



Matching All Students to Postsecondary Opportunities

How College Choice is Influenced by
Institutional, State, and Federal Policy

A Case for the Study of Average-Performing Students in College Match

By Awilda Rodriguez
University of Michigan

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With some exceptions, much of the recent literature addressing college match has centered on the high-achieving, low income high school senior and whether he or she applied to and enrolled at the colleges deemed “most selective” and “highly selective” by Barron’s Admissions Competitiveness Index.¹ The argument underpinning the study of college match is that if students enroll in more selective institutions, they will enjoy a host of resources positively associated with admissions selectivity and are thereby more likely to graduate.² Therefore, undermatch can be described as either an issue of stratification or inefficiency in our education system. Studies documenting the degree to which students undermatch, particularly low-income, high-achieving students, have touched off endless eye-catching (though accurate) headlines about the dearth of poor students at top colleges; have shown that a \$6 mailer about college options can dramatically change behavior; and have attracted the attention of the White House, where President Obama asked colleges to make a public pledge to increase low-income student enrollment.³

Low-income, high-achieving students are a natural place to focus our attention. Americans have long been enamored of boot-strapping “rags to riches” stories of social mobility for the deserving poor. Nearly every spring in recent history, newspapers across the country print an inspiring version of the “homeless to Harvard” story, depicting students overcoming extreme financial circumstances to gain admission to one (or several) of the most selective colleges in the country.⁴ Beyond our collective fascination with such rare tales of social mobility, this population of students is of particular research interest because their failure to apply is seen as the main obstacle to their success. After all, high-achieving, low-income seniors are well-positioned to get into and enroll in a

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wide range of colleges, and to do so at little to no cost, as their academic credentials and financial circumstances allow them access to generous need-based and merit-based financial aid packages.⁵ The fact that these students miss out because they fail to apply—not because they’re not prepared or lack the money—seems like obvious low-hanging fruit. What’s more, it is fairly easy for researchers to operationalize “high-achieving, low-income students,” typically through the use of income cut-offs and academic criteria such as exam scores or GPA.⁶ Lastly, enrollment at a selective institution is seen as preferable to enrollment at a less selective four-year or two-year college given the greater resources available to students at selective institutions and the increased likelihood of graduating.⁷

For all the deserved attention the traditional conception of undermatch has received, there are limitations to the problems we can solve—improving equity or increasing the number of college graduates—if we focus solely on these students and institutions. First, relative to the number of students graduating high school each year with the desire to earn a college degree, the share of high-achieving, low-income students is small. For example, the national population of 25,000 to 35,000 high-achieving, low-income students in a recent undermatch study only comprised 4 percent of high school seniors.⁸ Second, most selective institutions aren’t increasing the number of their incoming cohorts of first-year students.⁹ Because the number of college applicants has doubled since the 1970s, the bar for admission to selective U.S. institutions has continued to rise, while the incoming class sizes at these institutions have remained stagnant.¹⁰ This means that more colleges are making their way into the upper echelons of selectivity, but that does not mean that increasing numbers of students are gaining access to the resources traditionally available at selective institutions. By focusing the conversation on a small

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percentage of students gaining access to an even smaller percentage of highly selective institutions, we limit our understanding of the college match phenomenon—and our understanding of other forms of stratification across the higher education system.

In contrast, the “average-performing” student is both ubiquitous and obscure. Large shares of average-performing students enroll in college every year. In 2012, between half and two-thirds of college-aged students who were enrolled in either four- or two- year colleges reported having a high school GPA between 2.0 and 3.5.¹¹ Average-performing students comprise a large segment of the college-going population, yet their college aspirations and outcomes have not been a focus of the college match literature. These students are less likely to be competitive in securing a spot at a selective college, and thus enroll in the very colleges that would be deemed undermatches for high-achieving students. But the probability of completion is no higher (and likely lower) at these institutions for average-performing students, and they therefore face the same risks of not graduating from college if they enroll at less selective colleges.¹² However, the literature is less clear about the types of colleges that *would* be a good match for average-performing students. Moreover, identifying students by their chances of gaining admission to a college is not quite the same as identifying college options for students with a particular academic profile. Given the large number of college-bound, average-achieving students, a study of match for the average-achieving student is overdue. This chapter addresses the gap in our knowledge about average-performing students and their college choice process by answering the following questions:

1. What are the characteristics of average-performing students?

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2. How well do average-performing students match on degree-level aspirations, affordability, and completion?

In addressing these questions, we expand the college match conversation to a large share of college-bound students and institutions and challenge ourselves to broaden our definition of what constitutes a good “match.” We start with an examination of what the match literature has told us thus far about average-performing students.

PREVIOUS LITERATURE ON AVERAGE-PERFORMING STUDENTS AND COLLEGE MATCH

The undermatch literature has primarily drawn our attention to the high-performing student. To date, only two studies have considered undermatch for students of various academic levels. A series of reports from the Chicago Consortium for School Research examined college match across the full range of ACT and GPA scores. For example, a Chicago Public School graduate with a GPA between a 2.0 and 2.4 and a composite ACT score between 21 and 23 was eligible to enroll in a “somewhat selective” college. Their examination of match included an analysis of the college-going behaviors that increase the chances that average-performing students find a good match, including filling out the FAFSA, discussing their college options with their counselor, and applying to six or more colleges. In discussing their findings, Melissa Roderick and her colleagues underscored the challenges of match across the achievement spectrum. Half of students in the graduating class of 2005 were eligible for “somewhat selective” or “nonselective”

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colleges, of which only a fraction enrolled in a college at or above their qualification level (43 percent and 17 percent, respectively).¹³

Jonathan Smith and his colleagues extended our understanding of match by providing us with a national picture of average-performing students. The authors leveraged student information collected in two national datasets to predict the likelihood of admission to various levels of selectivity. They found about a quarter of seniors in 2004 were 90 percent likely to gain admission into “somewhat selective” or “nonselective” schools—26 percent. They also found 65 percent of these students enrolled in colleges that were at or more selective than their qualifications. In the discussion of their findings, the authors characterized undermatch for average-performing students with limited college options as “high stakes,” as these students may enroll in a two-year college or not enroll in college at all.¹⁴

While these studies have set the groundwork for our understanding of match, their findings elicit more questions than answers about average-performing students. For example, these studies have very disparate findings about who is eligible for such “somewhat selective” and “nonselective” colleges (50 percent versus 26 percent), which is most likely a result born of their differing approaches to identifying student qualifications and samples.¹⁵ Moreover, it is not clear that a four-year nonselective college is a better option than a two-year institution for an average-performing student if, for example, a student is place-bound, values affordability or has goals of obtaining an associate’s degree or certificate. Furthermore, in some cases, less selective four-year institutions have graduation rates that are indistinguishable from those of two-year colleges, while four-year colleges often cost more. In other words, these studies do not

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resolve the key question: How do we determine a “good” option for the mass of students in the middle?

There are a number of limitations to applying the notion of college match, as currently conceptualized, to the college application and enrollment behaviors of average-performing students. One of the common critiques of college match research has been the arbitrary delineations between the qualifications needed for admission to various groups of institutions.¹⁶ This is particularly true for institutions that are outside the most selective rung, where the range of admissible academic profiles is much larger. For this reason, our ability to predict admission to a somewhat selective college with certainty remains somewhat elusive.

Beyond issues of measurement, there are structural limitations of institutional proximity and supply that may make some of the undermatch assumptions inapplicable to many average-performing students. The college choice process cannot be examined without giving consideration to the geographical context that students face.¹⁷ Students who are high-achieving or who come from high socio-economic backgrounds typically engage in national college searches.¹⁸ However, for most students, the college choice set involves colleges that are predominantly close to home.¹⁹ With so many students bound to or preferring colleges within relatively small geographic areas, scholars have noted that the availability (or dearth) of postsecondary options is subject to the “geography of opportunity.”²⁰ Simply put, students’ postsecondary opportunities are directly linked to (and potentially limited by) where students happen to live. As such, students in areas where there are few college options, as Wisconsin professor Nicholas Hillman argues, are precluded from “shop[ping] around.”²¹ Proximity is key in framing the college choice

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process for average-performing students, as they are the students who are most likely to stay close to home and who may face additional constraints in their choices given their academic performance. A related structural limitation to match is the availability of seats in colleges that may be a match and are nearby, but have limited capacity. Indeed, a dearth of nearby “matched” seats may limit the extent to which match is a useful tool for understanding equity and access for average-performing students.

Taken together, the current conceptualization of college match has not served average-performing, college-bound high school students well. As a result, we know little about the average-performing student and her college aspirations. In the next section, we begin to unpack the characteristics of the average-performing student and his or her college-going behaviors and preferences.

WHO IS THE AVERAGE-PERFORMING STUDENT?

As there is still no clear picture of the average-performing student and her college choices, we first set out to characterize the average-performing student using data from the Education Longitudinal Survey of 2002 (ELS:2002). ELS is a national longitudinal survey administered by the National Center for Education Statistics (NCES) that collected data on students who were high school sophomores in 2002 (and were due to graduate high school in 2004).²² While ELS:2002 is over a decade old, it is still the most recent national dataset to track students’ college-application behavior. Also, its larger sample size minimizes self-reporting discrepancies found in sets with fewer respondents. The data were restricted to students who participated in the first three surveys and were

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not enrolled in vocational, alternative, or special education, because college preparation is not an explicit goal of those programs. Likewise, only students who expected to attend college at the onset of their high school career were included, so we could be certain of their interest in attending college. The resultant weighted sample totaled 1,011,030 students.²³

We used two criteria to define average-performance. First, we used students' average math score on a test NCES administered to all students in the sample. Much of the current literature uses SAT scores to identify undermatched students; however, we used students' scores on the NCES-administered math test because this measure was available for all students and did not bias our results in the direction of high-performing students, who are more likely to take a standardized college entrance exam. Recognizing that the NCES-administered math exam may be perceived as a low stakes exam for ELS:2002 participants, we also included unweighted high school GPAs between 2.0 and 3.5 for all courses as a second criteria. As we are proposing to broaden our attention from high-performers to include those with average academic ability in future undermatch research, a comparison of these two groups is merited. In the following section, we compare average-performing students with their higher performing peers by demographic characteristics and college-going behaviors.

Characteristics of Average-Performing Students

Demographic Characteristics. There are notable differences in demographic composition between average and high performers, as Black, Latino, low-income, and first-generation students are less common in the group of high-performing than they are in the average-

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performing group (see table 1). Though the majority of students in both groups identified as White, the representation of Black and Latino students is much greater in the average-performing group (for example, 12.4 percent of average-achieving students are Black versus 1.2 percent of high-achieving students are Black). This is consistent with a number of other well-documented educational achievement disparities among racial/ethnic groups that in most cases start in the early grades.²⁴ With higher percentages of Black and Hispanic students falling into the average-performing category, we can expect these students to have fewer postsecondary options on average than their White and Asian peers.

The distribution of socioeconomic status (SES) and parental education is also distinct across the two groups. Approximately 45.2 percent of average-performing students come from families earning less than \$50,000, whereas about 26.9 percent of high-performing students belong to the same income bracket. Similarly, the data indicate that about three-quarters (77.4 percent) of all high-performers have parents with a college or advanced degree, while only 55.5 percent of average-performing students' parents hold the same level of education attainment. Needless to say, parental education and income are influential in the college choice process.²⁵ High-SES parents in particular are known to use knowledge of their own college experience to influence their children's college application process, leaving students from more modest backgrounds—who are also more likely to be average-performing—at a disadvantage.²⁶ When we couple this income stratification with the existing racial and ethnic stratification, we can assume that many average-performing students have limited options for college. As we will see below, their college application and college-going behaviors reflect this hypothesis.

Table 1. Comparison of Average- and High-Achieving Students by Select Characteristics^a

Variable		Percentage	
		Average-Performing ^b	High-Performing ^c
N ^d		1,105,880	209,470
Demographic Characteristics			
Gender*	Female	55.3%	60.9%
Race/Ethnicity*	Asian, Pac. Islander	4.1%	6.0%
	Black/African American	12.4%	1.2%
	Hispanic	12.4%	4.3%
	Other Race/Ethnicity ^e	5.0%	2.0%
	White	66.2%	86.5%
Income	\$0-25K	15.8%	4.3%
	\$25-50K	29.4%	22.6%
	\$50-75K	23.2%	24.0%
	\$75-100K	16.1%	17.6%
	\$100K and above	15.6%	31.5%
Parents' Highest Level of Education	High school or less	21.8%	7.9%
	Some college, no degree ^f	22.6%	14.6%
	2-year graduate	11.7%	7.4%
	4-year graduate	43.8%	70.0%
College-Going Behaviors			
College Entrance Exam ^g	Took an exam	80.3%	96.3%
Minimal college course reqs	Took Algebra II	94.2%	99.4%
College preparatory courses	Took Calculus	10.3%	57.9%
	Took an AP/IB course	32%	80%
College Application	Average applications	2.45	3.53
		0.03	0.10
Importance of college characteristics	Price	2.15	2.00
		0.01	0.03
	Academic Reputation	2.50	2.80
		0.01	0.02
	Availability of Program	2.73	2.71
		0.01	0.02
Staying home	1.67	1.17	
		0.01	0.02
College Enrollment			
Distance	Average distance	135.10	244.24
		6.80	16.41
Sector	Four-year	61.0%	93.1%
	Two-year	30.2%	5.8%
	Less-than-two-year	1.2%	0.1%
	None	7.6%	1.0%

Notes: Results from t-test or chi-square tests are "n.s." if not significant, ***significant at $p < 0.001$ (a) Data were weighted using the F2F1WT (b) The sample of average students was restricted to respondents with scores above or below one SD from the mean on the ELS mathematics test, who had available responses for all described attributes listed in the table at the time of the first follow up, who were not enrolled in special, vocational, or alternative education, and had a GPA between 2.0 and 3.5; (c) High-achieving students met the same criteria as average students, except they had IRT Math scores above one SD; (d) Total N were rounded to uphold students' anonymity;

(e) Respondents who identified as Native American/American Indian and Multiracial were combined into a single category; (f) 'Some college, no degree' combines parents who attended either a two- or four-year institution, but did not graduate; (g) Students took the SAT, ACT, or both.

Source: Education Longitudinal Survey (ELS: 2002)

College Application Behavior. For students interested in college, the extent to which they engage in their coursework, exams, and college applications is essential to their competitiveness in the college admission market. The majority of both average-achieving and high-achieving high school students take Algebra II (94.2 versus 99.4 percent of students, respectively), a minimum requirement for many four-year colleges. There are large gaps, however, in advanced coursework participation rates. For example, only 10.3 percent of average-performing students took calculus, compared to 57.9 percent of high-performing students. Similar gaps exist in Advanced Placement and International Baccalaureate course-taking rates. In addition, taking college entrance exams sets students on a path toward four-year college enrollment, since many colleges require an SAT or ACT score for admission. However, about 80 percent of average-performing students reported taking either the SAT, ACT, or both tests, compared to nearly all high-performing students (96.3 percent). Yet taking college preparatory courses and exams is only the first step, as students' performance in those courses and tests further differentiates their future opportunities.

College-application behavior differed to a lesser extent between the groups. Both sets of students applied to college at similar rates, although average-performing students applied to one less college on average. In considering colleges, average-performing students were slightly more concerned with costs ($\mu = 2.15$ versus 2.0, respectively) and staying close to home ($\mu = 1.67$ versus 1.17, respectively) than were high-ability students. Moreover, although the rate at which average-performing students reported a college's

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academic reputation to be an important consideration, they were slightly less likely to report so than high-performing students. Their greatest consideration, on average, was the availability of their chosen academic program at an institution, a consideration which was not statistically different from their higher performing counterparts. Thus, while average-performing students generally may not demonstrate the requisite academic performance to compete for enrollment in highly selective institutions, most who have indicated an interest in college have taken purposeful steps toward college enrollment.

Where do average-performing students enroll? The bottom portion of table 1 shows enrollment figures for the sample based on institutional level, sector, and selectivity. Thirty percent of average-performing students enrolled in two-year institutions—six times the rate of high-performing students. An additional 61 percent of average performers enrolled in four-year colleges, as did the overwhelming majority of high-performing students (93.1 percent). Finally, an additional 7.6 percent of average performers were not enrolled in college two years after high school graduation and were not in the military, compared to only 1.0 percent of high-performing students.

Understanding the demographic and college-going characteristics of average-performing students is essential to our understanding of how they fit into the broader conversation around undermatch. In comparing average- and high-performing students we find there are sizable demographic differences between both groups. This finding underscores the importance of considering college choice for average-performing students if we are to improve equitable access to a high-performing college. The level of academic preparation and participation in college entrance exams in particular are likely to shape

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students' college choices and outcomes. Given the demographics of the sample of average-performing students, we can expect that many of them will have limited college options, if they decide to enroll at all. In the following sections, we explore what “match” looks like for these students, as well as the attributes of their postsecondary options.

COLLEGE MATCH ALTERNATIVES FOR AVERAGE-PERFORMING STUDENTS

Match has previously been defined purely by academic standards. In other words, a match occurs when a high-performing student attends a college or university with a student body with similar levels of academic achievement. Therefore, a “good” match for a high-performing student is when he or she enrolls at one of our nation’s top colleges, where standardized test scores and GPAs are universally high. However, average-performing students complicate this definition of match. So far, we have identified average-performing students using academic measures, such as standardized test scores and GPA, and have compared them to their high-performing peers demographically and academically. We have also discussed the influence of geography on college choice for average-performing students, who we know are more likely than high-performing students to enroll at an institution near home. In this section, we propose three alternative ways to consider match for average-performing students: 1) their career aspirations and academic interests; 2) their nearby college options; 3) the affordability of the institution; and 4) the likelihood of completion.

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College Match by Career Aspirations and Academic Interest

Absent clear admissions criteria, an institution's academic and career offerings can drive match for average-performers. An acknowledged shortcoming of the current match literature is the extent to which students match to institutions by their intended degree program. Indeed, 77 percent of respondents in our sample noted degree program was an important consideration in their college choice. Students who are interested in studying a specific vocation or are committed to working in a particular field may only consider a subset of schools, irrespective of selectivity. Therefore one way to reconceptualize college match is to examine whether students "match" their stated plans as seniors to actual enrollment based on degree-level.

Ideally, we would contrast students' career and academic interests with the strength of particular programs offered by colleges. There are several challenges to defining match by career aspirations and academic interests, however. First, students enrolling in college immediately after high school may not have a solid understanding of what they would like to study or the profession in which they would like to work later in life. Indeed, a large share of students change majors once enrolled in college (35 percent).²⁷ Basing match for average-performing students on what is effectively a moving target for many of them would be difficult. Second, it is not always clear what academic programs are being offered at which institutions, and whether those programs are considered significantly better or more attractive to prospective students than others. On a more practical level, ELS:2002 did not ask about students' intended majors, nor is there widely available information about institutions at the program-level. For more on the

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major selection process in two-year and open-access four-year colleges, see the chapter by Bailey et al. in this volume.

There is still value in understanding the degree-level students intend on pursuing, which is a less volatile measure. NCES collected information about the type of college in which students would like to continue their studies—either a four-year, two-year, or vocational/trade school—in addition to enrollment information. We subsequently compared students' intended degree-level with the level of institution in which they enrolled immediately after college.

Average-performing high school seniors who enroll in college generally follow through with their degree aspirations and enroll in a college with corresponding degree offerings. Three out of every four seniors who indicated a plan to pursue a four-year degree enrolled in a four-year college, as did students wanting a two-year degree (see table 2). Match is less clear for students who wanted to pursue vocational or technical training, as they were most likely to enroll in two-year colleges (47.1 percent) or not at all (25.7 percent). Therefore, the majority of average-performing students plan on earning either a two- or four-year degree and enroll in a college that fits that description. But are these colleges nearby? In the next section, we examine the role of institutional proximity in how students choose colleges.

College Match by Institutional Proximity.

One aspect of college match discussed less frequently is institutional proximity. Students' geographic preferences are varied. Some students prefer to stay at home in lieu of incurring room and board costs, while other students may desire to leave home to

Table 2. Average-Performing Student College Match by College Type, Affordability, and Graduation Rate^a

		Enrollment by Level				
12th grade plans by college type^b	<i>N</i>	No College	Four-year college	Two-year college	Less-than-two-year college	Total
Missing	5,330	25.7%	12.3%	62.0%	0.0%	100%
4-year college or university	816,403	5.4%	73.7%	20.5%	0.5%	100%
2-year community college	228,634	16.2%	8.1%	73.1%	2.5%	100%
Vocational, technical, or trade school	55,510	25.7%	16.1%	47.1%	11.2%	100%
		Affordability^d				
Importance of costs and aid in 12th grade^c	<i>N</i>	No loans	1-25% of income	25-50% of income	over 50% of income	Total
Missing	5,810	92.9%	6.9%	0.0%	0.3%	100%
Not important	88,660	80.4%	18.5%	0.2%	0.9%	100%
Somewhat important	368,010	64.7%	31.5%	2.8%	1.0%	100%
Very important	596,060	56.3%	37.2%	4.1%	2.4%	100%
		Graduation Rate^f				
How far student thinks they will go^e	<i>N</i>	0-25% graduation rate	26-50% graduation rate	51-75% graduation rate	76-100% graduation rate	Total
Missing	2,720	16.2%	38.5%	42.7%	2.6%	100%
Don't know	34,540	39.3%	39.5%	15.7%	5.5%	100%
HS or less	3,470	40.7%	46.5%	4.7%	8.2%	100%
Attend or complete 2-yr degree	77,960	40.9%	34.5%	20.3%	4.3%	100%
Some four-year college, no degree	8,340	45.6%	38.4%	16.0%	0.0%	100%
Bachelor's or beyond	837,270	20.7%	41.3%	32.7%	5.4%	100%
		Proximity				
Importance of living at home	<i>N</i>	0-10 miles	11-25 miles	26-50 miles	51-100 miles	100+ miles
Not important	287,490	14.1%	13.8%	11.2%	19.4%	41.5%
Somewhat important	396,420	40.5%	26.8%	11.4%	7.7%	13.6%
Very important	293,900	49.3%	28.5%	12.2%	4.1%	5.9%

Notes: (a) The sample represents average-performing students who have participated in the first three waves of data collection, expressed an interest in postsecondary education, enrolled in college, and were not in alternative or special

education. Figures were weighted using the F2F1WT and rounded to the nearest 10; (b) Response to the question (F1S49): "Which of the following will you most likely attend?"; (c) Rounded average of two ordinal questions (F1S52B, F1S52A): "Availability of aid important to participant" and "Post-sec school's low expenses important to respondent" where 1 = Not important, 2 = Somewhat important, 3=Very important; d) Affordability is the difference between the amount of loans borrowed (F2B26R) and the expected family contribution (PLEFC) as a percent of the expected family contribution per year. The affordability categories are divided by quartiles; (e) Response to the question (F1S52K): "As things stand now, how far in school do you think you will get?"; (f) Graduation rate is 150% of time for first-time full-time undergraduates.

Source: ELS:2002; IPEDS 2004 Survey Files

establish their independence or to live in a particular city or region. In some cases, students' preferences are bound by the intersection of colleges to which they are able to gain admission, are affordable, and are nearby.

In order to understand differences in the way students consider geographic proximity, we examined students' responses to the question, "How important is it to live away from home?" We compared their responses ("not important," "somewhat important," and "very important") to the proximity of the colleges in which they chose to enroll.²⁸ This approach has some limitations, as it does not consider geographic attributes (for example, urbanicity, rural areas, and mountainous terrains) or transit routes.

Therefore the difference between distance and actual driving times may vary.

Nonetheless, this approach allowed us to estimate proximity in the aggregate. Our analysis included students with valid residential zip codes who enrolled in colleges that also had valid zip codes ($N = 977,810$).

Average-performing students were somewhat evenly divided in their interest to live away from home during college. Table 2 illustrates how the value students attach to geographic proximity shapes their college enrollment choices. Three out of ten students did not think living away from home was important, and indeed 70 percent of these students enrolled in a college within 25 miles of home. Of those seniors who thought it

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was very important to live away from home, 42.5 percent enrolled in colleges over 100 miles away. The majority of students (57 percent) enrolled in colleges within 50 miles of home. Although many students intend to go away for college, only a fraction is able to do so. As a result, the extent of match for average-performing students largely depends on the available, nearby college options, which vary widely by region.²⁹

Some may argue that indicators such as institutional level and geographic proximity may be too broad for discerning college match. After all, the implicit goals of match are to improve students' college destinations, thereby increasing their chances of degree completion at a reasonable cost. Institutional level and geography do not really address either. Next we attempt to measure match for average-performing students on the basis of college affordability and the probability of degree completion.

College Match by Affordability

As college tuition continues to climb, affordability is ever more important in determining where students enroll. For many families, college costs and the availability of financial aid are the leading considerations in college enrollment.³⁰ With their postsecondary options limited by their academic performance, average-performing students may consider an affordable college a “good” match. Moreover they are less likely to qualify for merit-based aid and are more likely to lack financial resources than high-performing students (as seen in table 1). Indeed, average-performing students indicated that college costs and availability of aid were “very important” relative to their higher performing peers.

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Affordability, however, is not a straightforward concept to measure, as it is highly variable not only across, but also within institutions, and it is dependent upon cost of attendance as well as the availability of grants. In other words, some colleges may have a combination of lower costs and/or more aid that makes them more affordable than other colleges. At the same time, the amount of aid one receives is directly related to family income, and students within a college are asked to pay different amounts. Therefore it is more advantageous to examine affordability at the individual rather than institutional level (that is, we ask “Was the students’ choice affordable?” rather than “Did the student choose an affordable college?”). In addition to college costs and aid, the amounts students need to borrow are also considered an indicator of affordability, as loans are typically leveraged in the absence of financial aid, income, or assets.

In this analysis, we contrasted students’ responses to the importance of college affordability with the extent to which their college choices were affordable. First, we averaged and rounded the level of agreement to two items in the student survey, (1) “Availability of aid important to participant” and (2) “Post-sec school's low expenses important to respondent.” Then we calculated affordability as the amount of loans borrowed as a percent of annual family income (in order to account for the variation across students’ abilities to pay). Because the cumulative amount of loan borrowed was collected by NCES two years after graduation, we divided the amount borrowed by two to get an annual amount. This is not a perfect measure, as some students may have delayed enrollment or enrolled part-time. However, an annual measure that is relative to what students can afford (that is, annual family income).

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NCES collected information on family income as a categorical variable, with each category corresponding to a range of incomes. We therefore assigned family income as the midpoint of the ranges indicated by NCES. We then organized students by the amount they borrowed as a percent of family income. This is a conservative estimate of affordability, since it does not cover families' out-of-pocket expenses because they were not included in the ELS:2002 dataset. Further, not all students enrolled in college had information about the amount they borrowed, which resulted in a reduced sample size ($N = 963,694$).

We found that unlike the rates of match found between degree aspiration and institutional level, similar patterns did not emerge for affordability (see third section of table 2). First, a majority of average-performing students indicated that low costs and availability of aid were "very important" considerations when selecting a college. Indeed, the majority of students (93 percent) were able to enroll in colleges where they were not required to borrow or did not borrow more than 25 percent of their family income. They fared worse than those who indicated that college affordability was "not important," where virtually all students did not borrow more than 25 percent of their family income.

If we are to measure match for average-performing students as the extent to which students who care about affordability are enrolling in affordable options, then there are high rates of mismatch. There are two potential reasons for these findings. First, students' enrollment patterns may be constrained at the application step, which is a large source of undermatch.³¹ For example, this scenario would occur if a student's college choice set only included colleges that offered unfavorable aid packages. Moreover, the biggest

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challenge to considering affordability in a choice set is that one does not know whether a college is affordable a priori, but rather after one applies and gets admitted.³²

Second, there simply may be a dearth of affordable options available to average performers. Upon closer inspection, the rates of matching at “affordable options” are almost entirely driven by students enrolling in two-year colleges, as 74 percent of average-performing students who enrolled in two-year colleges did not take out loans. We also know that few four-year colleges have the financial capabilities to offer generous aid packages, leading many colleges to “gap” students—or not fully cover a student’s demonstrated need.³³ Therefore, while students may intend to apply or enroll in an affordable college, those that have four-year aspirations may simply be unable to do so.

College Match by Likelihood of Completion

The overwhelming majority of students who enroll in college do so expecting to receive a degree.³⁴ As authors of previous college match research note, the main benefit of enrolling in a more selective college is the effect it has on your likelihood of completion, relative to attending a less selective college.³⁵ Implicitly, this suggests that a college’s inputs (that is, high school GPA, entrance exams, percent of students admitted) are a proxy for its outcomes (such as graduation rates and workforce outcomes). Because it is less obvious where average-performing students should enroll, given the odds of getting into the most selective institutions in the country, in this section we match average-performing students directly to institutional outcomes—specifically, graduation rates.³⁶

In order to examine whether students choose to enroll at institutions with high graduation rates, we compared students’ expectations of earning a degree as high school

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seniors with the institutional graduation rate of their chosen college. Based on their responses to the question, “As things stand now, how far in school do you think you will get?” we categorized students into “less than high school,” “some college,” and “college degree or beyond.” Students who wanted a two-year degree were not captured by the nature in which ELS posed the response (that is, “attend or complete two-year college”), whereby attending two-year college and obtaining an associate’s degree could not be separated. We were therefore unable to analyze students who answered in this way and instead focused on students who wanted a bachelor’s degree.

We then pulled graduation rate data from the IPEDS 2004 Graduation Rate Survey File. Graduation rates are calculated as the share of first-time, full-time students who complete at 150 percent of time—three years for two-year colleges and six years for four-year colleges. A total of 974,300 average ability students were found to have enrolled in a college that reported graduation rates. Of course, there are well-known drawbacks to leveraging three- and six-year college graduation rates and many institutions—particularly two-year colleges—object to using graduation rates as a measure of quality.³⁷ Further, institutional graduation rates are only a proxy for an individual’s likelihood of completion. Research also tells us that students from varying demographic and academic backgrounds have different chances of completion, even within the same institution.³⁸ Notwithstanding these limitations, institutional graduation rates are currently the best measure that is consistently and widely available.

We found a large gap between students’ degree aspirations and the graduation rates of their choice institutions. An overwhelming majority of average-performing students who enrolled in college indicated a desire for a four-year degree (86 percent),

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with an additional share not captured by the ELS:2002 survey aspiring to two-year degrees. However, less than two in every five average performers who wanted a four-year degree enrolled in a college where their likelihood of graduating was greater than 50 percent (38 percent).

“A Good Match”

Individually, the institutional characteristics examined above may not constitute a “good match” on their own; for instance, a college may have high graduation rates but is also extremely expensive. So what share of average-performing students match on a combination of these measures? We aggregated whether students matched on degree-level (four-year, two-year, or vocational), affordability (that is, students borrowed less than 25 percent of their family income), and degree attainment (whether students enrolled in college which maintains at least a 50 percent graduation rate). We excluded proximity because it is a preference and not a necessary condition for completing college. We then aggregated the number of matches for every student, which ranged from zero (or no matches) to three (matched on all characteristics: degree-level, affordability, and degree attainment rates).

We found that 22 percent of average-performing students matched on only one of these characteristics. Fifty-one percent of students matched on two of these characteristics, and one out of every four average-performing students was able to enroll in a college that matched on all three. An additional 2 percent of students did not match on any characteristics. In comparison, 65 percent of high-performing students enrolled in an institution that matched all three dimensions.

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Parity in College Matching

Given the complexities of the college choice process and the myriad reasons that average students might reasonably choose a less selective college, researchers relent that students will never match 100 percent. Yet the estimation of match is quite useful as a comparative tool (or the extent to which students of different backgrounds match).³⁹ As such, much of the discussion around match has been around equity, as previous research shows that Black, Latino, and low-income students are more likely to undermatch than their peers. In this section, we continue our examination of match by considering average-performing underrepresented racial/ethnic groups and students of first-generation status.

We included additional dimensions of race/ethnicity and parental education in our analyses. In light of sample sizes and our ability to produce reliable estimates, we limited our racial/ethnic groups to non-underrepresented minority (White and Asian) and underrepresented minority (Black, Latino, and Other racial/ethnic groups). We also dichotomized first-generation status as those whose parents have earned college degrees (bachelor's or beyond) and those whose parents have not. This yielded a somewhat even split of the average-performing sample (see table 3). We did not examine students by income because we did not find a meaningful way to dichotomize the income distribution, and further categorization of students would make estimates unstable.

Table 3. Comparison of College Plans and Preferences by Racial/Ethnic Minority and First-Generation Status

12th grade plans by college type^b	URM	not-URM	First-Gen	Not First-Gen
Total	328,660	777,220	621,510	484,370
Missing	0.5%!	0.5%	0.6%!	0.3%!
4-year college or university	71.1%	75.0%	66.9%	82.8%
2-year community college	22.5%	19.9%	25.3%	14.7%
Vocational, technical, or trade school	5.9%	4.6%	7.2%	2.3%
Importance of living away from home				
Total	286,340	716,130	545,330	457,140
Not important	27.7%	30.0%	35.0%	22.6%
Somewhat important	41.1%	40.4%	39.7%	41.7%
Very important	31.2%	29.5%	25.3%	35.7%
Importance of costs and aid in 12th grade^c				
Total	289,100	721,930	551,070	459,960
Missing	0.7%!	0.4%	0.5%!	0.4%!
Not important	4.0%	10.3%	5.6%	11.9%
Somewhat important	26.8%	38.7%	30.5%	41.0%
Very important	68.5%	50.7%	63.4%	46.7%
How far student thinks they will go^e				
Total	289,100	721,930	551,070	459,960
Missing	0.2%!	0.3%!	0.3%	0.3%!
Don't know	4.4%	3.1%	4.2%	2.6%
HS or less	0.4%!	0.3%!	0.4%!	0.3%!
Attend or complete 2-yr degree	8.4%	8.6%	11.8%	4.7%
Some four-year college, no degree	3.0%	1.6%	2.5%	1.4%
Bachelor's or beyond	83.6%	86.1%	80.9%	90.8%

Notes: (a) The sample represents average-performing students who have participated in the first three waves of data collection, expressed an interest in postsecondary education, enrolled in college, and were not in alternative or special education. Figures were weighted using the F2F1WT and rounded to the nearest 10; (b) Response to the question (F1S49): "Which of the following will you most likely attend?"; (c) Rounded average of two ordinal questions (F1S52B, F1S52A): "Availability of aid important to participant" and "Post-sec school's low expenses important to respondent" where 1 = Not important, 2 = Somewhat important, 3=Very important; (d) Affordability is the difference between the amount of loans borrowed (F2B26R) and the expected family contribution (PLEFC) as a percent of the expected family contribution per year. The affordability categories are divided by quartiles; (e) Response to the question (F1S52K): "As things stand now, how far in school do you think you will get?" (f) Graduation rate is 150 percent of time for first-time full-time undergraduates.

Source: ELS:2002; IPEDS 2004 Survey Files.

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In some but not all cases, we found stark contrasts in the rates at which students matched their preferences as seniors and in their actual college enrollments across groups. With regard to degree aspirations, table 3 shows that average-performing students of underrepresented racial/ethnic backgrounds had somewhat similar degree goals as their non-underrepresented counterparts (for example, 71.1 percent versus 75.0 percent, respectively, planned on enrolling in a four-year institution), yet there were much larger differences when considering parental education. Not only are there differences in college plans, but table 4 shows that underrepresented minority and first-generation students who were four-year degree aspirants were less likely to enroll in four-year colleges than their non-minority and non-first-generation peers (for example, 66.9 percent of first-generation versus 82.8 percent of non-first-generation students). Average-performing first-generation students were much more likely than their counterparts with college-educated parents to enroll in a two-year college despite planning to enroll in a four-year college (25.3 percent versus 14.7 percent). This finding may be due to low-income students' enrolling at a community college with the intent to transfer, although these intentions were not captured in ELS:2002. Further, one out of every five underrepresented minority students who wanted a two-year degree had yet to enroll in any college two years after graduating high school, relative to one of every seven White or Asian students.

There were also differences between groups and their outcomes by institutional proximity. Of students who thought it was very important to live away from home, 20.6 percent of underrepresented minority students enrolled in a college that was within 10 miles from home, relative to 14.3 percent of their non-underrepresented counterparts. First-generation students were less likely to report that living away from home was “very

Table 4. Comparison of Match by Degree aspirations, institutional proximity, affordability, and degree completion for select students characteristics^a

<i>Preference</i>	<i>Actual</i>	URM	not-URM	First-Gen	Not First-Gen
Degree Aspirations^b					
4-year college	4-year college	70.4%	75.0%	65.8%	81.8%
4-year college	2-year college	20.2%	20.6%	25.7%	15.0%
2-year college	2- or 4-year college	75.2%	84.2%	80.9%	82.0%
2-year college	no college	20.3%	14.3%	16.7%	15.3%
Institutional Proximity					
Living away from home	within 10 miles	20.6%	14.7%	19.3%	14.0%
Living away from home	over 100 miles	36.7%	43.6%	31.1%	50.4%
Affordability^{cd}					
Affordable college important	No loans	53.7%	47.6%	50.7%	46.9%
Affordable college not important	loans over 50% of income	2.9%	2.0%	3.2%	1.5%
Degree Attainment^{ef}					
Bachelor's or beyond	college with > 75% grad rate	5.1%	5.3%	3.0%	7.6%
Bachelor's or beyond	college with < 25% grad rate	21.7%	19.4%	25.1%	14.6%
Don't know	college with < 25% grad rate	35.9%	40.3%	41.4%	33.7%!
Number of matched characteristics					
0		1.5%!	2.4%	2.8%	1.3%
1		25.5%	21.3%	25.7%	18.6%
2		54.5%	48.9%	52.5%	48.2%
3		18.4%	27.4%	19.0%	31.9%

Notes: (a) The sample represents average-performing students who have participated in the first three waves of data collection, expressed an interest in postsecondary education, enrolled in college, and were not in alternative or special education. Figures were weighted using the F2F1WT and rounded to the nearest 10; (b) Response to the question (F1S49): "Which of the following will you most likely attend?"; (c) Rounded average of two ordinal questions (F1S52B, F1S52A): "Availability of aid important to participant" and "Post-sec school's low expenses important to respondent" where 1 = Not important, 2 = Somewhat important, 3=Very important; (d) Affordability is the difference between the amount of loans borrowed (F2B26R) and the expected family contribution (PLEFC) as a percent of the expected family contribution per year. The affordability categories are divided by quartiles; (e) Response to the question (F1S52K): "As things stand now, how far in school do you think you will get?"; (f) graduation rate is 150% of time for first-time full-time undergraduates.

Source: ELS:2002; IPEDS 2004 Survey Files.

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important” than non-first-generation students (25.3 percent versus 35.7 percent). The differences by first-generation status for those who wanted to go away for college are also drastic. Half of students who have college-educated parents and had a desire to go away for college enrolled in colleges over 100 miles away, whereas only 31.1 percent of first-generation students were able to do the same. This difference may be due to first-generation students’ increased needs to work while in college, desire or need to save money by living at home, or having parents who prefer their children stay near.⁴⁰

The differences in matching on degree and proximity preferences mirror the discrepancies in matching by affordability and degree completion. If we consider a “good” match to be a college that is affordable or that has high graduation rates, the majority of students think affordability is very or somewhat important, irrespective of background, and plan on achieving a bachelor’s degree (see table 3). Average-performing minority students are matching on affordability at slightly higher rates than their White and Asian peers (53.7 percent versus 47.6 percent did not require borrowing, respectively), yet are on par in institutional graduation rates (5.1 percent versus 5.3 percent, respectively, aspired to receive a bachelor’s and to enroll in a college with graduation rates above 75 percent). Those first-generation students aspiring to a bachelor’s degree lag behind their peers in enrolling in a college that has high graduation rates (above 75 percent graduation rate), yet are more likely than their non-first-generation counterparts to enroll in colleges with extremely low graduation rates (below 25 percent). Finally, underrepresented minorities and first-generation students are less likely than White or Asian students to enroll in a college that is affordable, has graduation rates above chance, and matches their degree aspirations (18.4 percent versus 27.4

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percent). Similar patterns arise in students by first-generation status (19.0 percent first-generation versus 31.9 percent non-first generation students).

DISCUSSION

The purpose of this chapter is to advance our understanding of college match for students who have average academic performance and to expand the definition of match. Given the heterogeneity of institutional performance for colleges that are less selective, identifying a “good” match for average-performing students is challenging if we employ the selectivity paradigm previously used to study match. The implied benefit for a high-performing student attending a selective college, or a “match,” is an increased likelihood of completion and generous financial aid that will make college affordable relative to students’ individual financial circumstances. By applying this same rationale to the college choice decisions of average-performing students, we attain a better understanding of college match for a large share of the college-going population. Furthermore, this rationale moves us away from a hierarchical structure that is based on student inputs and implies that “good” students should go to “good” colleges and “average” students should go to “average” colleges, as this approach does not assume that two-year institutions are inferior to four-year colleges.

Degree aspirations are a major driver in college match that has thus far gone largely unexplored in college match research. The above analyses illustrate that average-performing students align their degree goals well with the level of institution in which they enroll and that students care about program offerings as much as high-performing

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students. Organizing institutions into a hierarchy of selectivity falls short of these considerations, as students' ideal choices based on program may be at a two-year or less selective college. Therefore, imposing a mismatch or undermatch on such a decision may be spurious to students' intentions. One potential critique of this approach is that it maps students who are traditionally underrepresented onto existing stratified enrollment patterns. For example, if students from low-income backgrounds are implicitly (or explicitly) encouraged to enroll in trade school or two-year colleges, then matching on students' intentions and their enrollment would support stratification.⁴¹ On the other hand, understanding the high degree to which students align their degree goals and college enrollment may also provide the opportunity for underscoring the practice of accurate and abundantly accessible college guidance and the importance of providing affordable postsecondary opportunities with high likelihood of completion at all selectivity levels.

Average-performing students are unlikely to enroll in a college that has their desired degree-level, manageable debt amounts, and high graduation rates. Consistent with previous college match research, we found students who have been traditionally underrepresented in higher education are less likely to match on all three characteristics. Some of this mismatch is a function of student demand, as we know college choice is a complex process. Therefore students may be applying to and enrolling in colleges that are in direct contradiction to their stated desires. Research tells us that part of the issues is the abundance, timeliness, and accuracy of information that students possess about their college options. One common and yet to be addressed prescription is to improve the college guidance students receive in their high schools to account for the consideration of

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institutional performance. Another potential solution has already been tested and taken to scale for high-achieving students—an informational mailer. Students could receive information about area colleges with high graduation rates. Such information could include the average amounts of debt of their graduates, tailored to students' income and zip codes.

At the same time, however, the lack of available seats at colleges that we might consider “good” explains persistent levels of mismatch for average-performing students. Average-performing students were more likely to want to stay close to home than their higher performing peers. Although a good share of average-performing students who cared most about enrolling at a college that was away from home were able to do so, the majority of students are still bound to enrolling at nearby institutions. As such, policymakers need to be made aware of the inequitable distribution of colleges by completion rate and affordability. Improving match can only be achieved if colleges that serve large shares of average-ability students well are encouraged to increase capacity while, at the same time improving the colleges that have low or middling completion rates. As more students seek entry into and credentials from higher education, the ability to attend an affordable college with a decent likelihood of completion should not be a luxury reserved for the best academic performers.

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²¹ Hillman, "Differential impacts of college ratings."

²² The NCES collected demographic, academic, and institutional data from a national sample of approximately 16,120 students enrolled in 10th grade in 2002. NCES conducted three follow-ups with students: the first at the end of their 12th grade year (2004), the second when many respondents were sophomores in college (2006), and the third eight years after most graduated from high school (2012).

²³ As reported in the Education Longitudinal Survey (ELS: 2002). The resultant sample includes average- and high-performing students for a weighted total of 1,353,889. The data were restricted to students who participated in the base and first two follow ups, were not enrolled in vocational, alternative, or special education programs, stated the number of colleges they applied to, and had IRT Math scores of +/- one *SD* from the mean (average-performing students) or above one *SD* from the mean (high-performing). There are limitations to this dataset. High school GPA was measured in bands (e.g., 2.01-2.50) rather than in exact numbers. Students who failed to respond to any of the questions of interest were not included in the sample. The sample was weighted using F2BYWT.

²⁴ Jaekyung Lee, "Multiple Facets of Inequity in Racial and Ethnic Achievement Gaps," *Peabody Journal of Education* 31, no. 1 (2002): 3-12; National Center for Education Statistics, "Digest of Education Statistics: 2013," <https://nces.ed.gov/programs/digest/d13/index.asp>.

²⁵ Laura W. Perna, "Studying College Access and Choice: A Proposed Conceptual Model." *Higher Education: Handbook of Theory and Research* 21, (2006): 99-157; Patricia M. McDonough, *Choosing Colleges: How Social Class and Schools Structure Opportunity* (Albany, NY: State University of New York Press, 1997).

²⁶ McDonough, *Choosing Colleges*.

²⁷ Analysis using Beginning Postsecondary Students using PowerStats. Figures were derived for recent high school graduates enrolled in two- and four-year colleges using MAJ09CHG, FLEVEL and FALLHSFT and were weighted using WTB000.

²⁸ The distance between students' homes and the first college in which they enrolled was calculated by using the "ZIPCITYDISTANCE" command in SAS, which calculates the linear distance between the center of two zip code areas.

²⁹ Lopez-Turley, "College Proximity; Hillman, "Differential impacts of college ratings."

³⁰ Steven J. Ingels, Ben Dalton, and Elise Christopher, *High School Longitudinal Study of 2009 (HSL:09) First Follow-up: A first look at Fall 2009 Ninth-graders in 2012*, (Washington, DC, National Center for Education Statistics, October 2013), <http://nces.ed.gov/pubs2014/2014360.pdf>.

³¹ Roderick, Coca, and Nagaoka, *Potholes on the Road to College*; Smith, Pender, and Howell, *The full extent of student-college academic undermatch*.

³² While the Obama Administration has taken steps to remedy this information gap by requiring all colleges that receive Title IV funding to furnish an online net price calculator on their websites, transparent pricing remains elusive. See The Institute for College Access and Success, *Adding it all up 2012: Are college net price calculators easy to find, use, and compare*, (Washington, DC: Institute for College Access and Success, October 2012), http://ticas.org/sites/default/files/pub_files/Adding_It_All_Up_2012.pdf.

³³ National Association for College Admission Counseling, “Need-blind college admission still prevalent, but enrollment strategies increasingly utilize merit aid targeting amid tightening economy, rising costs,” news release, November 25, 2008, www.nacacnet.org/media-center/PressRoom/2008PressReleases/Pages/finaidpaper.aspx.

³⁴ Kevin Eagan, Jennifer B. Lozano, Sylvia Hurtado, and Matthew H. Case, *The American Freshman: National Norms Fall 2013* (Los Angeles, California: Cooperative Institutional Research Program at the Higher Education Research Institute at UCLA, 2013), www.heru.ucla.edu/monographs/theamericanfreshman2013.pdf.

³⁵ Bowen, Chingos, and McPherson, *Crossing the Finish Line*; Roderick et al., *From High School to the Future*.

³⁶ Roderick et al., *From High School to the Future*.

³⁷ See Turner, 2013; The Chronicle of Higher Education, “Why Colleges Don’t Want to be Judged by Their Graduation Rates,” October 17, 2014, <http://chronicle.com/article/Why-Colleges-Don-t-Want-to/149435/>.

³⁸ Danette Gerald and Kati Haycock, *Engines of Inequality* (Washington, DC: The Education Trust, January 1, 2006), <http://1k9gl1yevnfp2lpq1dhrqe17.wpengine.netdna-cdn.com/wp-content/uploads/2013/10/EnginesofInequality.pdf>.

³⁹ Rodriguez, “Tradeoffs and limitations.”

⁴⁰ Lopez-Turley, “College Proximity.”

⁴¹ For example, one study found that the high school guidance counselors in their sample encouraged low-income students in their sample, regardless of ability, to enroll in community college. Frank Linnehan, Christy H. Weer, and Paul Stonely, “High School Guidance Counselor Recommendations: The Role of Student Race, Socioeconomic Status, and Academic Performance,” *Journal of Applied Social Psychology* 41, no. 3 (2011): 536-558.