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Reach Up, Fit in, or Stand out?
The Evaluation of Academic Quality and Fit in College Choices

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Abstract

Understanding students' college enrollment decisions is critical because the admission outcome can affect the school's quality and its reputation. In this paper, we study how students consider their relative academic ability compared to their potential peers. Drawing from social comparison theory, we posit that there are asymmetric effects due to deviation from peers' ability, depending on the deviations' direction. Using a rich data set of college applicants, we find that while the applicants negatively evaluate their deviations below their potential peers, they value positively those above their peers (the "big fish, little pond" effect). Moreover, students who applied to many universities are more susceptible to these psychological effects. Further analysis points to the level of the individual student's self-confidence as a possible explanation. Finally, we derive suggestions for college administrators to improve the yield of admitted students.

Keywords: College enrollment decision; selectivity; academic fit; social comparison theory; big fish, little pond effect

I kind of killed it in college. You know that saying "big fish in a small pond"? At Dartmouth College, I was freakin' Jaws in a community swimming pool.

- Mindy Kaling, *Is Everyone Hanging Out Without Me?*

1. INTRODUCTION

Universities spend a sizeable amount of their budget on their marketing activities (1.5%–6.0%; Zinkan, 2017), with colleges spending an estimated $2.2 billion on advertising alone (Kantar, as cited in Marcus, 2021). US colleges' overall recruiting expense alone was estimated at $10 billion and forecast to quickly grow to $100 billion (Katzman, 2016).

Yet college enrollment has been declining for the last decade, from a peak of 18.1 million enrolled students in 2010 to 16.6 million in 2019[1] (National Center for Education Statistics, 2022).At the same time, more applicants apply to a larger number of universities (Clinedinst, 2019). These two trends together account for increased competition between universities and decreased yield (i.e., the ratio of admitted students to accepted offers).

Improving yield has thus become of utmost importance for admissions offices. On the one hand, attracting more students has a direct impact on an institution's finances; on the other, improved yield also impacts an institution's reputation and ranking, which in turn will help its recruiting in future years. Identifying additional factors impacting applicants' decisions to help improve a college's recruitment process can have a major impact on an institution's success.

[1] Enrollment further declined to 15.9 million enrolled students in 2020. However, that accelerated decline was likely caused by the COVID-19 pandemic. Enrollment projections for the next decade hover between 16.5 million and 17 million students (National Center for Education Statistics, 2022).

Previous research on student's enrollment decisions has investigated the impact of institutions' academic quality, selectivity, and reputation (Parker & Summer, 1993; Punj & Staelin, 1978; Trusheim et al., 1990; Weiler, 1996), along with financial factors such as scholarships and aid packages (Avery & Hoxby, 2004; Nurnberg et al., 2012). In this paper, we add to this literature on college choice by focusing on applicants' evaluation of academic *fit* (in addition to academic quality).[2]

Using data covering a broad range of students with admission offers from multiple institutions, we estimate a college choice model rooted in social comparison theory (Festinger, 1954). Our results show asymmetric effects of academic aptitude difference from the peer students. While there is ample evidence of the positive effect on students of *being* the "big fish in a little pond" (e.g., Arief et al., 2013; Marsh & O'Mara, 2008), this study provides the first empirical evidence of applicants considering the big fish, little pond effect (BFLPE) when *choosing* which college to attend. We also find that students who applied to more universities are more susceptible to these psychological effects. Further analysis points to the level of the individual applicant's self-confidence as a possible explanation.

Our empirical results suggest two main implications: First, we derive managerial implications to help universities improve yield by providing information to admitted students tailored to each student's academic fit to the institution. Second, we add to the current policy debate regarding affirmative action in college admissions. Mismatch theory, the main argument against affirmative action, posits that using affirmative action to admit students to universities

[2] In Web Appendix A, we show the importance of including both the direct effect (due to academic quality) and indirect effects (due to academic fit) of peer students' SAT scores to accurately estimate these effects in modeling college choice. Some previous work included the effects of an applicant's academic performance relative to peers (Avery & Hoxby, 2004; Weiler, 1996; Fuller et al., 1982). However, by excluding variables capturing the general preference for an academically better institution (independent of academic fit), these models cannot separate the two effects.

where the average student has higher academic aptitude may in fact be detrimental to their academic success by placing them in educational environments above their abilities. Our findings suggest that applicants may correctly anticipate potential negative consequences of being overmatched and make their enrollment decisions accordingly. Thus, it is important when discussing affirmative action and mismatch theory to acknowledge that the applicant has an active role in this process via their enrollment decision, which impacts whether mismatch theory applies. We detail these implications in the Discussion section.

The remainder of this paper proceeds as follows: We first discuss relevant theory and draw some testable predictions. We then describe our data and modeling approach. After presenting our results, we conclude by discussing our findings' managerial and policy implications.

2. THEORETICAL BACKGROUND

Applicants interpret the academic ability of an institution's current students as a measure of the institution's quality (e.g., Parker & Summers, 1993) and, ceteris paribus, an applicant may choose the best education available to them (e.g., Griffith & Rask, 2007; Trusheim et al., 1990). However, we posit that students may also consider their own ability *relative to* the institution's current students' abilities. Furthermore, drawing from social comparison theory, we posit that students may evaluate deviations from their expected peers differently depending on the direction of the difference.

According to social comparison theory, people compare themselves to others to better evaluate their own skills and abilities across different domains. Research has identified the

impact these comparisons may have on people in different situations. One major distinction is between so-called “upward comparisons,” or comparisons against peers who are performing better than oneself, versus “downward comparisons,” or comparisons against peers who are performing worse than oneself. Below, we derive our predictions for applicants’ enrollment preferences from this research.

2.1 Applicant’s Academic Ability Lower Than Average Student

Attending a university with a higher average SAT score is more likely to lead to upward comparisons, as the average student at such a university should have higher academic ability than the applicant. Comparing oneself to better-performing peers can be motivational if the higher performance seems attainable (Lockwood & Kunda, 1997; Molleman et al., 1986), suggesting that applicants may prefer such schools. However, once the higher level seems out of reach, upward comparisons lead to reduced self-esteem (Morse & Gergen, 1970), a more negative mood (Tesser et al., 1988), and feelings of self-threat (Zheng et al., 2022). If students correctly foresee these effects, they should avoid attending colleges in which they would fall too far behind.

In a related study, Fuller et al. (1982) found that applicants’ general preference for higher-SAT institutions does in fact reverse once the school’s average SAT score exceeds their own by more than 100 points. The authors conjectured that this result may be due to a fear of falling behind or of their inability to successfully finish the degree.

2.2 Applicant’s Academic Ability Higher Than Average Student

In contrast, attending a university with a higher average SAT score leads to downward comparisons. The positive impact of downward comparisons in an academic setting is known as the BFLPE (Marsh, 1987; Marsh & Parker, 1984),[3] which refers to the positive effect of being a top student on a person's academic self-concept, or a person's beliefs about their own academic abilities and skills. The BFLPE has been shown to be robust across cultures, with some scholars calling it a pan-human theory (Seaton et al., 2009; see also Marsh et al., 2008, for a discussion of BFLPE's theoretical basis). This theory offers a hypothesis that college applicants may positively value their deviation above potential their peers.

Attending an institution with on average lower performing students increases an applicant's ability to stand out – or to be the "big fish" – in turn leading to higher academic self-concept. Higher academic self-concept has been shown to lead to better educational performance even 10 years later (Arief et al., 2013), while being a better predictor for academic performance five years later than grades, test scores, intelligence, or socioeconomic status (Marsh & O'Mara, 2008).

In practical terms, a student's academic performance relative to their peers affects their career choices and career opportunities. According to the *Financial Times*, several employers now prefer to hire stand-out students from good universities rather than average students from top universities (Broughton, 2014). Thus, applicants may attain a substantial long-term benefit of attending a university at which they may be able to stand out academically.

While the BFLPE is well established for students who *are* already in an academic environment where they can stand out, research has yet to determine whether applicants predict and consider this effect when *choosing* which educational institution to attend. And notably,

[3] The BFLPE has been popularized in Malcolm Gladwell's bestseller *David and Goliath: Misfits, Underdogs, and the Art of Battling Giants*.

Fuller et al.'s (1982) study did not find support for students choosing colleges to allow them to stand out. (As discussed in Footnote 2, this is likely due to their modeling choices.)

3. DATA

3.1 Applicant Data

We use data from an online college advisory website. High school seniors and their parents use this platform to gather information on colleges and get advice on college applications. The students provide their academic qualifications, and over the college application cycle, they can browse students' profiles from previous years who applied to and were accepted by each college. Furthermore, students can update their admission results and final enrollment decision on the website.

We collected only anonymous data publicly available at the time of collection. The data cover 11 annual cohorts of students who applied for college admission, from academic year 2004/2005 (for admission to the class of 2009) to academic year 2015/2016. For each student, we observe the set of colleges they applied to, admission offers they obtained, and the college at which they decided to matriculate. For each university the student applied to, we also have information on whether they applied to the university as (a) an early action or early decision applicant, (b) a legacy applicant (child of alumni), and/or (c) a student athlete.

In addition, we collected each student's self-reported academic and geographic information: college admission test scores (SAT, ACT, and SAT subject tests), location (state), and high school type (public vs. private). Some students did not report their SAT scores. For students who did not report their SAT scores but reported ACT scores, we convert their ACT

composite scores to the SAT composite scores using the ACT-SAT concordance tables published by the organizations that run SAT and ACT. A small number (2%) of students are missing both ACT and SAT test scores in our data, and we impute their missing SAT scores using the median SAT score in the sample.

Because we are interested in the students' college choices, our analyses focus on the students who received at least two college admission offers. The final sample consists of 6,858 students and 31,128 admission offers from 1,084 colleges. Hence, our data cover a wide range of colleges. Table 1 shows the descriptive statistics of the applicants' choice sets. On average, students chose among 4.54 admission offers. Within a student's choice set there is substantial variation in the college's SAT mid-points. The difference in the SAT mid-point of the best option and the worst option averages 160 points. Ten percent of students had more than 300 points difference in the range of the SAT mid-point in their choice sets.

<< Insert Table 1 about here >>

3.2 College Data

We supplement the admission and matriculation dataset with other sources of university-specific information. Every year, the US News and World Report publishes an ordinal ranking of universities in "America's Best Colleges," based on a composite measure of academic quality of the schools. Their "Best National University" ranking has received great attention from universities and applicants alike. For each university in the students' choice sets, we match its then-most-recent US News and World Report ranking that was available at the time of application. For colleges that are not included in the ranking (e.g., lower-tier schools), we

generate a binary variable to denote the schools whose ranking information is missing. This variable is then used in our empirical model to account separately for the students' preference for these unranked schools.

We construct additional university-specific covariates using data from the US Department of Education's Integrated Postsecondary Education Data System (IPEDS). IPEDS conducts annual surveys of higher education institutions and provides data, including admissions, enrollment, and tuition. University-specific covariates vary year on year, and thus each cohort of college applicants had a different set of information on their target colleges. When appropriate, we used the statistics in IPEDS that correspond to the academic year prior to that of the high school senior's college application.

4. ECONOMETRIC MODEL

Our model describes the decision of applicant *i* who faces a choice among several college admission offers. We index the colleges by *j* with a total of *J* colleges. Each applicant receives the offers from a subset of these *J* colleges, and has their own choice set. Let C_i denote applicant *i*'s choice set (i.e., the set of admitted schools). Furthermore, let $D_i \mid C_i$ denote the student's matriculation decision among the set C_i. The utility that applicant *i* obtains from school option *j* is specified as follows:

$$U_{ij} = X_j\beta + \text{AcademicFit}\left(Z_{ij};\phi\right) + \text{OtherFit}\left(M_{ij};\theta\right) + \epsilon_{ij}.$$

X_j is a vector of school-specific characteristics. In addition, we consider a set of match-specific variables: Z_{ij} is a vector of variables representing academic fit between a pair of students *i* and school *j*; M_{ij} accounts for other fit factors. We note that the student-specific characteristics are

not included because they do not vary across options within each student's choice set and cannot account for the student's matriculation choice. $\{\beta, \phi, \theta\}$ is a set of student preference parameters to estimate. We assume that a stochastic error component ϵ_{ij} follows type I extreme value distribution, and the probability of student *i* choosing to attend college *j* in their choice set C_i is as the following:

$$\Pr(D_i = j \mid X, Z, M, C_i) = \frac{\exp(X_j\beta + \text{AcademicFit}(Z_{ij}; \phi) + \text{OtherFit}(M_{ij}; \theta))}{\sum_{k \in C_i} \exp(X_k\beta + \text{AcademicFit}(Z_{ik}; \phi) + \text{OtherFit}(M_{ik}; \theta))}$$

4.1 School-Specific Characteristics

First, we include the average amount of tuition charged to full-time undergraduate students for the academic year in the last cohort.[4] Public universities often charge lower (in-state) tuition to students who reside in the same state as the university. If the focal student resided in the same state as the focal public university, then we use the in-state tuition amount; otherwise, we use the out-of-state tuition amount. Moreover, we include variables representing the quality aspect of the school characteristics. Since there is no single objective measure for quality of education, we consider three variables that could influence the students' perception of quality: (a) the US News and World Report public ranking (Griffith & Rask, 2007; Avery & Hoxby, 2004; Monks & Ehrenberg, 1999);[5] (b) the SAT scores of the most recently enrolled students;[6] and (c) the latest admission rate (the ratio of number of admitted students over number of applicants). We match the admission rate of the academic year prior to the focal student's

[4] This operationalization is chosen to focus on across-university differences, rather than across-year differences in tuition.
[5] We include the variable in logarithm. For colleges not listed in the ranking, the variable (in logarithm scale) is set to zero. In Web Appendix A, we show robustness to alternative specifications.
[6] From available data of the 25th and 75th percentiles of Verbal and Math SAT test scores of the students admitted in the academic year prior to the focal student's application, we construct a SAT mid-point for each university by averaging the 25th and 75th percentiles of SAT composite test scores.

application. These variables represent the expected level of intellect and aptitude of potential peer students. As schools design their curriculum in part based on students' overall aptitude and academic background, they reflect the expected level of curriculum quality and possibly other student services.

In addition, we include the college size (the number of full-time undergraduate students enrolled at the focal university during the academic year prior to the focal student's application) and the location information (whether the school is in a city, suburb, or in other area, based on the definition in the US Census Bureau's Population Division in 2005). We also include information on whether the school is public or private.

4.2 Academic Fit

Using the information of each student i's SAT scores (SAT_i, the total scores as the sum of math and verbal test scores) and for recently admitted students to school j (SAT_j), we operationalize the following squared distance to capture the effects depending on the direction of deviation:

$$\begin{aligned}&\text{AcademicFit}\left(Z_{ij};\phi\right)\\&\quad=\phi_1\left(SAT_j-SAT_i\right)^2\cdot 1\left[SAT_j-SAT_i<0\right]+\phi_2\left(SAT_j-SAT_i\right)^2\cdot 1\left[SAT_j-SAT_i\geq 0\right]\end{aligned}$$

The operationalization is akin to the ideal point model with a squared distance from each individual's ideal point (Green & Srinivasan, 1978). We depart from that model in allowing the model to capture varying effects of distance depending on the direction of deviation from the reference point. ϕ_1 captures the effect of positive deviations from the peer students' performance on their college choices, and the BFLPE suggests ϕ_1 could be positive ($\phi_1 > 0$). When the student is concerned about falling behind the peer students in their class, that negative effect is to be captured separately as negative ϕ_2 ($\phi_2 < 0$).

Notably, the variable SAT_j is included separately in the utility function as a school-specific characteristic because it contains the information of expected curriculum quality. Based on our earlier discussion on relevant theories, we allow this variable to have an impact on the student's utility in multiple ways. The total contribution of SAT_j to a student's utility is as follows:

$$\beta_1 SAT_j + \phi_1\left(SAT_j - SAT_i\right)^2 1\left[SAT_j - SAT_i < 0\right] + \phi_2\left(SAT_j - SAT_i\right)^2 1\left[SAT_j - SAT_i \geq 0\right] ,$$

with its marginal contribution to the utility:

$$\frac{\partial U_{ij}}{\partial SAT_j} = \begin{cases} \beta_1 + 2\phi_1(SAT_j - SAT_i) & \text{if} \quad SAT_j - SAT_i < 0 \\ \beta_1 + 2\phi_2(SAT_j - SAT_i) & \text{if} \quad SAT_j - SAT_i \geq 0 \end{cases}$$

When the expected peer students' academic performance (measured via SAT scores) increases by one unit, the model captures multiple sources of effects on a focal student's evaluation of that school. First, β_1 captures the direct effect due to a potential increase in the student's perception of curriculum quality. Then, depending on the relative standing of the focal student with respect to academic performance, there may be additional effects: ϕ_1 and ϕ_2.

4.3 Other Fit Factors

We first create a variable indicating whether a school is in the same state as the student. We also consider whether the student had familial ties to the college (i.e., whether one or both student's parents attended the college). Lastly, we account for whether the student is an athlete applicant, and whether they applied for an early action or early decision. The estimated effects reflect their strong preference for a school due to pecuniary benefits (e.g., scholarship) and non-pecuniary benefits (e.g., opportunity to play on a college team) to the athlete candidates, or due

to binding agreements signed for the early decision candidates. Table 2 presents descriptive statistics of the variables presented in this section.

<< Insert Table 2 about here >>

5. *EMPIRICAL RESULTS*

We now discuss our results from the model estimation. Table 3 presents the parameter estimates for our proposed model (Model II) and a benchmark model without the academic fit variables (Model I). A decrease in the Bayesian Information Criterion (BIC; from 16,755 to 16,701) provides evidence to favor our proposed model with additional covariates representing academic fit. Both models produce similar results with respect to the effects of most included variables besides the expected SAT scores of potential peer students. This finding is not surprising since the model without the academic fit variables would not be able to capture separately the effects due to changes in individual applicants' relative performance to their peer students. We find that the model without academic fit underestimates (in magnitude) the effect of the SAT scores of the peer students. We elaborate the sources of this bias when we describe our results in the following subsection. The results presented in Web Appendix A show that the significant effect of the academic fit variables is robust across different model specifications. We hence focus on Model II for the remainder of this section.

<< Insert Table 3 about here >>

5.1 Students' Evaluation Of Academic Quality And Fit

All three variables we included as proxies for academic quality and selectivity significantly affect the applicants' college choices. Applicants are more likely to choose colleges which (a) are placed higher in the public ranking (i.e., the rank number is lower), (b) had lower admission rates, and (c) had students with higher SAT scores enrolled in the latest year. The estimated sign of the effects of public ranking is consistent with previous findings (e.g., Griffith and Rask, 2007).

Our main interest in this study lies in the identification of the role of academic fit factors. We focus on understanding how applicants evaluate the distance from potential peer students with respect to academic aptitude (measured via SAT scores), after accounting for their preference for higher academic quality or selectivity of a school. The result demonstrates two opposite effects of deviations from peer students depending on the direction of deviations: (a) a positive effect of the deviations above the peer SAT scores; and (b) a negative effect of those below the peer SAT scores. The former effect suggests that the students consider an important evaluation factor the benefits of attending a school in which they can stand out (i.e., BFLPE).[7] But the latter effect suggests that the potential upward comparison against better-performing students can indeed deter them from attending schools in which they are likely to fall behind. We find the deviations in both directions to have a comparable impact in absolute magnitude.

As a robustness check, we consider an alternative operationalization of the effects. Theory suggests that upward comparisons with superior peers could be motivational if the higher comparison level seems attainable (Lockwood & Kunda, 1997; Molleman et al., 1986), and the negative effects of upward comparisons is likely to prevail if the deviation from the peer

[7] We acknowledge that this effect may capture not only long-term benefits (e.g., career opportunities) but also potentially immediate benefits such as merit-based scholarships.

performance is sufficiently large. Similarly, we also expect the positive effects of deviations due to the BFLPE to be greater when the focal student is far ahead of their peers. While the potential nonlinear effects are captured via squared deviations in our proposed model, we also estimate a model using only each student's deviation below (above) the first (third) quartile in the distribution of recently admitted students' SAT scores for each school as a robustness check. An important difference from our original specification is that we only capture the effects of deviations when they are substantial. We confirm that the alternative model produces consistent results and provide the detailed results in Web Appendix A.

Along with other effects due to match-specific variables such as location, the presence of the estimated effects due to the applicants' evaluation of academic fit provides an explanation for why some applicants do not attend the seemingly best option in their choice set. As the school's overall quality increases in terms of the peer students' ability, this increase often implies that the chances the focal student can stand out in that group is lower while the chances the student may fall behind the peer students is higher. Hence, the overall value of the best-ranked school in the objective measures does not necessarily dominate the others. Without explicitly accounting for these psychological effects due to the evaluation of students' academic fit, we show that the model could underestimate the effect of quality itself (see results of Model I).

5.2 Heterogeneous Effects Across Students

We now explore heterogeneity across students in the importance of academic fit in the college decision. By investigating how these effects differ across students based on several observed variables, we seek to draw some further theoretical implications of the effects. Our data contains the complete information of applicant behaviors from the initial application to the final

matriculation decision stages. From some of the observed behaviors during this overall process, we can learn certain characteristics of each applicant. We consider the number of applications each student made. Since we cannot include any applicant-specific variables in our proposed choice model as stand-alone independent variables, we interact the variable with our key variables of academic quality and fit factors to explore the potential heterogeneity of the effects.

We first count the total number of applications per student and look at the distribution of these numbers across the students (*M*: 6.7, *SD*: 3.6). We then divide the students into three groups – high, mid, and low – based on the percentile information (i.e., an equal percentile split). Table 4 presents summary statistics by group. With respect to the other observed characteristics, there is no notable difference among these segments.

<< Insert Table 4 about here >>

Table 5 presents the result with student heterogeneity. The table's first column of parameters presents the effects of academic quality and fit factors by these three segments.[8] First, we note that the segmented model is preferred to the non-segmented model in terms of BIC. Looking at the effects of academic fit, we find some evidence that the students who applied to more universities exhibited greater positive BFLPE. These students also show greater (in magnitude) negative effects of falling behind the peer students.[9] In line with these patterns, the

[8] Coefficients for the other control variables are assumed to be constant across segments. Parameter estimates are consistent with our main model.
[9] The largest difference of fit factor parameters between the segments is significant at the 10% level in the mean *t*-test.

peer students' SAT scores have a greater effect on their college choice.[10] The students also value more highly the school's public ranking and admission rate.

<< Insert Table 5 about here >>

We conjecture that a greater number of applications is associated with a lack of self-confidence about the applicant's own ability to get accepted to a university. (We also consider and rule out other alternative explanations below.) A confident student may choose to apply only to a few schools, whereas a less confident student may choose to apply to many schools to reduce the risk of not getting an offer from any one of them.

According to social comparison theory, more confident people benefit more from upward comparisons and less confident people favor downward comparisons (Aspinwall & Taylor, 1993). Hence, more confident students, or students with fewer applications, are affected less negatively by the deviation below their peers and less confident students, or students with more applications, are affected more positively by the deviation above their peers. This is in line with our empirical results. In addition, research has documented how the lack of (or threatened) confidence can lead to a propensity to engage in status consumption (i.e., an increased demand for certain products that may be seen as increasing a person's social status) (Gao et al., 2009; Sivanathan & Pettit, 2010). While a large body of literature has studied status motives to account for people's preferences for luxury and self-indulgence (Godoy et al., 2007; Rucker & Galinsky, 2008), the research scope has since expanded to other types of commodities through which people can build and maintain social reputation and thus achieve high status (e.g., Griskevicius et

[10] The largest difference of quality parameters between the segments is significant at the 1% level in the mean *t*-test.

al., 2010). When applicants are less confident about their ability, the estimated stronger preference for the higher ranked or more selective option may be accounted for in part by such status motives.

We note that other student characteristics are possibly correlated with the number of applications. First, the observed differences in the number of applications may arise from differences in the household income, as the college application process is also costly. Alternatively, fewer applications may indicate that the applicant had stricter preferences or restrictions. For example, if a student only considers colleges in the state they reside in, we will observe the student applies to few schools. We test whether these factors could also account for the observed heterogeneity of the effects. Using an indicator variable for whether an applicant attended a private high school (as a rough proxy for income) and the percentage of applications sent to in-state institutions (as a measure for geographical restrictions), we find that neither factor can explain the observed heterogeneity. (See Web Appendix B for a detailed description and results.)

6. DISCUSSION

6.1 Managerial Implications

Our main finding suggests that the applicants' evaluation of their relative academic fit could change their preference ranking over the available options. Their SAT scores relative to ones from their potential (average) peer students can capture this effect of academic fit to each school. Universities know both their own average SAT score and the SAT scores for all admitted students. Thus, by understanding this effect, college administrators may improve enrollment

yield by tailoring the marketing material accompanying their admission offer letters. Higher expected yield allows the universities to become more selective in their admissions process. Higher selectivity in turn would serve as a quality measure in future years, both directly (as per existing research and our results) and indirectly through its effect on the public rankings such as those provided by US News and World Report.

For applicants who are likely to significantly outperform at the university (based on observed SAT scores), the universities can complement standard advertising material with messages highlighting the benefits of standing out, both in terms of the psychological benefit of the BFLPE and in practical terms like collaboration opportunities with professors and improved job opportunities. They might also use testimony of a recent alumnus discussing how being the "big fish" provided further opportunities for them. Yet for a group of applicants who lie at the other end of the distribution in terms of demonstrated SAT scores, the university must deliver information about potential resources for academic support, such as peer student tutoring, writing help, or academic resource centers. For this group, mitigating the fear of falling behind would increase the probability that they choose to enroll in the given university.

6.2 Policy Implications

Our findings also complement existing research into understanding the impact of admission policies by exploring the role of the students' preferences on the observed enrollment outcomes. A major argument against affirmative action in college admissions is "mismatch theory." A "mismatch" refers to scenarios in which a student's academic ability does not match

the academic ability of their peers (i.e., it is a question of academic fit).[11] Mismatch theory posits that overmatching students because of affirmative action may in fact be detrimental to their academic success by placing them in educational environments above their abilities. In response, much of the research in this area has analyzed the impact of overmatching on academic achievements and has overwhelmingly found it not to be true (Alon & Tienda, 2005; Fischer & Massey, 2007; Kurlaender & Grodsky, 2013). However, this research typically looks at the educational outcomes of students who are already in a "mismatched" setting. It is worth acknowledging, though, that students have an active role in determining whether to put themselves into such a situation as part of their college choice. Our findings, then, suggest one potential reason for the lack of support for mismatch theory is that applicants who would be negatively affected by being severely overmatched may strategically self-select away from such situations.

[11] If the focal student's academic ability exceeds the average student's ability, that student is said to have "undermatched" in the college application process. If their academic ability falls short of the average student's ability, they are said to have "overmatched."

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Table 1

Descriptive Statistics of Applicants' Choice Sets With at Least Two Admission Offers

	Mean	SD
Number of admission offers	4.54	2.40
Proportion of universities in the student's state of residence	.37	.32
Average SAT mid-point of universities within choice set (in hundreds)	11.98	1.03
Range of SAT mid-points of universities within choice set (in hundreds)	1.62	1.05
Proportion of universities at which student's SAT score is lower than average peers	.76	.34

Table 2

Descriptive Statistics and Correlation Matrix

	Mean	*SD*
College Size (# full-time students in thousands)	13.27	10.77
College type indicator: Public	.47	.50
Geographic distance indicator: College same state as applicant	.40	.49
College location indicator: City	.56	.50
College location indicator: Suburb	.21	.41
Legacy applicant indicator	.03	.18
Early action / early decision applicant indicator	.16	.37
Athlete applicant indicator	.03	.18
College tuition (in thousands as of 2014)	29.07	15.21
Peer students' SAT scores (in hundreds)	12.01	1.26
Admission rate (%)	.53	.19
College ranking (if ranked)	60.63	40.66
Student's SAT scores (in hundreds)	13.04	1.59
# applications made by the student	8.15	4.24
Private high school indicator	.12	.33
% In-state applications	.37	.32

Table 3

Utility Parameter Estimates

	(I)			(II)		
Covariate	*Parameter*		*SD*	*Parameter*		*SD*
Quality and Selectivity:						
College ranking (in logarithm)	-0.635	***	(0.036)	-0.622	***	(0.036)
Admission rate (%)	-1.571	***	(0.143)	-1.562	***	(0.143)
Peer students' SAT scores (in hundreds)	0.387	***	(0.027)	0.660	***	(0.043)
Academic Fit:						
Squared deviations above peer students' scores (in hundreds)				0.100	***	(0.011)
Squared deviations below peer students' scores (in hundreds)				-0.092	***	(0.022)
Other Match-Specific factors:						
Geographic distance: colleges in the same state as applicants	0.139	***	(0.046)	0.134	***	(0.046)
Athlete applicants	1.053	***	(0.151)	1.054	***	(0.151)
Legacy applicants	0.769	***	(0.078)	0.762	***	(0.079)
Early action/ early decision applicants	0.677	***	(0.056)	0.681	***	(0.056)
Other College-Specific Controls:						
College Tuition (in thousands as of 2014)	-0.005	*	(0.003)	-0.005	*	(0.003)
College Size (# full-time students in logarithm)	0.010		(0.03)	0.016		(0.03)
College Location: City	-0.165	***	(0.057)	-0.163	***	(0.057)
College Location: Suburbs	-0.170	***	(0.06)	-0.167	***	(0.06)
College Type: Public	0.051		(0.077)	0.049		(0.078)
College Type: Unranked others	-2.611	***	(0.156)	-2.545	***	(0.156)
Log-likelihood	-8319.85			-8284.24		
BIC	16754.54			16700.98		

*** Significant at 1% level, ** at 5%, * at 10%.

Table 4

Descriptive Statistics by Segment

# Applications made by a student	Low 2 to 5		Mid 6 to 9		High 10 or more	
Summary statistics for student-specific characteristics	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*
Student's SAT scores ('00)	12.69	1.63	13.04	1.57	13.36	1.52
Private high school graduates	0.10	0.30	0.13	0.34	0.13	0.34
% In-state applications	0.49	0.50	0.39	0.49	0.33	0.47
Legacy applicants	0.04	0.20	0.03	0.18	0.03	0.17
Early action/ early decision applicant	0.17	0.38	0.16	0.37	0.15	0.36
Athlete applicant	0.04	0.19	0.03	0.18	0.03	0.17
# Students	3,006		2,515		1,337	
# Obs.	8,961		12,358		9,809	

* *Note.* The number of observations for each group is not equal due to the skewness of the distribution.

Table 5

Utility Parameter Estimates by Segment: Number of Applications

	Student Segments Based on Number of Applications		
Covariate	*Parameter*		*S.E.*
Quality and Selectivity:			
College ranking (in logarithm)			
Segment 1: High	-0.807	***	(0.073)
Segment 2: Mid	-0.634	***	(0.058)
Segment 3: Low	-0.413	***	(0.058)
Admission rate (%)			
Segment 1: High	-2.115	***	(0.312)
Segment 2: Mid	-1.956	***	(0.232)
Segment 3: Low	-0.876	***	(0.223)
Peer students' SAT scores (in hundreds)			
Segment 1: High	0.899	***	(0.095)
Segment 2: Mid	0.676	***	(0.068)
Segment 3: Low	0.529	***	(0.067)
Academic Fit:			
Deviations above peer scores (in hundreds)			
Segment 1: High	0.119	***	(0.024)
Segment 2: Mid	0.122	***	(0.019)
Segment 3: Low	0.075	***	(0.018)
Deviations below peer scores (in hundreds)			
Segment 1: High	-0.176	***	(0.057)
Segment 2: Mid	-0.091	***	(0.033)
Segment 3: Low	-0.066	*	(0.034)
All Other Controls	Yes		
Log-likelihood	-8220.74		
BIC	16680.00		

*** Significant at 1% level, ** at 5%, * at 10%.

Note. The included other fit factors and college-specific control variables are the same as the main model without heterogeneity.