Studying Educational Attainment among First-Generation Students in the United States

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Abstract

Although graduating from college may be viewed as a rite of passage for better social mobility in our society, first-generation students, whose parents never graduated from college, face unique challenges to achieve educational success in our country. The purpose of the proposed study is to investigate longitudinal educational attainments of first-generation students using the national data sets. This study tracks the same cohort of students over time, and illustrates their educational endeavors through multi-levels of analyses, from attrition behavior of 8th graders to the likelihood of college graduation.

Introduction

The value of higher education is evidenced in a form of governmental and societal investment. The annual differential in earnings associated with educational attainment helps federal and state governments to increase their tax revenues as the number of college-educated individuals increases (U.S. Census Bureau, 2000a). Moreover, voting behavior is strongly influenced by one's educational level (U.S. Census Bureau, 2000b).

Although substantial benefits associated with postsecondary education exist, certain groups of individuals are less likely to attend and graduate from American institutions of higher education and enjoy these benefits. For instance, rates of educational attainment vary across racial groups of students. The National Center for Educational Statistics (hereafter, NCES) (2001) estimated that between 1999 and 2000, 71.8% of Asians who entered college completed bachelor's degree programs by the age of 24, while about 61% of Hispanics did so. Another group of students that we attempt to gain a better understanding of their educational output is "first-generation" students, which are defined as those whose parents never attended college.

Studies have concluded that first-generation students were more likely to have lower college retention rates than their counterparts (Horn, 1998; Nunez & Cuccaro-Alamin, 1998; Riehl, 1994). Furthermore, Ishitani (2003a) addressed that first-generation students were less likely to complete their four-year programs in a timely manner. The purpose of the proposed study is to longitudinally investigate educational success of first-generation students in this country using national data sets. The cohort of 8th graders in 1988 was selected as an effective sample of the study. This study first assesses attrition behavior of first-generation students during their secondary school years. Second, using a

group of students from the cohort who successfully completed a secondary education, the study addresses types of institutions that first-generation students are most likely to enroll in, and their persistence and degree completion behavior at four-year institutions. The findings of this study will augment the existing knowledge base associated with first-generation students, and illustrate their longitudinal educational success in the United States.

Factors Affecting Path to College Degree Completion

Educational Planning Beyond High School

Previous research studies have explored how students navigate to reach their educational goals in detail. Hossler, Schmit, and Vesper (1999) state that many high school students develop their future educational plans between 8th and 10th grades. During this period, many factors are identified to impact formalizing a student's educational plan. One of these factors is parent's educational background. Among the 1992 high school graduates who were surveyed by NCES, 59% of first-generation students attended postsecondary institutions by 1994, while the enrollment rate among those whose parents graduated from college was 93% (Choy, 2001). Clearly, the higher educational attainment the parents have, the more likely their children will pursue college education. Furthermore, parents with higher educational attainment are recognized as sources of college-related information. Galotti and Mark (1994) suggested that students with college-educated parents were more likely to seek information from their parents. However, parental influence is not limited to providing information related to college planning. Parental support and encouragement given to students positively affect their educational aspirations. The more often parents talk to their children about educational

opportunities beyond high school, the higher their children's educational aspirations are shaped (Conklin & Dailey, 1981; Flint, 1992).

Other compelling factors, concerning one's decision to attend college, are the costs of higher education and the role of financial aid. According to a survey conducted by Hossler, Schmit, and Vesper (1999), more than 90% of the students stated that they were knowledgeable about college costs and financial aid by their junior year. Hossler et al. (1999) also suggest that students from higher income families are more likely to select more expensive schools. Strong relationships between students' college planning and their parents' income are discussed in other studies (Conklin & Dailey, 1981; Stage & Hossler, 1989).

College Persistence

Many researchers have investigated relationships between student characteristics and college persistence. Examples of these student characteristics are gender (Stage, 1988; Stage & Hossler, 1989), race (Braxton, Duster, & Pascarella, 1988), and high school academic achievement (Pascarella & Chapman, 1983; Pascarella & Terenzini, 1980). Braxton et al. (1988) suggested that minority students were more likely to drop out of college than their counterparts.

The effect of students' educational expectations on departure behavior was also addressed in former studies (Metzner & Bean, 1987; Pascarella, 1980). Metzner and Bean (1987) discussed that higher educational goals and student departure were negatively related. Family income was significantly associated with student departure (Braxton, Brier, & Hossler, 1988; Hossler & Vesper, 1993; Pascarella & Chapman, 1983). Pascarella and Chapman (1983) found that a higher level of socioeconomic status had a

positive effect on academic and social integration, and ultimately influenced one's enrollment decision.

Parent's educational attainment was associated with student attrition (Pascarella & Chapman, 1983; Pascarella & Terenzini, 1980; Stage, 1988). Particularly, lower persistence rates among first-generation students were highlighted in previous studies (Horn, 1998; Ishitani, 2003b; Nunez & Cuccaro-Alamin, 1998; Riehl, 1994). Using institutional data, Ishitani (2003b) identified a higher risk of departure among first-generation students in their first year of college.

The impact of financial aid on college attrition has been explored in previous research studies (Hochstein & Butler, 1983; Ishitani & DesJardins, 2002; James, 1988). Different types of aid were found to affect students' dropout behavior differently. For example, Hochstein and Butler (1983) identified that loans were negatively associated with college persistence. They also highlighted that grants had a positive effect on student persistence, whether awarded alone or in conjunction with loans. Using a NCES data set, Ishitani and DesJardins (2002) discussed longitudinal effects of financial aid amounts on college student departure. They noted that various aid amounts impacted student attrition behavior differently depending on the timing of departure.

Student's background characteristics have been identified as one of the major components in existing theoretical attrition models (Pascarella, 1980; Spady, 1971; Tinto, 1975). These theoretical models also emphasize the importance of interactions between students and institutional environments, which ultimately affect one's enrollment decision. Thus, the most comprehensive research design to examine college student attrition needs to include pre-college attributes of students coupled with the quality of

their on-going interactions with institutional environments. However, this study will only investigate the effects of pre-college attributes of students on their longitudinal attrition behavior, mainly due to a lack of available time-varying items in the study data, such as academic and social integration. The lack of student-institution interaction items does not nullify the value of this study. In fact, given that pre-college attributes of students are considered as an important component in explaining student attrition in the existing attrition theories (e.g., Tinto, 1975), the outcome of the study is still believed to be influential for policy makers in implementing retention strategies based on pre-college characteristics of students. In addition, this study will provide discussion on the timing of departure, which was rarely incorporated effectively in previous retention studies.

Time-to-Degree

A myriad number of studies on college attrition have been conducted up to date, while few studies have examined time-to-degree behavior. Findings from previous research on time-to-degree behavior suggested that fewer credit hours were associated with longer time to graduate (Knight, 1994; Knight & Arnold, 2000; Noxel & Katunich, 1998; Volkwein & Lorang, 1996). In a similar vein, the amount of remedial courses students have to take greatly affects the timing of graduation. Although inclusion of variables concerning earned credit hours and remedial courses may make obvious sense in the time-to-degree analysis, it is rather difficult to encompass the effect of earned credit hours using a national data set, which includes a vast number of institutions that vary uniquely in their academic curriculum.

Another example of factors often included in the study of time-to-degree is financial aid (DesJardins, Ahlburg, & McCall, 2002; Knight, 1994; Knight & Arnold,

2000; Lam, 1999; Volkwein & Lorang, 1996). The research findings concerning financial aid from previous studies, however, are not conclusive. For example, DesJardins et al. (2002) found that campus based employment, such as work-study, promoted graduation. Alternatively, other studies (Lam, 1999; Knight & Arnold, 2000) argued that campus based employment exhibited an inverse effect on timely graduation. As for the effect of student loans, Lam's study (1999) indicated that students with loans were likely to graduate in a timely fashion, while Knight and Arnold's study suggested that students who financed their education with loans took a longer time to graduate. Discrepancies in these research findings may be due to how financial aid variables were appropriately constructed for a chosen methodology in each study. For instance, DesJardins et al. (2002) incorporated the nature of inconsistent aid amounts over time into their model and examined the period-specific effects of aid variables, while other studies specified aid variables as cumulative financial aid amounts or average amounts of different aid types.

Data and Statistical Framework

Data

NELS: 88-2000 and NELS: 88-2000 Postsecondary Education Transcript Study (hereafter, PETS: 2000) are national data sets that are sponsored by NCES, and were used to develop a sampling pool for this study. NELS: 88-2000 is a longitudinal data set that followed diverse educational characteristics of 8th graders over twelve years beginning in 1988, while PETS: 2000 includes transcript information of participants in NELS: 88-2000. Since new participants were added to NELS: 88-2000 through four follow-ups, the principal condition for selecting eligible participants from the data set for the study

sample was to identify students who begun their participation in NELS: 88-2000 as 8th graders. The number of students who met this condition was 11,316.

Although the term, "first-generation students", is generally defined as students whose parents never graduated from college, this study further divided the broadly defined group of first-generation students into two subgroups. The first subgroup of first-generation students included students with parents whose highest educational attainment was either a high school diploma or less. The second subgroup included students whose parent(s) attended colleges, but never attained a bachelor's degree. Students in the first subgroup are referred to as first-generation students in this study hereafter. This division of first-generation students was made to examine if significant differences might exists in the analyses between students whose parents only attended high school and those whose parents had some college education.

Among these 11,316 students shown in Table 1, 30.2% was first-generation students and 40.2% was first-generation students of parents with some college education. Table 1 also displays subsequent educational paths of the study sample. As one can observe in Table 1, students who dropped at each analysis were removed from the sample for the next analysis. Hence, the sample size decreased as analyses proceeded.

From the sample of 6,687 students who attended postsecondary institutions, 4,427 students who initially enrolled in public and private four-year institutions were selected for attrition and degree completion behavior analyses. Table 2 summarizes educational outcomes of these 4,427 students at the end of year 2000. In this study college attrition was defined as the first departure from institutions where students initially enrolled, and these students did not resume their enrollment at any institutions. For instance, 2,256

students who continuously enrolled in their initial institutions graduated from the same institutions by year 2000. Eight hundred forty five students (19.1%) left their initial institutions and never attended either their initial institutions or other institutions by year 2000.

The rate of graduation within six years after matriculation was 66.3% (Table 2). About 36% of the sample graduated within four years. The group of students who graduated within four years were removed from the sub-sample used for the fifth year graduation analysis, since this group of students had already graduated in their fourth year and would not have another opportunity to graduate again in their fifth year (i.e., this sub-sample for the fifth-year graduation analysis only contained students who graduated in five years and students who were still enrolled in their fifth year). As indicated in Table 2, first-generation students from both subgroups were more likely to graduate in their sixth year.

Table 3 presents descriptive statistics of the explanatory variables included in the study. Some variables are considered as time-constant variables, since their values would not generally change over time, such as gender. Although the amount of family income changes over time, the study assumes that the amount changes proportionally across different income groups. As for parent's highest educational attainment, highest educational attainment of mothers and fathers were first identified. Then, higher educational attainment between the two was selected for this variable.

Values of time-varying variables are specified to change over time. For instance, one's educational expectation may change through educational levels as his/her future educational plans become more or less concrete. About 42% of the 8th graders were

expected to finish college, while 32.5% of the 10th graders were expected to do so. NELS: 88-2000 includes students' aptitude levels in the subject areas of reading comprehension, mathematics, and science, as time-varying variables.

Two sets of additional variables were included for the college matriculation and choice analyses. The first set of variables contained questions related to parents' involvement with their children's college planning. For instance, one of the questions asked if students had often discussed educational opportunities beyond high school with their parents. Other questions in this set also asked how supportive parents were for their children's college education when students were 12th graders.

The second set of variables consisted of questions related to factors that students thought were important for making their college selection. Table 3 indicates the percentage of students that cited an item as a very important factor in choosing a college.

For the college persistence and graduation analyses, different sets of explanatory variables were incorporated to assess college success of first-generation students (Table 4). High school rank and high school academic intensity quintiles of students were included to examine the effects of secondary education. High school academic intensity was estimated by the highest observed level of curriculum across each major component, such as math, reading, and science. The type of institution, as well as the institution's admission selectivity, was included in the study. NELS: 88-2000 only specified first-year financial aid (loan, grant, and work-study) status of the students. Thus, longitudinal effects of aid on attrition and time-to-degree behavior were examined solely based on their first-year aid status.

Since continuous enrollment has significant impact on the length of time to graduate, a dichotomous variable that indicated student's continuous enrollment status was added to the time-to-degree analysis. Total acceleration credit hours were composed of postsecondary credit hours, which students earned prior to their high school graduation, and credit hours students earned by examination, such as Advanced Placement. This study also examined the effect of ratio between remedial and all courses on degree completion behavior.

Statistical Framework

Multiple logistic regression was used for all the analyses except for the college persistence analysis. Event history modeling was used to investigate longitudinal college persistence based on various student pre-college attributes. This particular statistical technique has certain advantages over other methodologies. For instance, structural equation modeling has been one typical statistical technique used in these studies (Bean, 1983; Braxton, Duster, & Pascarella, 1988; Cabrera, Nora, & Castaneda, 1993; Nora, Attinasi, & Matonak, 1990; Pascarella & Chapman, 1983; Pascarella & Terenzini, 1983). Since students may depart at any given time while they are enrolled, selecting an arbitrary point in time to specify enrollment status of students in structural equation modeling fails to examine differences in departure behavior that may exist at various time. Moreover, values of explanatory variables may be constant, while effects of these variables may change over time. Assessment of these varying effects of explanatory variables becomes difficult when one uses traditional structural equation techniques. In addition, event history modeling censors different types of departure behavior, such as dropout, transfer, stopout, academic dismissal, and graduation. By designating different

codes to such departure types, this statistical method allows the analyst to estimate parameters by particular departure type.

While a handful of studies have addressed educational issues using the event history modeling (DesJardins, Ahlburg, & McCall, 1999, 2002; Murtaugh, Burns, & Schuster, 1999; Ishitani & DesJardins, 2002; Singer & Willett, 1991), examination of attrition behavior of first-generation college students using this particular statistical technique is non-existent (except for Ishitani, 2003b). Thus, the outcome of the college persistence in this study would make a unique contribution to the educational literature on first-generation students.

Some of previous research studies examined the length of time to graduation using linear regression modeling techniques (Knight, 1994; Knight & Arnold, 2000; Lam, 1999). Studies using the linear regression estimated the actual elapsed time to degree completion. However, this may be less relevant to policy makers, since they tend to view graduation as an event at discrete time (e.g., four-year graduation rate). Moreover, given the fact that the study sample includes institutions that had different academic calendar systems, estimation of the length to graduation may lead to spurious interpretation of the result. Thus, this study defines degree completion behavior as dichotomous values (i.e., whether or not students graduated) at discrete points of time (i.e., four-, five-, and six-year graduation). As for the time-to-degree analysis in this study, multiple logistics regression was used to analyze the dichotomous nature of degree completion behavior.

Empirical Results

Path to College Matriculation

Table 5 includes results of departure behavior from secondary education, and

college matriculation. Since departure was coded as '1' in the logistic regression analysis,

negative parameters indicate positive effects on persistence, while positive parameters

indicate positive effects on departure. Interpretation of the coefficients produced by the

model is made easier by $\Delta r = (\exp(\alpha_j)^{\Delta A} - 1) * 100\%$. $\exp(\alpha_j)$ is the antilogarithm of the

unstandardized coefficient (α_j) and known as the "relative risk". ΔA is the change in the

variable under consideration, and Δr is, therefore, the percentage change in the relative

risk of departure (column, "Rel. Impact" in tables).

The math level showed strong association with departure behavior through 8th and

12th grades. Particularly, students who were in the math level lower than 1 were about 12

times more likely to drop out that students who were in the level 3 for the period between

8th and 10th grades. The level of science played a stronger role to impact attrition behavior

between 10th and 12th grades.

Being first-generation presented its effect on departure between 10th and 12th

grades. First-generation students were 2.3 times more likely to drop out than students

with college-educated parents.

Although students with family income less than $20,000 were about 69% more

likely to drop out for the period between 10th and 12th grades, they were most likely to

drop out between 8th and 10th grades. Lower educational expectation had a negative

impact on retention through 8th and 12th grades. Students who did not think of graduating

from college were about 1.2 and 1.3 times more likely to depart from the secondary educational system than students who were sure about graduating from college.

As for college matriculation, factors such as, being a first-generation, family income, educational expectations, parent's involvement and college choice, were associated with the likelihood to attend college. Among those who graduated from high school, first-generation students were 35% less likely to enroll in college than students with college-educated parents. Students with lower family incomes were less likely to continue their education after high school.

Lower educational expectations from students and their parents impacted the likelihood of college matriculation. Not surprisingly, students who did not think of graduating from college were 64% less likely to matriculate to college. Students whose parents had the same educational expectation for them were 35% less likely to enroll in college. Parent's involvement had a positive effect on college matriculation, which was parallel to what Hossler, Schmit, and Vesper (1999) suggested earlier. When students and their parents discussed college planning during the 12th grade, the likelihood of enrollment increased by 29%. If students and parents discussed educational careers after high school, when the students were in the 10th through 12th grades, the odds of college matriculation increased by about 43%. Clearly, longer planning periods for college education improved the likelihood of attending college.

After controlling for other variables, such as parent's education, students who considered financial aid and job placement as important factors in their college decision-making were about 17% less likely to attend college. This may reflect general perception regarding affordability of higher education in our country and unclear linkage between

higher education and their future careers among 12th graders. Interestingly, students who considered school reputation as an important factor were 38% more likely to attend college.

College Choice

First-generation students were about 1.5 times more likely to attend two-year institutions. Student characteristics of two-year college enrollees somewhat contradict what has been discussed to improve college matriculation. For example, students who were not sure about graduating from college were more likely to enroll in two-year institutions. The odds of their matriculation to two-year institutions were further increased when paired with parents who were also unsure about their children's college education. Students with lower levels of math and science were more likely to attend two-year institutions. Compared to students who were in the highest math level in 12th grade, students who were in the math level 3 were 3.2 times more likely to enroll in two-year colleges.

Students, whose parents were less concerned with the future education of their children, were more likely to attend two-year institutions. Students, who discussed college education with their parents while in the 12th grade, were 44% less likely to attend community colleges. College expenses and specific courses were important factors for those who decided to attend two-year institutions. Students who thought college expense as an important factor were 80% more likely to attend community colleges.

First-generation students were 59% less likely to attend private institutions. Higher educational attainment of parents clearly strengthened the likelihood of matriculation to private colleges and universities. The odds of enrolling in a private

institution were further enhanced by parental involvement. Twelfth graders who discussed educational planning with their parents were 92% more likely to attend private institutions that those who never discussed college education with their parents. As for college choice factors, private institution enrollees were most concerned with financial aid, job placement, and school reputation, while they were less concerned with college expense, specific courses, and easy admission standard. Perhaps, a student who attended a private institution had clearer expectations from his/her institution when choosing such an institution.

Although students with higher academic aptitude in math were more likely to enroll in public four-year institutions, no compelling traits in student characteristics were observed among students from public four-year institution. This may be due to the fact that public four-year institutions are generally designed to educate students with a wider range of pre-college characteristics.

College Persistence

The portion of students who were still enrolled in each year (survival rates) was first estimated by the Kaplan-Meier method. Since the Kaplan-Meier is a nonparametric, it does not impose any assumptions about the distribution of the variables being examined. Hence, it is especially useful when one needs to display the overall behavioral process by chosen criteria. Figure 1 graphically illustrates Kaplan-Meier estimates by parent's educational attainment. The gap between first-generation students and their peers widened during the first two years in college. Particularly, a precipitous decline was found among first-generation students in the first year.

Based on the results from equality testing of the Kaplan-Meier estimates (Wilcoxon and Peto-Peto-Prentice tests[1]), the null hypothesis that the departure rates were the same for students from different groups was rejected. Although similar findings were previously discussed using the data from a single institution (Ishiatni, 2003), the Kaplan-Meier estimates of this study evidence that first-generation students were indeed more likely to drop out of college than students with college-educated parents.

Table 6 presents the analysis results of departure behavior by year. Departure was also coded as '1' in this analysis. Thus, negative parameters indicate positive effects on persistence, while positive parameters indicate positive effects on departure. Both types of first-generation students were likely to depart through year one to year three, and they were most likely to leave in the second year. For the second year, first-generation students were 8.5 times more likely to dropout than students with college-educated parents, while first-generation students whose parents had some college education were 4.4 times more likely to do so.

Furthermore, estimating the likelihood of departure by year revealed interesting period-specific effects of other variables on college attrition. Hispanic or female students were more likely to drop out of college during their second year. Students who matriculated to four-year institutions with uncertainty in their academic goals were most vulnerable to college attrition in year two. Although students who were unconfident in graduating from college were most likely to drop out in year four, they were already exposed to higher risks of departure during their first two years in college. Students whose parents expected them to attain a graduate degree had the highest attrition rate in

the fourth year. Perhaps, this particular attrition behavior may be associated with the pressure that students experienced to meet their parents' greater educational expectation.

High school class rank and high school academic intensity had significant effects on college attrition behavior. However, the highest risk periods of departure varied across different quintiles over time. For instance, students from 4th class rank quintile were approximately 1.5 times more likely to leave than students from the highest quintile in the second year, while students from the lowest quintile were 5.5 times more likely to do so during the third year. As for academic intensity, students from the 3rd quintile had the highest risk of departure during the second year. However, their probability of departure was actually higher than that of students from the 4th quintile. They were 1.4 times more likely to leave college than students from the highest quintile.

Not surprisingly, students who enrolled in private institutions were less likely to depart, while students who attended non-selective institutions were more likely to leave their institutions. Grants were found to have a positive effect on persistence in the first-year, while work-study showed its positive impact on retention in the first and second years. Grant recipients or work-study students were 37% or 41% less likely to drop out of college in their first year.

Time-to-Degree

Since logistic regression was identified as an appropriate statistical method for the analysis earlier, graduation status was coded as '1' in the dichotomous dependent variables. Table 7 includes the results of the time-to-degree analysis. First-generation students were 51% and 32% less likely to graduate in the fourth and fifth years than students whose parents graduated from college. First-generation students whose parents

had some college education were 44% and 29% less likely to do so in the years four and five. One may not be surprised with lower graduation rates among first-generation students, since their higher college attrition rates were discussed in the earlier analysis. However, the magnitude of these lower graduation rates indicated by percentage is worthwhile to be noted.

Other variables that negatively affected timely graduation include race, family income, lower high school academic aptitudes, lower admission selectivity, and loans. Hispanic students were 59% or 31% less likely to graduate in four or five year than Caucasian students. Students from the lowest income group were 41% less likely to graduate within four years, while students from the income ranged between $20,000 and $34,999 were 41% less likely to graduate in the fifth year.

As for high school rank, students from the 4th or lowest quintile were least likely to graduate in four years. Students from the 2nd or 3rd quintile had the lowest probability of graduation in their sixth year. Among those who did not graduate either in their fourth or fifth year, students from the 2nd or 3rd quintile were 40% or 68% less likely to graduate than those in the 1st quintile. High school academic intensity presented strong association with degree completion behavior in the fourth year. Students from the lowest academic intensity were about 59% less likely to graduate within four years.

Students who enrolled in non-selective institutions were approximately 50% or 38% less likely to graduate in the fourth or fifth year. First-year loan recipients were about 20% less likely to graduate in four years.

Continuous enrollment had the largest positive impact to facilitate timely graduation. Students who continuously enrolled were 11 times more likely to graduate

within four years. However, one may be troubled with large parameter values for this variable. This is partially due to continuous enrollment being defined in dichotomous and lacking detailed information on discontinuous enrollment status, such as how often or how long students discontinued their enrollment.

Discussion

The findings of this study indicate that first-generation students encountered profound challenges at each level in our educational system. Knowing the fact that being first-generation affects one's persistence, college matriculation or degree-completion behavior is valuable. However, a much fuller understanding of the educational success among first-generation students is obtained when one takes the effects of other factors into account simultaneously. Gender or family income is an example of factors that educators and policy makers have little chance to influence, while parental involvement or academic support is an area where we could positively influence to enhance one's educational success. Given the longitudinal nature of our educational system, parameters estimated in this study allow the analyst to illustrate how changes in various factors positively impact student's educational outcome over the period of twelve years. Let's hypothesize two Hispanic female first-generation students with a family income of $32,000. Student A did not have any plan to attend college in 8th grade. Although Student A and her parents were indecisive about college education, she decided to attend college when she was in 12th grade. Student B also did not have any clear idea about her educational goal as an 8th grader. However, over time, Student B and her parents gained much confidence in planning for her college education through school personnel over

time. Figures 2 through 4 illustrate longitudinal educational outcome of these two students.

More parental involvement and gaining confidence in college planning not only reduced the odds of dropping out of higher school, but also dramatically improved the likelihood of college matriculation for Student B. Given the premise that estimations for institutional selection were independent for different types of institutions, Student A was most likely to enroll in a two-year institution, while Student B had a 50% chance of attending a public four-year institution.

Although the study did not examine how collegiate experiences, such as academic and social integration defined by Tinto (1975), influenced college persistence and degree-completion behavior, the findings herein indicate strong association between pre-college characteristics of students and their college success. After both Students A and B enrolled in four-year institutions, Student B was clearly more successful in college. As for Student A, her departure risks, longitudinally illustrated in Figure 3, would allow institutional personnel to identify the timing of their interventions to improve her retention behavior. An understanding of educational success among first-generation students would be further enhanced by research on how time-varying factors, such as academic and social integration, financial aid amounts, or college GPA, would affect their college persistence by year.

Finally, what makes this study most unique is its longitudinal framework composed by several analyses. In the past, educators and researchers attempted to illustrate the longitudinal educational outcome of first-generation students by linking findings from different studies. While this makes logical sense in allowing one to gain a

broader understanding of how first-generation students proceed in our educational

system, this approach lacks consistency by using different samples in individual studies.

The present study was designed to mitigate this problem by using the same cohort over a

period of twelve years, and to replicate the longitudinal educational outcome as a process.

Thus, the findings of this study would assist in bridging the intersection between policy

makers and researchers from secondary and postsecondary education to enhance

educational success among first-generation students in our country.

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Endnote

1. These are statistic tests to compare survivor functions across groups. They are similar to nonparametric rank tests, which compare the observed and expected number of students who left in each of the groups. The expected number of departed students is obtained under the null hypothesis of no differences in survivor functions across the groups.

TABLE 1: Study Sample and Educational Output

Label	Student Behavior	Percent	Count	Portion of First-Gen. Within Group	Portion of FG of Some College Parent. Within Group
Effective Sample Cohort			11,316	30.2%	40.2%
10th Grade	In School	96.2%	10,887	29.1%	40.5%
	Dropout by 10th Grade	3.8%	429	58.5%	34.7%
12th Grade	In School	92.0%	10,021	27.2%	40.6%
	Dropout by 12th Grade	8.0%	866	51.0%	38.9%
Enrolled in College by 1994	Yes	68.1%	6,687	19.2%	39.6%
	No	31.9%	3,135	42.6%	42.7%
Types of School Initially Enrolled	Two-Yr. Public	33.8%	2,260	28.1%	49.1%
	Four-Yr. Public	42.9%	2,871	16.4%	39.2%
	Four-Yr. Private	23.3%	1,556	11.5%	26.5%

TABLE 2: Postsecondary Educational Output of the Sample

First Attrition Behavior — Status	Count	Percent	Portion of First-Gen. Within Group	Portion of FG of Some College Parent. Within Group
Graduated from Initially Enrolled Inst.	2,256	51.0%	12.2%	30.5%
Departed from Initially Enrolled Inst.	845	19.1%	24.5%	47.7%
Transferred from Initially Enrolled Inst.	1,109	25.1%	11.0%	32.5%
Stopped out at Initially Enrolled Inst.	172	3.9%	20.9%	37.8%
Still Enrolled at Initially Enrolled Inst.	45	1.0%	22.2%	48.9%
Total	4,427			

Degree Completion Behavior — Status	Count	Percent	Portion of First-Gen. Within Group	Portion of FG of Some College Parent. Within Group
Overall Graduation within Six Yrs.	2,933	66.3%	11.5%	29.8%
Fourth-Yr. Graduation - Yes	1,600	36.1%	8.8%	24.6%
Fourth-Yr. Graduation - No	2,827	63.9%	18.1%	40.5%
Sub-Total of Sample	4,427	100.0%		
Fifth-Yr. Graduation - Yes	996	35.2%	14.2%	35.9%
Fifth-Yr. Graduation - No	1,831	64.8%	20.2%	43.0%
Sub-Total of Sample	2,827	100.0%		
Sixth-Yr. Graduation - Yes	337	18.4%	16.6%	36.2%
Sixth-Yr. Graduation - No	1,494	81.6%	21.0%	44.5%
Sub-Total of Sample	1,831	100.0%		

TABLE 3: Descriptive Statistics of the Study Sample

Time-Constant Variables		Educational Level
		8th Grade
Variable	**Label**	**Percent**
Gender	Male	46.9%
	Female	53.1%
Race	Asian	6.7%
	Hispanic	12.7%
	Black	9.2%
	Caucasian	67.8%
	Native American	3.5%
Parent's Education	First-generation	30.2%
	Parent with some college	40.2%
	One parent with BA	16.8%
	Both parents with BAs	11.8%
	Unknown	0.9%
Family Income	0 - $19,999	26.3%
	$20,000 - $34,999	29.5%
	$35,000 - $49,999	21.1%
	$50,000 or higher	23.1%

Time-Varying Variables		8th Grade	10th Grade	12th Grade
Variable	**Label**	**Percent**	**Percent**	**Percent**
Educational Expectation	Unsure	2.2%	2.7%	8.1%
	Won't graduate from college	31.0%	36.3%	27.0%
	Graduate from college	42.2%	32.5%	32.4%
	Finish graduate school	24.6%	28.5%	32.5%
Parent's Highest	Unsure	11.4%	10.0%	13.2%
Educational Expectation	Won't graduate from college	17.8%	23.6%	17.4%
	Graduate from college	42.9%	43.5%	35.6%
	Finish graduate school	27.9%	22.9%	33.8%
Reading	Below level 1	11.5%	8.9%	6.3%
	Level 1	50.3%	38.1%	29.3%
	Level 2	38.2%	53.0%	39.6%
	Level 3	0.0%	0.0%	24.8%
Math	Below level 1	15.3%	9.7%	5.5%
	Level 1	37.8%	24.1%	18.3%
	Level 2	23.6%	14.5%	13.1%
	Level 3	23.3%	25.9%	25.3%
	Level 4	0.0%	25.8%	32.3%
	Level 5	0.0%	0.0%	5.5%
Science	Below level 1	25.5%	18.6%	14.6%
	Level 1	47.1%	33.8%	29.2%
	Level 2	27.4%	31.2%	31.3%
	Level 3	0.0%	16.4%	24.9%

Additional Variables for College Matriculation and Choice Analyses		10th Grade	12th Grade
Variable	**Label**	**Percent**	**Percent**
Parent's Involvement	Talked to my parents about college education	40.0%	43.8%
	Attended education after H.S. program		35.7%
	Attended financial aid program		75.0%
	Parents gave their child information on college		70.6%
College Choice Factors	College expense		29.3%
	Financial aid		45.3%
	Specific courses		63.2%
	Job placement		52.7%
	Graduate school placement		35.9%
	School reputation		51.8%
	Easy admission standard		15.6%
	Job in chosen field		67.3%

NOTE: Columns may not add to 100.0 due to rounding

TABLE 4: Additional Explanatory Variables for College Persistence and Completion

Variable	Label	Count	Percent
Cohort	1991/1992	4,269	96.4%
	1993/1994	158	3.6%
Gender	Male	2,055	46.4%
	Female	2,372	53.6%
Race	Asian	419	9.5%
	Hispanic	336	7.6%
	Black	356	8.0%
	Caucasian	3,180	71.8%
	Native American	87	2.0%
	Unknown	49	1.1%
Parent's Education	First-generation	651	14.7%
	Parent with some college	1,539	34.8%
	One parent with BA	1,153	26.0%
	Both parents with BAs	1,056	23.9%
	Unknown	28	0.6%
Family Income (in 1988)	0 - $19,999	565	12.8%
	$20,000 - $34,999	999	22.6%
	$35,000 - $49,999	929	21.0%
	$50,000 or higher	1,548	35.0%
	Unknown	386	8.7%
Educational Expectation	Unsure	196	4.4%
	Won't graduate from college	183	4.1%
	Graduate from college	1,761	39.8%
	Finish graduate school	2,287	51.7%
Parent's Highest	Unsure	282	6.4%
Educational Expectation	Won't graduate from college	149	3.4%
	Graduate from college	1,823	41.2%
	Finish graduate school	2,173	49.1%
High School Class Rank	Highest quintile	1,440	32.5%
	2nd quintile	971	21.9%
	3rd quintile	672	15.2%
	4th quintile	401	9.1%
	Lowest quintile	227	5.1%
	Unknown	716	16.2%
High School Academic	Highest quintile	1,692	38.2%
Intensity	2nd quintile	1,196	27.0%
	3rd quintile	588	13.3%
	4th quintile	380	8.6%
	Lowest quintile	117	2.6%
	Unknown	454	10.3%
Institutional Type	Public 4-yr.	2,871	64.9%
	Private 4-yr.	1,556	35.1%
Institutional Selectivity	Highly selective or selective	1,309	29.6%
	Non-selective	3,059	69.1%
	Unknown	59	1.3%
Financial Aid	1st yr. grant recipients	2,348	53.0%
	1st yr. loan recipients	1,608	36.3%
	1st yr. workstudy recipients	687	15.5%

Additional Variables for Time-to-Degree Analysis			
Variable	**Label**	**Count**	**Percent**
Continuous Enrollment	Yes	3,591	81.1%
	No	836	18.9%
		Mean	**Median**
Total Acceleration Credits	Continuous	2.57	0.00
Ratio of Remedial Courses to All Courses	Continuous	0.02	0.00

NOTE: Columns may not add to 100.0 due to rounding

TABLE 5: Path to College Matriculation

| Variable | Label | Departure from Secondary Education | | | | College Matriculation | | Choice of Postsecondary Institution | | | | | |
| | | 8th thru. 10th | | 10th thru. 12th | | | | Two-Year Public | | Four-Year Public | | Four-Year Private | |
		Coeff. *p*	Rel. Impact	Coeff. *p*	Rel. Impact	Coeff. *p*	Rel. Impact	Coeff. *p*	Rel. Impact	Coeff. *p*	Rel. Impact	Coeff. *p*	Rel. Impact
Constant		-6.104 **		-5.811 **		2.559 **		-2.892 **		0.078		-0.940 **	
Gender	Female	0.074	0.077	0.099	0.104	0.122	0.130	-0.142	-0.132	-0.050	-0.049	0.215 *	0.240
Race	Asian	-1.642 **	-0.806	-0.621	-0.463	0.273	0.314	-0.078	-0.075	-0.021	-0.021	0.176	0.192
	Hispanic	-0.282	-0.246	-0.443	-0.358	0.019	0.019	0.175	0.191	-0.183	-0.167	0.037	0.038
	Black	-0.619	-0.462	-0.819 **	-0.559	-0.245	-0.217	-0.284	-0.247	0.172	0.188	0.148	0.160
	Native American	0.000	0.000	-0.315	-0.270	-0.146	-0.136	0.034	0.035	0.099	0.104	-0.242	-0.215
Parent's Education	First-generation	-0.065	-0.063	1.199 *	2.317	-0.428 *	-0.348	0.896 **	1.450	0.082	0.085	-0.887 **	-0.588
	One parent with some college	-0.259	-0.228	1.002	1.724	-0.279	-0.243	0.942 **	1.565	0.002	0.002	-0.702 **	-0.504
	One parent with BA	-1.124	-0.675	0.691	0.996	-0.069	-0.067	0.438 **	0.550	0.082	0.085	-0.300 *	-0.259
Family Income	0 - $19,999	1.358 **	2.888	0.522 *	0.685	-0.527 **	-0.410	0.172	0.188	0.180	0.197	-0.492 **	-0.389
	$20,000 - $34,999	0.092	0.096	0.259	0.296	-0.331 *	-0.282	0.093	0.097	0.142	0.153	-0.264 *	-0.232
	$35,000 - $49,999	0.433	0.542	-0.081	-0.078	-0.214	-0.193	0.215	0.240	-0.034	-0.033	-0.160	-0.148
Educational Expectation	Unsure	-0.581	-0.441	0.067	0.069	-0.612 **	-0.458	-0.109	-0.103	-0.014	-0.014	0.138	0.148
	Won't graduate from college	0.783 *	1.188	0.850 **	1.340	-1.020 **	-0.639	1.148 **	2.152	-1.055 **	-0.652	-0.844 **	-0.570
	Finish graduate school	-0.173	-0.159	-0.100	-0.095	0.145	0.156	-0.374 *	-0.312	0.175	0.191	0.079	0.082
Parent's Highest	Unsure	-0.260	-0.229	0.670 **	0.954	-0.359 *	-0.302	0.079	0.082	-0.326 *	-0.278	0.331	0.392
Educational Expectation	Won't graduate from college	-0.092	-0.088	0.311 *	0.365	-0.434 **	-0.352	0.821 **	1.273	-0.837 **	-0.567	-0.076	-0.073
	Finish graduate school	0.000	0.000	0.493 *	0.637	0.039	0.040	0.190	0.209	-0.127	-0.119	-0.057	-0.055
Reading	Lower than level 1	0.254	0.289	0.330	0.391	-0.362	-0.304	0.616 *	0.852	-0.250	-0.221	-0.632	-0.468
	Level 1	0.681 **	0.976	0.164	0.178	-0.333 *	-0.283	0.278	0.320	-0.005	-0.005	-0.243	-0.216
	Level 2					-0.195	-0.177	0.031	0.031	0.168	0.183	-0.178	-0.163
Math	Lower than level 1	2.559 **	11.923	1.540 **	3.665	-0.609 *	-0.456	2.527 **	11.516	-1.178 **	-0.692	-0.570	-0.434
	Level 1	1.974 **	6.199	1.512 **	3.536	-0.344	-0.291	2.317 **	9.145	-0.779 **	-0.541	-0.874 **	-0.583
	Level 2	1.234 **	2.4349	0.860 *	1.363	-0.181	-0.166	2.012 **	6.478	-0.621 **	-0.463	-0.452 *	-0.364
	Level 3			0.835 **	1.305	0.024	0.024	1.433 **	3.191	-0.154	-0.143	-0.314	-0.269
	Level 4					0.204	0.226	1.092 **	1.980	-0.053	-0.052	-0.182	-0.166
Science	Lower than level 1	0.549	0.732	0.923 **	1.517	-0.245	-0.217	0.498 *	0.645	-0.262	-0.230	-0.120	-0.113
	Level 1	-0.068	-0.066	0.707 *	1.028	-0.179	-0.164	0.391 *	0.478	-0.247 *	-0.219	0.057	0.059
	Level 2			0.587 *	0.799	-0.037	-0.036	0.321 *	0.379	-0.001	-0.001	-0.199	-0.180
Parent's Involvement	Discussed college only in 10th grade					-0.013	-0.013	0.205	0.228	-0.197	-0.179	0.072	0.075
	Discussed college only in 12th grade					0.257 *	0.293	-0.583 **	-0.442	-0.044	-0.043	0.654 **	0.923
	Discussed college in 10th and 12th grades					0.356 **	0.428	-0.514 **	-0.402	-0.013	-0.013	0.559 **	0.749
	Attended educational opportunity after H.S.					0.060	0.062	-0.338 **	-0.287	0.081	0.084	0.203 *	0.225
	Attended financial aid program					0.094	0.099	-0.326 *	-0.278	0.163	0.177	0.170	0.185
	Parents gave information on college					0.065	0.067	-0.068	-0.066	0.001	0.001	0.077	0.080
College Choice Factors	College expense					0.108	0.114	0.589 **	0.802	0.159	0.172	-0.989 **	-0.628
	Financial aid					-0.187 *	-0.171	-0.259 *	-0.228	-0.294 **	-0.255	0.704 **	1.022
	Specific courses					0.002	0.002	0.258 *	0.294	0.054	0.055	-0.322 **	-0.275
	Job placement					-0.191 *	-0.174	-0.210	-0.189	-0.072	-0.069	0.315 **	0.370
	Graduate school placement					-0.032	-0.031	-0.099	-0.094	-0.068	-0.066	0.155	0.168
	School reputation					0.323 **	0.381	-0.136	-0.127	-0.069	-0.067	0.254 *	0.289
	Easy admission standard					-0.175	-0.161	0.198	0.219	0.016	0.016	-0.361 *	-0.303
	Job in chosen field					-0.025	-0.025	-0.056	-0.054	0.169	0.184	-0.168	-0.155

** = *p* < 0.01, * = *p* <0.05

TABLE 6: Period Specific Estimations of College Attrition Behavior

Variable	Label	First Year Coeff. p	First Year Rel. Impact	Second Year Coeff. p	Second Year Rel. Impact	Third Year Coeff. p	Third Year Rel. Impact	Fourth Year Coeff. p	Fourth Year Rel. Impact	Fifth Year Coeff. p	Fifth Year Rel. Impact
Constant		-4.729 **		-6.391 **		-5.120 **		-4.328 **		-2.562 **	
Cohort	1993/1994	0.337	0.401	0.595 *	0.813	0.371	0.449	0.091	0.095	0.665	0.945
Gender	Female	-0.048	-0.047	0.407 **	0.502	-0.087	-0.083	-0.428 *	-0.348	-0.165	-0.152
Race	Asian	-0.734	-0.520	0.240	0.271	0.033	0.033	-0.160	-0.148	-0.421	-0.343
	Hispanic	0.166	0.181	0.463 *	0.589	-0.260	-0.229	-0.071	-0.068	-0.379	-0.315
	Black	-0.141	-0.132	0.192	0.212	0.310	0.363	0.005	0.005	0.365	0.440
	Native American	-0.234	-0.209	0.406	0.501	0.198	0.219	0.179	0.196	1.290 **	2.632
Parent's Education	First-generation	0.712 *	1.038	2.253 **	8.514	0.728	1.070	0.178	0.195	-0.141	-0.131
	One parent with some college	0.739 **	1.093	1.692 **	4.430	0.782 *	1.186	0.588	0.801	-0.383	-0.318
	One parent with BA	0.253	0.287	0.991 *	1.694	0.622	0.863	0.170	0.186	-0.455	-0.366
Family Income	0 - $19,999	1.193 **	2.298	-0.023	-0.023	0.194	0.214	0.390	0.477	0.626	0.871
	$20,000 - $34,999	0.874 **	1.396	0.371	0.450	0.441	0.555	0.393	0.481	0.525	0.691
	$35,000 - $49,999	0.246	0.279	0.134	0.144	0.267	0.305	-0.223	-0.200	-0.001	-0.001
Educational Expectation	Unsure	-0.069	-0.067	0.818 **	1.267	-0.589	-0.445	-0.233	-0.208	-0.168	-0.154
	Won't graduate from college	0.810 **	1.247	0.576 *	0.779	0.233	0.262	0.872 *	1.392	0.362	0.436
	Finish graduate school	-0.134	-0.125	-0.294	-0.255	0.140	0.150	-0.152	-0.141	-0.047	-0.046
Parent's Highest	Unsure	0.009	0.009	0.750 **	1.118	-1.009	-0.635	-1.172	-0.690	0.250	0.284
Educational Expectation	Won't graduate from college	-0.372	-0.310	0.743 **	1.102	0.945 **	1.573	-0.057	-0.056	0.190	0.209
	Finish graduate school	-0.201	-0.182	0.238	0.269	-0.137	-0.128	0.773 **	1.167	0.047	0.048
High School Class Rank	2nd quintile	0.556 *	0.744	0.662 **	0.938	0.790 *	1.203	-0.515	-0.403	0.217	0.243
	3rd quintile	0.954 **	1.597	0.834 **	1.301	1.336 **	2.804	0.366	0.442	0.436	0.547
	4th quintile	0.889 **	1.433	0.921 **	1.511	0.870 *	1.386	0.409	0.505	0.902 **	1.464
	Lowest quintile	1.337 **	2.807	1.128 **	2.088	1.878 **	5.541	0.412	0.510	-0.455	-0.365
High School Academic	2nd quintile	-0.081	-0.078	0.372	0.450	-0.190	-0.173	0.119	0.126	-0.281	-0.245
Intensity	3rd quintile	0.599 **	0.821	0.861 **	1.366	0.482	0.619	0.312	0.366	0.185	0.203
	4th quintile	0.605 **	0.831	0.822 **	1.274	0.608 *	0.837	1.074 **	1.928	0.091	0.095
	Lowest quintile	0.850 **	1.340	1.310 **	2.708	1.661 **	4.263	1.433 **	3.192	0.439	0.551
Institutional Type	Private four-year	-0.220	-0.198	-0.360 *	-0.302	-0.774 **	-0.539	-0.263	-0.231	-0.643 *	-0.474
Institutional Selectivity	Non-selective	0.693 **	0.999	0.490 *	0.632	0.638 *	0.893	0.890 **	1.436	0.105	0.111
First-Yr. Financial Aid	Grant	-0.465 **	-0.372	0.199	0.220	-0.067	-0.064	-0.425	-0.346	0.080	0.084
	Loan	-0.220	-0.197	0.057	0.059	-0.094	-0.089	0.287	0.332	0.108	0.113
	Workstudy	-0.529 *	-0.411	-0.555 *	-0.426	-0.249	-0.220	-0.321	-0.275	0.140	0.150

** = $p < 0.01$, * = $p < 0.05$

TABLE 7: Parameter Estimates for Time-to-Degree Behavior

Variable	Label	Fourth-Year			Fifth-Year			Sixth-Year		
		Coeff.	p	Rel. Impact	Coeff.	p	Rel. Impact	Coeff.	p	Rel. Impact
Constant		-1.935	**		-0.899	**		-1.621	**	
Cohort	1993	-0.360		-0.302	-0.217		-0.195	-0.763		-0.534
Gender	Female	0.444	**	0.559	0.122		0.130	0.098		0.103
Race	Asian	-0.200		-0.181	-0.172		-0.158	0.175		0.191
	Hispanic	-0.895	**	-0.591	-0.365	*	-0.306	0.441		0.554
	Black	-0.869	**	-0.581	-0.334		-0.284	-0.183		-0.167
	Native American	0.072		0.075	-0.147		-0.137	0.509		0.664
Parent's Education	First-generation	-0.706	**	-0.506	-0.378	*	-0.315	-0.166		-0.153
	One parent with some college	-0.572	**	-0.436	-0.336	*	-0.285	-0.330		-0.281
	One parent with BA	-0.301	*	-0.260	-0.246		-0.218	-0.039		-0.038
Family Income	0 - $19,999	-0.523	**	-0.407	-0.272		-0.238	-1.158	**	-0.686
	$20,000 - $34,999	-0.157		-0.145	-0.522	**	-0.407	-0.553	*	-0.425
	$35,000 - $49,999	-0.448	**	-0.361	-0.042		-0.041	-0.349		-0.295
Educational Expectation	Unsure	-0.278		-0.243	0.034		0.035	0.094		0.099
	Won't graduate from college	-0.659		-0.483	-0.458		-0.367	-0.515		-0.402
	Finish graduate school	0.126		0.134	0.094		0.099	-0.008		-0.008
Parent's Highest	Unsure	-0.401		-0.330	-0.056		-0.054	-0.028		-0.028
Educational Expectation	Won't graduate from college	-0.530		-0.411	-0.217		-0.195	-0.578		-0.439
	Finish graduate school	-0.105		-0.100	-0.203		-0.184	-0.209		-0.189
High School Class Rank	2nd quintile	-0.280	*	-0.244	-0.054		-0.053	-0.509	*	-0.399
	3rd quintile	-0.874	**	-0.583	-0.407	*	-0.334	-1.129	**	-0.677
	4th quintile	-1.063	**	-0.655	-0.419		-0.342	-0.887	**	-0.588
	Lowest quintile	-0.714	**	-0.510	-0.659	**	-0.483	-0.351		-0.296
High School Academic	2nd quintile	-0.300	*	-0.259	0.025		0.025	0.160		0.174
Intensity	3rd quintile	-0.308	*	-0.265	-0.368	*	-0.308	0.048		0.049
	4th quintile	-0.700	**	-0.503	-0.498	*	-0.392	-0.142		-0.132
	Lowest quintile	-0.886	*	-0.588	-0.274		-0.240	-0.020		-0.020
Institutional Type	Private four-year	1.091	**	1.977	0.064		0.066	-0.117		-0.110
Continuous Enrollment	Yes	2.520	**	11.429	2.015	**	6.501	2.051	**	6.776
Institutional Selectivity	Non-selective	-0.701	**	-0.504	-0.471	**	-0.376	-0.134		-0.125
Accerlation Credit Hours		0.031	*	0.031	-0.005		-0.005	0.009		0.009
Remeidal Course Ratio		-0.356		-0.300	-0.247		-0.219	-2.613	*	-0.927
First-Yr. Financial Aid	Grant	0.084		0.088	-0.026		-0.026	0.074		0.077
	Loan	-0.218	*	-0.196	-0.090		-0.086	-0.281		-0.245
	Workstudy	0.593	**	0.809	0.184		0.202	0.343		0.409

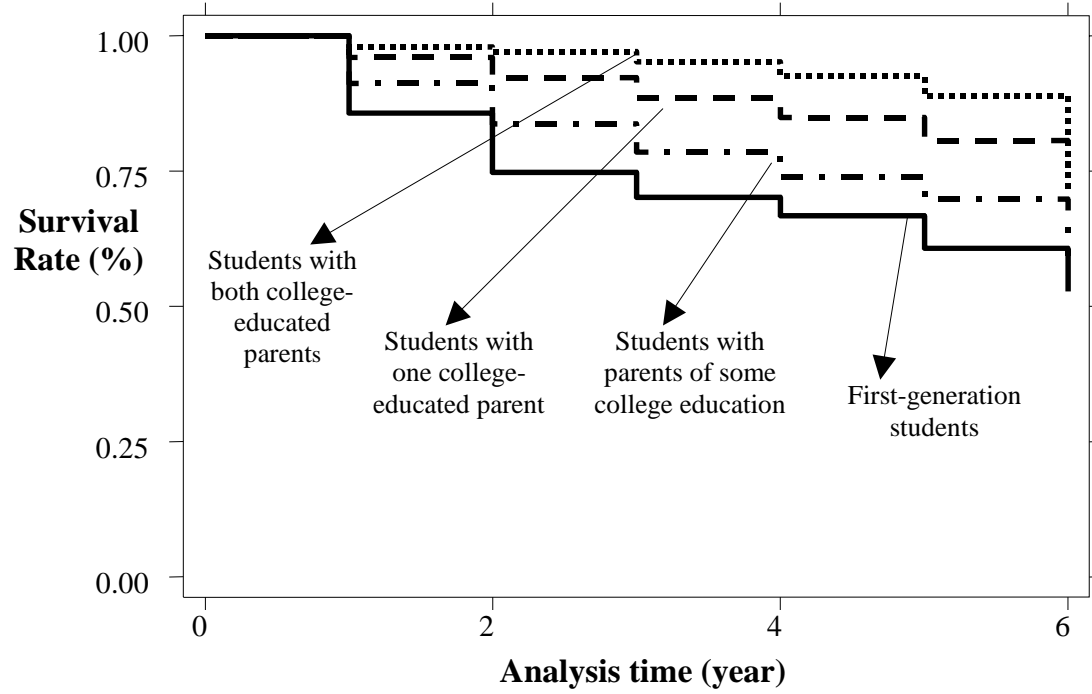** = p < 0.01, * = p <0.05

FIGURE 1: Kaplan-Meier Survivor Function by Parents' Educational Attainment

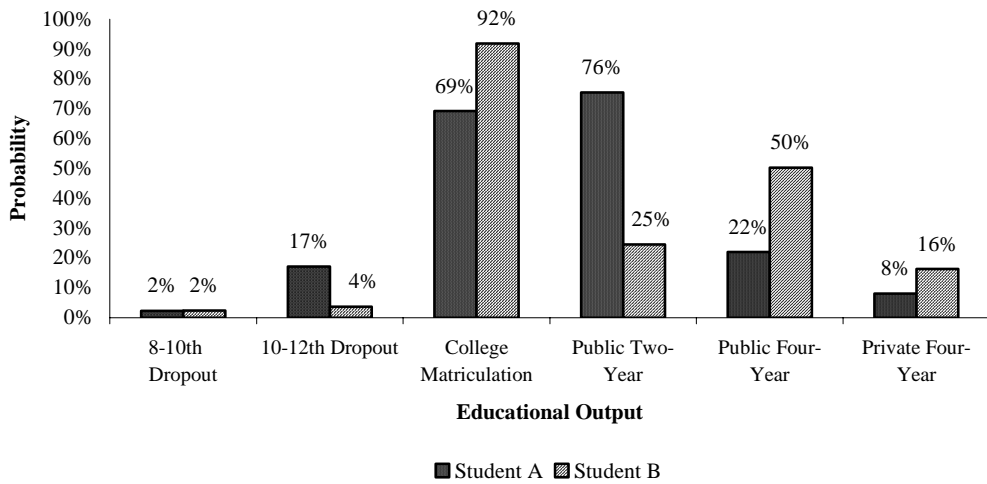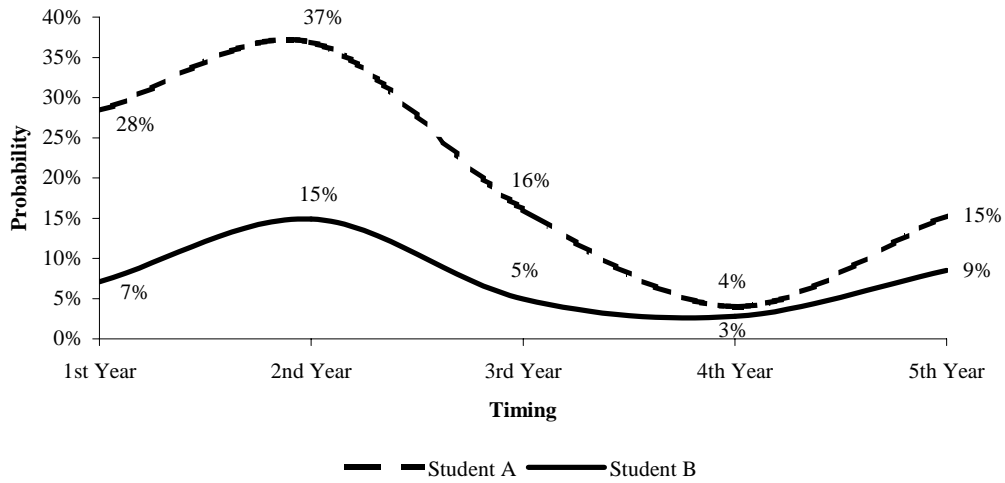**FIGURE 2: Simulation: Path to College Matriculation**

FIGURE 3: Simulation: College Attrition

FIGURE 4: Simulation: Degree Completion