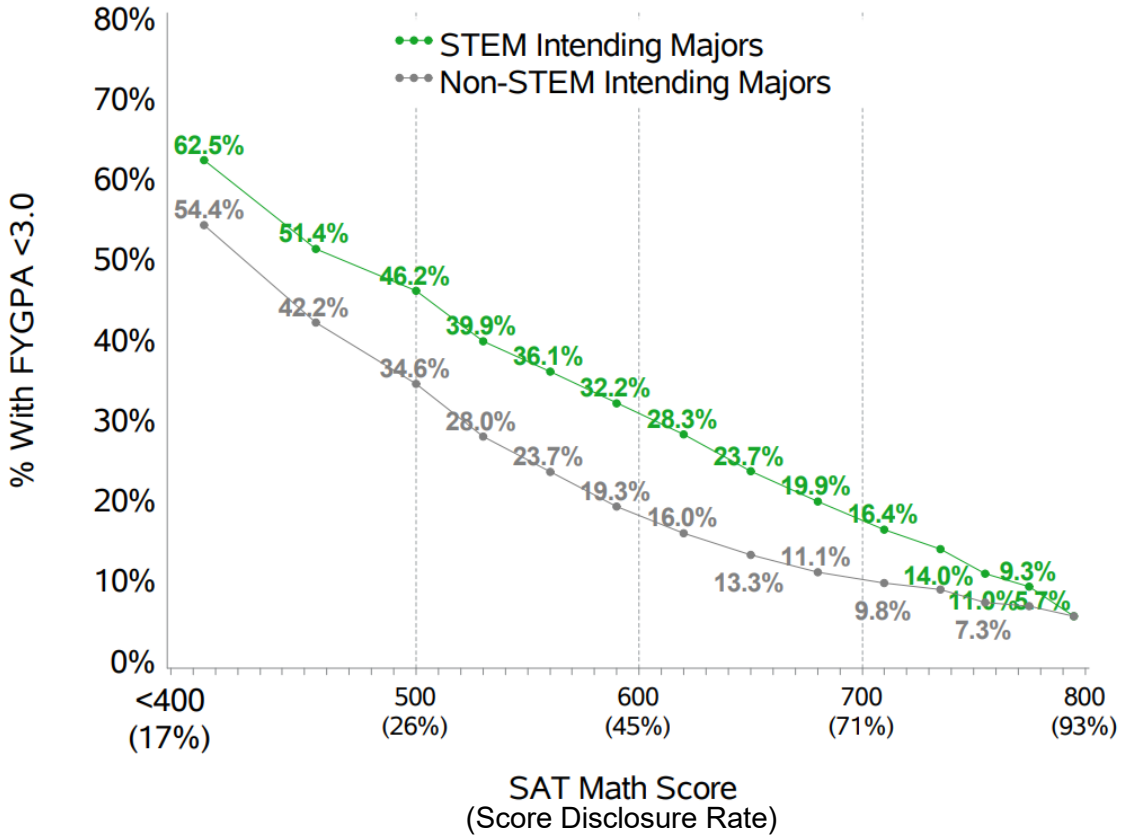
Figure 2: Probability of a STEM FYGPA 3.0 or Higher, by SAT Math Score and HSGPA



Source: Westrick et al. (2023b).

New research examines the academic risk of lower first-year performance since the introduction of widespread test-optional admissions policies brought about by the pandemic (Bloem et al., 2025). In a test-optional environment, SAT math scores remain highly predictive of FYGPAs below 3.0, particularly in STEM. As shown in Figure 3, more than 40% of STEM students with SAT math scores of approximately 500 or lower are predicted to earn FYGPAs below 3.0 and be at academic risk. Colleges that are test-optional for admissions and who do not collect test scores at the point of enrollment lack visibility that would enable targeted advising and support. As seen in parentheses on the horizontal axis, students with lower test scores generally are less likely to submit scores under test-optional. For example, only one-quarter of students with SAT math scores of 500 disclose test scores under test-optional admissions policies. Thus, the very students at greatest risk of lower performance in STEM are the least likely to share SAT scores that would help identify them for advising and support.

Figure 3: Probability of a FYGPA 3.0 or Lower, by SAT Math Score and Score Disclosure Percentage Under Test-Optional Admissions



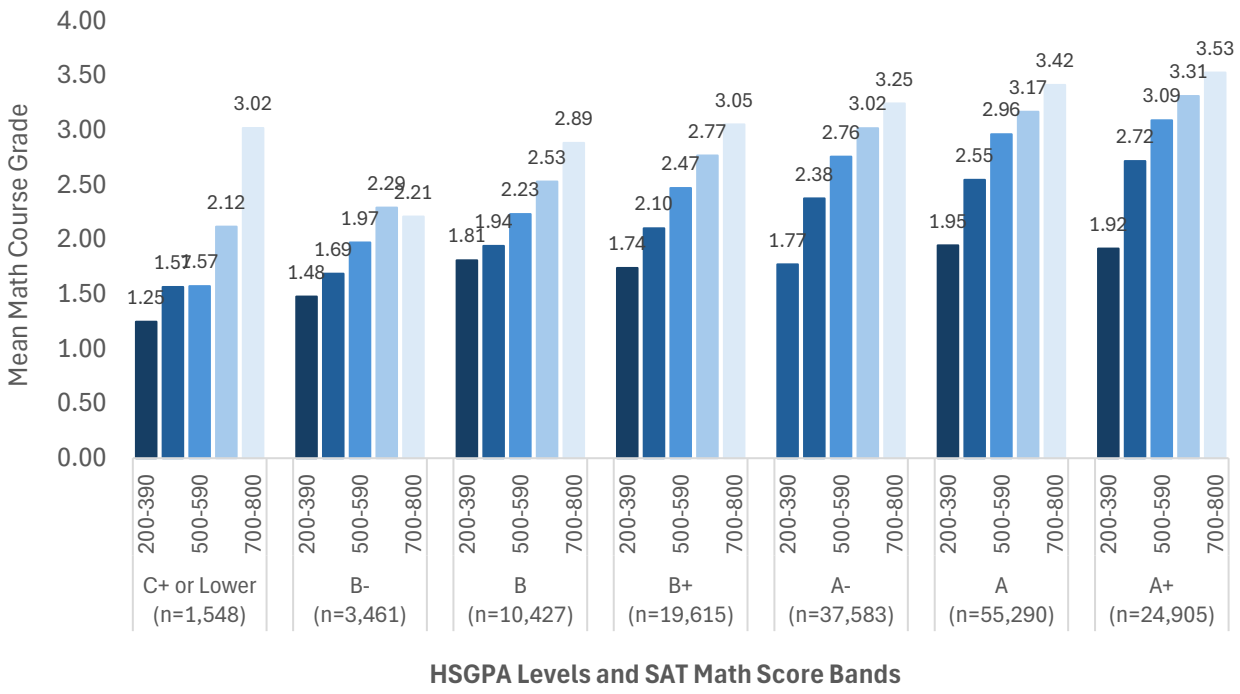
Source: Bloem et al. (2025).

SAT Math and Course Placement

SAT math scores provide critical information beyond HSGPA, to predict first-semester and first-year math performance in specific coursework (Westrick et al., 2020; Westrick et al., 2023b; Westrick et al., 2025). When students are accurately placed into appropriate entry level math courses, they are set up for success in ways that contribute to persistence through each year of college and on-time degree completion (Ganga and Mazzariello, 2019).

Figure 4 shows average first-year math course grades by SAT math score bands for students with the same HSGPAs. Students' average math course grades increase with SAT math scores for students in every HSGPA category. Even for the strongest students with an A+ HSGPA, students in the 400 to 490 SAT math section score band earned an average math GPA of 2.72, while similar A+ students with SAT math scores between 500 and 590 had an average math GPA of 3.09. Recent research on SAT math scores demonstrates that HSGPA information is not enough to evaluate student readiness for college level coursework in math; SAT math scores provide crucial information for placement decisions (Westrick et al., 2025).

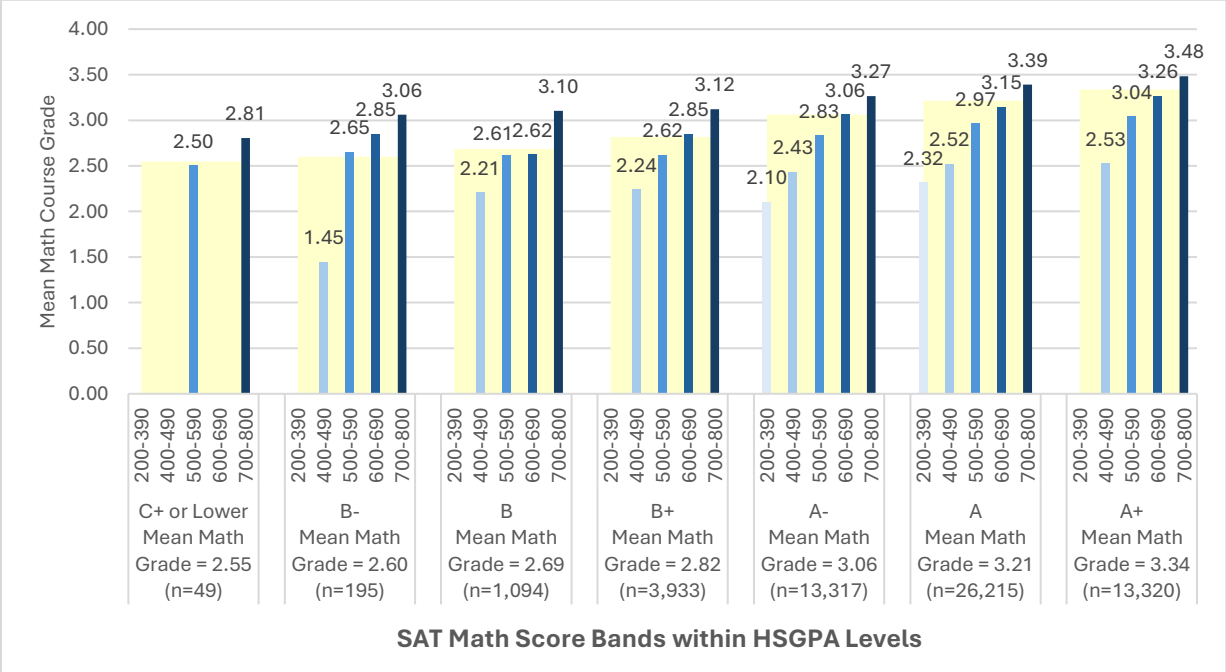
Figure 4: Average Math Course Grades by SAT Math Score Bands and HSGPA



Source: Westrick et al. (2025).

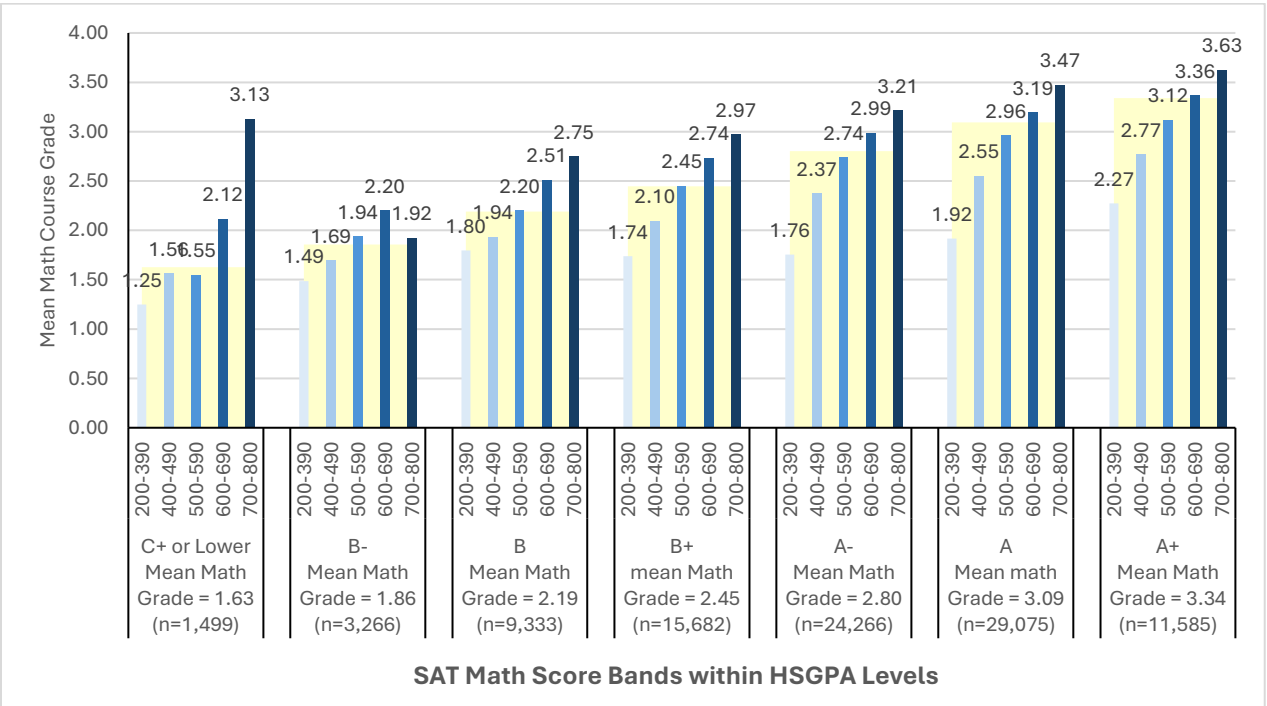
Recent research also shows that the predictive value of SAT math scores above and beyond HSGPA for college course placement decisions holds across institutions of varying selectivity (Westrick et al., 2025). For example, the wide yellow bars in Figure 5 demonstrates that, at more-selective institutions with admit rates below 50 percent, the average first-year math GPA for all students with an “A” HSGPA is 3.21, while first-year math GPAs varied from 2.32 to 3.39 for “A” students from the lowest to the highest SAT score bands. Figure 6 affirms these patterns also hold for institutions with admit rates above 50 percent. This additional information provided by SAT math scores reveals the nuance in math readiness needed to place students in the correct math course at all colleges and universities.

Figure 5: Average Math Course Grades by SAT Math Score Bands and HSGPA, Institutions with Admit Rates Below 50 Percent



Source: Westrick et al. (2025).

Figure 6: Average Math Course Grades by SAT Math Score Bands and HSGPA, Institutions with Admit Rates Above 50 Percent



Source: Westrick et al. (2025).

Discussion

This synthesis of recent research connects SAT validity evidence across many studies to institutional decisions that support student success in STEM. These studies show that the SAT is a useful tool for evaluating student readiness for STEM coursework and majors needed in admissions, advising, student support, and course placement. The evidence is particularly compelling for SAT math scores, which are strong predictors of academic risk and success in first-year courses and for STEM majors, generally. The most recent evidence demonstrates these patterns hold under recent changes to college admissions policies and practices, and reveals the higher stakes for admitting, supporting, and placing lower-scoring students who opt not to share test scores in a test-optional environment. Institutions can feel confident collecting and using SAT scores to inform important campus decisions that support student success in STEM.

Institutions with test-optional policies that do not collect test scores when students enroll are lacking visibility into student readiness and success in STEM fields. It's therefore unsurprising that multiple test-optional institutions require or request test scores for students at the point of enrollment to use them for the purposes described in this study.

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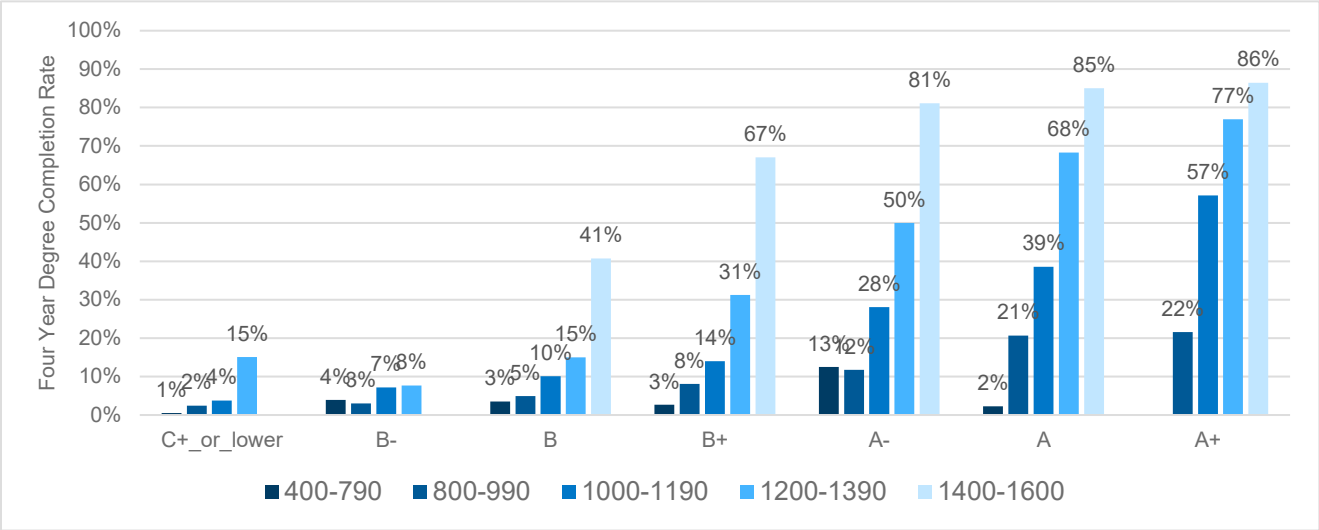
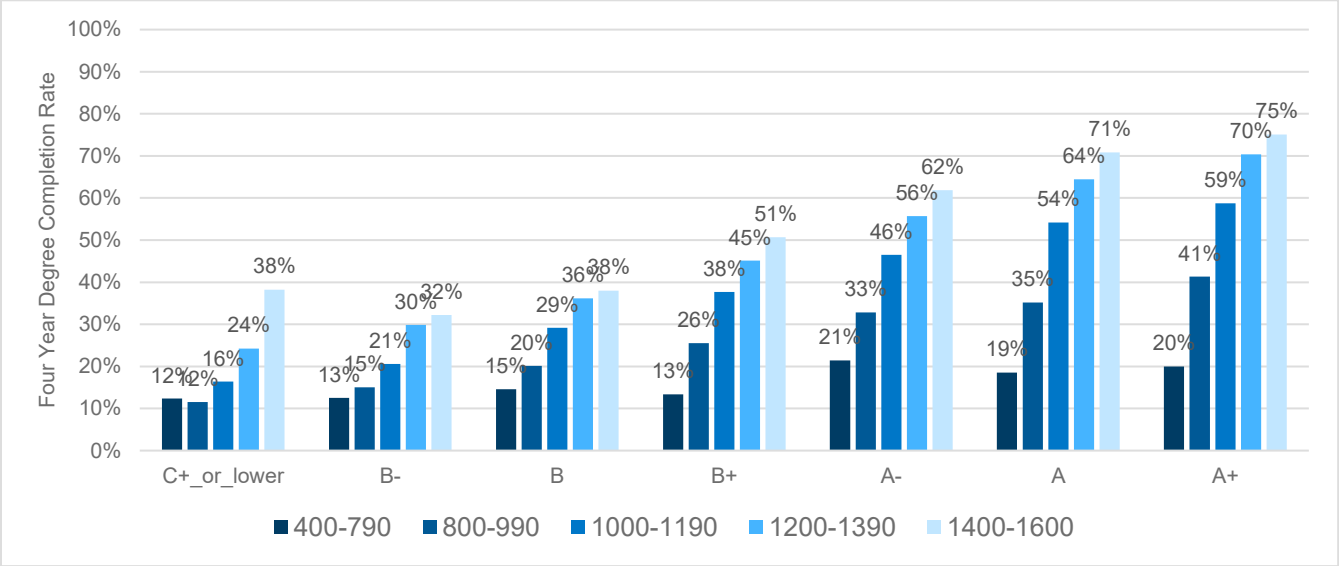
Appendix

Figure 1A: STEM Major Degree Completion Rates in Four Years at Institutions with Admit Rates Below 25 Percent, by SAT Score and HSGPA



Note: Data represent students in the 2017 entering college cohort with SAT scores and self-reported HSGPAs who indicate majoring in a STEM field in the first or second year of college.

Figure 1B: STEM Major Degree Completion Rates in Four Years at Institutions with Admit Rates Above 50 Percent, by SAT Score and HSGPA



Note: Data represent students in the 2017 entering college cohort with SAT scores and self-reported HSGPAs who indicate majoring in a STEM field in the first or second year of college.

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