Conceptual and Methodological Problems in Research on College Undermatch

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Access to the nation’s most selective colleges remains starkly unequal, with students in the lowest income quartile constituting less than 4% of enrollment. A popular explanation for this phenomenon is that low-income students undermatch by attending less selective colleges when their credentials predict admission to more highly selective colleges. We identify three problematic assumptions in research on undermatching: (a) that researchers can differentiate colleges at the “margin that matters” for student outcomes; (b) that researchers can accurately predict who will be admitted at colleges that use holistic admission processes; and (c) that using achievement measures like SAT (Scholastic Assessment Test) scores to match students to colleges will reduce postsecondary inequality. We discuss the implications of these assumptions for future research on college choice and stratification.

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designed to reduce undermatching behavior among low-income students—by improving access to college information—are currently being tested (Hoxby & Turner, 2013; Sherwin, 2012) and the slate of college match presentations at recent education conferences indicates that additional published research on the topic is forthcoming. Undermatching has also become a hot topic in popular media, which reports on matching studies with attention-grabbing headlines such as “Smart, Poor Kids are Applying to the Wrong Colleges” (Yglesias, 2013).

Scholars who examine the undermatching phenomenon are careful not to label students’ enrollment choices as “right” or “wrong.” However, the key assumption underlying work on college match is that researchers can identify whether a particular college is an appropriate enrollment choice for students with a given set of observable characteristics. Both students and colleges must be differentiated and stratified for the concept of matching to exist. Compared to countries that have centralized education systems and national exams that explicitly allocate students to positions in the tertiary system, however, “the process of matching students to institutions is much more fluid in the United States” (Karen, 2002, p. 191). Thus, in the American context, researcher-generated hierarchies of students and institutions must be created to examine the undermatching phenomenon. Typically, researchers differentiate students by academic achievement (grade point averages [GPAs] and Scholastic Assessment Test [SAT] scores) and colleges by selectivity. They present the ideal social order as the attendance of higher ability students at highly selective colleges and lower ability students at low- or non-selective colleges; deviations from that order are labeled as mismatches. Mismatches are problematic not only because they represent missed educational opportunities but also because researchers presume higher ability students are best poised to capitalize on the abundant resources provided at selective colleges.

Given the increasing visibility of undermatching research and that match is derived from researchers’ models—and thus is not an objective, observable state—it is important that scholars begin to unpack the assumptions that support this body of work. We have reviewed the emerging undermatch literature and identified three key assumptions that are held by researchers. Researchers assume that (a) they have differentiated colleges at the margins that matter for student outcomes; (b) they can accurately determine who will be admitted to colleges of varying selectivity; and (c) that relying more strongly on academic achievement measures such as SAT scores to match students to colleges will reduce post-secondary inequality and improve student outcomes. We identify several conceptual and methodological issues embedded in each assumption, which derive mostly from researchers’ idealized models of the college choice and admissions processes. The essay concludes with a discussion of the implications of these issues for future research on college match. It is widely observed that colleges are stratified, “yet there is no consensus as to how one should measure the stratification of collegiate institutions” (Lucas, 2001, p. 1670). Undermatching researchers have taken two different approaches toward stratifying colleges. The first approach is to categorize colleges as either “very selective” or “less than very selective.” For instance, Bowen et al. (2009), who limit their undermatching analysis to the North Carolina context, group the two most selective public colleges in the state (North Carolina State University and University of North Carolina-Chapel Hill) together as their institutional destination of interest for high-ability students. Similarly, Hoxby and Avery (2012) examine whether high-ability students across the United States apply to one of the 236 most selective colleges in the nation.

The second method of stratifying colleges is the creation of a selectivity hierarchy that encompasses diverse institutions. Both Roderick et al. (2008, 2011) and Smith et al. (2013) use the competitiveness categories from Barron’s Profiles of American Colleges to differentiate four-year colleges; they collapse the seven Barron’s categories into four, and add a two-year category that includes community colleges and for-profit schools. Thus, they create a “ladder” of selectivity that has five rungs and these rungs represent institutional destinations to which students of varying academic ability are matched. It is important to keep in mind that undermatching is only a problem if attendance at a college that is lower in the status hierarchy results in diminished student success or social mobility. Therefore, researchers’ methods of stratifying colleges represent their hypotheses about the “margins that matter” for student access and outcomes.

There is ample conceptual and empirical support for stratifying colleges by their elite status. Various methods of classifying and ranking colleges produce very similar lists of elite colleges (Kingston & Lewis, 1990). However, institutional ranking is more ambiguous and fluid among less selective colleges, particularly those that have primarily local or regional reputations. Because there is no objective standard for educational excellence, a college’s quality is gauged in relation to peer institutions (Bastedo & Bowman, 2010). Although low-prestige colleges focus on sustaining enrollments, the striving of middle-tier institutions to improve their relative position complicates efforts to place them in a specific and consistent place in the status hierarchy.

We would define elite colleges as only the “most competitive” group in the Barron’s index, who admit less than a third of their applicants. These institutions benefit from a vast gap in the resources available at prestigious institutions, a gap that is growing larger because higher education has transformed from a series of linked local markets to a national market in which colleges compete to attract the best students and faculty from across the nation (Hoxby, 2009). Elite colleges leverage their considerable financial resources to outcompete lower status colleges in the market for talent, providing an accelerative advantage in the competition for additional resources (Frank & Cook, 1995). Because of this highly skewed resource distribution, the rungs on the selectivity ladder are not equally spaced apart. As noted by Kingston and Lewis (1990, p. xxi), “The effects of prestige or quality are not linear . . . a degree from a school of middling rank

**Review and Critique of Undermatching Assumptions**

**Assumption 1:** Researchers have differentiated colleges at the margins that matter for student outcomes.
may not confer better chances than one at the bottom of the prestige hierarchy.” Thus the differences between “most competitive” and “highly competitive” colleges can be quite substantial in terms of resources and effects.

Institutional wealth affects various facets of the student experience, including classroom resources and financial aid. Hoxby and Avery (2012) demonstrate that elite colleges (e.g., Yale University) provide more than $13,000 more per student in educational spending than institutions only one tier lower (e.g., Boston University). Elite colleges are able to further compete for student talent by eliminating loans from aid packages for low-income students (Hillman, 2013), making them less expensive to attend than a community college for needy students. Colleges in the middle of the prestige hierarchy may confer worse outcomes than those at the bottom when student loan burden is considered. Hoxby and Avery’s (2012) estimation of the net price that low-income students pay at various institutions indicates that a degree earned over 5 years at a less competitive college costs, on average, approximately $37,000 more than a degree earned at a least competitive college. This large difference in net price obscures the fact that less competitive colleges are only one tier higher in the seven-tiered Barron’s selectivity hierarchy and spend a measly $240 more per year on instructional expenditures per student than the least selective colleges. Further, elite colleges have exceptionally high graduation rates compared to other colleges. More than 90% of students who enroll in elite private colleges graduate, although it is unclear if this graduation rate is merely a reflection of student selection and innate abilities or if it is also due to institutional resources and labor market incentives to complete a degree (Bound, Lovenheim, & Turner, 2010).

Highly selective colleges may influence student outcomes most strongly through their ostensible signaling effects in the labor market. Elite colleges serve as gatekeepers to well-paying and politically influential occupations, at least partially because of enhanced odds of admission to prestigious law and medical schools for their graduates (Kingston & Smart, 1990). Most research finds that graduates of selective colleges earn a premium in the labor market, and this relationship holds after accounting for selection bias with quasi-experimental methodologies (Hoekstra, 2009), although it may not hold if one could control for student motivation (Dale & Krueger, 2011). Providing further evidence that the benefits of selectivity are not linear, Monks (2000) finds that after controlling for student ability and other confounding factors, there is no significant difference in wages between alumni of selective colleges and nonselective colleges. However, alumni of colleges at the top of the prestige hierarchy (very, highly, or most selective) do earn more than graduates of selective colleges. One rung in the selectivity ladder that likely corresponds to a margin that matters for student outcomes is attendance at a 2-year college as opposed to a 4-year college. Unlike subjective differentiations of prestige that make distinctions among institutions with similar missions, objective differentiation is the result of policy that establishes explicit postsecondary sectors, or tracks (Bastedo, 2009; Bastedo & Gumport, 2003). The 2-year college track provides college experiences and resources that fundamentally differ from the 4-year college track and can facilitate different outcomes. Most 2-year colleges are precluded from offering baccalaureate degrees, are provided with smaller per-student appropriations, and are tasked with providing the bulk of remediation in state postsecondary systems (Bahrt, 2013; Goldrick-Rab, 2010). Although community colleges provide an important democratizing function by expanding access to higher education, a wide body of research indicates that attendance at a 2-year college deters baccalaureate-seeking students from eventually earning a degree (Reynolds & DesJardins, 2009).

There is ample evidence that students who attend prestigious colleges are rewarded with multidimensional benefits that track to high-status positions in the social hierarchy. However, the aforementioned evidence suggests that students receive the greatest benefits from attending the most prestigious colleges, which are ones that are viewed as elite rather than simply selective. Elite colleges in the “most competitive” Barron’s category are the top 65 institutions, and they admit up to one third of their applicants; even in the next “highly competitive” category, these institutions admit up to half. The distinctions among the tracks are quite different. In particular, highly selective 4-year colleges and 2-year colleges appear to represent distinct tracks that propel graduates into different social strata, whereas the impact of moderately selective colleges is quite muddy. The distinctions that matter are thus at the extremes, a fact easily mistaken when we create ladders of selectivity with seemingly equal rungs.

Assumption 2: Researchers can accurately predict who will be admitted to colleges of varying selectivity.

College match researchers assert that they can predict whether a student has access to particular colleges by examining measures of the student’s academic achievement. All undermatching studies employ standardized tests to match students to colleges, and some augment test scores with high school GPA and a dummy variable that indicates AP/IB course participation. Matches are often made by predicting students’ probability of admission at a selectivity level given their academic achievement and the achievement patterns of other students at that level. For instance, Bowen et al. (2009) and Smith et al. (2013) assume that if their model predicts a student has less than a 90% chance of admission, that student will not be admitted.

On the surface, researchers’ claims that they can accurately determine who has access to various colleges seem highly plausible because American norms dictate that rewards should be allocated according to educational merit and demonstrated effort rather than ascriptive characteristics (Turner, 1960). Further, as the practices of formal academic tracking and ranking in high schools decline (Attewell, 2001) and the market for student talent becomes nationalized (Hoxby, 2009), meritocratic criteria such as test scores are increasingly relied on to provide a universalistic structure that facilitates the sorting of students into colleges (Alon, 2009).

Given the advantages of attending highly selective colleges, it is not surprising that many students apply to them. But selective institutions are unlikely to admit all qualified applicants because restricting access further enhances their measures of selectivity and prestige, which in turn is assumed to enhance alumni giving,
foundation support, and other resources (Bastedo & Bowman, 2011; Winston, 1999). Colleges “craft” a freshman class that meets their needs for student academic ability, diversity (broadly defined to include students’ life experiences, talents, and interests), and capacity to pay tuition. Although meritocratic indicators do not guarantee any applicant their choice of college, academic credentials do serve as a form of currency that allows students access to the market for selective college admissions.

To determine which qualified students to admit, selective colleges generally employ a holistic admissions process, which considers traditional measures of academic achievement, such as grades, SAT scores, and Advanced Placement and International Baccalaureate (AP/IB) participation, in light of school and family context. One particularly crucial indicator in the holistic process is the strength of the student’s curriculum in relationship to the most rigorous curriculum offered by the school—often called “maxing the curriculum” (Bastedo & Howard, 2013). Colleges explicitly use extracurricular activities and essays to assess student traits that are proxies for motivation and are linked to future leadership in political and economic spheres. Athletic involvement, in particular, improves one’s likelihood of admission (Espenshade & Chung, 2005), as does involvement in activities that “stand out” or cause applicants to “defy expectations” (Kaufman & Gabler, 2004).

Each of these factors is highly stratified by SES. Among students in the Educational Longitudinal Survey (ELS:02), students in the lowest SES quartile were less likely to maximize their math curricula by nearly half a standard deviation, and science curricula by a quarter of a standard deviation (Bastedo & Howard, 2013). Athletic and extracurricular activity participation are also highly stratified because of differences in high school opportunities, financial limitations, class-related parenting logics, and safety issues, among other factors (Bennett, Lutz, & Jayaram, 2012; Espenshade & Chung, 2005). A study of North Carolina high schools showed that the percentage of students on free or reduced-price lunch was negatively associated with the number of activities available, particularly academic honors, service, and sports activities, all of which are considered in a holistic admissions process (Stearns & Glennie, 2010).

The extension of admissions preferences to various groups in accordance with institutions’ particular preferences makes it difficult to predict admissions outcomes. As evidence, Espenshade and Chung (2005) found that even applicants with a SAT score in the 99th percentile have a less than 50% chance of being admitted to the elite private universities they studied. No student is guaranteed access to very selective colleges; applications have simply increased too much without concomitant increases in enrollment capacity. None of the existing undermatch studies considers these factors, which are crucial to predicting holistic admission.

We also must consider the institutional factors that influence access for low-income students, particularly admissions and enrollment policy, enrollment management practices, and college finance. Over the past three decades, elite colleges, including flagship public universities, have essentially choked off enrollment increases (Haycock, Lynch, & Engle, 2010). In the face of tax resistance and increasing costs for prisons and Medicaid, states have chosen to disinvest in public higher education, leading to increased applicant competition for spaces and increased collegiate searching for alternative sources of revenue. Colleges meet their desire for financial support by giving legacy applicants extra consideration (Hurwitz, 2011) or, for public colleges, by admitting more out-of-state students (Jaquette & Curs, 2013). These supply-side restrictions are incredibly important for researchers to consider.

Enrollment management practices also ensure that admissions and financial aid processes are no longer separate activities at the vast majority of institutions, even at elite colleges. Each enrolled student from a low-SES family is an extraordinarily expensive financial proposition compared to a full-pay student—a full-pay student who is most likely just as academically qualified as a low-SES student requiring extensive resources. Small shifts in the number of low-income students enrolled in a class can lead to very large differences in tuition revenue, and colleges have strong incentives to ensure that this does not occur. Class-based diversity among college students is also relatively unobservable, both physically and statistically, compared to race and gender diversity. Thus, very few elite colleges have made recruiting low-income students a true priority, although the issue is undoubtedly gaining some traction nationally.

Given this complexity, undermatching researchers are simply overconfident in their ability to predict who has access to selective colleges. Evidence from undermatching studies themselves supports this conclusion. For example, Smith et al. (2013) use ELS:02 data to examine the prevalence of undermatching by high school graduates across the nation. Their results indicate that 13% of the students they match to nonselective 4-year colleges actually enroll in this selectivity strata, whereas 52% enroll in a somewhat selective, selective, or very selective college—colleges that they deem inaccessible to students with these academic credentials. Undermatching researchers assert that “college ‘match’ is an easily quantifiable outcome” (Roderick et al., 2008, p. 5), but the methods they use to match students and colleges do not account for supply-side restrictions of capacity and represent an idealized version of the messy sorting process that characterizes the admissions process. Unless researchers are studying undermatching in a highly formulaic admissions context, it is unlikely that any statistical model will be able to predict admissions outcomes with great precision. In addition, as the models often do not consider curriculum rigor or extracurricular activity participation—each of which is itself highly stratified by high school context and SES—these models are likely to be biased in favor of finding more low-SES students who undermatch than truly exist.

Assumption 3: Using achievement measures such as SAT scores to match low-income college students to colleges will reduce postsecondary inequality and improve student outcomes.

Undermatching researchers imply that strengthening the association between a student’s academic achievement and the selectivity of the college she attends will increase the representation of low-income students at prestigious colleges and improve graduation rates. The models used by undermatching researchers use SAT scores as one of the primary determinants of college
match. So although they have not explicitly advocated for increased reliance on SAT scores in admissions, their models presume that low-income students with high SAT scores should attend highly selective colleges and vice versa.

Yet research that examines the evolution of institutional stratification suggests that adhering more strongly to an education-based meritocracy in college admissions does not reduce gaps in college access between advantaged and disadvantaged students (Bastedo & Jaquette, 2011; Posselt, Jaquette, Bielby, & Bastedo, 2012). High-income students benefit disproportionately in the competition for academic achievement throughout their lives. The tournament system of mobility practiced in the United States allows ample time for class-based disparities in financial and social capital to influence the distribution of “merit” that matters for college admission, and thus for eventual placement in the occupational hierarchy. As a result, even if students were “perfectly matched” to institutions, low-income students would not benefit systematically. The result is “effectively-maintained inequality” that is highly robust against attempts to change the social order (Lucas, 2001).

This has been demonstrated repeatedly using nationally representative data. As competition for admission to selective colleges increases and colleges place more weight on standardized tests, high-SES students improve their relative performance over low-SES students in the SAT score distribution (Alon, 2009). Although low-SES students have made remarkable improvements in academic performance over the past several decades—earning higher GPAs and taking more challenging coursework—high-SES students have improved their performance even more dramatically (Bastedo & Jaquette, 2011). Once you closely examine high school coursework patterns, relatively few low-SES students have the qualifications required for admittance to the nation’s most selective colleges.

Using four national longitudinal data sets, Bastedo and Jaquette (2011) estimate college destinations for all students if they were “perfectly matched” based on their academic achievement, including GPA, SAT, and curriculum rigor. They find there would be no change in the percentage of low-SES students admitted to colleges in the top three Barron’s categories (very, highly, or most selective institutions). If perfectly matched purely on GPA and SAT scores, students in the highest SES quartile would actually increase their access to the most selective colleges. This is because the majority of low-SES students attending highly selective colleges are actually overmatched to their institutions based on traditional indicators (e.g., Smith et al., 2013). Thus, even if low-SES students who are undermatching were to be admitted, they might simply replace low-SES students who are currently overmatching.

The movement to reduce undermatch rests not only on concerns for equity but also the proposition that it will improve student outcomes, particularly graduation rates (Bowen et al., 2009). This suggests that higher achieving students are better poised to capitalize on the plentiful resources and able peers found at selective colleges. Although few would suggest that a student who struggled to graduate from high school would have greater success at Harvard than at a community college, advocating for better student–college matches can be taken too far. As noted by McPherson and Schapiro (1990), our current system of postsecondary tracking, in which students are grouped by similar achievement levels and provided with unequal resources, is not the most efficient method of maximizing student learning. Indeed, lower performing students seem to benefit more from investments in elite education than higher performing students, a phenomenon labeled the “negative-selection hypothesis” (Brand & Xie, 2010).

Thus, in a counterfactual world in which there is perfect concordance between all students’ educational achievement measures and the selectivity of college they attend, higher education stratification would largely remain the same. And the evidence that improving match would improve educational outcomes, such as student learning, is weak. Although their numbers are likely overstated, there are undoubtedly outstanding low-income students who could earn admission to elite colleges if encouraged to apply (Hoxby & Avery, 2012; Radford, 2013), and for those students, the effects on their choice of college and life outcomes could be substantial (Hoxby & Turner, 2013). This does not change the fact, however, that college application interventions are not a panacea, and stronger interventions at the institutional level are needed to effect real change—in the resources provided by colleges to support low-income students, in enrollment practices, or in the ways students are admitted to selective colleges. Anything less will fail to reduce postsecondary inequality significantly at a systemic level.

Conclusion

Our goal in writing this essay was to critically examine the assumptions that underlie the burgeoning undermatching literature. In doing so, we identified several conceptual and methodological choices undermatching researchers make when differentiating colleges, determining student–college matches, and situating their work that we find problematic. First, we are skeptical that the rewards associated with attendance at colleges of varying selectivity accrue in a linear manner. Undermatching researchers who use selectivity margins to differentiate colleges should offer an explicit rationale for their classification scheme rather than simply relying on the Barron’s hierarchy among 4-year colleges. Additionally, more emphasis should be placed on the 2-year/4-year college margin. “Match,” the outcome of interest in undermatching studies, is determined by the researcher’s model, and a critical component of this model is the designation of “margins that matter” for student outcomes. The evidence is that students at the “most competitive” institutions benefit disproportionately, and that students at less competitive institutions may actually be disadvantaged once debt burdens are considered. Therefore, future undermatching researchers should justify their choices for differentiating institutions, when possible, by examining how attendance at colleges of varying selectivity corresponds to differences in student outcomes such as debt burden, graduation rates, professional school placement, and earnings. Researchers should also consider and account for institutional capacity, enrollment management practices, and state policy influences on admissions and finance.

Second, although elite colleges undoubtedly provide their graduates with a wealth of rewards that differ from what graduates of less selective colleges receive, holistic admissions makes it
very difficult to determine with accuracy who will have access to highly selective colleges. We encourage researchers to develop models that more accurately reflect the holistic admissions process, by including variables that reflect student course-taking (ideally drawn from actual transcripts) and the extracurricular and community service activities that students have engaged. Given the importance of school and family context in holistic admissions, academic achievements should be modeled in light of the high school curriculum offerings and family resources, and not merely as pure GPAs or standardized test scores. These variables are available in national data sets (such as the ELS-02) but are often not used in existing matching research. It would also be helpful if these data sets used better measures of extracurricular activities leadership, and considering the use of legacy admissions, provided the actual colleges a student’s parents attended.

The most defensible undermatching research would be in circumstances where there is bureaucratization of admissions, where it is clear—based on explicit policy—who does and does not have access to specific colleges. An ideal situation for studying undermatch would be in a state context that uses a publicized admissions cut-off, such as Texas, where it is easier to determine who has access to selective public colleges. Students who graduate in the top 7% of their high school graduating class are guaranteed admission to the University of Texas at Austin, and therefore top 7% students who elect to attend other state colleges could legitimately be labeled “undermatchers.” However, most states do not have such an explicit admissions policy, so much more information is needed on potential applicants beyond SAT scores and GPA to attempt to estimate matching models in those contexts.

Third, and most importantly, we are skeptical of researchers’ claims that institutional stratification would decrease if society could induce stronger meritocratic matches between students and colleges. We do not mean to imply that it is unnecessary to improve the quality of information available to low-income students about their college options. Clearly, low-income students deserve and should receive better access to high-quality personalized guidance on applying to college, such as services provided by federal TRIO programs. However, outreach programs are underfunded and, as noted by Hoxby and Avery (2012), are unlikely to reach all students who need help understanding their college options. And large financial barriers to college access remain at all but the nation’s most prestigious and well-resourced colleges.

Rather, we suspect that interventions that rely solely on remediating informational deficits among low-SES students may work to change some individuals’ college choices but will not do much to counter the overall amount of stratification. If the number of applicants to selective colleges increases, high-SES students will adapt to the changing landscape of admissions and continue to gain disproportionate access to the most prestigious institutions. Therefore, unless society makes efforts to flatten the stratification of educational institutions (i.e., equalize the distribution of resources, not simply opportunities to access resources), prestigious colleges will continue to accrue the lion’s share of resources and social mobility will stagnate. As education researchers, we must continue to focus our attention on inequality at all stages of the educational trajectory, so as not to neglect critical components of educational stratification.

NOTE
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