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## Addressing Undermatch

### Creating Opportunity and Social Mobility

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Students deserve to attend a postsecondary institution that matches their academic accomplishments, regardless of their background. This is important not just for meritocratic reasons. Students' lifetime opportunities and the country's economic competitiveness also depend on individuals fulfilling their potential. As we describe in more detail below, research suggests that students are more likely to complete college degrees and fare well in the labor market when they attend a college that matches their level of academic preparation.

There has been a lot of media, political, and legal attention paid to the role of college admissions in determining where students ultimately enroll. Yet research shows that there are other key points in the transition to college that also shape where students attend. Since the ability of colleges to intervene in the admissions stage has become increasingly restricted by courts or voters, it is important to explore policies and practices that can be implemented during other stages of student decision-making that might help students attend institutions where they can fulfill their potential.

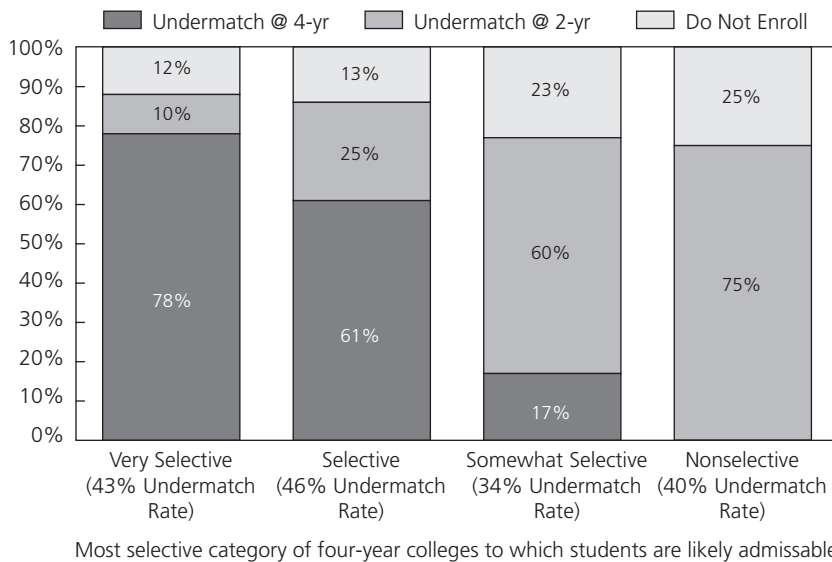
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When students' academic credentials give them access to a college or university that is more selective than the postsecondary alternative that they actually choose, that is known as academic *undermatch*.<sup>1</sup> This chapter will report the extent to which undermatch occurs for different populations, the consequences of undermatch for student outcomes, what a new mixed-methods study of high achievers indicates about when and why undermatch occurs, and promising strategies for reducing undermatch and its deleterious effects on student success.

### The Extent of Undermatch

Recent research shows that undermatch is pervasive, especially among low-income, underrepresented minorities, and first-generation college-goers. Nationally representative data from the 2004 high school senior cohort reveal that 41 percent of students undermatch.<sup>2</sup> This estimate is roughly consistent with several region-specific estimates of undermatch that apply the same operational definition to specific subpopulations of students. In North Carolina, for example, 40 percent of students who were highly qualified to attend a selective college in 1999 did not enroll in one.<sup>3</sup> In the Chicago Public Schools, about two-thirds of the 2005 high school graduating class undermatched.<sup>4</sup>

These estimates of the prevalence of undermatch mask important differences across students by measured academic ability as well as the severity or type of undermatch observed. Analyzing SAT takers who graduated from high school in 2010 reveals substantial variation along these dimensions. Figure 11.1 shows that 43 percent of students with academic credentials that make them likely to gain admission to a “very selective” college undermatch, but that most of those students (78 percent) still enroll at a four-year institution, just with a lower selectivity level. This 43 percent undermatch rate among SAT takers with the strongest academic credentials represents approximately 80,000 students in the high school class of 2010, composed predominantly of white students, but also roughly 4,000 Latinos, 2,000 African Americans, 10,000 Asians, and 3,000 students who list “other race” or do not report race/ethnicity.<sup>5</sup> By contrast, 34 percent of students with predicted access to a “somewhat selective” college undermatch, and the vast majority of these students with more modest academic credentials (60 percent) undermatch at a two-year institution. Finally, a quarter of the students with academic credentials to gain access to a “nonselective” four-year

**FIGURE 11.1.** Type of Undermatch, by College Selectivity Category Accessible to Student

Source: Based on the authors' calculations using the population of SAT takers who graduated from high school in the spring of 2010 and matched with National Student Clearinghouse records of college enrollment through 2013. A student is "undermatched" if her SAT score (critical reading + math) is above the median of a college's selectivity category and she instead enrolls at a college in a lower selectivity category. The four selectivity categories are condensed Barron's categories as defined in Jonathan Smith, Matea Pender, and Jessica Howell, "The Full Extent of Academic Undermatch," *Economics of Education Review* 32 (February 2013): 247–61.

institution do not enroll in any postsecondary institution within three years of high school graduation.

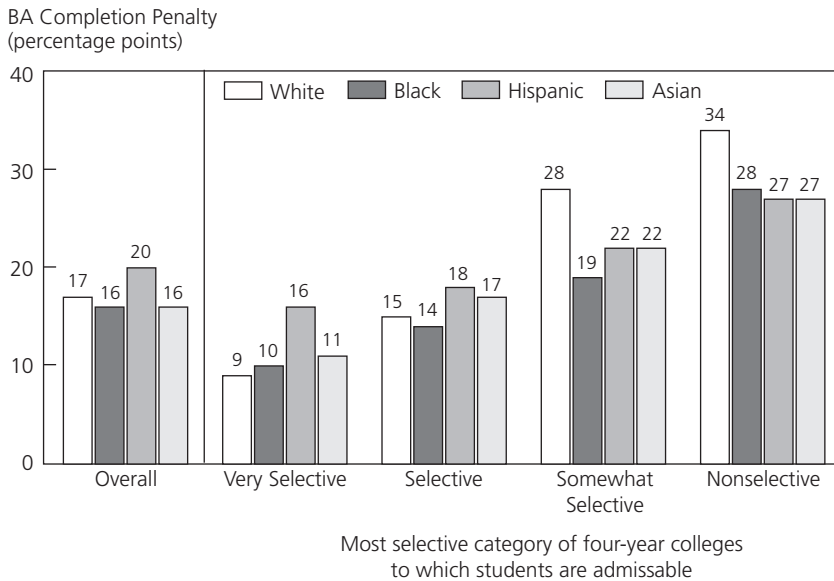
Studies show different rates of undermatch by demographic characteristics as well. In the Chicago Public Schools, Latino students were the most likely to academically undermatch, with 44 percent enrolling in colleges far below what their academic credentials would indicate, compared with 36 percent of whites, 28 percent of African Americans, and 31 percent of Asians.<sup>6</sup> Academic undermatch in North Carolina was more common among African-American than white students, and was also strongly correlated with family income and parental education. Specifically, 59 percent of students in the lowest income quartile undermatched, compared with only 27 percent in the top quartile. And 64 percent of first-generation students undermatched, compared with 31 percent of

students who had parents with graduate degrees.<sup>7</sup> A nationally representative sample similarly revealed that students in the lower half of the socioeconomic status (SES) distribution had a fifteen-percentage-point higher rate of undermatch than their peers from higher-SES families. It also showed that students in rural high schools were more likely to undermatch.<sup>8</sup> Despite the obvious potential influence of school effects on undermatch (through school resources, academic culture, school counseling, etc.), observable high school attributes actually explain only about half of the across-school variation in undermatch rates.<sup>9</sup> High schools that look nearly identical by many quantitative measures may have vastly different rates of undermatch among their graduating seniors, which makes qualitative analyses by Melissa Roderick and colleagues and by Alexandria Walton Radford so compelling and useful for understanding the role of students' high school context.<sup>10</sup>

### Consequences of Undermatch

Over the past decade, researchers have begun to investigate academic undermatch as a potential source of stagnant college completion rates in the United States. Ohio State University economist Audrey Light and Texas A&M economist Wayne Strayer find that students of all academic ability levels have a higher probability of completing a degree if the selectivity level of the college they attend matches their measured academic skill level.<sup>11</sup> Why might this be the case? Some colleges are better at graduating some—or even all—students because of services offered, support systems, peers, and/or expenditures. In fact, consistent with this story, Chicago Public School students with similar high school GPAs had higher graduation rates at more selective Illinois colleges.<sup>12</sup> Among high-achieving students in North Carolina, 81 percent of matched students compared with 66 percent of undermatched students complete a bachelor's degree within six years—a fifteen-percentage-point completion penalty.<sup>13</sup>

Figure 11.2 shows that the consequences of undermatch for bachelor's degree completion are not the same for students of all academic ability levels or all racial/ethnic backgrounds. Analyses of the population of SAT takers who graduated from high school in the spring of 2004 reveals fairly small differences by race/ethnicity overall (see left-most panel of Figure 11.2), but larger differences by race/ethnicity within broad academic ability categories. Among students with the strongest academic credentials (those likely to be admissible to “very selective” institutions),

**FIGURE 11.2.** Bachelor's Degree Completion Penalty of Undermatch, by Race/Ethnicity and Predicted College Selectivity Access

Source: Based on the authors' calculations using the population of SAT takers who graduated from high school in the spring of 2004 and matched with National Student Clearinghouse records of college enrollment through 2011. A student is "undermatched" if her SAT score (critical reading + math) is above the median of a college's selectivity category and she instead enrolls at a college in a lower selectivity category. The four selectivity categories are condensed Barron's categories as defined in Jonathan Smith, Matea Pender, and Jessica Howell, "The Full Extent of Academic Undermatch," *Economics of Education Review* 32 (February 2013): 247–61. Students self-report race/ethnicity when they register for the SAT.

Hispanic students who undermatch are sixteen percentage points less likely to complete a bachelor's within six years, but the undermatch penalty among their similarly able white peers was only about half as large. This pattern reverses somewhat among students with more modest academic credentials; among students with access to "somewhat selective" and "nonselective" four-year institutions, white students faced steeper penalties associated with undermatch than their similarly able peers in any other racial/ethnic group.

We also know that individuals with higher levels of educational attainment benefit in multiple ways including having higher wages, lower unemployment rates, better health insurance and pensions, greater satisfaction

with their jobs, and healthier lifestyles, so there are labor market and general quality-of-life consequences associated with undermatch.<sup>14</sup> Students who attend relatively selective colleges are not only more likely to complete a bachelor's degree, but they also enjoy greater success in the labor market, with estimated 5 percent to 20 percent wage premiums for attending a more selective college.<sup>15</sup>

### When Undermatch Occurs

In order to develop appropriate interventions for addressing undermatch, we must better understand when in the student decision-making process it occurs. To address this question, Radford studied public high school valedictorians from five states who graduated between 2003 and 2006.<sup>16</sup> These valedictorians were high achievers not just based on their class rank, but on standardized test scores and performance in rigorous coursework too.<sup>17</sup> They thus had an excellent chance of admission and success at the seventy-two public and private colleges rated “most selective” by *U.S. News & World Report*.<sup>18</sup> Yet when their college choice was disaggregated by socioeconomic status (SES), only 43 percent of low-SES and 47 percent of middle-SES valedictorians attended a “most selective” institution, compared with 84 percent of high-SES valedictorians. This ultimate enrollment gap can mostly be attributed to high-SES valedictorians being more likely to apply.<sup>19</sup> All SES groups were similarly likely to receive an offer of admission from at least one “most selective” public or “most selective” private institution if they applied to at least one. And when admitted, most groups enrolled in these institutions at similar rates as well. The one exception was middle-SES valedictorians at most selective private colleges.<sup>20</sup> But even in that case, four-fifths of the final enrollment gap between middle-SES and high-SES valedictorians could be attributed to the former's lower application rate.

Research on students with a broader range of academic preparation also underscores the importance of the application and enrollment stages. Examining a nationally representative sample of 2004 high school graduates, Jonathan Smith, Matea Pender, and Jessica Howell of the College Board found that 61 percent of all undermatched students were fated to undermatch by the end of the application stage, precisely because these students did not even apply to a single match college.<sup>21</sup> Other studies also indicate that the reason students from less affluent backgrounds are more likely to undermatch is that they are less likely to apply and enroll

in selective colleges or in any college at all.<sup>22</sup> Thus, research suggests that efforts to tackle undermatch should concentrate on changing students' application behavior and, to a lesser extent, enrollment decisions.

### Why Undermatch Occurs by the Application Stage

In order to develop appropriate interventions, it is critical to determine why students do not apply to match colleges, thereby putting themselves on track to undermatch. Radford's research on valedictorians suggests the first contributing factor is a lack of understanding about need-based financial aid and net college costs. Families are not sufficiently informed about the existence of need-based financial aid and the range of incomes that can qualify, causing some that could have received aid to not even apply.<sup>23</sup> Even families who do apply for financial aid do not understand the impact it is likely to have on their ultimate college costs. Among valedictorians who applied for aid, 59 percent believed that they—and 53 percent felt that their parents—did not have a strong understanding of the financial aid process by the fall of their senior year of high school.

Lack of guidance from high school counselors about match colleges is a second factor during the application stage that contributes to undermatch. Valedictorians reported that college information was generally provided to them and their classmates en masse and thus focused on the public in-state colleges that average students from their high school were most likely to attend. Even when valedictorians managed to arrange a one-on-one meeting, counselors rarely volunteered that the high achiever in front of them might consider more selective, private, or out-of-state institutions, or that these universities might provide better student outcomes. And when valedictorians took the initiative to ask about these types of colleges specifically, counselors were still uninformed about options and the admissions process. One valedictorian explained that his counselor "just couldn't give me . . . the information. . . . There weren't many students from my school [who] ever went out of state. So when I started having questions about out-of-state [and private] colleges, [the counselor] was just generally unsure." Some counselors even tried to steer students back to the public in-state colleges with which they were more familiar. Another valedictorian related that when students would express interest in exploring private colleges, the counselor would respond, "Oh. OK. Well, have you looked at [in-state public university x, in-state public university y]?"

The third contributing factor is that, in the absence of sufficient information about need-based aid, college costs, and match colleges from high school advisors or other outside sources, students are forced to rely on themselves, their families, and their social networks. Valedictorians followed two main approaches in identifying potential colleges: (1) setting a few parameters and only exploring colleges that met them, and (2) investigating only institutions already known to them.<sup>24</sup>

In the first method, valedictorians searched based on key characteristics, but the criteria they selected differ by social class. Low-SES families, lacking personal college experience, often saw colleges as offering similar benefits. One first-generation college student described her parents' attitude as, "It's a school. You'll get a degree." Even when poorer families suspected college quality might vary, they had difficulty assessing it and so they focused on sticker price. And poorer and middle-SES families were often so scared off by sticker price that they did not allow themselves to explore match colleges as options. As one middle-SES valedictorian explained, private colleges "were thrown right out, right in the beginning."<sup>25</sup> Low-SES and middle-SES valedictorians also placed greater value on proximity to home, often expressing the need to be within a few hours' drive of home in case of emergencies. More affluent families, on the other hand, were much more attuned to colleges' reputations and were willing to pay more and travel farther in order to access universities with greater prestige.

The second method that valedictorians used to explore college options was investigating only those colleges that were already familiar to them. One such student described his search process as sitting in front of the computer and asking himself, "Uhhh, what are the universities I know?" and then looking at those colleges' websites. Valedictorians of all social class backgrounds knew local colleges because they were integrated into community life. Their sports were covered in the local news and their facilities were sometimes used for high school competitions. Teachers and other community members were often graduates of these local colleges as well.

But familiarity with more selective colleges differed by social class. More affluent valedictorians were often introduced to these colleges through their family or social network. Less affluent valedictorians, on the other hand, often only came into contact with more selective colleges if the colleges reached out to them or were nearby. Familiarity with a greater number of most selective colleges becomes important in avoiding



undermatch when students limit their search to only familiar institutions. Those who are aware of more match colleges are more likely to find ones that are also a good fit on other dimensions and apply. For time and cost reasons, however, colleges focus on locations that are likely to have a critical mass of students with the academic and social class background that make them likely applicants.<sup>26</sup> In fact, Vassar College president Catharine B. Hill and Williams college political economist Gordon C. Winston argue that low-income, high-ability students are underrepresented at selective colleges in part due to geographical biases in the spread of information during the college recruitment process, and this is borne out in the recent analyses by Stanford University economist Caroline M. Hoxby and Harvard University professor of public policy Christopher Avery.<sup>27</sup>

A final factor in the application stage that contributes to the undermatch of high achievers is concerns about the academic and social environment of America's top institutions. As one valedictorian put it, "I wanted to go to a quality school without wanting to kill myself. I want to get a good education but . . . I want to mix it with a social life. You know what I mean?" Valedictorians with these apprehensions tended not to know anyone who had attended an elite institution. In contrast, those with someone in their social network who had attended a top university were much more likely to feel confident they could survive academically and enjoy themselves socially. Less affluent students, however, were far less likely to know a student or alumnus from a leading college.

### How Undermatch Occurs in the Enrollment Stage

While perceptions about financial aid and price of attendance can contribute to undermatch by shaping application behavior, the actual price of attendance can result in undermatch by influencing enrollment choices. Both social class and academic preparation determine the role that these final costs play in students' choices. Ultimate college prices are less of a factor in undermatch for affluent students, regardless of their preparation, because their families' greater resources make them less sensitive to price differences.<sup>28</sup> Low-income students who are high achievers and apply to match colleges also are less likely to undermatch because of final college costs. This is because the top institutions to which they match typically offer generous need-based financial aid packages, making attendance cheaper or comparable to any undermatch college options they may have.

The choice is less straightforward for others. For middle-income high achievers, net costs at match colleges are sometimes higher than at undermatch colleges because undermatch colleges frequently offer merit aid to entice these top students to enroll and raise the academic credentials of the entering class. For low-SES and middle-SES students whose academic preparation does not enable them to secure offers of admission at wealthy elite institutions, match colleges can be more expensive than undermatch colleges as well. In these cases, families must weigh the benefits of attending a match college with the lower costs of an undermatch college.<sup>29</sup>

### Strategies for Addressing Undermatch

In an effort to reduce undermatch and create greater opportunity for less affluent students, different actors usually have focused either on information barriers prior to the application stage or on cost hurdles in the enrollment stage. Top colleges with larger endowments have tended to concentrate on the latter. At some elite colleges, all matriculates are able to attend without ever taking out a student loan, and even families earning up to \$200,000 a year can qualify for need-based aid.<sup>30</sup> Moreover, at an even greater number of top colleges, families with annual incomes of up to \$65,000 pay nothing at all.<sup>31</sup> That said, when Harvard first offered free tuition to low-income students, the number of entering students with annual incomes of less than \$40,000 increased by only twenty.<sup>32</sup>

Other initiatives have focused on addressing information barriers that academically strong students encounter before they make their college application decisions. For example, Caroline Hoxby and University of Virginia economist Sarah Turner designed an information-based intervention for very-high-achieving, low-income students, which they then tested with a randomized control methodology. Students in the treatment group received mailings that included guidance about college application strategies that mimic the advice provided by a good school counselor, as well as semi-customized net price information on five colleges and eight college application fee waivers accepted by a large number of selective institutions. The project's materials were very inexpensive yet very successful at increasing treatment students' applications to more "reach" institutions and, as a result, the fraction of students who enrolled in a college or university that was on par with their own academic credentials.<sup>33</sup> The intervention designed by Hoxby and Turner was intended to be implemented at scale by a third-party organization that could act as

a credible and neutral source of information for students.<sup>34</sup> The College Board scaled the Expanding College Opportunities intervention in 2013 for all high-achieving, low-income students who took the PSAT or SAT, and is committed to continued evaluation, improvement, and broadening of this evidence-based direct-to-student outreach.<sup>35</sup>

Other programs have sought to provide better college information to students in person. For example, the University of Maryland Ascent Program engages directly with qualified Baltimore high school students about the college application, admission, and financial aid process at the University of Maryland and other institutions that would match students' academic credentials.<sup>36</sup> The College Prep program at Franklin and Marshall College is a direct institutional response to undermatch. It is a three-week residential program that brings together rising high school seniors from underserved communities around the country and offers them the affective experience of college with substantive liberal arts courses taught by college professors.<sup>37</sup> Researchers at MDRC targeted students in eight Chicago public high schools with more of a near-peer advising model.<sup>38</sup> In the first year of the pilot, which was not administered using a randomized framework, participating schools witnessed substantial increases in selective college enrollment and lower rates of enrollment in proprietary colleges, community colleges, or no college at all compared to pre-pilot years. Yet the program also found that, for these solid students who were not necessarily the country's highest achievers, the cost of attending a match college could still be a barrier.<sup>39</sup>

Other programs are trying to tackle both informational barriers during the application stage and cost barriers at the enrollment stage. Rutgers University's Future Scholars Program, for example, reaches out to low-income and first-generation middle school students in towns surrounding campus by providing five years of college guidance as well as a scholarship to cover the full cost of attendance.<sup>40</sup> A rigorous evaluation of this program has not yet been done.

### Moving Forward

The problem of undermatch has only recently been diagnosed. Thus far, efforts to improve match in the college application stage have primarily targeted the country's academically stronger students. Efforts to address undermatch in the enrollment stage by reducing cost barriers have mainly been pursued by the nation's top private institutions and public flagships,

which have the greatest resources. Combining tactics may be most likely to yield strong results, but greater evaluation of the effectiveness of a blended strategy is needed.

It is also critical that we look beyond our brightest students and examine which of these approaches can be employed to help students of average and lower academic preparation as well. The institutions that are matches for students with more modest achievement typically have fewer resources, which can make affordability a bigger obstacle in the enrollment stage, even if information barriers in the application stage are properly addressed. Determining how colleges can better serve students who do undermatch, whatever the reason, may be an important complementary strategy in ensuring students receive the opportunities their academic preparation warrants. The authors are in the process of pursuing such an investigation.

As institutions of higher education seek new ways to increase socioeconomic and racial diversity, addressing the issue of undermatch may prove to be a fruitful avenue for reaching those goals—and, more generally, for helping all students fulfill their potential.