Improving Admission of Low-SES Students at Selective Colleges: Results from a National Experiment

Michael N. Bastedo (corresponding)
Center for the Study of Higher and Postsecondary Education
University of Michigan
610 E. University, 2117 SEB
Ann Arbor, MI 48109
bastedo@umich.edu
cell: 734.272.7619; work: 734.615.3349

Nicholas A. Bowman
Center for Research on Undergraduate Education
University of Iowa
N491 Lindquist Center
Iowa City, IA 52242
nick-bowman@uiowa.edu
319.335.5372 (office)

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Abstract: Low-SES students are underrepresented at selective colleges, but the role that admissions offices play is poorly understood. Because admissions offices often have inconsistent information on high school contexts, we conducted a randomized controlled trial to determine whether providing detailed information on high school contexts increases the likelihood that admissions officers (n = 311) would recommend admitting low-SES applicants. Admissions officers in the detailed-information condition were 13-14 percentage points more likely to recommend admitting a low-SES applicant from an underserved high school than those in the lower-information condition, even though the limited-information condition provided significant details about family SES and high school context. These findings were consistent regardless of the selectivity of the college, admissions office practices, and participant demographics.

Keywords: college admissions, low-income students, undermatching, correspondence bias, cognitive bias, decision making, randomized controlled trial

A substantial number of highly-qualified, low-income students do not enroll in selective colleges (Bastedo & Jaquette, 2011; Hoxby & Avery, 2012), and enrollment gaps in science and engineering are particularly disparate (Chen, 2009; Museus, Palmer, Davis, & Maramba, 2011). Nonetheless, once they enroll in these colleges, low-income students often succeed academically and graduate at high rates (Bowen, Chingos & McPherson, 2009). Because admissions offices are so reluctant to be studied, surprisingly little research has been conducted on the effects of selective colleges' own admissions practices, particularly with respect to applicants from lower socioeconomic status (SES) families. Although issues with access for low-SES students are well documented, admissions officers often lack evidence-based practices that would allow them to make decisions that simultaneously maximize access and excellence.

We drew upon a nationally-representative pool of college admissions officers to conduct a randomized controlled trial to demonstrate how decision-making biases may interact with the structure of admissions applications, particularly with respect to low-SES applicants in science and engineering. Despite a robust research program among decision theorists since the 1970s, little work on such cognitive biases exists in educational contexts (Moore, Swift, Sharek, & Gino, 2010; Swift, Moore, Sharek, & Gino, 2013) or in examining how cognitive biases may play a role in reproducing inequality.

This research is particularly salient given growing concerns about undermatching and the representation of low-income and first-generation college students on selective college campuses. The undermatching literature defines the problem of low-income student representation as largely one of identification and recruitment – where are the best low-income students, and how do we get them to apply? This relies upon the flawed assumption that once low-income students apply that they will be admitted on their academic merits (Bastedo &

Flaster, 2014). However, undermatched students generally come from low-SES high schools that offer fewer advanced courses, which are crucial for admission to selective colleges. And there are reasons to believe that admissions officers may discount the important ways that contextual opportunities shape student achievement.

Correspondence Bias and College Admissions

In this study, we examine the possible role of *correspondence bias*, which is the human tendency to attribute decisions to a person's disposition or personality rather than to the situation in which the decision occurs (Gilbert & Malone, 1995; Ross & Nisbett, 1991). This phenomenon has been dubbed the "fundamental attribution error," because it is so common and has been demonstrated repeatedly across many contexts (Ross, 1977). In a famous experiment demonstrating correspondence bias, participants were asked to conduct a quiz bowl and randomly assigned to the role of quizmaster, contestant, and audience member (Ross, Amabile, & Steinmetz, 1977). Quizmasters were asked to write questions based on their personal, esoteric knowledge. One might expect observers to note how unfair this game is for contestants, since almost everyone knows some random facts that most people do not. Yet after the quiz, observers consistently rated the randomly-selected quizmasters as having much more "general knowledge" than the contestants; thus, observers routinely attributed task performance to dispositional attributes (i.e., general knowledge) even when the situation was designed so that the quizmaster clearly had a substantial advantage. Dozens of experiments have demonstrated these correspondence bias effects both among novices and experts (Ross & Nisbett, 1991).

Based on this research, we hypothesized that correspondence bias is likely to be present in the evaluation of high school academic credentials during the college application review

process. Applicants from under-resourced high schools have reduced access to the honors and Advanced Placement (AP) courses (Attewell & Domina, 2008; Klopfenstein, 2004; Perna, 2004) that are strong predictors of admission to selective colleges (Espenshade & Radford, 2009). To help balance the playing field, selective colleges that use holistic admissions practices wish to identify applicants who maximize the opportunities available at their high school (Lucido, 2015; Mamlet & Vandevelde, 2012). As a result, providing higher-quality information on high school context should make this information more salient, making it more likely that admissions officers will admit a low-SES applicant as admission officers account for applicants' external circumstances. Because high-SES applicants often do not face these types of environmental constraints, correspondence bias likely has a disproportionately negative effect on low-SES applicants. Prior research has found, for example, that stereotypes about racial minorities lead to a greater prevalence of correspondence bias (Eberhardt, 1993).

Many admissions officers do not have consistent, high quality data available to them about school context, such as the percentage of students who are English language learners or who qualify for free, government-subsidized school lunches (Bastedo, 2014). As a result, admissions officers occasionally resort to searching for high school information on the Internet, but that information is often dated, inaccurate, or impossible to find; these information problems are even more likely for applicants from low-SES high schools. On a regular basis, however, admissions officers simply do not have the time to conduct additional research on each application. During the busy times of the admissions cycle, participants in our study read an average of 137 files per week, and about 25% of these admissions officers reported reading at least 200 applications per week. In addition, selection bias can be enacted through which applications admissions officers choose to investigate and which they do not.

Most importantly, high-quality contextual information is most likely to mitigate correspondence bias when it is provided clearly and consistently. The availability heuristic ensures that we are biased towards information that is readily at hand, and correspondence bias ensures that we are biased toward information that relates to dispositions rather than contexts. As Kahneman (2011, p. 86) says most simply, "what you see is all there is." However, evidence suggests that our natural biases can be mitigated by providing high-quality and robust information. In a study of anchoring bias, for example, Galinsky & Mussweiler (2001) show that the anchoring power of the first offer in a negotiation can be eliminated by providing strong inconsistent information, providing a different perspective.

Thus, in the present study, we will experimentally manipulate the quality of high school information provided in the application. In the limited condition, we provide enough information to assess socioeconomic status through parental education and high school graduation rate. In the more detailed condition, we provide additional data, including college enrollment rates, average standardized test scores, Advanced Placement curriculum offerings, and measures of poverty, such as the percentage of students on free/reduced lunch. As a result, participants assigned to the detailed condition will have a more robust understanding of the high school context for all applicants. Because we did not provide specific instructions about how to use this information, we will be able to gauge the impact of this additional information within the admissions context of the participants' colleges.

Given the social psychology of correspondence and availability bias, we hypothesized the following:

Hypothesis 1: Admissions officers will provide higher ratings and will be more likely to recommend admission for low-SES applicants when provided with more detailed information about high school context. No corresponding effect will be found for higher-SES applicants.

Hypothesis 2: Admissions officers will provide higher ratings for academic qualifications and essays for low-SES applicants with more detailed information about high school context, which will mediate the effect of contextual detail on the decision to admit.

Method

Participants

Given that college students may be much more susceptible to psychological interventions than other adults (Henry, 2008; Sears, 1986), it was important to examine actual college admissions officers for this study. Therefore, we recruited admissions officers who regularly read admissions files and who work at colleges or universities within the top three tiers of Barron's (2013) selectivity ratings. The *most competitive* institutions were those that generally met the following criteria: (a) students rank in the top 10-20% of their high school class with grade averages from A to B+, (b) median test scores of 655-800 on the SAT (math and verbal) and at least 29 on the ACT among incoming first-year students, and (c) admitting fewer than 1/3 of applicants. The second tier of institutions were *highly competitive*; schools in this group were generally characterized by the following: (a) students are in the top 20-35% of their class in high school and have an average GPA of at least B or B+, (b) institutional median scores of 620-654 on the SAT (math and verbal) and 27-28 on the ACT, and (c) admitting between 1/3 and 1/2 of

applicants. *Very competitive* institutions generally had these characteristics: (a) students rank in the top 35-50% of their high school class with grade averages of at least B-, (b) median test scores of 573-619 on the SAT (math and verbal) and 24-26 on the ACT, and (c) admitting between 1/2 and 3/4 of their applicants.

A total of 311 admissions officers participated in the study, who worked at 174 different colleges and universities. Of these, 57% were female, 77% were White/Caucasian, 10% were Black/African American, 9% were Latino/Hispanic/Chicano, 6% were Asian American/Pacific Islander, 1% were American Indian/Alaska Native, and 2% were from other racial/ethnic groups (these racial/ethnic figures add up to slightly more than 100%, since participants were allowed to choose multiple categories). Participants were recruited from attendees of the 2014 annual meeting of the primary professional organization for admissions officers (National Association of College Admissions Counseling). In addition, the leadership of CACHET (College Admissions Collaborative Highlighting Engineering and Technology), a subgroup within NACAC, encouraged its members attending the annual meeting to participate. Admissions officers received $50 gift cards for their participation.

Procedure

This survey was administered using Qualtrics online software. Admissions officers were informed that they would review three simulated admissions files and that they should use the same standards and criteria that they would use when reading files at their own institution. Participants were then presented files that contained information about each applicant's high school, academic qualifications (i.e., unweighted and weighted high school GPA, number of honors/Advanced Placement courses taken, scores for each section of the SAT and/or ACT [including ACT composite], Advanced Placement [AP] examinations and scores, and the names

and grades of all academic courses during their four years), extracurricular activities, and personal statement.

Participants read a total of three applications: one student had strong academic credentials (in terms of high school grades, difficulty of coursework, and standardized test scores) and attended an upper-middle-class high school. Another applicant also attended an upper-middle-class high school, but his grades, coursework, and standardized test scores were all lower than those of the first applicant. Another received good grades and took among the most difficult courses offered at the lower-SES high school that he attended. However, his courses were less advanced and his standardized test scores were lower than those of the first applicant. The order in which these applications were reviewed was counterbalanced. To control for any effect of race/ethnicity or gender, all applicants were White and male, and the major identified for all applicants was engineering.

The amount of information about the high school and applicants' performance relative to their high school peers varied across experimental conditions. Participants in the limited-information condition (n = 154) were provided with the following: high school name (fictitious), state, institutional control (public), number of students, and graduation rate. This last piece of information is especially important, because graduation rates are very strongly associated with the average socioeconomic status of students at the high school (Rouse & Barrow, 2006). Participants were also given the applicants' parental education; all parents of the higher-SES applicants had at least a master's degree, whereas neither of the low-SES applicant's parents had attended college.

All information provided in the limited condition was also provided in the detailed condition (n = 157). Moreover, the applications in the detailed-information condition contained

additional information about the high school: enrollment rates at four-year and two-year colleges, average ACT composite score and SAT score (critical reading plus mathematics), percentage of students who meet federal eligibility criteria for free or reduced-cost lunch, percentage of students with limited English proficiency, number of AP courses offered, and percentage of students who take AP examinations who receive a score of at least 3 (which is considered a passing grade at many institutions). These measures of socioeconomic status within high schools are available from the U.S. government or other national organizations (such as The College Board) and are used by some colleges to assess high school context. The detailed condition also contained each applicant's percentile within his high school for weighted and unweighted high school GPA as well as number of honors/AP classes. The median ACT and SAT scores at the high school were also shown for each section of these exams (including ACT composite). By providing information about students' high school overall and their performance relative to high school peers, we sought to give admission officers multiple forms of information in which applicants' performance could be considered in the context of their high school environment.

Clearly, admissions officers at the most competitive schools would typically reject some applicants that would often be accepted by those at less selective schools. Therefore, students' academic qualifications and extracurricular activities were adjusted by selectivity tier so that they would be competitive at these different levels of selectivity. Details about the creation of simulated admission files, pilot testing, and other logistics are provided in the supplemental online material.

Measures

The primary dependent variable was participants' admissions recommendation for each applicant (1 = deny, 2 = wait list, 3 = accept). Many students who are placed on wait lists at selective institutions are never ultimately accepted (Clinedinst, 2015), so the accept decision is particularly important. Therefore, additional analyses used a binary decision outcome (0 = deny or wait list, 1 = accept). Participants rated each applicant's academic record, extracurricular activities, and personal statement on a six-point scale (1 = very poor, 2 = poor, 3 = fair, 4 = good, 5 = very good, 6 = excellent).

For independent variables, experimental condition was indicated with a dichotomous variable (0 = limited high school information, 1 = detailed high school information). For measuring selectivity tier in the regression analyses, dummy-coded variables were used for highly competitive and very competitive, with most competitive as the referent group. Binary variables were also used in moderation analyses to measure participants' gender (0 = male, 1 = female) and race/ethnicity (given the small sample sizes for some racial/ethnic groups, a single variable was used: 0 = White/Caucasian, 1 = participant of color). Parental education was computed as the average of mother's and father's education (1 = elementary school, to 9 = graduate degree). Experience working in admissions was rated on a seven-point scale (1 = less than one year, to 7 = 21 years or more). Whether committees are used to make final admissions decisions was indicated with a binary variable (0 = no, 1 = yes). The average number of minutes spent reading each admissions file and the number of files read per week during busy times were measured through open-ended responses, and they were coded as continuous variables. A few participants reported ranges for these variables (e.g., "10-15" minutes per file); when this occurred, the median was computed and used (e.g., 12.5). Given the skewed distribution for

number of files read, a natural-log transformation of this variable was also examined. Finally, to explore moderation effects of the detailed information intervention, the variable for the experimental condition was multiplied by each potential moderating variable to create an interaction term (Jaccard & Turrisi, 2003).

Analyses

Ordinal logit and logistic regression analyses were used to model these non-continuous outcomes (admissions and acceptance recommendations, respectively) for each applicant, with detailed condition and selectivity tier as predictors (see Long, 1997; O'Connell, 2006). To determine whether the effect of high school information was greater for the low-SES applicant, hierarchical generalized linear models were used with applicant recommendations (level 1) nested within participants (level 2) (see Raudenbush & Bryk, 2002; Snijders & Bosker, 2012). A dichotomous variable indicating the low-SES applicant was included at level 1, and variables indicating tier and detailed condition were at level 2. The key analysis was a slopes-as-outcomes model that explored whether the effect of the detailed condition differed between the low-SES and higher-SES applicants. A substantial proportion of variance in admissions and acceptance recommendations occurred between participants (intraclass correlation coefficients were .32 and .24, respectively). Chi-square analyses were also used to test the bivariate relationship between detailed condition and acceptance recommendation.

To provide a greater understanding of key findings, follow-up analyses included a series of interactions between detailed condition and participant characteristics predicting admissions recommendations for the low-SES applicant; these analyses examined whether this intervention was more effective in promoting for some participants than others. Moreover, bootstrap mediation analyses with 5,000 resamples were used to examine the extent to which the effect of

detailed information on admissions recommendations was explained by ratings of specific aspects of the file (see Hayes, 2013; Preacher & Hayes, 2008).

Two limitations should be noted. First, the detailed-information condition contained more information about the high school as well as providing applicants' rankings relative to their high school peers. Because these two sources of information were varied simultaneously, it is unclear whether one of these manipulations was primarily or exclusively responsible for the effects observed here. Second, applicants' gender, race/ethnicity, and intended major were all identical across participants. This standardization has the benefit of removing the potential influence of these demographics across files, and correspondence bias has been shown to have powerful effects across demographic groups in Western contexts (Choi, Nisbett, & Noranzayan, 1999). Nonetheless, it is unknown whether similar results would be obtained if different demographic variables were selected.

Results

As an initial step, we examined whether the randomization resulted in groups that were similar across a range of characteristics. Indeed, *t*-tests showed that participants in the limited and detailed information conditions did not differ significantly by selectivity tier, gender, race/ethnicity, parental education, years of admissions experience, whether a committee is used to make admissions decisions, time spent reading files, and number of files read (original and natural-log transformed scale) (ps > .11).

Ordinal logit regressions examined admissions officers' decisions to deny, wait list, or accept each applicant. In analyses with institutional selectivity as a covariate, the lower-SES applicant received more favorable admissions recommendations when the simulated application contained detailed information about students' high school contexts than when it did not (p =

.011). This effect did not significantly interact with institutional selectivity (*p*s > .11), which suggests that providing additional high school context may be equally effective at highly and moderately selective schools. No significant effects of high school information were observed for the two higher-SES students (*p*s > .64). Multilevel analyses with applicants nested within participants showed that the effect of providing detailed information was significantly more positive for the lower-SES applicant than the other applicants ($p = .006$) (Figure 1).

As noted earlier, many students who are placed on wait lists at selective institutions are never ultimately accepted (Clinedinst, 2015), so logistic regression analyses examined a binary outcome (accept vs. wait list/deny). The main results for both the ordinal and binary outcomes are summarized in Table 1. When controlling for institutional selectivity, the lower-SES applicant was more likely to be recommended for acceptance when additional high school context was provided in the application ($p = .017$). Delta-*p* statistics showed a 13.0 percentage-point effect for the average participant; that is, the low-SES applicant had a 63.1% chance of acceptance in the detailed high school information condition versus 50.1% chance in the limited condition. Moreover, analyses that explored interactions between high school information and selectivity showed no significant moderation effect (*p*s > .16). For the higher-SES applicants, the overall effect of high school information on acceptance recommendations was non-significant (*p*s > .39) (Figure 2). Using chi-square analyses that did not account for selectivity, the lower-SES applicant had higher acceptance rates in the detailed condition (63.5%) than the limited-information condition (49.7%) [$\chi^2(1) = 5.979$, $p = .014$]. The chi-square analyses did not find significant effects of condition for either of the higher-SES applicants (*p*s > .28). Moreover, the impact of high school information on acceptance recommendations was significantly greater for the lower-SES applicant than the higher-SES applicants in multilevel analyses ($p = .005$).

Numerous moderators of the impact of high school information were explored for the lower-SES applicant, including the parental education, race/ethnicity, gender, and years of admissions experience of the participant as well as the number of admissions applications read per week, the amount of time spent reading an average application, and whether committees are used to make final admissions decisions. None of these variables significantly interacted with high school information to predict admissions recommendations (ps > .50).

The impact of high school information on the lower-SES applicant was mediated by perceptions of academic qualifications and personal statements (see Table 2 and Figure 3). In multiple regression analyses controlling for institutional selectivity, admissions officers gave higher ratings of academics (p = .024, d = .22) and personal statements (p = .062, d = .21) when additional high school information was provided, but this effect was non-significant for extracurricular activities (p = .93). In bootstrap mediation analyses, academic and personal statement ratings both significantly mediated the link between high school information and admissions recommendation; with the addition of these mediators to the model, the direct effect of high school information became non-significant. This effect was similar regardless of whether the dependent variable was modeled as continuous or dichotomous.

Discussion

Our results suggest that the quality of contextual information can play a substantial role in the evaluation of low-SES applicants in college admissions. Consistent with the philosophy of holistic review, admissions officers showed a willingness to reward applicants for overcoming obstacles rather than penalizing applicants for attending an insufficiently rigorous high school. This finding suggests that the lack of access for low-income students in selective colleges may be partially due to a lack of high-quality information rather than an unwillingness

to consider class-based disparities or an overreliance on any litmus test for admission (such as taking AP Calculus). The non-significant results for higher-SES applicants suggest that admissions officers do not seem to penalize higher-SES students for attending high schools with more rigorous curricula.

Surprisingly, there are no moderating effects based on institutional selectivity, admissions office practices or admissions officer characteristics. The effects in the study were consistent across all other measured characteristics of the admissions office or the admissions officer. The results are robust across elite and less elite colleges, and they do not depend on whether admissions offices use committees, read more applications, or spend less time reading each application.

There is also strong evidence that the admissions officers in this study were reading and judging the application in context, because they rated academics and essays more positively in the detailed information condition. Thus, they did not seem to have used a more lenient admissions standard for lower-SES applicants, which some sociologists have called "compensatory sponsorship" (Grodsky, 2007). If this were the case, then perceptions of academic qualifications and personal statements would not have mediated the effect of high school information.

This finding has substantial implications for decision making in selective college admissions offices. Today, admissions officers often have low-quality information about high school contexts based upon anecdotal information, personal experience, or photocopies of school-produced "profile sheets" that contain inconsistent and even propagandistic information (Bastedo, 2014). Low-quality information leads to incomplete correction of dispositional inferences; even when admissions officers know they should account for contextual information,

normal human biases ensure that they will often fail to do so sufficiently under these circumstances (Gilbert & Malone, 1995).

This experiment suggests that specific interventions with admissions officers have the potential to increase the number of low-SES students in selective science and engineering programs. Consistent, high-quality data on high school contexts can and should be provided to admissions offices around the country; a number of organizations have this capacity, particularly The College Board, ACT, and The Common Application. Prior research has shown that higher-quality information can reduce correspondence bias and improve decision quality even among expert decision makers (Moore, Swift, Sharek, & Gino, 2010; Swift, Moore, Sharek, & Gino, 2013). Information can thus provide a "nudge" (Thaler & Sunstein, 2009) to reduce correspondence bias and improve decision making.

Our results also have important implications for research on college match. Much of the existing research has been focused on recruitment and application, but low-income students face significant obstacles across the enrollment process (Espenshade & Radford, 2009; Espinosa, Gaertner, & Orfield, 2015). Although admissions offices that use holistic review instruct application readers to consider high school and family context during the reading process, our research suggests that cognitive biases lead people to discount consideration of these contexts when making decisions. So in addition to formal policy barriers in admissions that disadvantage low-income students (such as the additional consideration provided to legacies and development cases), we must also consider the unconscious biases that disadvantage low-income applicants. Our research suggests that providing high-quality contextual information in every college admissions file can ameliorate these biases.

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Table 1. Effects of detailed high school information on admissions officers' recommendations.

	Admissions Recommendation		Acceptance Recommendation		
Applicant	B	SE	B	SE	OR
Low SES	.577*	.228	.565*	.236	1.759
Higher SES, high achieving	-.170	.374	-.252	.376	.777
Higher SES, middle achieving	.093	.229	.210	.244	1.233
Low SES x detailed condition	.687**	.249	.707**	.249	2.029

Note. Ordinal logit regression analyses were used to predict admissions recommendations (1 = deny, 2 = wait list, 3 = accept), and binary logistic regression analyses were used to predict acceptance recommendations (0 = deny/wait list, 1 = accept). Multilevel analyses were used to examine whether the impact of providing detailed high school information differed significantly across applicants (these results appear in the last row of the table). All analyses controlled for selectivity tier. *$p < .05$ **$p < .01$

Table 2. Bootstrap multiple mediation analyses of detailed high school information predicting admissions recommendation (ordinal and dichotomous). Analyses used 5,000 resamples with institutional selectivity as control variables. Statistical significance of indirect effects is determined by whether the bootstrap confidence interval contains zero. Nagelgerke pseudo-R^2 is displayed for the dichotomous outcome. $+p = .06$ $*p < .05$ $**p < .01$ $***p < .001$

Dependent variable	Mediator	Effect of detailed information on DV: Without mediators (*c*-path)	Effect of detailed information on DV: With mediators (*c*' path)	Effect of detailed information on mediator (*a*-path)	Effect of mediator on DV (*b*-path)	Bootstrap point estimate of indirect effect	95% bootstrap confidence interval for point estimate	R^2 for model predicting DV
Admissions recommendation (deny, wait list, accept)	Academic rating	.192* (.076)	.101 (.069)	.184* (.081)	.371*** (.049)	.068 (.032)	[.0109, .1353]	.261***
	Personal statement rating			.213+ (.114)	.119*** (.035)	.025 (.016)	[.0011, .0646]	
	Combined paths			--	--	.094 (.036)	[.0262, .1698]	
Acceptance recommendation (wait list/deny, accept)	Academic rating	.565* (.236)	.330 (.262)	.184* (.081)	1.230*** (.221)	.227 (.110)	[.0323, .4607]	.279***
	Personal statement rating			.213+ (.114)	.462*** (.134)	.099 (.062)	[.0002, .2445]	
	Combined paths			--	--	.325 (.130)	[.0816, .5977]	

Figure 1. Admissions recommendations as a function of applicant and high school informati
(detailed versus limited). Error bars represent standard errors. The outcome was coded as 1 =
deny, 2 = wait list, and 3 = accept. **(Top)** Raw means and error terms. **(Bottom)** Means and
terms adjusted for institutional selectivity.

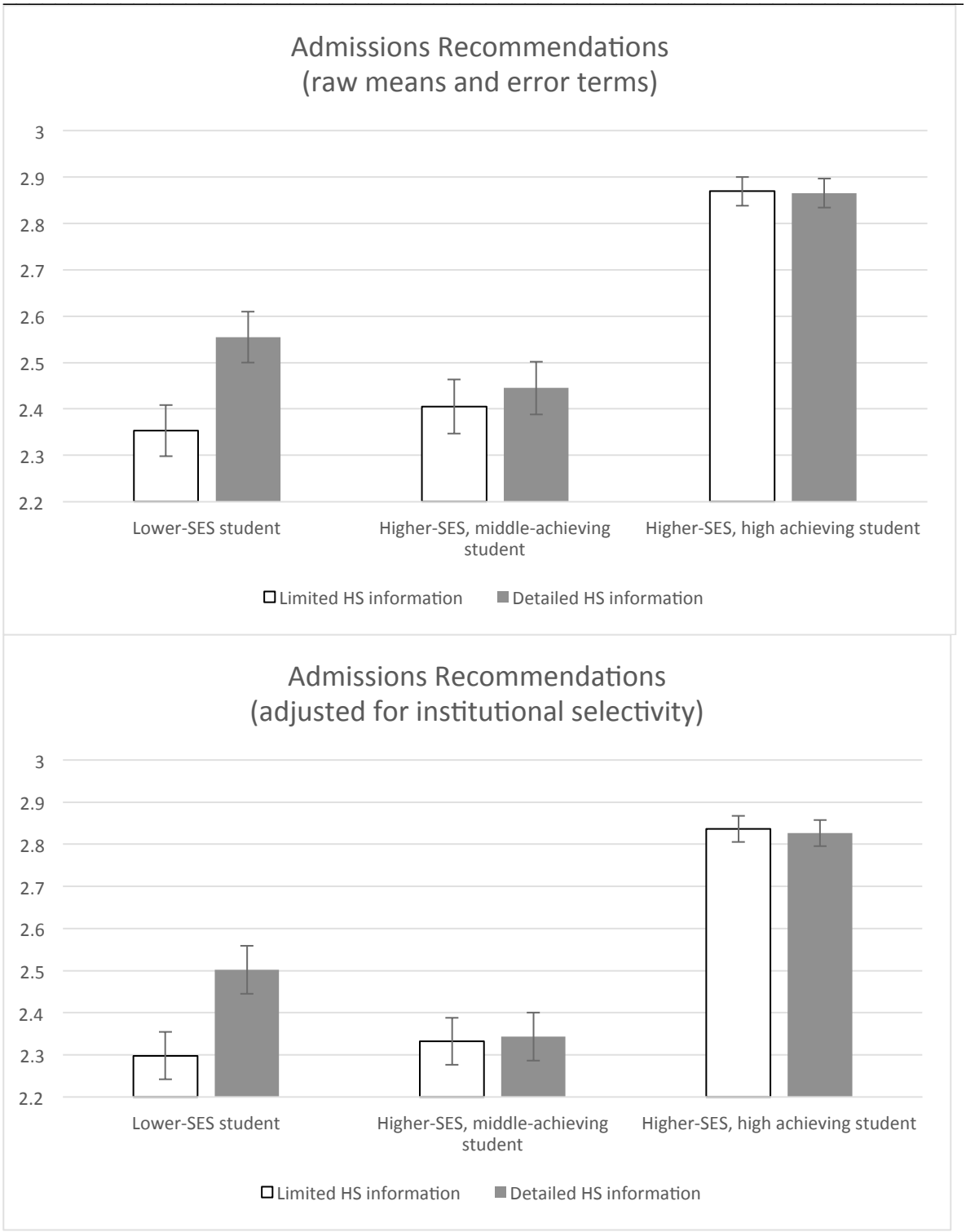
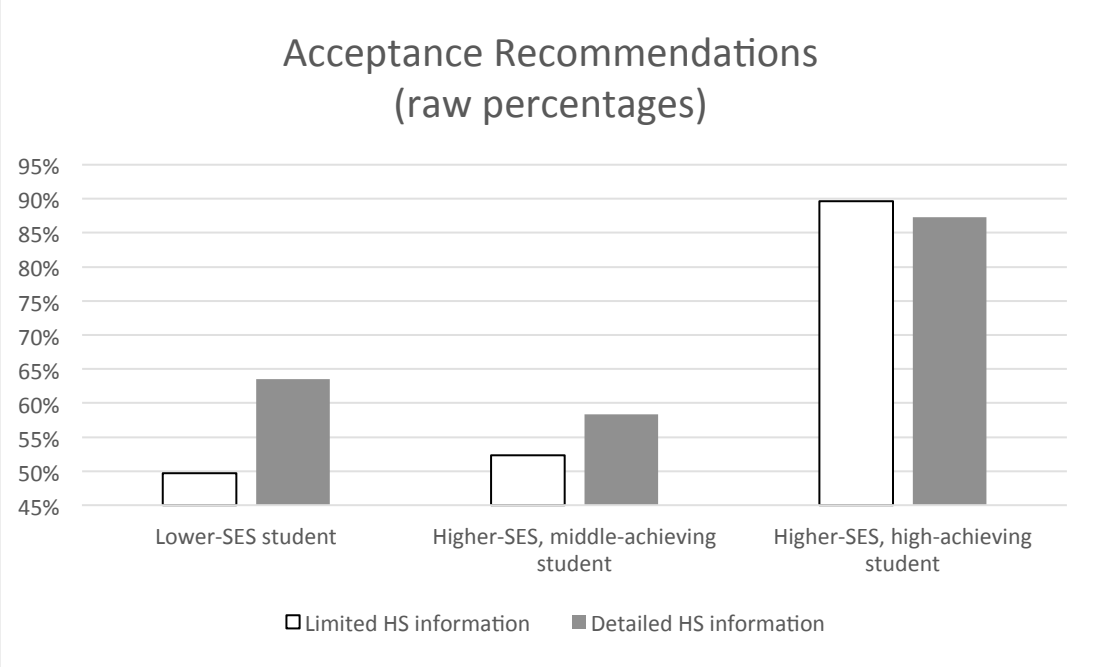


Figure 2. Acceptance recommendations as a function of applicant and high school information (detailed versus limited). The outcome was coded as 0 = deny or wait list, and 1 = accept. **(Top)** Raw percentages of accept recommendations. **(Bottom)** Percentages obtained with delta-p statistics from logistic regression analyses that controlled for institutional selectivity (inferential statistics reported in main text).



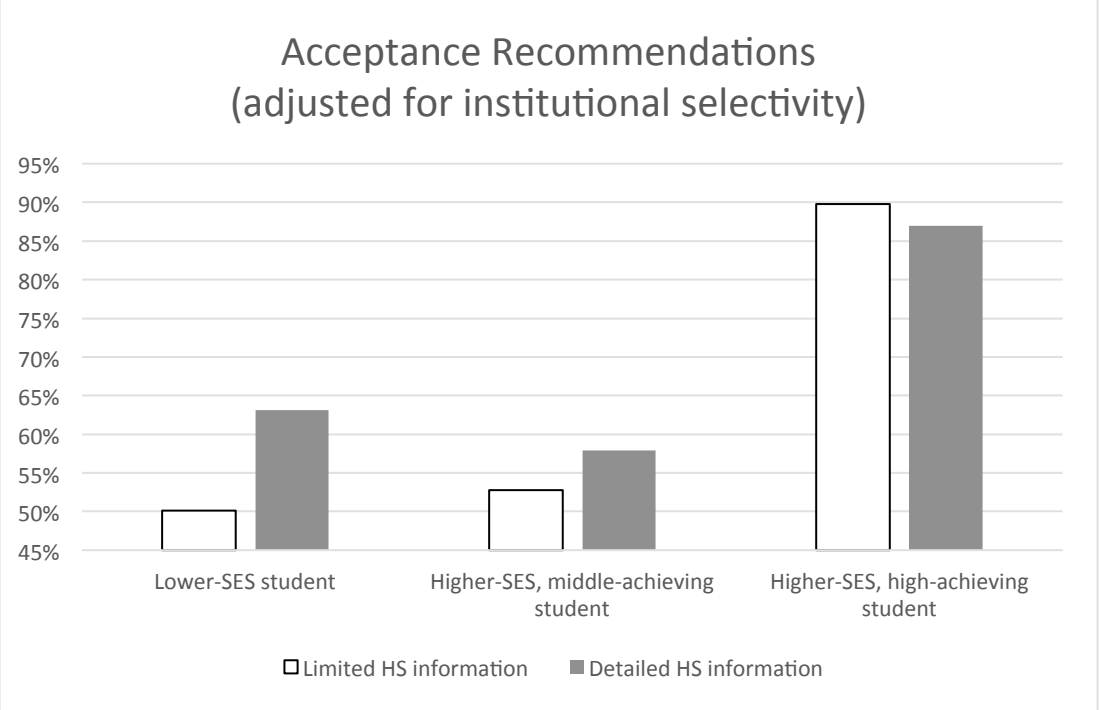
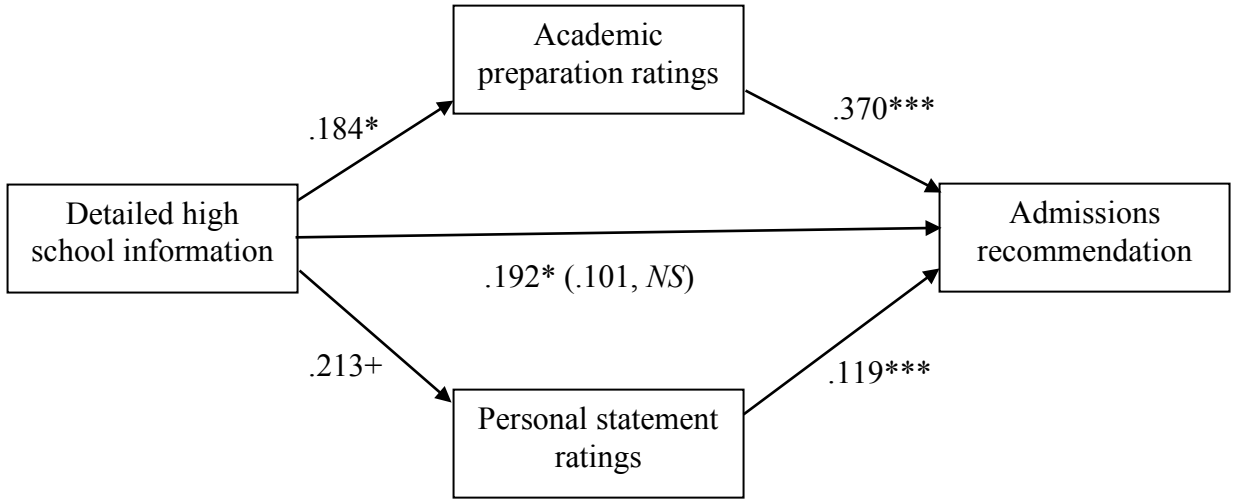


Figure 3. Bootstrap multiple mediation analysis predicting admissions recommendations for the lower-SES applicant. Analysis used 5,000 resamples with institutional selectivity as control variables. Values in parentheses indicate the direct effect when the mediators were included in the model. +p = .06 *p < .05 **p < .01 ***p < .001



Supplementary Online Material

Participants

Invitations were sent to admissions officers to participate in person at the NACAC annual meeting. This recruitment resulted in data from 145 participants (all available timeslots were filled, but 35 participants did not show up for their appointment). Because power analyses suggested that this was an insufficient number of participants to identify the expected effects, we subsequently recruited additional attendees to participate online several weeks after the conference; these participants were from the same pool of conference attendees who met the inclusion criteria. Both in person and fully online participants completed identical computer-based surveys, which were administered using Qualtrics survey software. The in-person administration was used because it made providing compensation easier (all participants received $50 gift cards), and the experimenters would be available to answer any questions in real time.

For the in-person data collection for the actual study, participants entered a room in the conference center with 10 computers and were asked to sit at one of the computers. They were then given a paper consent form to sign. Fully online participants viewed and completed the consent form on the first page of the online survey. Besides these differences, the procedure for all participants was identical. Supplementary analyses showed that the findings were not moderated by in-person versus fully online participation.

Pilot Testing

A pilot survey was conducted to ensure that participants understood the protocol and to obtain feedback on questions regarding admissions office practices, admissions officer demographics, and other covariates. We piloted the survey with six admissions officers at the 2014 annual conference of the Michigan Association of College Admissions Counseling

(MACAC). These participants were recruited from the attendee list provided by MACAC, and only admissions officers from selective colleges participated. Each pilot participant received a $50 amazon.com gift card. The participants gave useful information on how information on high school context is used in their admissions offices, how to simulate admissions files so that they were appropriate for the selectivity group, and a number of logistical issues.

Development of Admissions Files

The Education Longitudinal Study (ELS:2002) was used to create the grades, test scores, and coursework for each simulated admissions file. ELS is a federal dataset that contains a nationally representative sample of 10th graders in 2002 that were tracked longitudinally with follow-up data collected two, four, and ten years later. For the purposes of this study, ELS is preferable to federal datasets that track only college students (e.g., Beginning Postsecondary Students Longitudinal Study), because ELS contains extensive data on all colleges and universities to which students applied as well as their complete high school coursework, grades, and test scores. As a result, we were able to compile nationally-representative information about college applicants at particular institutions, whereas publicly available information almost exclusively focuses on the characteristics of incoming students (i.e., those who are accepted and decide to attend, who may differ considerably from the overall applicant pool).

Within the ELS dataset, we identified the students who applied to each institution, and then grouped institutions by selectivity tier (most competitive, highly competitive, and very competitive). The deciles for high school GPA (weighted and unweighted), standardized test scores (ACT and SAT), and AP coursework for students who applied to each selectivity tier were computed. These figures allowed us to select how these applicants' credentials would compare to other students who were also applying to institutions in that tier. Because more selective schools

reject a greater percentage of applicants, we made the percentiles for applicants' credentials higher at more selective tiers. Specifically, the grades, test scores, and AP coursework for the higher-SES, high-achieving applicant were all in the 90th percentile for most competitive schools, 80th percentile for highly competitive, and 70th percentile for very competitive. Similarly, these three metrics for the higher-SES, middle-achieving applicant were in the 60th, 50th, and 40th percentiles for institutions that were most, highly, and very competitive, respectively.

This percentile decision was more complicated for the low-SES applicant, since he was intended to simulate a student who maximized the opportunities available at his high school, while still having some of the adverse effects of his background. It is well established that measures of SES are highly associated with standardized test scores (Zwick, 2002) and curriculum rigor (Klugman, 2013). Therefore, we assigned this applicant high grades (80th percentile in the most competitive tier), strong but comparatively modest test scores (50th percentile in the top tier), and a lower number of AP courses taken given his limited access to this curriculum (30th percentile). This applicant's high school grades and scores were adjusted for tier level (70th and 40th percentile for highly competitive and 60th and 30th for very competitive, respectively). The number of AP courses was set to the 30th percentile for all tiers, since this engagement was already low, and the participants needed to infer that he was maximizing his educational opportunities. To illustrate applicants' relative qualifications, an overview of their academic indicators for the most competitive tier is provided in Table S1.

The same three personal statements were used for the participants at all levels of selectivity. Personal statements were randomly assigned to files. To ensure that these statements were believable when assigned to any applicant, they did not refer to high school achievement,

extracurricular activities, or any form of experience that would provide insight into the applicant's socioeconomic status (e.g., trips abroad, overcoming financial obstacles).

ELS data also informed the creation of extracurricular activities. These data are less detailed for extracurriculars than for academics; students reported whether or not they participated or were a "leader" in various types of activities (e.g., sports, performance, academic club, community service, paid employment). Extracurricular activities were designed to be similar in quality and quantity for all three applicants. At all selectivity levels, each applicant participated in one varsity sport, at least one student organization, and at least one paid job or regular volunteering commitment. In addition, involvement was increased for files reviewed by admissions officers at more selective schools. Specifically, applicants engaged in more leadership for highly competitive schools than for very competitive, and the amount of involvement was greater at the most competitive schools than for highly competitive.

Within the Qualtrics survey software, each of these application sections was presented on a separate page, and participants were allowed to go back to earlier pages if they desired. Participants provided ratings of the quality of academic record, extracurricular activities, and personal statement at the end of the corresponding page with that information. The top of the page with the academic profile also stated the applicant's sex (male), race/ethnicity (White/Caucasian), U.S. citizenship (yes), college (engineering), and father's and mother's education (both had master's degrees for the higher-SES, high achieving applicant; doctorate and master's for the higher-SES, middle-achieving applicant; and high school diploma and some high school for the low-SES applicant). After reading all sections, participants also provided their admissions recommendation if that applicant had applied to the institution at which they work.

Supplementary References

Klugman, J. (2013). The Advanced Placement arms race and the reproduction of educational inequality. *Teachers College Record*, *115*(5), 1-34.

Zwick, R. (2002). *Fair game: The use of standardized tests in higher education*. New York: Routledge.

Table S1. Overview of Applicants' Academic Indicators for the Most Competitive Tier

Academic Indicator	Applicant		
	Low SES	High SES, middle achieving	High SES, high achieving
Unweighted HSGPA	3.92	3.76	3.96
Weighted HSGPA	4.19	4.19	4.51
Number of honors/AP classes	10	13	18
ACT composite	27	28	32
SAT critical reading + math	[Did not take SAT]	1340	1480

Note. Weighted HSGPA was computed by adding ½ point for an honors class and a full point for an AP class; description of the weighting approach was provided to participants within the simulated application files.