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CHAPTER 7

Pathways to a Four-Year Degree

Determinants of Transfer and Degree Completion

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INTRODUCTION

A bachelor's degree is no longer considered a potential stepping-stone to a better life. It is the gatekeeper to myriad social and individual benefits, ranging from income, employment stability, and occupational prestige to engagement in civic and political activities (e.g., W. Bowen & Bok 1998; Hossler, Braxton, & Coopersmith 1988; Leslie & Brinkman 1986; Lin & Vogt 1996; Pascarella & Terenzini 1991). Though the social and economic benefits of a college degree are numerous, acquiring them is tied to a single stepping-stone: completing a college degree (Adelman 1999).

As early as the 1960s, federal, state, and local governments have recognized that completion of a four-year degree can be an insurmountable step for individuals from disadvantaged socioeconomic backgrounds. Some student assistance programs like Chapter I, TRIO, and GEAR UP recognize the important role that academic preparation, awareness of opportunities for college, and assistance in completing the college application process play for low-income students whose parents are not college educated. However, most federal and state assistance programs focus on inability to pay as a deterrent for access to higher education and persistence to degree completion (College Board 2003).

The importance our society places in making a college degree an affordable option for able and willing low-income individuals is evidenced by the growth of college financial aid programs. In the early 1980s, the

cost of federal financial aid programs approached \$20 billion per year (Lewis 1989). By 2003, these federal financial aid program expenditures were \$66 billion (College Board 2003). As important as these need-based programs have been in facilitating access to and success in college, economic need per se does not appear to explain fully why low-income individuals enroll (Hossler, Schmitt, & Vesper 1999) or persist in college (e.g., Adelman 1999; Braxton 2000; Cabrera, Nora, & Castañeda 1992; Choy 2002; Gladieux & Swail 2000; Swail 1995; Terenzini, Cabrera, & Bernal 2001).

In addition to students' socioeconomic background, we know access to and success in college as well as transferring from a two-year institution to a four-year institution are the product of a complex set of factors, some of which can be traced back to at least the eighth grade, while others pertain to postsecondary experiences (e.g., Blecher, Michael, & Hagedorn 2002; Braxton 2000; Cabrera & La Nasa 2001; Hossler, Schmitt, & Vesper 1999; McDonough 1997; Paulsen & St. John 2002; Tinto 1993). In terms of what matters on the path to a four-year degree, we also know individuals from low socioeconomic (SES) backgrounds are most disadvantaged.¹ Low-SES students tend to be raised by parents who are less likely to be involved in school activities (Cabrera & La Nasa 2001). Their parents are less knowledgeable about how to plan and pay for college (Flint 1992, 1993; King 1996). The middle schools that low-SES students attend also compound the problem by lacking in enough certified teachers, adequate career counseling resources, and course offerings (Venezia, Kirst, & Antonio 2003). By the end the senior year, low-SES twelfth graders are less likely to have planned for and be academically prepared for college (Adelman 1999; Cabrera & La Nasa 2000, 2001; Terenzini, Cabrera, & Bernal 2001). If and when they enter college, they do so often at readiness levels far below those of their better-off counterparts, while choosing public institutions and being clustered in community colleges (e.g., Kim 2004; McPherson & Shapiro 1998). Once enrolled in postsecondary education, low-SES students' involvement with the institution is similar to that exhibited by their better-off counterparts, with a few exceptions, including less involvement with faculty, other students, clubs, and organizations and being more prone to work longer hours (e.g., Cuccaro-Alamin & Choy 1998; Terenzini, Cabrera, & Bernal 2001; Walpole 2003). Moreover, at the end of their first year, low-SES students report greater learning gains in critical thinking and enjoyment of arts than those reported by better-off students (Terenzini, Cabrera, & Bernal 2001). In spite of the many similarities within college, low-SES students' degree completion rates lag substantially behind

those of their more affluent counterparts (Carroll 1989; Paulsen & St. John 2002; Terenzini, Cabrera, & Bernal 2001).

This chapter seeks to further our understanding of why postsecondary attendance and degree completion patterns differ markedly between socioeconomically disadvantaged students and their better-off peers. This is important as socioeconomically disadvantaged students are attending college in much greater numbers than in the past. Two milestones along the college path for members of the high school sophomore cohort of 1980 were examined. These two milestones are: (1) transferring from the two-year sector to the four-year sector, and (2) persistence to degree completion. This chapter also addresses three major shortcomings when examining socioeconomically disadvantaged students' path to a four-year degree. First, it examines the effect of financial aid *in addition to* other important determinants of degree completion. Second, it adheres to a more comprehensive definition of persistence by focusing on degree completion rather than persistence at the end of the first year. Third, it studies how determinants of degree completion vary across socioeconomic levels. When SES is brought to bear, with few notable exceptions (e.g., Paulsen & St. John 2002; St. John et al. 1996; Terenzini, Cabrera, & Bernal 2001; Walpole 2003), it is done with the purpose of controlling for an alternative explanation rather than with the explicit intention of highlighting differences between socioeconomically disadvantaged students and their better-off peers. Simply put: *we still do not know what specific factors lead some low-SES students to succeed on their path to a college degree despite overwhelming odds.* This study uses SES with the intention of highlighting differences between socioeconomically disadvantaged students and their better-off peers, an approach which has received little attention (Paulsen & St. John 2002; Walpole 2003).²

PATHWAYS TO A FOUR-YEAR DEGREE

In examining the 1980 high school sophomore cohort, Adelman (1999) concluded that the quality and intensity of academic preparation secured in high school was one of the most important determinants of completing a four-year degree. Velez (1985) and Carroll (1989) found that postsecondary tracks also matter. Their findings suggest that high school students are more prone to obtain a bachelor's degree if their port of entry to postsecondary education was a four-year institution. When these two concepts are combined (preparation for college and first type of postsecondary institution attended),³ it is possible to identify nine

pathways to a college degree followed by the high school sophomore cohort of 1980 (see Figure 7.1).

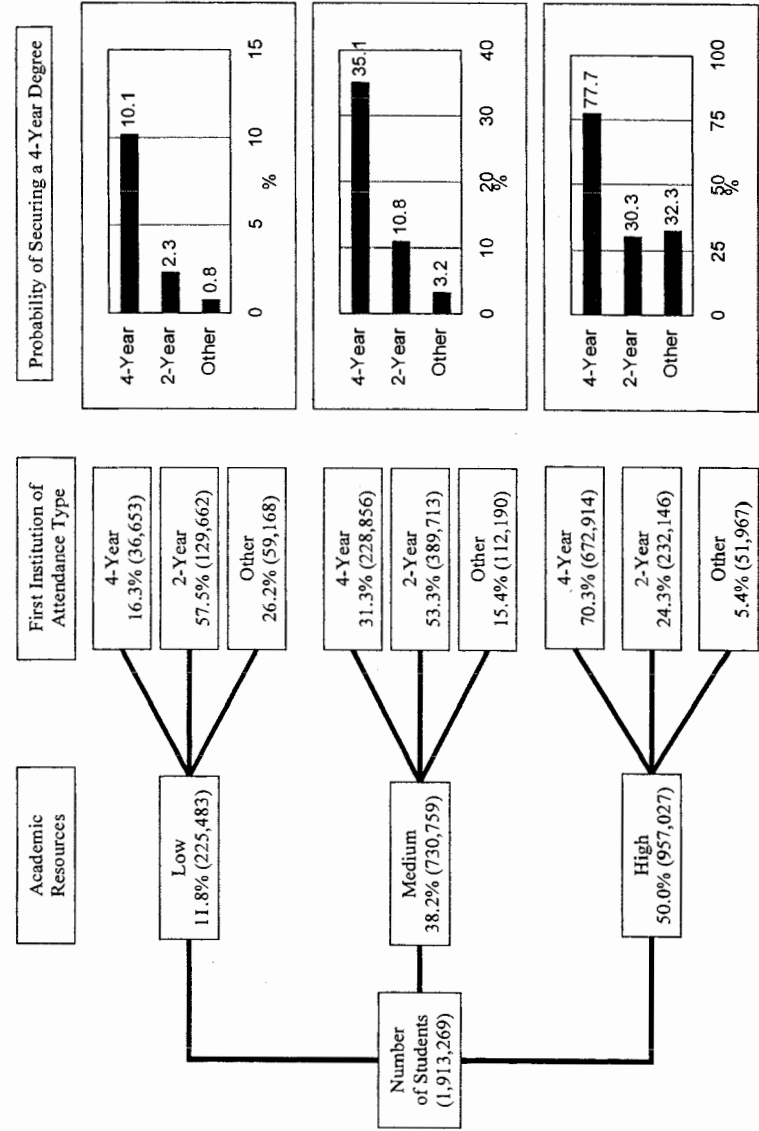
By 1993, 58 percent of the high school sophomore cohort of 1980 had enrolled in a postsecondary institution. Of those enrolled, 47 percent first attended a four-year institution, 41 percent first opted for a two-year institution, and 12 percent first selected another type of institution. Only half were fully qualified for college. Figure 7.1 depicts the nine different paths to a four-year degree followed by the high school sophomore cohort of 1980, resulting from combinations of academic resource levels and the first type of institution attended. The type of institution students first enter correlates strongly with academic resources secured in high school ($r = 0.412, p < 0.001$). Seventy percent of those students highly prepared academically first enrolled at four-year institutions. In contrast, only 16 percent of the lowest prepared first enrolled at a four-year institution. For these academically deficient students, first institutional choice appears almost exclusively confined to institutions offering the associate's degree or less.

Academic Resources–Institutional Choice paths vary in their likelihood to produce a four-year degree. In the aggregate, successful pathways to a bachelor's degree appear to follow a logical progression: students who obtain the highest academic preparation and enter a four-year institution tend to secure a four-year degree. Conversely, students who are poorly qualified and choose a first institution other than a four-year college or university see their chances to graduate diminished. Seventy-eight percent of those students who pursued the first path graduated within ten years. In contrast, just 2.3 percent of those who were poorly qualified and first entered a two-year institution earned a four-year degree in the same timeframe. Although enrolling in a four-year institution exerts a powerful effect, academic preparation seems to provide better chances to graduate from college regardless of port of entry. Even when students begin their postsecondary careers in the two-year sector, those who are highly prepared have a 30 percent chance to earn a four-year degree (see Figure 7.1).

Securing different levels of academic preparation and choosing institutions of postsecondary education vary as one examines a student's socioeconomic status. Twenty-five percent of all lowest-SES students secure high academic resources. Moreover, only 30 percent of lowest-SES students first enrolled at a four-year institution regardless of academic resources (see Figure 7.2).

In contrast to the case of lowest-SES students, 59 percent of students from the highest-SES background obtained high academic resources. Ad-

Figure 7.1
Degree Attainment by ACRES and First Institution Type for All Students



Note: Based on High School and Beyond, Sophomore Cohort (NCES 2000-194). Only cases with verified data were used.

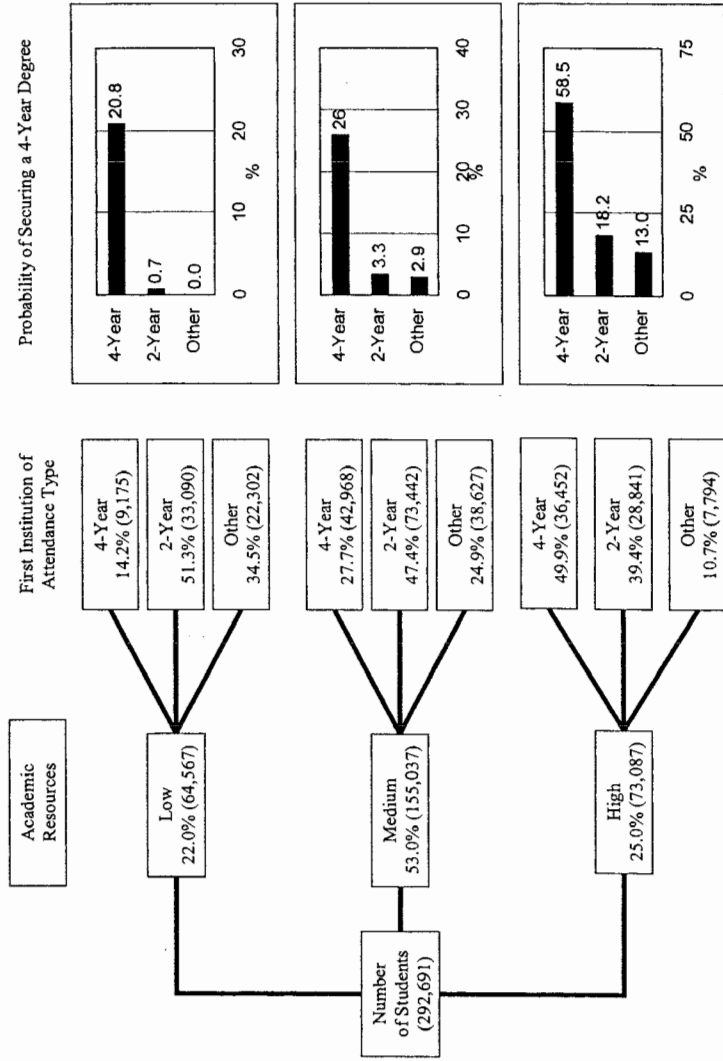
ditionally, 58 percent of all highest-SES students first entered a four-year institution regardless of their academic resources (see Figure 7.3). These figures confirm a pervasive national trend documented more fully elsewhere (Cabrera & La Nasa 2000, 2001).

Paths pursued by students to earn a bachelor's degree do vary, in fact, by socioeconomic status. Lowest-SES students are most likely to journey on the path of medium academic resources and entrance at a two-year institution. The degree completion chances of those who journey on this path are only 3.3 percent (see Figure 7.2). At the opposite end is the case of highest-SES students who travel on the path of high academic resources and entrance in a four-year institution. Eighty-one percent of highest-SES students traveling on this path graduate with a bachelor's degree (see Figure 7.3).

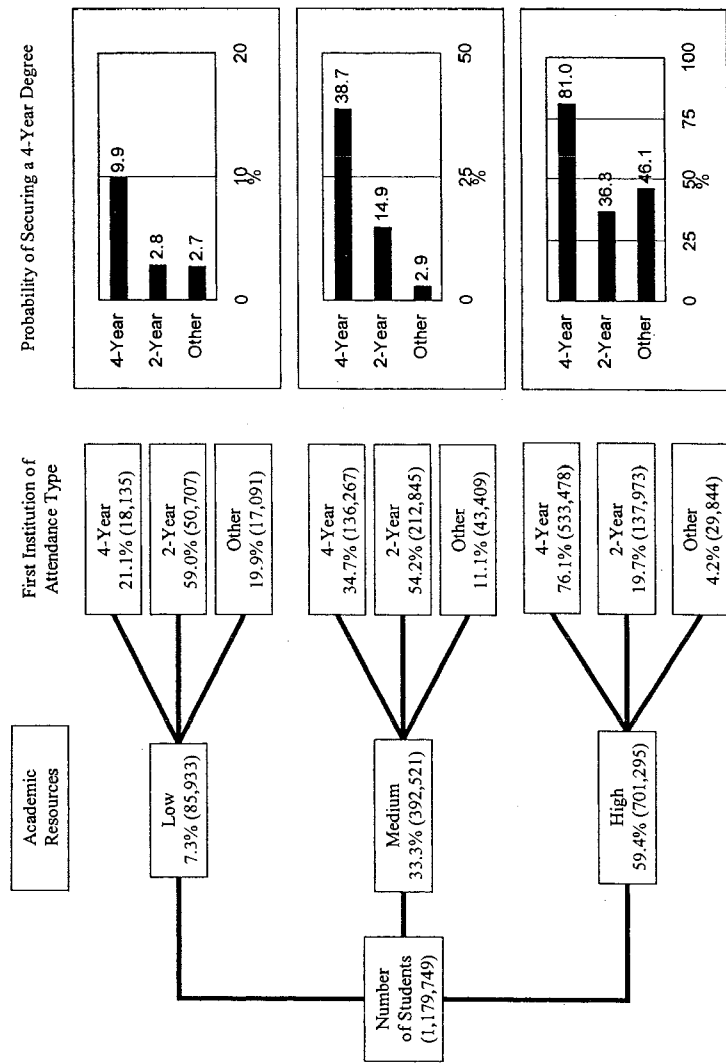
Students from high socioeconomic backgrounds appear to have a relative advantage over students from the lowest socioeconomic levels for most of the pathways to a college degree. In all but one path, students from the highest socioeconomic backgrounds are more likely to secure a four-year degree than their disadvantaged peers, regardless of academic preparation or port of entry. Nevertheless, the results are not entirely dismal for disadvantaged students, because these students display remarkable success along a very important path. Lowest-SES students who secure only minimal academic resources and enter a four-year institution are approximately 11 percent more likely to secure a four-year degree than their better-off peers who follow the same path. This fact speaks highly to these students' resilience to overcome the high hurdles they face.

While our descriptive examination of the high school class of 1982 confirms an SES-based gap in postsecondary opportunities, the pathways to a four-year degree does not help us to form firm conclusions as to what helps lowest-SES students overcome their substantially low odds of degree completion. We know that collegiate experiences and curricular choices matter, irrespective of a student's SES (e.g., Adelman 1999; Montodon & Eikener 1997). Yet, the nature and role of collegiate experiences and their contribution to degree completion among socioeconomically disadvantaged students remain to be examined (Terenzini, Cabrera, & Bernal 2001; Walpole 2003). Examination of the high school sophomore cohort of 1980 database has already revealed much about the important role academic preparation has on persisting to degree completion (Adelman 1999). What remains is to uncover the role of academic preparation in facilitating transfer from the two-year sector to the four-year sector.

Figure 7.2 Degree Attainment by ACRES and First Institution Type for Lowest-SES Students



Note: Based on High School and Beyond, Sophomore Cohort (NCES 2000-194). Only cases with verified data were used.



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The next sections, “Determinants of Transfer” and “Determinants of Degree Completion,” examine critical factors enabling a student to transfer to the four-year sector and persist to degree completion. Each of these sections comprises two parts. The first part is an examination of each individual factor in the model using descriptive statistics, and the second part takes each of the separate factors into account simultaneously using more sophisticated statistical techniques.⁴

DETERMINANTS OF TRANSFER

First Type of Institution Attended and SES

Low-income students are more likely to enroll in two-year institutions than are their economically better-off counterparts (e.g., Blecher, Michael, & Hagedorn 2002; Hagedorn, Moon, Cypers, Maxwell, & Lester 2003; McPherson & Shapiro 1998). This institutional attendance pattern seems to support the claim of inequity of educational opportunities based on one’s socioeconomic background (Karabel 1972, 1986).

Our examination of the college destinations for the high school sophomore cohort of 1980 supports McPherson and Shapiro’s findings, and is in line with Karabel’s notion of SES-based inequity of higher education opportunity.⁵ As shown in Table 7.1, a small but significant association between socioeconomic status and college destinations of high school sophomores exists ($\chi^2 = 206,703.6$, $p < 0.001$, $r = 0.290$). Compared to the average high school sophomore, whose chances of enrolling at a four-year institution are almost 50 percent, the average poor sophomore’s chance of enrolling at a four-year institution is only 30 percent. When comparing the enrollment rate at four-year institutions between the lowest-SES students and the highest-SES students, a huge disparity is evident. Highest-SES students are 37 percent more likely to enroll in a four-year institution than lowest-SES students.

Transfer Patterns and SES

Compounding the problem of the moderate association between college destination and socioeconomic factors is the fact that few students enrolled in the two-year sector actually transfer to a four-year institution. Tinto (1987), while examining the high school class of 1972, estimated that only one out of four community college students eventually trans-

Table 7.1
First Type of Postsecondary Institution Attended for the High School Sophomore Cohort of 1980

Socioeconomic status	First type of postsecondary institution attended		
	Other	2-year	4-year
Lowest	22.3%	47.8%	29.9%
Medium low	14.4%	49.5%	36.1%
Medium high	13.7%	42.5%	43.9%
Highest	3.9%	29.2%	66.9%
Overall	12.0%	40.4%	47.6%

Note: Estimates are based on the HSB/So panel weight PSEWT1.

ferred to a four-year institution. Other articles report that enrolling at a two-year institution substantially reduces one's chances of eventually securing a four-year degree (e.g., Astin 1975; Breneman & Nelson, 1981).

Our descriptive analyses of transfer rates among community college students enrolled during the 1983–84 academic year corroborate Karabel's contention: *community colleges do appear to help in perpetuating a system of unequal access to a college degree*. The overall transfer rate among this group was 29 percent, a transfer rate remarkably close to Tinto's estimates. We also found transfer to a four-year institution to be significantly associated with a student's SES ($\chi^2 = 13,380.9$, $p < 0.001$, $r = 0.164$). Differences in transfer rates by SES are vast. Lowest-SES community college students were 20 percent, 17 percent, and 6 percent less likely to transfer to a four-year institution than their counterparts in the highest-, medium high-, and medium low-SES quartiles (see Table 7.2).

Despite these data, the role of the community college as an SES-based gatekeeper for eventual college degree attainment is debated. At the core of this controversy lie the level of analysis and the type of controls different studies employ. Experts on the community college sector have long believed that simple descriptive statistics obscure the role played by a variety of factors critical to a student's chances to eventually transfer to the four-year sector (e.g., Blecher, Michael, & Hagedorn 2002; Hagedorn et al. 2003; Kinnick and Kempner 1988; Breneman & Nelson 1981; Adelman 1999; Berkner & Chavez 1997; Hearn 1988, 1991; Lee & Frank 1990; Velez & Javalgi 1987). Their research suggests socioeconomic status plays a secondary role in transfer decisions when compared to other factors.

Table 7.2
Transfer Rates by SES among Students Enrolled in a Community College during the 1983–84 Academic Year

Socioeconomic status (in quartiles)	Percentage transferring
Lowest	17.0%
Medium low	22.9%
Medium high	33.9%
Highest	36.7%
Overall	29.4%

Note: Estimates are based on the HSB/So panel weight PSEWT1.

Educational Aspirations

Having clear educational aspirations along with strong high school preparation for college seems to play a pivotal role in transfer decisions. Kinnick and Kempner (1988) found that students entering a two-year institution were able to secure a four-year degree to the extent that they had clear educational goals, were highly motivated, and were academically prepared. More recently, Adelman (1999) found the odds of eventually securing a four-year degree among community college students to be highly associated with collegiate degree expectations. Lee and Frank (1990) reported similar results when they examined transfer behavior for a representative sample of the high school senior class of 1980.

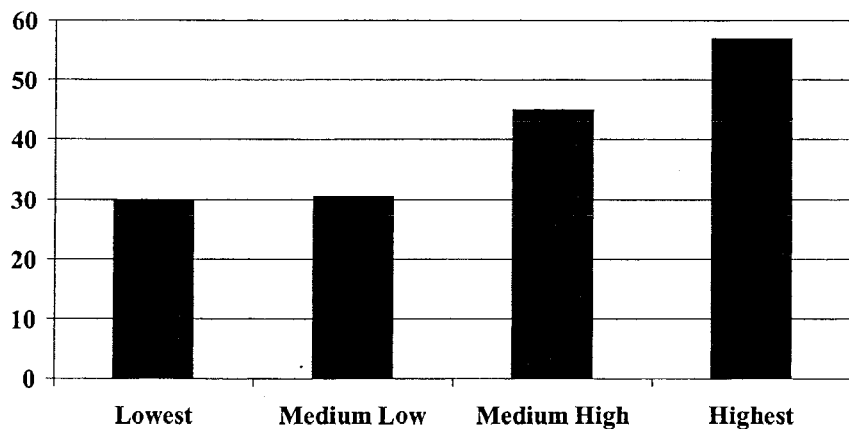
Degree Aspirations

When we examined those 1980 high school sophomores who entered a community college between 1982 and 1983, we found striking differences in degree aspirations across SES quartiles. A moderate, but significant, correlation between SES and degree aspirations was observed, where degree aspirations increased across SES. Lowest-SES students were almost 30 percent less likely to aspire to a four-year degree than highest-SES students (see Figure 7.4).

Academic Resources

Securing academic resources in high school seems to be a determinant of success in postsecondary education. Adelman (1999) found that the

Figure 7.4
Proportion of Students Entering a Community College Aspiring to a Four-Year Degree by SES



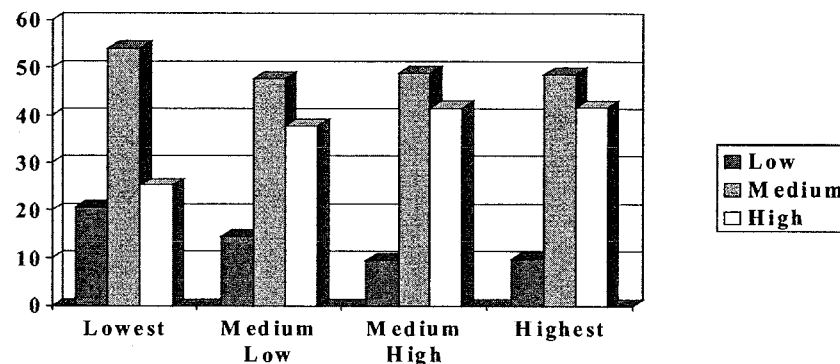
Note: Estimates are based on those high school sophomores who enrolled at a two-year institution between 1982 and 1983 ($r = 0.224$).

odds of earning a four-year degree increased in tandem with the academic resources the college student secured in high school: *the greater one's academic resources, the greater one's chances of four-year degree completion*. We find that the level of academic resources among community college is moderately associated with SES. Lowest-SES students were less prepared. While 42 percent of highest-SES students were highly academically prepared for college, merely 25 percent of lowest-SES students enjoyed the same level of academic preparation (see Figure 7.5).

Community College Curricular Choice, Academic Success, and Collegiate Experiences

The type and quality of community college experiences are determining factors in decisions to transfer as well. Kraemer (1995) reported that academic performance in the community college affected a student's intent to transfer and actual transfer decisions. While examining factors that lead to transfer students' academic success at the four-year institution, Montondon and Eikner (1997) found academic performance at the two-year institution to be defining. In addition to academic performance, the quality of the interactions of community college students with faculty and peers matters. Nora and Rendón (1990) found intent to trans-

Figure 7.5
Academic Resources among Community College Students across SES



Note: Estimates are based on those high school sophomores who enrolled at a two-year institution between 1982 and 1983 ($r = 0.106$).

fer was most affected by the extent to which the community college student was satisfied with the academic and social components of the two-year institution. College curriculum also seems to play a role (e.g., Adelman 1999). Velez and Javalgi (1987) found that students enrolled in a community college in 1972 were more likely to transfer if they had an on-campus work-study position and lived on campus. They also found the effect of SES on transferring was negligible after controlling for background and collegiate experiences. Curricular choices and collegiate academic performance also seem to facilitate transfer. For instance, Lee and Frank (1990) found taking courses in math and science, along with having strong academic performance, to be among the strongest predictors of transfer for members of the 1980 high school class.

Table 7.3 highlights the degree of association between different collegiate experiences⁶ and decisions to transfer for our student population. It is evident that transfer decisions are mostly associated with the number of courses earned in math and science, a finding consistent with Lee and Frank (1990). How well the student performs in the community college is also a factor associated with eventual transfer. Positive out-of-classroom experiences also matter. The degree of association between the remaining collegiate experiences, though positive, is small. We found no association between being satisfied with the cost of attending a community college and the likelihood of transferring to a four-year institution. Taken as a whole, our results suggest transfer is more likely to be associated with

Table 7.3
Degree of Association between Collegiate Experiences and Transfer among 1980 High School Sophomores

Variable	r
GPA	0.178
Out-of-classroom experiences	0.123
Quality of instruction	0.088
Counseling	0.067
Campus facilities	0.078
Institutional prestige	0.088
Number of math courses	0.342
Number of science courses	0.332
Satisfaction with cost of attendance	-0.043

a community college student's curricular choices and academic success than with any other collegiate experience measured.

SES and Community College Curricular Choice, Academic Success, and Collegiate Experiences

The nature of collegiate experiences among socioeconomically disadvantaged students is an issue long neglected in the literature. Table 7.4 highlights specific SES-based collegiate differences. While there are significant mean differences between highest- and lowest-SES students within each collegiate experience, the largest differences are again seen in the number of math and science courses and grade point average (GPA). It is also noteworthy that these differences, though statistically significant, are rather small in absolute terms. For instance, lowest-SES students' academic performance in college was only a quarter of a grade lower than highest-SES students'.

Remedial Education

The nature of remediation also plays a role in the likelihood of a community college student eventually attaining a four-year degree. Adelman (1998), while examining college transcripts of the 1980 high school sophomore cohort, found a negative relationship between taking remedial education and degree completion. However, in reviewing the data provided by Adelman (1998), Merisotis and Phipps (2000) reached an opposite conclusion. They found that the effectiveness, and eventual de-

Table 7.4
Differences in Collegiate Experiences and Curriculum Patterns across SES (Means and Proportions Comparison)

Variable	Socioeconomic status (in quartiles)				F/X ²	r
	Lowest	Middle low	Middle high	Highest		
GPA	2.23	2.49	2.54	2.50	3,233.81**	0.097
Out-of-classroom experiences	3.59	3.60	3.61	3.73	806.00**	0.064
Quality of instruction	4.01	4.01	3.94	4.04	393.26**	0.006
Counseling	3.36	3.37	3.31	3.49	670.08**	0.039
Campus facilities	4.11	3.96	4.10	4.16	949.88**	0.049
Institutional prestige	3.81	3.72	3.71	3.83	490.50**	0.021
Enroll in at least 1 math course	21.4%	28.5%	32.9%	38.4%	7,740.35**	0.124
Enroll in at least 1 science course	29.3%	38.3%	41.9%	53.4%	13,766.23**	0.165
Satisfaction with cost of attendance	66.1%	66.6%	69.6%	65.8%	500.06**	0.035

***p* < 0.001.

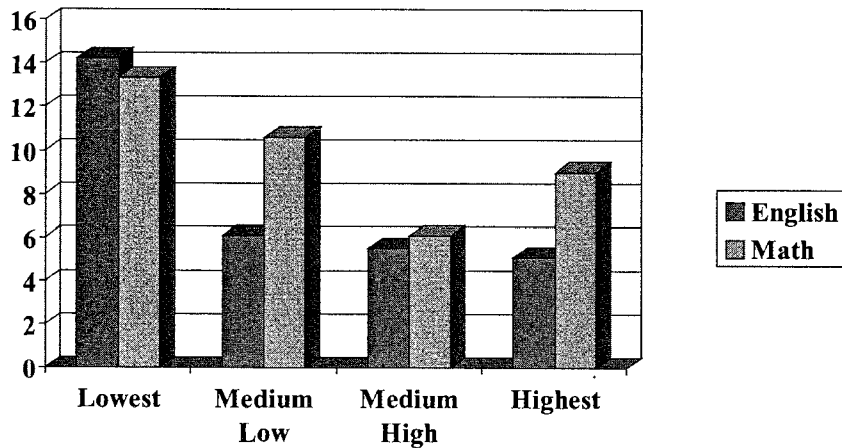
gree attainment, among the least prepared students rested on the total number of remediation courses completed. Clearly, firm conclusions have not been reached regarding the role of remediation in transfer.

Our analysis indicates that the degree of association between SES and remediation is weak. Correlations between SES and remediation in English and in math were 0.125 and 0.084, respectively. However, it is evident that lowest-SES students are more likely to take remediation courses than are highest-SES students. Lowest-SES students were 9 percent and 4 percent more likely to take remedial English and math, respectively, than their highest-SES counterparts (see Figure 7.6).

Family Responsibilities

Family responsibilities, particularly having a child prior to degree completion, have been found to diminish a student's chance of succeeding in college. For instance, Nora, Cabrera, Hagedorn, and Pascarella (1996)

Figure 7.6
Percentage of Community College Students Taking Remedial English and Math Courses by SES



Note: Estimates are based on those high school sophomores who first enrolled at a two-year institution between 1982 and 1983 ($r = 0.125$ for English, $r = 0.084$ for math).

found family responsibilities decrease a student's likelihood to become involved with an institution, increasing the possibilities of dropping out of college. Similarly, Adelman (1999) identified lower long-term degree completion rates for students who had children while attending college.

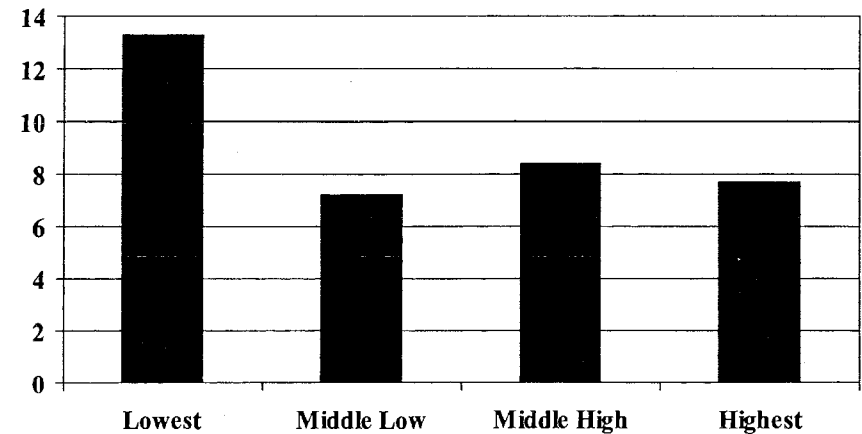
Overall, we find that community college students who have children prior to degree completion are 24 percent less likely to transfer than are students without this type of responsibility. The degree of association between having a child and transfer was moderately small ($r = 0.148$). This impact is exacerbated within the lowest-SES quartile, as lowest-SES students are more prone to have children while attending college. As can be seen in Figure 7.7, lowest-SES students were 6 percent more likely to assume family responsibilities of this nature than highest-SES students. Though significant ($X^2 = 2,543.56$, $df = 3$, $p < 0.001$), the degree of association between SES and having children is rather small ($r = 0.073$).

WHAT REALLY FACILITATES TRANSFER?

Socioeconomic Status

From a purely descriptive basis, SES plays an important role in shaping transfer decisions for our student population. Yet, descriptive statistics can be misleading: they fail to account for the simultaneous effects

Figure 7.7
Percentage of Students Having Children Prior to Degree Completion across SES



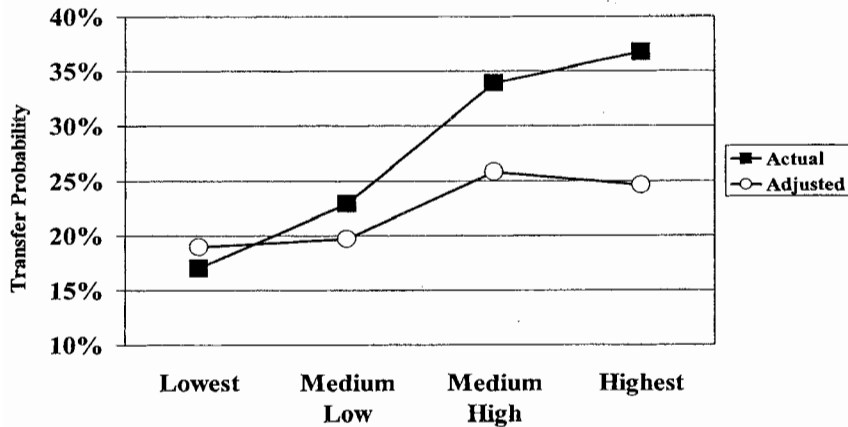
Note: Estimates are based on the High School and Beyond: 1980 (sophomore cohort). Panel weight PSEWT1 ($r = 0.073$).

of myriad other factors identified as critical to the transfer process. Once the joint effect of these factors is included in the analysis, the vast differences attributable to SES substantially decrease.⁷ The 20 percent transfer gap between lowest-SES students and highest-SES students is reduced to 7 percent once demographic characteristics, encouragement, academic preparation, collegiate degree aspirations, performance in college, effort, remedial education, collegiate experiences, financial aid, and family status are controlled (see Table 7.5 and Figure 7.8).⁸

Community College Curricular Choice

While aspirations, academic resources, remedial education, and family responsibilities were found to play a role in transfer, our analysis indicates taking math and science courses to be the most significant factor for all students. Community college students who took two science courses were 33 percent more likely to successfully transfer compared to those who took no science courses. Similarly, community college students who took two math courses were 19 percent more likely to transfer. The effect of taking science courses among lowest-SES students is even more pronounced. For this group, taking only one science course increases the likelihood of transferring 55 percent (see Table 7.5).

Figure 7.8
Probabilities of Transferring to a Four-Year Institution by SES for the High School Sophomore Cohort 1980, Actual and Adjusted



Academic Resources

Sound preparation for college plays a key role in facilitating transfer. Compared to those students who had poor academic resources, middle and highly academically prepared community college students were 6 percent and 21 percent, respectively, more likely to transfer to a four-year institution. Among lowest-SES students, being highly academically prepared increases the chance of transferring by 21 percent (see Table 7.5).

Educational Aspirations

Consistent with the extant literature (e.g., Adelman 1999), we find that aspiring to a four-year degree is a significant predictor of transfer. Net of other factors, such as academic ability, a community college student who aspired to a four-year degree while a high school sophomore had a 15 percent greater chance to transfer than high school sophomores holding lower educational aspirations. The literature also suggests that transfer rates are grossly underestimated by failing to account for the fact that not all community college students enroll with the intent to transfer (e.g., Adelman 1999; Kinnick & Kempner 1988). Isolating those students who aspired to a four-year degree, we find the adjusted probability of transfer substantially increases for the lowest- and middle low-SES groups (see Figure 7.9). This finding suggests that without controlling for

Table 7.5
Changes in the Probability of Transferring due to Background, Encouragement, Academic Resources, Performance in College, Remediation, Collegiate Experiences, Financial Aid, and Family Responsibilities

Factor	All	Socioeconomic Status			
		Lowest	Middle low	Middle high	Highest
SES					
Middle low	—				
Middle high	0.089*				
Highest	0.073*				
Female	—	-0.092**	-0.073**	—	-0.156**
Ethnicity					
African American	—	-0.096**	—	-0.145**	0.374**
Hispanic	-0.084**	-0.079*	-0.107*	-0.229**	—
Asian American	0.052*	-0.152**	0.514**	—	0.188*
High school encouragement					
From parents	—	—	0.105*	0.094*	—
From high school professionals	0.029*	—	—	—	0.211*
From friends	0.062*	0.249*	—	0.166*	—
Academic resources					
Moderately prepared	0.063*	—	—	0.101*	0.149*
Highly prepared	0.210*	0.207*	0.117*	0.075*	0.386*
Collegiate aspirations	0.154*	0.073*	0.284*	0.175*	0.262*
Grade point average	0.085*	—	—	0.095*	0.303*
Earned hours					
Three quarters and more of attempted	—	—	—	0.104*	—
Earned all hours attempted	—	—	—	—	—
Remediation courses					
In mathematics	0.040*	0.031*	0.041*	0.026*	0.104*
In reading	—	0.240*	—	—	—
Number of math courses					
One course	0.225*	0.053*	0.278*	0.376*	0.145*
Two courses	0.187*	0.072*	0.280*	0.353*	0.070*
Three or more courses	0.233*	0.781*	0.619*	0.377*	—
Number of science courses					
One course	0.130*	0.546*	0.117*	0.141*	0.189*
Two courses	0.333*	—	0.341*	0.375*	0.357*
Three or more courses	0.254*	0.435*	0.215*	0.252*	0.292*
Collegiate experiences					
Out-of-classroom	0.053*	0.048*	—	0.111*	0.028*
Quality of instruction	0.061*	0.147*	0.228*	0.049*	—
Counseling	0.025*	—	0.133*	0.031*	—
Campus facilities	—	—	—	—	—
Institutional prestige	—	—	—	—	0.142*

Table 7.5 (continued)

Factor	All	Socioeconomic Status			
		Lowest	Middle low	Middle high	Highest
Satisfaction with costs	—	—	—	—	—
Financial aid					
Loans	0.113**	0.217*	0.209*	0.125*	—
Grants/scholarships	0.061**	0.104*	0.037*	—	0.290*
Having children	-0.183*	-0.151*	—	-0.318*	-0.242*

Note: Only marginal probabilities associated with significant betas are reported.

degree aspirations, along with other factors, observed probabilities of transferring are not reliable indicators of what really matters.

Remedial Education

The merits of remediation have been debated. While Adelman (1998) questions its role, Merisotis and Phipps (2000) consider remediation important in facilitating transfer. Our results support both positions. Across all students, and controlling for SES, we find remediation plays either a mediocre or negative role. For all students, those taking math remediation courses were 4 percent more likely to transfer than those who did not. Taking remedial reading has a negative effect, by lowering the chances to transfer by 4 percent. However, among lowest-SES students, the effect of taking remedial reading is particularly noteworthy. For this group, taking remedial reading actually increases their likelihood of transferring by 24 percent (see Table 7.5).⁹

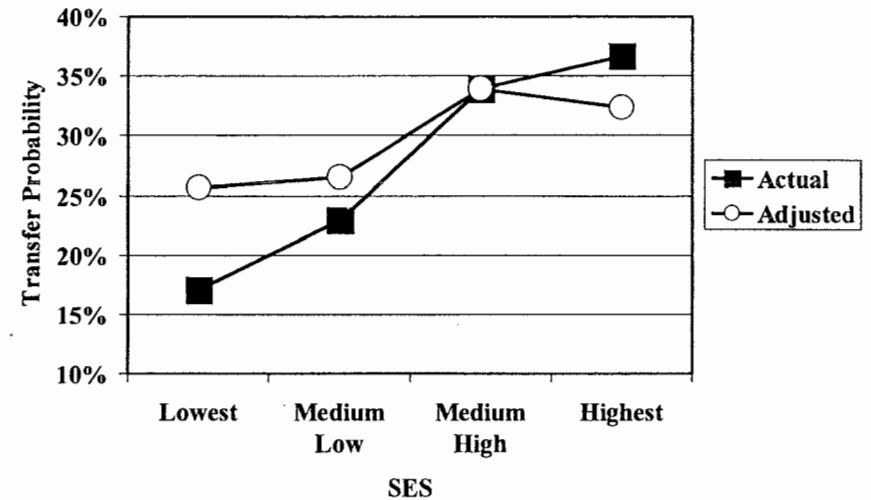
Financial Aid

Financial aid facilitated transfer to the four-year sector. For all students, receipt of loans increased the chance to transfer by 11 percent, while receiving grants improved transfer chances by 6 percent. For lowest-SES students, receiving loans increased their chances to transfer by 22 percent (see Table 7.5).

Parental Responsibilities

Adelman (1999) found that having family responsibilities plays a negative effect on a student's chance to succeed in postsecondary education.

Figure 7.9
Adjusted Probabilities of Transferring to a Four-Year Institution by SES among 1980 High School Sophomores Aspiring to at Least a Four-Year Degree



Our results are consistent with Adelman's. For all students, having children before completing a college degree reduces their chances to transfer to a four-year institution by 18 percent. Among lowest-SES students, this effect is about 15 percent (see Table 7.5).

DETERMINANTS OF DEGREE COMPLETION

A growing body of literature that indicates what happens to students before and after they enroll in college helps explain four-year degree completion (e.g., Adelman 1999; Astin 1993; Cabrera, Nora, & Castañeda 1992; Gladieux & Swail 2000; Pascarella & Terenzini 1991; Terenzini, Cabrera, & Bernal 2001; Swail 1995; Tinto 1997). Factors associated with four-year degree completion include (a) background characteristics, (b) encouragement received in high school, (c) college preparation, (d) degree aspirations, (e) college path patterns, (f) academic involvement and success, (g) college curriculum, (h) collegiate experiences, (i) financial aid, and (j) parental responsibilities (Adelman 1999; Cabrera & La Nasa 2001; Hagedorn et al. 2003; Horn & Chen 1998; St. John, Cabrera, Nora, & Asker 2000; Velez & Javalgi 1987). As is the case with transfer, most degree completion studies use SES as a

control factor, thereby neglecting examination of lowest-SES students' experiences within the postsecondary education system. In short, we do not know what specific factors lead some lowest-SES students to succeed on their path to a college degree despite overwhelming odds. This section examines degree completion by providing a synopsis of past research, descriptive statistics of the high school sophomore cohort of 1980, and results of our regression analyses for each factor.

Degree Completion and SES

Terenzini, Cabrera, and Bernal's (2001) comprehensive review of the literature informs us that low-income students are already handicapped by a variety of adverse factors while attending college. These factors include low participation rates at the four-year sector; enrolling on a part-time basis; delayed enrollment after high school completion; working full-time; dropping, withdrawing from, or not completing college credits; and being a parent.

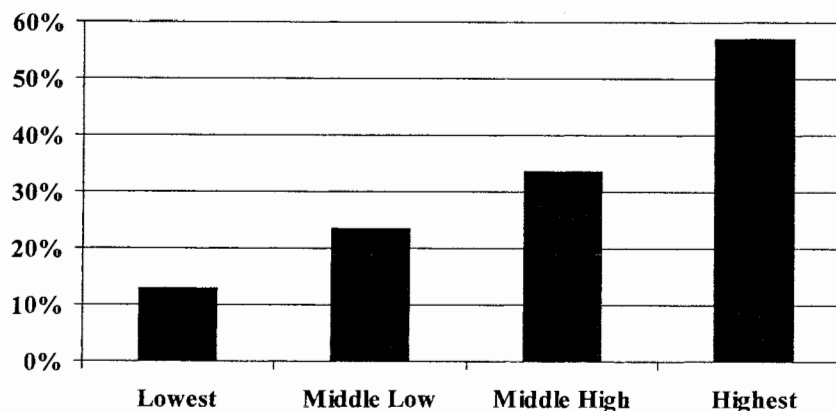
Of the 1980 high school sophomores who went on to postsecondary education, almost half first enrolled at a four-year institution (see Table 7.1). However, the four-year participation rate among lowest-SES students in this group is strikingly low compared to students for all other SES categories. The four-year college participation rate for lowest-SES students lags behind that of highest-SES students by 37 percent (see Table 7.1).

As we examine degree completion rates for the 1980 high school sophomore cohort, we find a moderate but positive association between a student's socioeconomic background and her chances of earning a bachelor's degree ($r = 0.335$). Two important trends underlying degree completion rates across SES quartiles are evident. First, the gap in degree completion rates across SES quartiles substantially increases as one moves up the SES ladder, and second, highest-SES students are 44 percent more likely to earn a college degree than lowest-SES students (see Figure 7.10).

Encouragement

Development of degree aspirations as early as the eighth grade, securing high school academic qualifications, applying for college, and successful adjustment to college are related to the extent to which the student receives encouragement from parents, high school personnel, and important high school friends (e.g., Cabrera & La Nasa 2000, 2001; Cabrera, Nora, & Castañeda 1992; Flint 1992; Hossler, Schmitt, & Ves-

Figure 7.10
Observed Probabilities of Degree Completion by 1993 for the High School Sophomore Cohort of 1980 (by SES)



Note: Estimates are based on the High School and Beyond: 1980 (sophomore cohort). Panel weight PSEWT1 ($r = 0.335$).

per 1999). This type of encouragement takes different forms, including motivational support, saving for college, and being involved in school activities (Cabrera & La Nasa 2001). Encouragement received while in high school is crucial for subsequent college enrollment. Perna (2000), for instance, noted that parental involvement in school activities predicts whether the student would enroll at a four-year college or university following high school graduation.

Some research suggests encouragement varies by SES. King (1996) observed that low-income high school seniors uncertain of whether their parents approved of their postsecondary plans were less likely than their better-off peers to aspire to attend a four-year institution. Saving for college provides the student a clear indication their parents are committed to their postsecondary education (Flint 1992, 1993). The amount of saving correlates with SES, as well. Miller (1997) reported that less than 33 percent of low-income parents saved enough money to cover more than 10 percent of their children's college education costs. Parental involvement also varies by SES. Cabrera and La Nasa (2000) reported that lowest-SES parents were less likely to participate in school activities.

Our analysis of the 1980 high school sophomore cohort reveals that a student's likelihood to receive encouragement to secure a college degree from parents, high school personnel, and high school friends was related

Table 7.6
Differences in Encouragement across SES (Proportions Comparison)

Encouragement	Socioeconomic status (in quartiles)				F/X ²	r
	Lowest	Middle low	Middle high	Highest		
Parental	68.8%	71.1%	83.6%	92.7%	131,125.46**	0.248
High school professionals	61.3%	63.5%	68.9%	76.7%	35,994.37**	0.130
Friends	47.7%	54.2%	64.9%	75.5%	98,770.08**	0.216

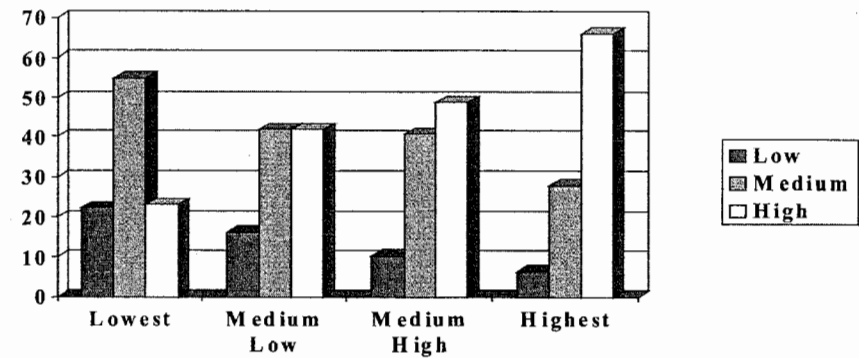
** $p < 0.001$.

to his or her socioeconomic background. As a whole, highest-SES students received more encouragement, while the reverse is true for lowest-SES students. This encouragement-SES association ranged from 0.13 to 0.25. Ninety-three percent of highest-SES students reported their parents encouraged them to pursue a college degree. In contrast, 69 percent of lowest-SES students were similarly encouraged. While 77 percent of highest-SES students reported encouragement from high school professionals, only 61 percent of lowest-SES students reported receiving this sort of encouragement. The SES-based encouragement gap is even more pronounced when encouragement originates from high school friends. Less than 50 percent of lowest-SES students were encouraged by their high school friends to earn a college degree, whereas over three-fourths of highest-SES students were encouraged by their friends to become a college graduate (see Table 7.6). Given the connection between encouragement and success in college, this SES-encouragement association is troublesome.

Academic Resources

Adelman (1999) demonstrated that securing high school-based academic resources substantially increases a student's chance to complete a bachelor's degree within eleven years of high school graduation. We find a moderate association between SES and the level of academic resources among 1980 high school sophomores who enrolled in higher education ($r = 0.216$). Lowest-SES students were less prepared. While 66 percent of highest-SES students were highly prepared academically for college, merely 23 percent of lowest-SES students enjoyed the same level of academic preparation (see Figure 7.11).

Figure 7.11
Academic Resources among 1980 High School Sophomores across SES



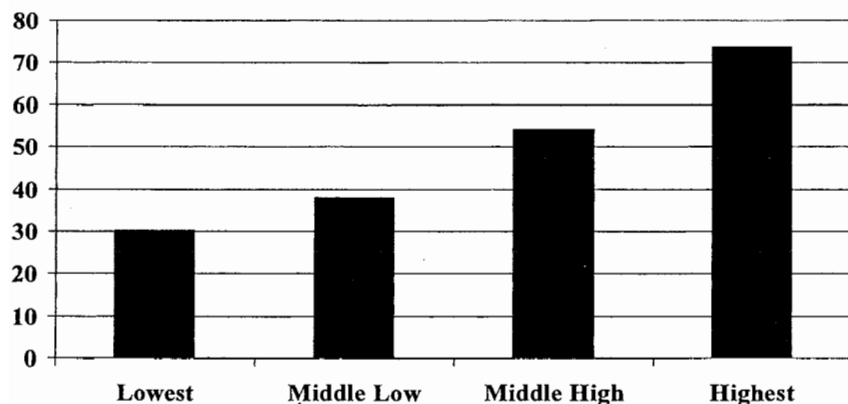
Note: Estimates are based on the 1980 High School Sophomores ($r = 0.216$).

Degree Aspirations

Aspiring for a four-year college degree as early as the eighth grade enables middle school students, high school students, and their families to ready themselves for college (Cabrera & La Nasa 2001). Students aspiring for at least a four-year degree are predisposed to take the appropriate course curriculum, complete high school, apply to college, enroll, and eventually graduate (e.g., Adelman 1999; Cabrera & La Nasa 2001). Some research indicates that SES moderates degree aspirations. While examining degree aspirations among 1988 middle school students, Terenzini, Cabrera, and Bernal (2001) found a difference of 29 percent between lowest-SES and highest-SES students' aspirations for at least a college degree.

As is the case for the 1988 middle school student cohort, we find significant SES-based differences in aspiring to a four-year degree among 1980 high school sophomores who entered postsecondary education during the 1982–83 academic year ($r = 0.335$). As the SES level increases, so does the chance to develop college degree aspirations by the senior year in high school. The SES-based gap in degree aspirations is astounding. Seventy percent of the lowest-SES students who attended postsecondary education did not aspire to a college degree while a high school senior. This pattern is reversed among highest-SES students, whereby 74 percent of them had developed college aspirations before entering postsecondary education. In other words, lowest-SES students were 44 per-

Figure 7.12
Degree Aspirations by SES for the 1980 High School Sophomores



Note: Estimates are based on the High School and Beyond: 1980 (sophomore cohort). Panel weight PSEWT1 ($r = 0.335$).

cent less likely to aspire to a four-year degree than highest-SES students (see Figure 7.12).

SES and Curricular Choice, Academic Success, and Collegiate Experiences

The degree to which a student engages with the different components of a college or university plays a key role in her cognitive and affective development (e.g., Kuh, Douglas, Lund, & Ramin-Gyurnek 1994). These positive collegiate experiences shape the extent to which a student successfully adjusts to college (e.g., Cabrera, Nora, & Castañeda 1992; Nora, Cabrera, Hagedorn, & Pascarella 1996; Pascarella & Terenzini 1991). Research has singled out several defining elements, including classroom experiences, interactions with faculty, interactions with peers, working on campus, involvement with college curriculum, and maintaining adequate academic performance (Pascarella & Terenzini 1991). The effort a student spends on academically related issues, such as maintaining adequate academic performance, seeking out and engaging faculty inside and outside the classroom, and curricular choices, is an important determinant of educational outcomes (Astin 1993; Cabrera, Colbeck, & Terenzini 2001; Kuh, Douglas, Lund, & Ramin-Gyurnek 1994). These important

Table 7.7
Differences in Collegiate Experiences and Curriculum Patterns across SES (Means and Proportions Comparison)

Variable	Socioeconomic status (in quartiles)				F/ χ^2	r
	Lowest	Middle low	Middle high	Highest		
GPA	2.33	2.51	2.49	2.65	11,143.99**	0.112
Out-of-classroom experiences	3.61	3.64	3.65	3.83	9,114.92**	0.108
Quality of instruction	4.05	4.11	4.04	4.09	961.74**	0.007
Counseling	3.36	3.44	3.31	3.43	1,472.62**	0.011
Campus facilities	3.97	3.97	9.97	4.06	1,155.36**	0.035
Institutional prestige	3.81	3.81	3.81	3.94	2,451.29**	0.051
Worked on campus	27.5%	32.9%	42.9%	40.7%	33,522.06**	0.119
Enroll in at least 1 math course	23.7%	33.6%	41.5%	59.3%	164,528.54**	0.264
Enroll in at least 1 science course	24.4%	33.9%	41.1%	56.7%	134,332.16**	0.239

** $p < 0.001$.

outcomes include critical thinking, gains in competencies, clarity in vocational aspirations, and persistence.

Associated with these purely academic related activities, on-campus work positively impacts persistence and degree completion (Hossler 1984; Olivas 1985; Stampen & Cabrera 1986, 1988). Students who work on campus are more likely to interact with faculty and peers, develop transferable work skills, and become more integrated into the academic and social components of the institution. How the above factors play a role in degree completion is largely unknown. However, given the connection between persistence and collegiate experience on the one hand, and persistence and degree completion on the other, the connection between these collegiate experiences and degree completion is plausible.

The degree of association between SES and collegiate experiences ranges from 0.007 to 0.239, signifying a relationship ranging from non-existent to moderately low (see Table 7.7). The degree of association between GPA and SES is significant, but rather small ($r = 0.112$). As a whole, lowest-SES students had a GPA one quarter lower than that exhibited by highest-SES students. Of the non-academically related collegiate experiences, whether the student had an on-campus work position

was found to be somewhat significant ($r = 0.119$). SES-based differences are noted here as well, with lowest-SES students being 13 percent less likely to work on campus than highest-SES students. SES-based differences with out-of-classroom experiences, quality of instruction, counseling, and institutional prestige, though significant in absolute value, are almost nonexistent. What defines the nature of collegiate experiences between lowest-SES students and their better-off counterparts the most is the intensity of curriculum in math and sciences. The gap in the likelihood of taking at least one math and science course between lowest-SES and highest-SES is striking; on average, a lowest-SES student is 36 percent less likely to take college math courses and 32 percent less likely to take college science courses than his or her highest-SES counterpart.

College Path

Popular belief holds that most students follow the same, straightforward path through college. Dubbed the "persistence track" by Carroll (1989), this path assumes entrance into a four-year institution the fall following high school graduation, enrolling full-time for four years, and then graduating with a four-year degree. Mounting research challenges this belief. Examining the college paths among members of the high school class of 1980, Carroll (1989) reported that one out of five students delayed entry into postsecondary education, entered less than four-year institutions, and enrolled part-time. Using the same cohort of students, Hearn (1992) identified thirteen college path patterns based on the combinations of three factors: delayed entrance, part-time versus full-time enrollment, and first type of institution attended. Furthermore, Hearn reported that the choice of one of these paths was highly conditioned by a student's socioeconomic background, degree aspirations, and academic preparation for college. In general, nontraditional college paths were chosen most by socioeconomically disadvantaged students with low degree aspirations who were poorly prepared for collegiate work.

Adelman's (1999) analysis of the college path patterns followed by the high school sophomore cohort of 1980 further demonstrates that students' trek through higher education is quite complex for a rather large number of students. Having examined college transcripts, Adelman found most college students do not graduate within four years. Moreover, a considerable proportion of high school students delay college entrance. Taking into account only those students who earned a minimum of ten college credits, Adelman reported that 19 percent of all high school graduates do

not enroll in college immediately following high school graduation. Further examination by Adelman of the high school sophomore cohort of 1980 showed that only 53 percent initially enroll at a four-year institution, and only 46 percent remain solely within the four-year sector.

While a variety of college paths to degree completion exist (Adelman 1999; Carroll 1989; Hearn 1992), some paths are riskier than others. Challenging commonly held perceptions, Adelman (1999) did not find transfer per se to be a problematic college path behavior. He found many members of the high school sophomore cohort of 1980 transferred or alternated enrollment among institutions, yet still managed to secure a college degree within ten years of high school graduation. What matter, though, are part-time enrollment and the effort spent in earning college credits. Adelman demonstrated that failing to maintain continuous enrollment along with dropping, withdrawing from, and not completing college courses are the two riskiest college paths to a four-year degree.

Our examination of the college paths followed by members of the 1980 high school sophomore cohort shows lowest-SES students are, indeed, more prone to follow at-risk paths. Only 30 percent of lowest-SES students enter higher education at the four-year sector, a trend in sharp contrast to the 67 percent participation rate exhibited by highest-SES students (see Table 7.1). Slightly less than half of lowest-SES students enroll on a continuous basis, while 71 percent of highest-SES students do. Forty-one percent of lowest-SES students dropped, withdrew from, or left incomplete 10 percent or more of their college courses. This is in contrast to the 32 percent of highest-SES students who engaged in this at-risk behavior (see Table 7.8).

Financial Aid

Some researchers have examined persistence in college as the by-product of economic decisions (e.g., Manski & Wise 1983; St. John 1990; St. John, Andrieu, Oescher, & Starkey 1994; Stampen & Cabrera 1986, 1988). Under this scenario, a student persists to the extent that social and economic benefits of attending college outweigh the costs and benefits associated with alternative activities (e.g., working full time). Higher costs of attendance relative to students' perceptions of their ability to pay could influence their decision to drop out, particularly if the costs of attending college far exceed future benefits (Becker 1964). Reduced tuition, direct grants, low-interest loans, and subsidized work-study programs all seek to equalize (if not increase) the benefits of attending

Table 7.8
College Paths of the 1980 High School Sophomore Cohort across SES

Variable	Lowest	Medium low	Medium high	Highest	χ^2	r
Continuous enrollment	48.4%	58.7%	59.5%	71.3%	44,989.59**	0.147
Percentage of courses dropped, withdrawn from, or left incomplete						
Less than 10%	58.9%	64.3%	62.0%	68.3%		
10%–20%	14.7%	15.8%	14.8%	15.0%	17,288.64**	
More than 20%	26.4%	19.9%	23.2%	16.7%		–0.066

college relative to its costs (H. Bowen 1977; Cabrera, Stampen, & Hansen 1990; St. John 1994).

Research into the effect financial aid plays on degree completion is contradictory. Nora (1990), Voorhees (1987), and St. John (1990) found all forms of federal support equally effective in preventing students from dropping out. However, Stampen and Cabrera (1986, 1988) found persistence rates were highest when student aid packages included work-study programs. More recently, Adelman (1999) reported grants-in-aid and loans had a small but positive contribution to the probability of securing a college degree. On the other hand, Astin (1975) found grants and work-study programs had positive effects on persistence, while loans had negative effects when directed to low-income students. St. John's (1991) comprehensive review of twenty-five years of research on the effect of financial aid led him to conclude reception of financial aid has a positive effect on persistence to graduation regardless of the type of financial aid. St. John also noted inconsistencies could be attributed to methodological problems in terms of analytical models followed, the use of institutional databases versus national databases, and levels of controls.

We find SES differences in terms of financial aid received. Slightly more than half of lowest-SES students received grants-in-aid, whereas 36 percent of highest-SES students received this kind of aid (see Table 7.9). This finding is consistent with Stampen and Cabrera's (1988) study of the way in which student aid was targeted in the early 1980s. SES-based differences in the reception of loans are also noted ($r = 0.059$); however, these differences are rather small, and a clear trend is not seen. While

Table 7.9
Financial Aid Factors for the 1980 High School Sophomore Cohort across SES

Variable	Lowest	Medium low	Medium high	Highest	χ^2	r
Satisfied with cost of attending	60.0%	63.7%	59.1%	57.0%	4,475.84**	0.023
Received grants between 1982 and 1986	53.5%	44.6%	41.3%	36.2%	34,095.21**	–0.118
Received loans between 1982 and 1986	38.9%	36.5%	40.7%	33.6%	8,343.610**	0.059

** $p < 0.001$.

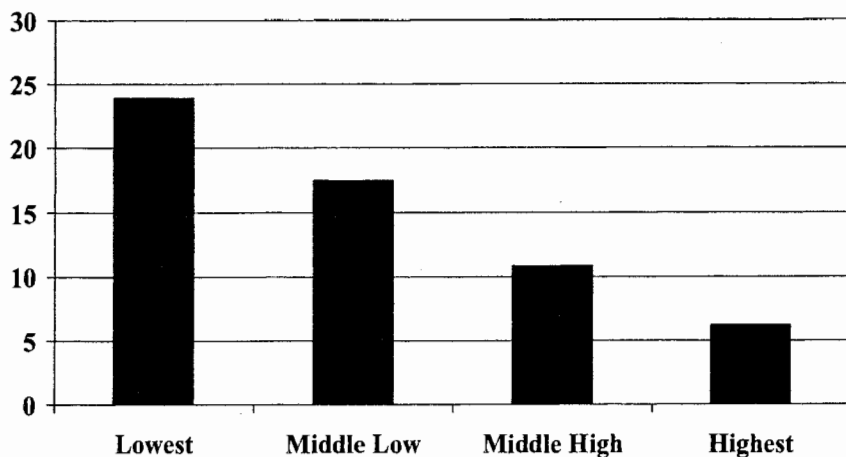
lowest-SES students are as likely to rely on loans as are students from the middle two SES groups, highest-SES students receive loans to a lesser degree. Regarding satisfaction with cost of attending, the same mixed effect is seen: differences among SES groups are rather small, and no clear trend unfolds.

Parental Responsibilities

Having children while attending college has been identified as another risk factor for persisting in college to degree completion. Nora, Cabrera, Hagedorn, and Pascarella (1996) reported family responsibilities had the effect of competing with the academic and social components of the institution, thereby lessening a student's engagement in the college experience, intellectual development, and subsequent persistence. Adelman (1999) adds that having children while attending college lessens one's chances of completing a college degree within ten years upon high school graduation.

For our student population, we find lowest-SES students are, indeed, more prone to having children prior to receiving a college degree. Twenty-four percent of lowest-SES students reported having at least one child by age 23 (see Figure 7.13). This number is 18 percent, 11 percent, and 5 percent greater than the ones reported by highest-SES, middle high-SES, and middle low-SES students, respectively.

Figure 7.13
Percentage of 1980 High School Sophomore Cohort Enrolled in College Who Had Parental Responsibilities by 1986 (by SES)



Note: Estimates are based on the High School and Beyond: 1980 (sophomore cohort). Panel weight PSEWT1 ($r = 0.191$).

WHAT REALLY FACILITATES DEGREE COMPLETION?

Socioeconomic Status

By 1993, 35 percent of the 1980 high school sophomore cohort earned a college degree. Among lowest-SES students, merely 13 percent managed to do so. In contrast, 57 percent of highest-SES students completed their college degree. Descriptive statistics underscore other significant differences between lowest-SES and highest-SES students in factors known or presumed to be critical in securing a four-year college degree. Once the effect of these degree-related factors is taken into account in a simultaneous manner, the 44 percent degree completion gap between highest- and lowest-SES students is reduced to 24 percent (see Table 7.10¹⁰ and Figure 7.14).

Encouragement

Encouragement matters in a student's chances of getting a college degree. Irrespective of SES, students who received encouragement from parents and friends to pursue a college degree while in high school were

Table 7.10
Changes in the Probability of Degree Completion due to Background, Encouragement, Academic Resources, Performance in College, Remediation, Collegiate Experiences, Financial Aid, and Family Responsibilities

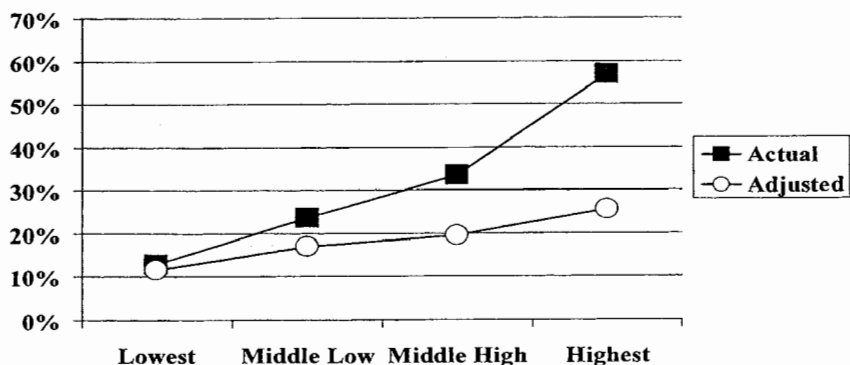
Factor	All	Socioeconomic status			
		Lowest	Middle low	Middle high	Highest
SES					
Middle low	0.106*				
Middle high	0.149*				
Highest	0.235*				
Female	-0.044*	-0.076**	-0.052**	-0.043**	-0.022*
Ethnicity					
African American	—	—	-0.065*	-0.068*	0.112**
Hispanic	-0.038*	-0.055*	—	-0.088*	—
Asian American	0.192**	0.369**	—	0.105*	0.209**
High school encouragement					
From parents	0.041*	—	—	0.092*	—
From high school professionals	—	—	—	—	0.076*
From friends	0.052*	—	0.140*	0.152*	—
Academic resources					
Moderately prepared	0.044*	0.191*	—	0.081*	0.075*
Highly prepared	0.120*	0.319*	—	0.274*	0.087*
Collegiate aspirations	0.229*	0.223*	0.425*	0.155*	0.255*
Type of first institution attended					
2-year institution	0.183*	0.461*	0.390*	—	0.253*
4-year institution	0.459*	0.686*	0.496*	0.311*	0.391*
Continuous enrollment	0.230*	0.267*	0.377*	0.158*	0.224*
DWI index					
10–20% of courses	-0.132*	—	-0.086*	-0.172*	-0.208*
At least 20% of courses	-0.267*	-0.124*	-0.156*	-0.270*	-0.364*
Number of math courses					
One course	0.274*	0.031*	0.422*	0.339*	0.193*
Two courses	0.292*	0.340*	0.296*	0.221*	0.296*
Three or more courses	0.419*	0.567*	0.622*	0.497*	0.268*
Number of science courses					
One course	0.206*	0.245*	0.219*	0.196*	0.085*
Two courses	0.208*	0.262*	0.249*	0.192*	0.151*
Three or more courses	0.287*	0.420*	0.355*	0.355*	0.148*
Collegiate experiences					
Out-of-classroom	0.083*	—	0.157*	0.114*	0.037*
Quality of instruction	0.076*	0.148*	—	0.148*	0.027*
Counseling	0.009*	0.055*	—	0.022*	0.021*
Campus facilities	—	—	0.040*	—	—
Institutional prestige	0.012*	0.057*	0.023*	—	0.018*

Table 7.10 (continued)

Factor	All	Socioeconomic status			
		Lowest	Middle low	Middle high	Highest
Satisfaction with costs	—	0.071*	—	—	—
Financial aid					
Loans	0.104*	0.112*	0.296*	0.036*	0.051*
Grants/scholarships	0.070*	0.077*	0.099*	0.080*	0.085*
Worked on campus	0.037	0.019*	0.023*	0.092*	0.009*
College GPA	0.320*	0.279*	0.493*	0.190*	0.328*
Having children	-0.221*	-0.126*	—	-0.229*	-0.458*

Note: Only marginal probabilities associated with significant betas are reported.

Figure 7.14
Adjusted Probabilities of Degree Completion by 1993 for the 1980 High School Sophomore Cohort (by SES)



Note: Estimates are based on the High School and Beyond: 1980 (sophomore cohort). Panel weight PSEWT1 ($r = 0.335$).

more likely to complete this goal. Compared with students whose parents did not encourage them to pursue a college degree, those who received parental encouragement increased their chance of degree completion by 4 percent. The impact of high school peer encouragement is similar, increasing degree completion chances by 5 percent (see Table 7.10).

Academic Resources

Consistent with Adelman (1999), we find academic resources to have a substantial effect on degree completion across all SES groups. Compared to students poorly prepared academically, moderately and highly prepared students were 4 percent and 12 percent more likely to complete a college degree within ten years of graduating from high school, respectively (see Table 7.10). The effect of academic preparation among lowest-SES students is even more pronounced. Being moderately prepared or highly prepared for college increased their chances to secure a degree by 19 percent and 31 percent for this SES group, respectively (see Table 7.10).

College Aspirations

Aspiring for a college degree is a good predictor of eventual college degree completion. Across all SES quartiles, students with college degree aspirations while still in high school were 23 percent more likely to do so, as compared with students without such aspirations. SES moderates the effect of collegiate aspirations. While all students benefit from this factor, middle low-SES students benefit the most. Lowest-SES students holding degree aspirations while in high school increase their chances of completing a degree by 22 percent. Middle low-SES, middle high-SES, and highest-SES students increase their degree completion chances by 43 percent, 16 percent, and 26 percent, respectively (see Table 7.10).

Curricular Choice, Academic Success, and Collegiate Experiences

While most collegiate experiences increase the rate of degree completion across all students, academic performance in college (GPA) is the most significant factor. Across all students, every increasing grade change in GPA improves the chances to complete a college degree by 32 percent. SES also moderates the effect of GPA. For example, among lowest-SES students, changes in GPA increase degree completion rates by 28 percent, while among middle low-SES students the size of the effect is 49 percent (see Table 7.10).

Curricular choices are crucial too. Students who take only one college math course increase their degree completion chances by 27 percent. Those who take only one college science course increase their degree

completion chances by 21 percent. Students who take three college math courses increase degree completion rates by 42 percent. Additionally, the impact of taking college math and science courses among lowest-SES students is striking. For this group, taking one, two, or three or more college science courses increases their chances of degree completion by 25 percent, 26 percent, and 42 percent, respectively. Lowest-SES students taking one, two, or three or more college math courses increase their chances of degree completion by 3 percent, 34 percent, and 57 percent, respectively (see Table 7.10).

Out-of-classroom experiences, quality of instruction, counseling, institutional prestige, and working on campus have small but significant effects on degree completion. For all students, positive out-of-classroom activities increase degree completion chances by 8 percent, while exposure to good classroom instruction does so by 8 percent. The quality of instruction is particularly relevant for lowest-SES students, whose probability to persist to graduation increases by 15 percent when taught effectively. Working on campus also helps. Every additional year of on-campus work increases a student's chances of completing a degree by 2 percent (see Table 7.10).

College Path

The first type of postsecondary institution attended, continuous enrollment in college, and maintaining enrollment in college courses are also important factors in degree completion. For all students, those who first enroll in a two-year institution are 18 percent more likely to earn a college degree than those who enroll at a proprietary school. Those who enroll in a four-year institution are 46 percent more likely to earn a college degree. The effect of the first type of institution attended is particularly strong for lowest-SES students. For this group, enrollment at a two-year institution helps, but starting at a four-year institution helps even more. Lowest-SES students who started in a 2-year institution increase their chances by 46 percent. Lowest-SES students who first enroll in a four-year institution saw their chances to complete their four-year degree increase by 69 percent. Students who do not maintain continuous college enrollment are 23 percent less likely to earn a bachelor's degree. Those who drop, withdraw from, or fail to complete between 10 percent and 20 percent of their coursework are 13 percent less likely to secure a baccalaureate degree. Dropping, withdrawing from, or failing to complete more than 20 percent of the course work reduces a student's chances to complete a degree by 27 percent (see Table 7.10).

Financial Aid

For all students, receiving grants-in-aid and loans increases chances of completing a four-year degree. Recipients of grants-in-aid are 7 percent more likely to earn a degree, while loan recipients are 10 percent more likely. SES also moderates the impact of financial aid, particularly for loan recipients. Lowest-SES and middle low-SES students receiving loans increase their degree completion chances by 11 percent and 30 percent, respectively (see Table 7.10).

Parental Responsibilities

Incurring parental responsibilities while pursuing a college degree hampers one's chances of degree completion by 22 percent. This negative effect is felt most by highest-SES students for whom having children by age 23 decreases their degree completion chances by 46 percent (see Table 7.10).

DISCUSSION

Pathways to a Four-Year Degree

A high school graduate faces nine pathways to a college degree. These pathways result from several degrees of academic preparation for college and the type of postsecondary institution first attended. Not all these paths are equally effective in leading to a four-year degree. When students follow the pathway of having high academic resources and choosing a four-year institution as their port of entry, their chances of eventually securing a four-year degree within a decade are considerable (78 percent). No other pathway is nearly as effective. When a student enters postsecondary education at the four-year sector and is only moderately academically prepared, his or her chances of earning a four-year degree are only 35 percent. Even more difficult is the pathway for those students with poor academic preparation who enter at a two-year institution. Their chance of earning a degree is only 10 percent.

Not all pathways are equally accessible to all students. Those traveling on the most successful pathways are most often highest-SES students. Almost 60 percent of all highest-SES sophomores have secured the highest level of academic resources before college enrollment. Of those, 76 percent enroll in a four-year institution. Overall, 45 percent of highest-SES 1980 high school sophomores followed the pathway defined by hav-

ing high academic resources and enrolling at a four-year institution. For them, the chances of degree completion are almost certain (81 percent). Lowest-SES sophomores follow pathways opposite to those traveled by Highest-SES sophomores. They are 35 percent less likely to be highly academically prepared for college. Of those with high academic resources, less than half enter a four-year institution, and only 59 percent of these students earn a four-year degree. In other words, compared to equally prepared highest-SES students who followed the same path, the chances of lowest-SES sophomores to complete a degree are 22 percent less. However, lowest-SES high school sophomores are most likely to follow the pathway defined by medium academic resources and entrance at a two-year institution, a pathway where the chance of securing a four-year degree is only 3 percent.

Determinants of Transfer

In following members of the high school sophomore cohort of 1980, we found that two out of five seniors selected a community college as their port of entry into higher education, regardless of SES. However, almost 50 percent of the lowest-SES students from this group attended a community college first, and only 17 percent of these students transferred to a four-year institution. The 20 percent transfer rate difference between lowest-SES and highest-SES students is reduced to just 7 percent once factors other than SES are considered simultaneously. What closes this SES-transfer gap is adequate preparation for college; degree aspirations; taking college math, science, and remedial reading courses; collegiate experiences; encouragement from peers; financial aid; and avoiding having children prior to transfer.

It has been argued the community college can be an obstacle in eventually securing a four-year degree because few community college students transfer (Karabel 1972, 1986). Underlying this argument is the assumption that community college students enroll while aspiring to a four-year degree. Our findings suggest enrollment at a community college per se plays little role in determining whether the student would eventually secure a four-year degree. First, only 42 percent of all community college students actually enter aspiring to a four-year degree. Second, net of other factors, community college students are 18 percent more likely to secure a four-year degree than are proprietary students (see Table 7.10).

Pre-college factors and collegiate experiences define a student's chances to transfer. Regardless of a student's socioeconomic background, securing appropriate academic resources in high school, coupled with degree aspirations, provides a foundation upon which transfer is facilitated.

The adjusted probability of transferring among highly prepared college degree seekers is 40 percent. What is striking is comparing this group of students to their exact opposites: those who are not academically prepared to perform college-level work and do not desire a bachelor's degree. Transfer rates for this group are only twelve percent. In short, for those individuals who planned and readied themselves for collegiate work as early as middle school, the community college can play a positive role in facilitating transfer.

Curricular choices at the community college are the second factor facilitating transfer. Students who take only one college-level math course increase their chances of transferring by 23 percent. Taking only one college-level science course increases transfer chances by 13 percent. When the pre-college factors of degree aspirations and high academic preparation are combined with taking one math and one science course in the community college, the adjusted probability of transferring is 60 percent. Thus, a college curriculum that includes math and science, combined with adequate academic preparation and a desire to attain a four-year degree, plays a pivotal role in facilitating transfer.

Merisotis and Phipps (2000) and Adelman (1999) have differing views of the role of remediation as a facilitator of transfer. Our findings support Adelman's contention when all students are considered in regard to remediation in reading. While remedial reading education was found not to play a significant role in facilitating transfer among all students, remediation in math is somewhat helpful for all students, increasing chances to transfer by four percent for each math remediation course completed. Our findings also support Merisotis and Phipps' contention as far as lowest-SES students are concerned. Indeed, lowest-SES students who take remedial reading see their chances to transfer increase by 24 percent.

Financial aid policies aimed at facilitating access to higher education seem to play a small but significant role in transferring. In this respect, our results are consistent with Adelman's (1999). Of all types of financial aid, loans are most beneficial. All students who received educational loans while enrolled at the community college were 11 percent more likely to transfer. The effect of this type of financial aid on lowest-SES students is even greater: receiving aid in the form of loans increases their chances to transfer by 22 percent.

Determinants of Degree Completion

By 1993, three out of ten members of the 1980 high school sophomore cohort graduated from college with a baccalaureate degree. Out of 100

lowest-SES students, merely thirteen graduated with a four-year degree by 1993. In the same period of time, fifty-seven out of 100 highest-SES students graduated. The 44 percent SES-based gap between lowest- and highest-SES students decreased to 24 percent once demographics, collegiate aspirations, academic resources, collegiate experiences, college path, college curriculum, and financial aid factors are taken into account along with SES. However, factors other than SES help equalize chances to earn a bachelor's degree between lowest-SES students and their better-off counterparts. As in transfer, these mitigating factors produce significant effects for degree completion, regardless of SES.

Pre-college factors, college path factors, and collegiate-related factors play significant roles in facilitating degree completion. Of pre-college factors, high school-based academic resources and degree aspirations are the defining ones. The net added probability of earning a college degree by securing high school-based academic resources and aspiring for at least a bachelor's degree is 31 percent, irrespective of socioeconomic background.

Consistent with the literature (Adelman 1999; Carroll 1989; Hearn 1991, 1992), paths followed in postsecondary education greatly affect a 1980 high school sophomore's chances of getting a four-year degree. Opting for a four-year institution as the port of entry to postsecondary education yields a net benefit of 46 percent in one's chances of completing a degree, regardless of socioeconomic background. Among lowest-SES students, the effect of attending a four-year institution is more pronounced, yielding a 69 percent increase in the likelihood of graduating with a bachelor's degree within a decade (see Table 7.10).

Of the collegiate experience factors, continuous enrollment, academic performance, and a curricular emphasis on math and science are the most important determinants of degree completion. The effort a student spends in maintaining continuous enrollment in both postsecondary institutions and in his or her program courses enhances chances to graduate by 23 percent and 27 percent, respectively (see Table 7.10). For example, if a student maintains continuous enrollment and does not drop, withdraw from, or leave incomplete more than 10 percent of his or her courses, chances of degree completion increase 35 percent.

For every unit increase in GPA, a student's chances to secure a degree increase by 32 percent. Taking one, two, or three or more college math courses increases this probability by 27 percent, 29 percent, and 42 percent, respectively. For science courses, the corresponding effects are 21 percent, 21 percent, and 29 percent for one, two, or three or more courses, respectively (see Table 7.10). The joint effect of academic per-

formance and curricular choices is particularly noteworthy. For example, a student who was academically prepared, aspired for college, maintained a C average, and took one math and science course has a net increase in the probability of degree completion of 36 percent. If that same student had maintained a B average, his or her chances of securing a degree increase to 68 percent. This is in stark contrast to a student who did not take any math or science courses while still maintaining a B average. His or her degree completion chances drop to only 23 percent. C average students with no math or science courses have only a 7 percent chance of graduating with a degree.

We also find financial aid policies enhanced 1980 high school sophomores' chances of securing a bachelor's degree by 1993. Net of SES, receiving loans increases the chances to complete a bachelor's degree by 10 percent, while grants had a net added benefit of 7 percent. Interestingly, the effect of loans is particularly strong among middle low-SES sophomores. For this group, receiving loans increased the probability of completing a degree by 30 percent (see Table 7.10).

Positive experiences with the academic and social domains of the postsecondary institutions contributed to the students' chances of earning a four-year degree. Students satisfied with their out-of-classroom experiences are 8 percent more likely to persist to graduation. Students satisfied with the quality of instruction feel the same level of benefit. Every year of working on campus yields a net benefit on this probability by 4 percent (see Table 7.10).

Limitations

Readers should bear in mind the following when forming their own conclusions about the validity and usefulness of our findings.

Our conclusions are based on just one generation of students, those who were high school sophomores in 1980. During the last twenty years, school reform initiatives, changes in the composition of financial aid, and substantial technological and economic transformations have produced new generations for which the determinants of transfer and degree completion may be qualitatively different. We can tell the story of one single cohort; we cannot presume that all their experiences are applicable to subsequent cohorts.

Our study does not take into account some factors that affect the adjustment of the student with the institution, including the frequency and quality of the interactions with faculty and peers, exposure to different teaching practices, out-of-classroom experiences, and the nature of the

curriculum (Astin 1993; Chickering & Reisser 1993; Hurtado, Milem, Clayton-Pedersen, & Allen 1999; Kuh, Douglas, Lund, & Ramin-Gyurnek 1994; Pascarella & Terenzini 1991; Tinto 1993, 1997). The lack of measures on these factors may lead to an underestimation of the effect of collegiate experiences on transfer and degree completion.

During the last twenty years, a number of valid measures of collegiate experiences have emerged. These measures capture academic and intellectual development, commitments to the institution, engagement with different elements of the campus life, student effort, campus and classroom climates, and classroom experiences (Pace 1980; Kuh 2000; Pascarella & Terenzini 1980; Cabrera & Nora 1994; Nora & Cabrera 1993; Kuh, Pace, & Vesper 1997; Cabrera, Colbeck, & Terenzini 2001). Though most of those measures were not available at the time the database was designed, future designers of national databases may want to consider their incorporation.

Strengths

The strengths of this study derive primarily from its theoretical framework and research design.

All factors included in examining determinants of transfer from the two-year sector to the four-year sector were selected after a careful review of the literature (see references). This literature review led us to conclude that studies seeking to bring a comprehensive perspective in examining decisions to transfer ought to consider the following factors: (a) demographic characteristics of the high school student, (b) encouragement and support provided in high school, (c) a high school student's early degree aspirations, (d) acquisition of high school-based academic resources, (e) performance in college, (f) collegiate experiences, (g) remediation courses taken, (h) satisfaction with cost of attendance and type of financial aid received, and (i) acquiring family responsibilities before completing a college degree.

Our study uses degree completion as the measure of collegiate success. As shown by Adelman (1999), persistence to degree completion is a more valid and reliable measure of a student's success in college than are year-to-year persistence rates. The economic benefit a student receives due to his or her collegiate experience is predicated on his or her completing a degree, not on persisting from the first to second year of college.

Our use of a national database allowed us to track students from their sophomore year in high school to ten years post-high school graduation.

The HS&B/So database contains a sufficiently large number of student cases allowing for generalization of results on a national level.

Our measures of academic resources, enrollment patterns, curricular choices, financial aid, and academic performance are based on verifiable student records, such as high school and college transcripts and financial aid records (Adelman 1999). This feature increases the internal validity of our study while also ensuring the reliability of the relationships observed between these performance measures and transfer and degree completion.

Our conclusions regarding the nexus between SES and transfer and degree completion rest on sophisticated statistical analyses, rather than on simple descriptive statistics. Descriptive statistics tend to overestimate the connection between variables and fail to take into account the simultaneous effects of those factors also known to affect transfer and degree completion.

Data regarding satisfaction and student engagement with postsecondary education institutions were secured while the student was enrolled. We included statistical controls to make certain this was the case.

Conclusions and Implications

This chapter underscores the importance of understanding the complex interaction of those factors shaping transfer and degree completion decisions as a precondition to developing intervention strategies. It also draws attention to the value of advanced statistical methods that single out the net effects of each of these factors. Though commonly used to inform policymaking, descriptive statistics may blind policymakers as to the importance of socioeconomic status as the sole determinant of transfer and degree completion. The real danger of using descriptive statistics as the basis of policy analysis is that the choice of variables automatically defines the problem and the solution.

Our study suggests that factors other than socioeconomic status play a larger role in successfully navigating the pathway to a college degree. As with countless generations, the path to a four-year degree for members of the 1980 high school sophomore cohort began as early as the eighth grade (Cabrera & La Nasa 2001; Wallace, Abel, & Ropers-Huilman 2000). At this time, aspirations for college triggered the need to secure the academic preparation necessary to succeed in college. Those who met this task had ample choices in their quest for a college degree, regardless of

their socioeconomic status. In view of the fact that preparation for college and degree aspirations are so intertwined (Cabrera & La Nasa 2001), it stands to reason that strategies addressing these two critical factors simultaneously are more likely to enable students and their families to navigate the right path to a college degree. Programs such as TRIO and GEAR UP, which recognize that academic readiness and degree aspirations are the by-product of the connections between a student's family with peers, the K-16 school system, and the larger community, seem most appropriate (Cabrera & La Nasa 2001; Gladieux & Swail 2000).

Curriculum is at the heart of academic preparation for college (Adelman 1999). Academic preparation for college should begin as early as the eighth grade. Our results suggest curriculum should be articulated to foster the development of critical competencies, values, and skills known to prepare the student to successfully undertake collegiate work. The competencies acquired through math and science courses made a difference for members of the 1980 high school sophomore cohort by fostering their chances to transfer and earn a college degree. Current emphasis on the use of testing to hold elementary and secondary institutions accountable will be successful only if the tests themselves are valid measures of collegiate academic resources (National Research Council 1999). Without this orientation, the testing regime will produce countless children able to answer test questions, but unable to perform successfully in college. While the important nexus between high school and college is based on a single cohort who began their path to a four-year degree more than two decades ago, their story is remarkably similar to the one recently told by the most comprehensive study on the condition of K-12 across six states: socioeconomically disadvantaged middle and high school students aspire to college at rates similar to those exhibited by their better-off counterparts, but lacking adequate preparation for college denies them this dream (Venezia, Kirst, & Antonio 2003).

Accountability of public higher education, particularly for community colleges, needs revising on two fronts. First, policies aimed at holding community colleges accountable for low transfer rates need to be reconsidered. The community college as a potential funnel to a four-year degree is facilitated to the extent to which the student is academically prepared and aspires for at least a baccalaureate degree. Only 47 percent of the 1980 high school sophomore cohort who entered community college aspired to a college degree, and only 38 percent were highly academically prepared. It seems disingenuous to hold community colleges accountable for low transfer rates for those students who are not aca-

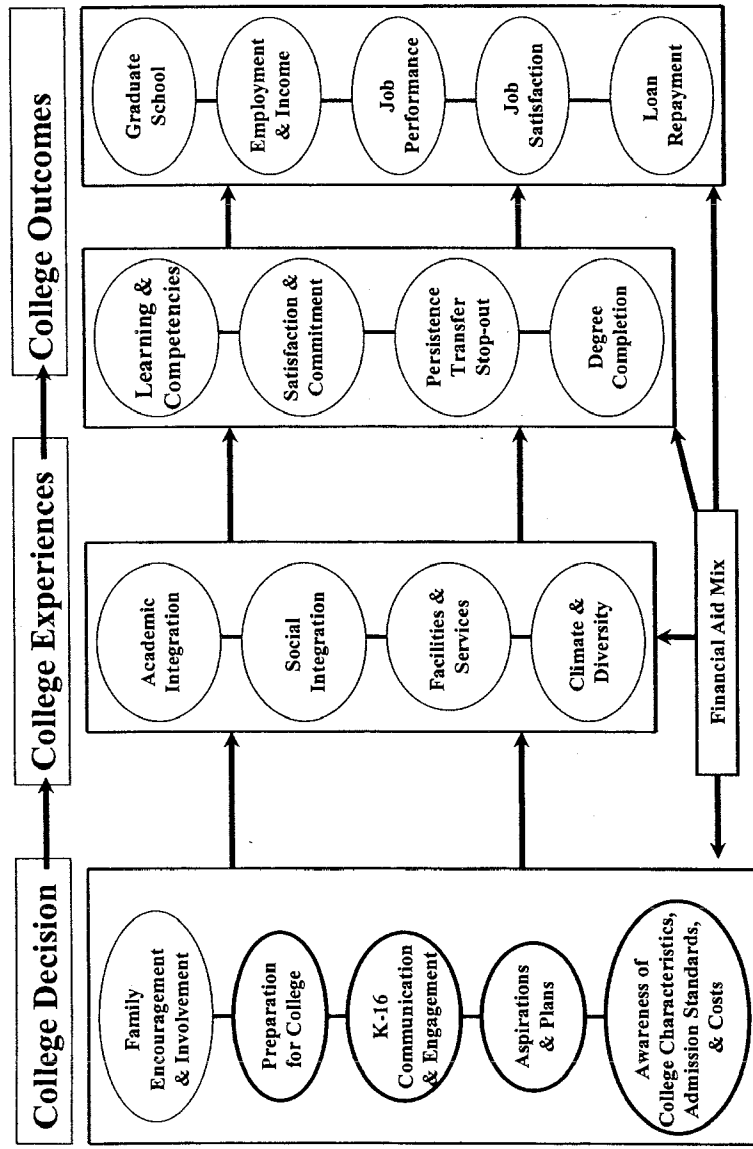
demically prepared for college-level coursework, do not want to transfer, and do not want a bachelor's degree. Second, holding community colleges responsible for creating academic resources, which evolve throughout middle and high school, is misplacing a responsibility that lies at the middle and high school levels.

Policies that stress year-to-year persistence within one institution should be revised to emphasize persistence to degree completion across the entire higher education system. We join Adelman (1999) in this recommendation. After all, the benefits of a college degree are universal, regardless of where the degree was ultimately obtained (Pascarella & Terenzini 1991). This change in policy would also recognize the increasingly transient nature of today's college student population. As Adelman (1999) noted, only 43 percent of all college students remained at the first institution attended; however, 63 percent of the same students persisted to degree completion in the entire higher education system.

The use of the year-to-year persistence rate as a criterion of success leads institutions to enact intervention strategies with short-term gains which miss the real causes of disengagement with the postsecondary system. Simply counting all students who failed to return to a specific institution for their second year as dropouts ignores the multidimensional nature of college withdrawal behavior (Tinto 1987, 1993). Mallette and Cabrera (1991) estimate that about two-thirds of all students counted as dropouts actually transferred to another institution. Counting nonreturnees as dropouts also ignores the fact that factors influencing withdrawal, transfer, and stopout decisions are different (Mallette & Cabrera 1991). Emphasis on first-year persistence has another drawback: it detracts attention from the realization that degree completion is the result of a longitudinal process. For many students, the roots of the first-year dropout rate go back as far as the eighth grade (Adelman 1999; Cabrera & La Nasa 2001).

Enrollment management should begin in grade school and be patterned after the complex process students undergo for readying themselves for college, a process whose main stages are college choice, collegiate experiences, and college outcomes (see Figure 7.15). In this longitudinal view to persistence, interventions can be designed with at least three groups in mind: students, their families, and K-12 school personnel. Community colleges and four-year institutions can help educate students and their parents about the benefits associated with college degree completion. They can advise students and parents about K-12 curricular choices that position a student to be academically prepared for

Figure 7.15
Degree Completion as a Longitudinal Process



college. College personnel can best provide information about the college application process, including financial aid. Colleges and universities are also best equipped to tell parents and children what college is all about. Summer camps, summer bridge programs, and targeted visits are some strategies already in place for eleventh and twelfth graders. Making these opportunities available as early as the eighth grade is one mechanism to bring early awareness for college, particularly among lowest-SES students and their families.

Intervention strategies aimed at K-12 can touch several key domains. To begin, colleges and universities can work with elementary and secondary schools in aligning curriculum with competencies, experiences, values, and skills deemed essential for future collegial work. Universities can also assist impoverished school districts with faculty and resources to teach higher level math as well as foundations in sciences (Adelman 1999). K-12 personnel can also profit from the research and technical assistance colleges and universities can provide regarding effective instructional techniques and parental support mechanisms. These and other collaborative efforts are currently facilitated by initiatives such as GEAR UP, a federal program that supports multiple partnership initiatives targeted to low-income seventh graders.

Learning and academic performance in college leads to degree completion. These outcomes are best fostered when university personnel create contexts and environments that enhance student engagement with the academic and social components of the institution (Astin 1993; Kuh, Douglas, Lund, & Ramin-Gyurnek 1994; Tinto 1987, 1993). Learning communities are one of the promising intervention strategies. They seek to maximize student engagement in academically purposeful ways by increasing academic and social involvement through collaborative learning (Gablenick, MacGregor, Matthews, & Smith 1990; Lenning & Ebbers 1999; Tinto 1987, 1993; Zhao & Kuh 2004). Our study shows that taking college-level math and science courses significantly influences degree completion. What better way to foster a student's involvement with math and science than incorporating these two disciplines as part of the block scheduling underlying the use of learning communities?

Providing grants and loans on a need basis eases the pursuit of a four-year degree. Because involvement in academic and social areas matters, institutions should develop finance mechanisms to help pay for college which also increase opportunities for student involvement (St. John, Cabrera, Nora, & Asker 2000). Our results indicate that well-crafted forms of working on campus can be a viable way for students to pay for

college while simultaneously being involved in academically purposeful activities.

NOTES

1. Socioeconomic status, as defined by the National Center for Educational Statistics' data sets, includes the following measures: parental education, parental occupation, items in the home (i.e., dishwasher, books, etc.), and family income. This variable was built upon the respondent's socioeconomic status at the time he or she was a tenth grader in 1980, ranging from 1 (lowest SES) to 4 (highest SES).

2. General methods guiding the results reported in this chapter are included in footnotes. Contact the chapter authors for a full accounting of the research methods used.

3. Adelman (1999) created a composite measure of academic resources, dubbed ACRES, capturing students' abilities, high school graduation rank, and quality and intensity of high school curriculum. Adelman reported ACRES to be one of the best predictors of degree completion for members of the 1982 high school class. To facilitate comparisons, ACRES quintiles were transformed into thirds (low, medium, and high) by collapsing the two quintiles at both ends of the scale.

4. This study is based on the expanded college-choice persistence model (Blecher, Michael, & Hagedorn 2002; St. John, Cabrera, Nora, & Asker 2000; St. John, Paulsen, & Starkey 1996). The nexus model posits that college persistence is the by-product of a longitudinal process linking factors that predispose a high school student to select a college with his or her collegiate experiences and ability to pay for college. Our data analysis strategy was twofold. First, we examined the path to a four-year degree followed by members of the 1980 high school sophomore cohort. Second, we examined determinants of degree completion among four distinct SES groups.

5. The sample for this study was drawn from the National Longitudinal High School and Beyond 1980 Sophomore Cohort (HS&B/So), which tracks almost 15,000 high school sophomores over an eleven-year span (Zahs, Pedlow, Morrissey, Marnell, & Nichols 1995). The database also contains extensive college transcripts, financial aid records, and other verifiable information regarding college destinations (see Adelman 1999). The Postsecondary Education Participation Panel Weight (PSEWT1) was used to approximate the sample to the population of 1980 high school sophomores who enrolled in postsecondary education ($n = 2,155,164$).

6. The five indicators of collegiate experiences chosen were found by Cabrera (1987) to have moderate correlations with Pascarella and Terenzini's (1980) scales of academic and social integration.

7. Two logistic regression models were used to assess the effect of demographic, school-based, degree aspirations, collegiate experiences, college paths,

and family responsibilities on the probability of transferring and securing a four-year degree. Since a panel weight was employed to approximate the sample to the population of 1980 high school seniors who participated in Postsecondary Education (PSE), the average design effect of 1.5 was used for adjusting the standard deviations of the parameters in the regression models.

8. Adjusted probabilities were estimated using a logistic regression model controlling for background, high school academic resources, degree aspirations, collegiate experiences and financial aid. All independent variables were held constant at their mean value.

9. Using the formula developed by Petersen (1985), Table 7.5 reports incremental changes in the probability of transferring due to a unit change in the independent variable. Interpretation of marginal probabilities varies as a function of the metric of the independent variable under examination. In the case of GPA, a continuous variable, the marginal probability of 0.085 signifies that the probability of transferring increases by nine percentage points for every unit increase in GPA. The probability of 0.073 associated to the highest-SES group indicates that this group is seven percentage points more likely to transfer in relation to the lowest-SES group holding other factors constant.

10. Table 7.10 reports incremental changes in the probability of degree completion.

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