

Increasing Admission of Low-Income Students in Engineering

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In a randomized experiment, admissions officers were 13 percentage points more likely to admit a low-SES engineering student when they had more robust data on high school context.

Students from low socioeconomic (SES) backgrounds remain underrepresented at selective colleges and universities, with students from the lowest quartile constituting only about 4% of total enrollment. Institutional stratification among elite schools is particularly troubling, as low-income students have better academic performance and higher graduation rates once admitted to these institutions. Students from low-SES families are more likely to attend underserved high schools that offer fewer advanced courses and support services critical for admission to elite institutions. However, this dearth of resources can go unnoticed when admissions officers rely on incomplete high school profiles, anecdotal information, and personal experience. A lack of data on school curricula (e.g., advanced coursework availability) and student demographics can leave officers unaware of inequalities of opportunity among prospective students.

Because a college degree is often one's ticket to the middle class, the underrepresentation of low-income students at selective institutions has gained national attention, from *The New York Times* to the Obama administration.

The federal government has recently made several efforts to improve access for less wealthy students, including investments in Pell Grants, increased college tax credits, reformed student loans, and new tactics to decrease college costs. Over the past two years, the White House has also convened hundreds of college presidents in two summits to address methods to expand opportunity for low-income college students. The summits have resulted in more than 500 commitments to make progress on identified barriers for low-income students, in addition to substantial philanthropic investments like the \$30 million Michael and Susan Dell Foundation pledge to improve college graduation rates.

The Experiment

To support these efforts to diversify selective colleges, we investigated whether more detailed information on

high school contexts would improve the probability that admissions officers would recommend admitting prospective students from low-income families. We specifically examined the possible influence of correspondence bias, or the human tendency to attribute decisions to a person's disposition or personality rather than one's situation. Because college applications contain a great deal of decontextualized information, we hypothesized that correspondence bias may influence the evaluation of college applications by causing admissions officers to discount the importance of high school and family context in evaluating credentials.

With the help of the National Association of College Admissions Counselors (NACAC), we recruited 311 admissions officers at 174 undergraduate science and engineering programs ranked in the top three tiers of institutional selectivity by Barron's Profiles of American Colleges. The admissions officers regularly read admissions files and were 57% female, 77% White/Caucasian, 10% Black/African American, 9% Latino/Hispanic/Chicano, 6% Asian American/Pacific Islander, and 1% American Indian/Alaska Native.

Participants evaluated three simulated admissions files of hypothetical applicants from different socioeconomic backgrounds. To control for any effect of race/ethnicity, gender, or academic discipline, all applicants were White males applying to engineering majors. The order in which applications were provided to admissions officers was randomized to mitigate effects of evaluating applications in relation to one another as opposed to individual merit. Admissions officers were instructed to use their institutions' standard policies and admissions criteria to determine whether to admit or reject each applicant, and the applications were adjusted to the selectivity of their own institution.

Each file had varying degrees of information about the student's high school context and family background in relation to their academic performance. Participants in the limited-information condition ($n = 154$) were provided

HIGHLIGHTS

- Students from low-income and low-SES backgrounds are still highly underrepresented at selective colleges, representing only 4% of the incoming class across all schools. This seems to be particularly true in engineering and STEM, yet these degrees can be a ticket to the middle class for those who succeed academically.
- Understanding of high school context is crucial for a truly fair and holistic review of all applicants. Often admissions officers have to rely upon profile sheets or other inaccurate measures of context. If high school context is poorly understood, admissions officers may be less likely to admit low-income students whose raw academic credentials do not compare favorably to more privileged applicants.
- After a fairly simple intervention where we provided consistent data on AP and advanced course taking, percentage of students on free/reduced lunch, and other important measures, admissions officers were 13-14 percentage points more likely to admit a low-SES applicant when reviewing simulated applications.
- These findings were consistent across college selectivity, the race, gender, and educational background of the admissions officer, and the practices and workload of the admissions office.

parental education level and the following high school data: name (fictitious), state, institutional control (public), number of students, and graduation rate. (Graduation rate is strongly associated with average socioeconomic status at a high school.) The detailed condition (n = 157) contained all the information from the limited condition as well as the following high school data: college enrollment rates; average standardized test scores; number of AP courses offered; and percentage of students 1) eligible for free/reduced-cost lunch, 2) with limited English proficiency, and 3) who received a score of at least 3 on AP examinations (which is often considered a passing grade). The detailed condition also indicated each applicant's high school percentile for GPA (weighted and unweighted) and number of honors/AP classes. The intent in providing greater information on applicants' high school and academic performance in relation to high school peers was to equip admissions officers with multiple pieces of evidence to evaluate applicants in context. There was adequate information in the limited condition to assess the SES of the applicant, but the detailed condition provided a more complete, robust picture of the applicant's high school context.

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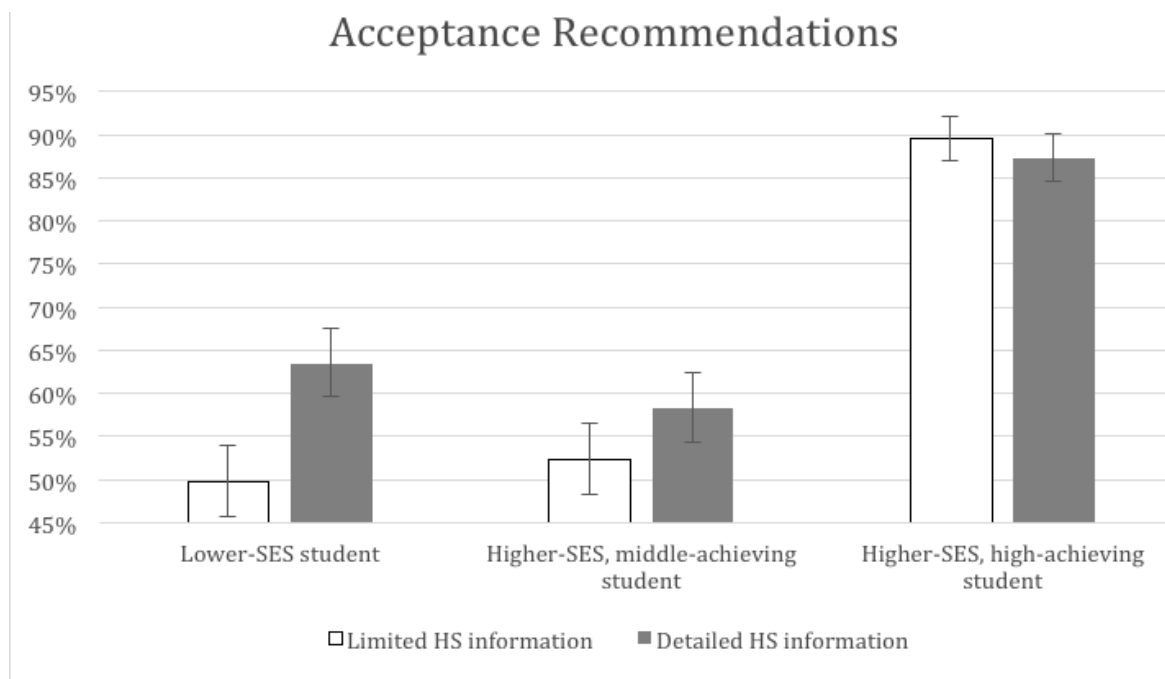
Results

We found that the quality of contextual information provided by high schools can have a significant impact on the admission of low-income students. As illustrated in Figure 1, admissions officers provided with more detailed information about the high school context were 13-14 percentage points more likely to recommend admitting a low-SES applicant from an underserved high school.

This pattern held constant even though all admissions officers knew that our applicant came from a low-SES family. Admissions officers also assigned higher rankings to academic performance and personal essays when provided better high school descriptions, further demonstrating their evaluation of applicants in context.

The experimental results suggest that a relatively simple intervention can help selective colleges and universities make better-informed admissions decisions that benefit low-income students. These findings were consistent across all measured characteristics of admissions offices and admissions officers, including selectivity of the institution, the race/gender/class of the admissions officer, and the work experience of the admissions officer. Outcomes were also independent of admissions office processes, including use of committees, numbers of applications reviewed, or time dedicated to prospective student materials. As a result, this study provides strong evidence that insufficient quality information from high schools may partially contribute to lower acceptance rates of low-SES students in selective colleges and universities.

Acceptance Recommendations



Policy and Practice Implications

Several promising interventions to substantially raise the admission rates of low-income students in selective science and engineering programs emerge from this work.

- **Quality Contextual Information for All Applicants**

This study provides quantifiable evidence to support admissions officers' sentiments that greater information enables more nuanced and equitable decision-making and, in turn, increases the likelihood of admitting low-SES students. Detailed information on high-school environments, student populations, and resources can reduce decision-making biases and prompt more thoughtful consideration of educational and familial contexts when evaluating applicants. Several qualified organizations to guide the provision of more consistent, detailed high school data include The College Board, ACT, and The Common Application.

- **Raising Awareness of Cognitive Biases**

The results also indicate that implicit bias in college admissions may disadvantage low-income students. However, standardizing high-quality, contextual information across all college admissions files can ameliorate these biases. Admissions offices should educate application readers about unconscious biases and situations in which such biases may be more likely to occur. Admissions officers can also combat bias by intentionally giving more thorough consideration to student backgrounds when evaluating scholastic accomplishments, or by changing the order in which readers review information to give more emphasis to high school and family context. Such efforts will result in more individualized, comprehensive, and equitable assessments of high school contexts.

- **Achieving Diversity Goals**

Thorough high school data can also help college and universities better enact institutional priorities to expand diversity in terms of socioeconomic background. Specifically, more nuanced information on students' high school environments better positions admissions officers to discern structural inequities influencing academic performance. Admissions offices can then use this information to make better-educated evaluations of low-income students in light of their educational opportunities.

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