

## ABSTRACT

Title of Document: PATHWAYS TO THE BACCALAUREATE: A LONGITUDINAL STUDY OF SEQUENCE DIFFERENCES BY PARENTS' EDUCATION LEVEL

Rebecca E. Thomas, Doctor of Philosophy, 2007

Directed By: Robert G. Croninger, Ph.D.  
Department of Education Policy Studies

Sharon L. Fries-Britt, Ph.D.  
Department of Education Leadership, Higher Education and International Education

This study identified and examined 12 postsecondary pathways that students with bachelor's degree aspirations followed based on the type of first institution enrolled (four-year, two-year, and for-profit), actions while in college (no movement, transfer, stop out, and transfer and stop out), and bachelor's degree attainment (1=yes) to determine whether pathways and attainment rates differed by parents' level of education. Movement along the 12 pathways was examined for first-generation (neither parent had any college experience), some-college (at least one parent had college experience, but no bachelor's degree), and continuing-generation (at least one parent earned a bachelor's degree) students. This study utilized data from the baseline and first two follow up surveys of the Beginning Postsecondary Survey 1996/2001 (BPS:96/01). Descriptive analyses were used to identify the pathways and to describe the similarities and differences among groups. Logistic regression analyses were used to determine whether attainment differences existed among groups at four-year and two-year institutions once control variables were considered.

At least three conclusions may be drawn from the findings of this research study. First, in accordance with the findings of previous research (Adelman, 1999; 2006; Cabrera, Burkum, & La Nasa, 2005; Carroll, 1989), the results of this study suggest that the type of institution where a student initially enrolls matters. Students who begin their college careers at four-year institutions are more likely to earn a bachelor's degree. Second, the actions that students exhibit after enrolling also affect their likelihood of bachelor's degree attainment. Different actions matter more at certain types of institutions. Third, differential consequences existed for students who followed the most successful paths. Even when students followed the routes most closely associated with bachelor's degree attainment, continuing-generation students earned degrees at significantly higher rates than first-generation students. Path selection does not fully explain differences in bachelor's degree attainment among groups. These conclusions have implications for future research, policy, and practice.

PATHWAYS TO THE BACCALAUREATE: A LONGITUDINAL STUDY OF  
SEQUENCE DIFFERENCES BY PARENTS' EDUCATION LEVEL

By

Rebecca E. Thomas

Dissertation submitted to the Faculty of the Graduate School of the  
University of Maryland, College Park, in partial fulfillment  
of the requirements for the degree of  
Doctor of Philosophy  
2007

Advisory Committee:

Associate Professor Robert G. Croninger, Co-Chair

Associate Professor Sharon L. Fries-Britt, Co-Chair

Professor Alberto F. Cabrera

Associate Professor Susan R. Komives

Dr. Robert E. Waters

© Copyright by  
Rebecca E. Thomas  
2007

## DEDICATION

To my husband, Brad Thomas, for loving me unconditionally and for helping me to  
find the courage to pursue my goals.

To my parents, Ronald and Connie Schenk, for all of the ways that they've given to  
me throughout my life and especially for making sure that I attended and graduated  
from college.

## ACKNOWLEDGEMENTS

God has blessed me throughout my life in countless ways, the most recent of which have been opportunities for education and a number of individuals who have played a key role in helping me to reach my goals. I would first like to thank my advisor and co-chair, Dr. Robert Croninger. Even though I wasn't a student in his program, he graciously agreed to work with me when my program's faculty was short-staffed and experiencing transition. He has exhibited the utmost generosity and kindness in all of our interactions. Dr. Croninger's patience and calm, detailed guidance helped to build my confidence in my research skills. He gave willingly of his time and met with me often, even if it meant juggling a number of other commitments on his end. I would also like to thank my other co-chair, Dr. Sharon Fries-Britt, for initially cultivating my interest in retention issues through her wonderfully interesting course. In addition, Dr. Alberto Cabrera, Dr. Susan Komives, and Dr. Rob Waters played key roles on my committee. Dr. Cabrera's work on postsecondary pathways served as a foundation for my study. Dr. Komives helped me to find new and interesting ways to interpret my results. And Dr. Waters' jovial personality kept the proposal and final defense comfortable for everyone involved.

I would like to thank my friends and family who have supported my educational endeavors. My colleagues in the Gemstone Program are the most caring and considerate group of people with whom I have ever worked. They supported my pursuit of a Ph.D. from the beginning and took joy in celebrating with me at my dissertation defense. My dissertation support group kept me motivated and grounded. My parents-in-law graciously accommodated a number of visits that involved me

working on academic projects. My younger siblings shared words of encouragement during key steps in my academic journey. I am proud that they also strive to earn advanced degrees.

My parents, Ronald and Connie Schenk, deserve much of the credit for my educational accomplishments. Even though I grew up in a very rural area, they always encouraged me to explore life beyond the small town where we lived. At an early age, they taught me to never be a quitter, a value that became especially relevant during the dissertation stage of my academic career. Even though neither of them had the opportunity to earn a bachelor's degree, they did everything in their power to make sure that I did. I truly believe that attending college has changed my life. And I thank my parents for their love, encouragement, and support throughout my life.

Finally, I owe a great deal of gratitude to my husband, Brad, who is truly the center of my life. He had more faith in me throughout this process than I did in myself. He spent countless evenings, weekends, and events alone because I was so busy with school, yet he rarely complained and never made me feel guilty about pursuing my goals. Brad provided crucial practical assistance (writing, editing) as well as the strong emotional support that I needed to finish my dissertation. I am 100% certain that I could not have done this without him and I thank him for his love, patience, and understanding.

## TABLE OF CONTENTS

DEDICATION .....	II
ACKNOWLEDGEMENTS .....	III
TABLE OF CONTENTS .....	V
LIST OF TABLES .....	VIII
LIST OF FIGURES .....	IX
CHAPTER I: INTRODUCTION .....	1
Description of the Problem .....	1
Definition of Terms .....	5
Research Questions .....	7
Highlights of the Literature .....	8
<i>First-Generation Students</i> .....	9
<i>Benefits of Persistence and Degree Attainment</i> .....	11
<i>Postsecondary Pathways</i> .....	13
Methods .....	14
Implications .....	16
Summary .....	17
CHAPTER II: LITERATURE REVIEW .....	19
Introduction .....	19
Persistence and Involvement Theories .....	20
<i>Tinto's Longitudinal Model of Institutional Departure</i> .....	20
<i>Astin's Theory of Student Involvement</i> .....	24
<i>Bean and Metzner's Nontraditional Student Attrition Model</i> .....	24
<i>Institutional vs. System Persistence</i> .....	26
<i>Year One to Year Two vs. Year One to Degree Attainment</i> .....	27
<i>Time to Degree</i> .....	28
Factors Affecting the Persistence of First-Generation Students .....	30
<i>Background Characteristics</i> .....	30
<i>Academic Preparation and Experiences</i> .....	32
<i>Social Experiences</i> .....	33
<i>Campus Experiences</i> .....	34
<i>Institutional Fit</i> .....	37
External Commitments: The Important Role of Parents and Family .....	38



<i>Key Influences: Parents and Siblings</i> .....	39
<i>The Advantages that College Experience Provides</i> .....	42
Pathways to Degree Attainment .....	43
<i>Background Research on Postsecondary Pathways</i> .....	44
<i>Relevant Literature on Other Variables in the Model</i> .....	52
Summary .....	61
CHAPTER III: METHODOLOGY .....	62
Introduction.....	62
Database.....	64
Sample .....	69
Statistical Analysis.....	78
Conceptual Pathways Model .....	82
Variables .....	85
<i>Dependent Variable</i> .....	85
<i>Independent Variables</i> .....	86
Summary .....	94
CHAPTER IV: RESULTS.....	95
Introduction.....	95
Results by Research Question.....	97
<i>Research Question 1: Direct and Indirect Paths</i> .....	97
<i>Research Question Two: Success Rates Along Pathways by Institution Type and Parents' Education Level</i> .....	110
<i>Research Question Three: Degree Attainment Differences with the Introduction of Selected Control Variables</i> .....	119
Summary .....	131
CHAPTER V: DISCUSSION.....	133
Introduction.....	133
Discussion of Findings Related to Research Questions.....	134
<i>Research Question 1: Direct and Indirect Paths</i> .....	135
<i>Research Question Two: Success Rates Along Pathways by Institution Type and Parents' Education Level</i> .....	138
<i>Research Question Three: Degree Attainment Differences with the Introduction of Selected Control Variables</i> .....	141
Conclusions.....	143
Implications .....	148
<i>Recommendations for Policy and Practice</i> .....	148
<i>Limitations of the Study</i> .....	156

<i>Recommendations for Future Research</i> .....	158
Final Thoughts .....	161
APPENDICES .....	165
Appendix A. Bivariate Correlations for Four-Year Institutions (n=4,917) .....	166
Appendix B. Bivariate Correlations for Two-Year Institutions (n=842).....	169
Appendix C. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor’s Degree when Matriculating at Four-Year Institutions (Model 1; n=4,917) † .....	172
Appendix D. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor’s Degree when Matriculating at Four-Year Institutions (Model 2; n=4,917) † .....	173
Appendix E. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor’s Degree when Matriculating at Four-Year Institutions (Model 3; n=4,917) † .....	174
Appendix F. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor’s Degree when Matriculating at Four-Year Institutions (Model 4; n=4,917) † .....	175
Appendix G. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor’s Degree when Matriculating at Two-Year Institutions (Model 1; n=819) † .....	176
Appendix H. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor’s Degree when Matriculating at Two-Year Institutions (Model 2; n=819) † .....	177
Appendix I. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor’s Degree when Matriculating at Two-Year Institutions (Model 3; n=819) † .....	178
REFERENCES .....	179

## LIST OF TABLES

Table 3.1. Descriptive Statistics of Baseline and Analytic Samples .....	71
Table 3.2. Percentage Missing Data in Analytic Sample by Parents' Education Level (n=6,074) .....	73
Table 3.3. Descriptive Statistics of Analytic Sample by Parents' Education Level (n=6,074).....	75
Table 3.4. Variables Used to Model Pathways to Bachelor's Degree Attainment.	90
Table 4.1. Cumulative Percentages of Earning a Bachelor's Degree Within Four-Year Institutions (n=4,917).....	111
Table 4.2. Cumulative Percentages of Earning a Bachelor's Degree Within Two-Year Institutions (n=842).....	113
Table 4.3. Cumulative Percentages of Earning a Bachelor's Degree Within For-Profit Institutions (n=315) .....	115
Table 4.4. Cumulative Percentages of Earning a Bachelor's Degree Across Institutions (n=6,074).....	117
Table 4.5. Change in Probability of Earning a Bachelor's Degree when Matriculating at Four-Year Institutions (n=4,917) .....	123
Table 4.6. Change in Probability of Earning a Bachelor's Degree When Matriculating at Two-Year Institutions (n=842) .....	129

## LIST OF FIGURES

Figure 3.1. Conceptual model of postsecondary pathways for all students.....	84
Figure 4.1. Postsecondary pathways for all students .....	100
Figure 4.2. Postsecondary pathways for first-generation students .....	103
Figure 4.3. Postsecondary pathways for some-college students.....	106
Figure 4.4. Postsecondary pathways for continuing-generation students.....	108

## CHAPTER I

### INTRODUCTION

Although college student persistence remains a much-studied phenomenon, a common misconception is that the path to degree completion is a straightforward one for all students. Early researchers based their work on a number of assumptions regarding college students' persistence, including the premises that students enter college immediately after high school graduation, matriculate at a four-year institution, enroll on a full-time basis, and earn a bachelor's degree after four years (Carroll, 1989). While this may be the primary path that students have traditionally pursued, an increase in access to postsecondary education with ongoing challenges to earning the degree has led some students to take alternate routes to bachelor's degree attainment. For example, Cabrera, Burkum, and La Nasa (2005) identified nine different postsecondary pathways that students of various socioeconomic status (SES) backgrounds followed in pursuit of a bachelor's degree based on academic resources acquired in high school and the type of first institution attended. Hearn's (1992) research identified 13 such pathways based on delayed entry, full-time or part-time enrollment, and the type of first institution attended.

#### Description of the Problem

Even though institutions of higher education allocate myriad resources to improving retention and degree completion rates, only about half of students seeking a four-year degree actually complete it in five years (ACT Incorporated, 2002, 2004, 2006;

Adelman, 1999). Of students who begin postsecondary education at two-year institutions with the hopes of eventually transferring and earning a four-year degree, slightly less than one-third complete a bachelor's degree within six years (Berkner, He, & Cataldi, 2002). While degree completion rates are already considered troubling for the general student population, some groups of students continue to earn college degrees at noticeably lower rates than others. One sizeable gap in degree attainment rates pertains to parental education level, which has been found to affect one's educational aspirations, persistence, and degree attainment (Choy, 2002). Students whose parents have not earned bachelor's degrees are not only less likely to pursue a bachelor's degree than their peers with college-educated parents, some researchers have found that they drop out of college at a rate nearly double that of students who have at least one parent who holds a bachelor's degree (Ishitani, 2006; Warburton, Bugarin & Nunez, 2001). In a qualitative study of first-generation students and degree attainment, Engle, Bermeo, and O'Brien (2006) posited that staying in college actually appeared more difficult for these students than beginning postsecondary education initially.

The current study examined a number of direct and indirect paths that students followed over six academic years with the intention of earning a bachelor's degree, and specifically focused on how the bachelor's degree attainment rates along these paths differed by parents' level of education. The current research study met three goals. First, examining degree attainment patterns of different groups based on one's parents' education level highlighted differences between the groups, such as where students enrolled in college, how they moved through the educational pipeline, and when and where they attained degrees. This information will be valuable for policymakers and

educational administrators when creating programs and policies that help students, especially those considered at-risk, persist toward degree completion. Second, this study contributed to the current work on pathways to degree attainment by identifying myriad successful and unsuccessful routes that students followed in pursuit of a bachelor's degree. Specifically, this study examined differences in how students whose parents possessed no experience with higher education (first-generation), students whose parents had higher education experience, but no bachelor's degree (some-college), and students for whom at least one parent held a bachelor's degree (continuing-generation) progressed toward degree attainment. Previous research focused on the persistence of students from a low SES, of which parental education was taken into account. But few studies have examined how the success rates along direct and indirect paths differ specifically by parents' level of education. Finally, by using nationally representative, longitudinal data, this study identified direct and indirect routes across institution types and time. Few studies concentrated on sequences across multiple institutions. Examining pathways across institutions for six years provided a more accurate analysis of students' progress toward earning a bachelor's degree.

The findings from this study could be valuable to policymakers in several ways. Studying routes that students follow over six years across institutions provides a more holistic picture of student attendance patterns and degree attainment, especially given the transient nature of today's college population. Over the next decade, scholars project the number of students enrolling in postsecondary education to drastically increase (Anderson, 2003; Carnevale & Fry, 2002). Researchers predict many of these new college students will be students of color and first-generation students. Policymakers

need to better understand the enrollment and degree completion patterns of these students to help this growing population succeed in the future (Longanecker & Blanco, 2003).

Because the college-going population demographics continue to expand, institutions in states predicted to experience the most growth, such as California, Texas, and Florida, among others, need to be especially prepared (Anderson; Carnevale & Fry).

Policymakers should analyze how colleges and universities that typically serve underrepresented groups, such as two-year and for-profit institutions, will accommodate a surge of students. Another consideration for policymakers involves how to support students who delay entry to postsecondary education and who follow indirect pathways, where the rates of success are typically much lower. While the focus of this study did not directly address these considerations, the current research aimed to provide policymakers and researchers a more informed framework from which to analyze these issues.

One other potentially meaningful aspect of this study to policymakers involves analyzing postsecondary pathways and bachelor's degree attainment of students who began their college education at proprietary institutions. The for-profit sector continues to grow. These institutions serve many first-generation students, students of color, and low-income students (Phipps, Harrison & Merisotis, 2000). Analyzing the degree completion rates of students who began postsecondary education in this sector could provide more information about students' success rates at these institutions. This analysis is important to policymakers given that proprietary institutions are eligible for the same federal student aid funds that not-for-profit institutions receive (Hittman, 1994).

This introductory chapter includes definition of terms, research questions, and significance of study sections. This chapter will highlight the literature, provide an



overview of the proposed research methodology and methods, and address the implications of the study.

### Definition of Terms

Two primary definitions of first-generation status exist: students for whom neither parent has any experience with postsecondary education and students for whom neither parent holds a bachelor's degree (but may have some-college experience). The latter definition is often applied when determining eligibility for federal programs such as TRIO, while the first definition is often referenced in the literature (Nunez & Cuccaro-Alamin, 1998). This study focused on how students' movements through higher education and bachelor's degree attainment differ by their parents' education level and therefore divided the sample into three groups. The first group, termed first-generation students, refers to those for whom neither parent has any experience with postsecondary education. The highest level of educational attainment for the parents of these students is a high school diploma or general education development (GED) credential. The second group, referred to as some-college students, includes those with at least one parent who has postsecondary experience but not a bachelor's degree. This group's parents earned an associate's degree or a certificate, or simply attended a postsecondary institution, but did not earn a bachelor's degree. The third group, continuing-generation students, refers to individuals for whom at least one parent has earned a bachelor's degree or higher.

This study defines parent as the person that participants identified as their parent or guardian. This term could refer to biological parents, adoptive parents, or step parents. Respondents self-reported the educational attainment level of each parent, whether they

lived with both parents or not. It is assumed that even though a participant may not live with both parents, he or she correctly reported the educational levels of both parents. The term parents' education, in the plural form, is used because respondents were asked to report the education level of both parents and this information is used when classifying a student as first-generation, some-college, or continuing-generation. This classification allows for the consideration of the educational attainment of both parents.

This study defines a postsecondary pathway as the route that students pursue to make academic progress toward a bachelor's degree. A number of factors, such as type of first institution enrolled (three options) and students' actions once enrolled (four options) differentiate the possible pathways identified in this study. A direct pathway is one that leads to a bachelor's degree, without transferring to other institutions or taking breaks in enrollment along the way. An indirect pathway is defined as a route that leads to bachelor's degree attainment only when the student transfers institutions, takes a break from enrollment, or both.

This study included one dependent variable, bachelor's degree attainment. This binary variable indicated whether a student attained this outcome within six years after enrollment. This study examines bachelor's degree attainment rates along postsecondary pathways. In this study, bachelor's degree attainment rates are considered and often referred to as success rates.

Some students formally leave their first institution of attendance to attend another institution, which is termed transfer. Other students take breaks from postsecondary education for at least one semester or quarter, but return within the time frame of this study (six academic years). This action is called stop out. Students who leave

postsecondary education and fail to return within the time window of this study are considered dropouts. The final action variable is referred to as no movement, which means that a student did not transfer from his or her first institution of attendance and remained continuously enrolled each semester.

### Research Questions

The analytic sample for the current study included students who began postsecondary education for the first time in the 1995-1996 academic year. The sample was limited to participants who cited aspirations of earning a bachelor's degree or higher on the baseline survey during their first year in college. But despite these educational goals, a significant number of the participants began their educational career at two-year institutions, which do not award bachelor's degrees, therefore necessitating a transfer to a four-year institution to complete a bachelor's degree. Previous research (Adelman, 1999, 2000; Cabrera et al., 2005; Carroll, 1989; Hearn, 1992) has suggested that educational aspirations, academic preparation, and the type of first institution enrolled play key roles in determining one's path through postsecondary education. The current study examined how a student's movement through postsecondary education and successful completion of a bachelor's degree within six years of enrollment varied by parents' level of education. While parents' education served as the primary independent variable of interest, this study utilized race, gender, delay entry, household income, parents' financial support, sibling college attendance, and high school academic preparation as controls.

In order to better understand the direct and indirect routes that students follow over six years toward earning a bachelor's degree and how their rates of success along these paths may differ, the following research questions guided this study:

1. What are the direct and indirect paths that first-generation, some-college, and continuing-generation students follow to attain a bachelor's degree within six years of entering college?
2. What are the success rates associated with pathways within and across institution types? Do success rates vary for first-generation, some-college, and continuing-generation students?
3. When controlling for selected background characteristics, familial support, and high school academic preparation, to what extent does the probability of earning a bachelor's degree vary among first-generation, some-college, and continuing-generation students at four-year and two-year institutions?

### Highlights of the Literature

The literature that informed this study touched upon four areas of higher education research. These areas included persistence and involvement theories, factors affecting the persistence of first-generation students, the role of parents and siblings in students' persistence, and pathways to degree completion. Chapter two provides a more comprehensive literature review, including a description of the theoretical and conceptual framework. The following section details demographic and other background information on the group of primary interest in this study: first-generation students.

Additionally, this section addresses the benefits of bachelor's degree attainment and provides an introduction to the extant literature on postsecondary pathways.

### *First-Generation Students*

Describing the first-generation student population is complex. While first-generation students represent all racial and ethnic groups and class backgrounds, they are more likely to be members of minority groups, come from a lower SES, matriculate at an older age, and begin their studies at a community college (Striplin, 1999). For example, in Choy's (2002) study, Hispanic and African-American students comprised 10% of the continuing-generation student population, but 30% of first-generation students in the sample. Research has shown that students of color, particularly Hispanic and African-American students, are overrepresented in the first-generation student population (Horn, 1995). Barriers to higher education that first-generation students face escalate for some minority students, who face additional challenges in navigating the academy.

Choy (2000) also examined the persistence and postsecondary experiences of low-income students. She found that certain groups, particularly students of color and first-generation students, were more likely to come from low-income families. Choy (2000) posited that the relationship between parental education level and low-income status was inversely related, stating, "As parents' education increased, the percentage who were low-income decreased" (p. iv). Students for whom neither parent finished high school were over four times more likely to come from a low-income family than students for whom at least one parent had attended college. Horn asserted that students of color were more likely to come from low-income families than White students. In her study,

approximately one-third of minority students fell into the lowest family income quartile, while only one-fifth of White students fell into this category. Even though these background characteristics are often intertwined, this study attempted to disentangle the effects of parents' education level, race, and SES on bachelor's degree attainment.

Research has shown that delaying enrollment inhibits degree attainment, which poses implications for first-generation students, many of whom fail to matriculate immediately after graduating from high school (Institute for Higher Education Policy, 1998). Additionally, because first-generation students tend to be older when they matriculate, they are more likely to be married and have more dependents than continuing-generation students (Bui, 2002, "Characteristics of first-generation college students", 1998; Inman & Mays, 1999). First-generation students are also less likely to be academically prepared, possess lower high school grade point averages, and enter college lacking reading, math and critical thinking skills compared to their peers whose parents held college degrees ("First generation collegians lag behind", 1997; Institute for Higher Education Policy).

Research has shown that once in college, first-generation students are more likely to work over ten hours a week, enroll on a part-time basis, and live off-campus than continuing-generation students. These findings could be attributed to anxieties about financing their education, which also lead students to be less involved in extracurricular activities and therefore less engaged in the campus community (Institute for Higher Education Policy, 1998; Pike & Kuh, 2005). Understanding the basic demographic differences between first-generation and continuing-generation students establishes a

context for examining how the process of pursuing a bachelor's degree may differ between groups.

A number of studies examined factors relating to the persistence of low SES students (Cabrera et al., 2005; Goldrick-Rab, 2006). A SES composite is normally comprised of students' parental education level, household income, and certain resources in a home, such as a dishwasher or books, among other variables. This study considered the effects of parents' education level on students' educational attainment separate from the overall effects of SES. While many first-generation students come from low SES families, not all of them do. Therefore, a measure of household income was used along with parents' education level. A SES composite score was excluded from the current study.

### *Benefits of Persistence and Degree Attainment*

Research has shown that rewards exist for those who persist to degree attainment (Institute for Higher Education Policy, 1998, 2005; Perna, 2005; Porter, 2002). Scholars associate a variety of public and private economic and social benefits with holding a bachelor's degree. For example, those who hold a bachelor's degree tend to earn higher incomes over a lifetime than individuals who forgo postsecondary education. This distinction serves as a private economic benefit to college degree holders and aids society by creating a larger tax base (Institute for Higher Education Policy, 1998, 2005; Perna; Porter). Similarly, college graduates commit fewer crimes and are more likely to be involved in their communities and donate to charitable organizations than those who do not attend college. In terms of private benefits from higher education, Pascarella and

Terenzini (2005) posited that those who possess a college degree enjoy an increased lifespan and better health, make wiser consumer decisions, and participate in more leisure activities. Especially pertinent to the current study, one of the most important benefits of attaining a college degree is intergenerational. Children are more likely to enroll in college and earn a degree if their parents are degree holders (Bowen, 1997). Some scholars argued that persistence without a degree is futile, and that the personal and financial sacrifices made without the reward of a degree are more detrimental to the student than if he or she had foregone postsecondary education entirely (Adelman, 1999; DesJardins et al., 2002).

Despite the multiple risk factors often associated with first-generation students, a number of these students earn a college degree within six years, though at a lower rate than their peers whose parents are college-educated. Little is known about these success stories, including how first-generation students progress through the postsecondary pipeline compared to continuing-generation students. Scholars often study first-generation students from a deficit perspective, or why they fail, rather than examining how they succeed (Byrd & MacDonald, 2005). While the federal government has developed TRIO programs to aid first-generation, low-income, and academically under-prepared students to enroll and persist in postsecondary education, many first-generation students are still left to navigate the college environment on their own, without the academic and social resources that continuing-generation students possess. While a few institutions of higher education have taken a proactive approach to retaining this population by creating special programs and support services, more efforts are required to understand the needs of first-generation students and help them persist to degree



attainment. Only by earning a college degree do a majority of these students begin to realize the professional and social mobility that education can bring (Adelman, 1999, 2006; Bowen, 1997).

Understanding how first-generation students persist to degree completion compared to some-college and continuing-generation students can help to identify the characteristics, needs, and behaviors of the three groups and how they may differ. The practical and theoretical implications of this knowledge are discussed later in this chapter.

### *Postsecondary Pathways*

A number of theoretical frameworks (Astin, 1993; Bean & Eaton, 2000; Tinto, 1993) and research studies (Bradburn, 2002; Choy, 2002; Horn, 1999; Horn & Berger, 2005; Horn & Kojaku, 2001; Lohfink & Paulsen, 2005; Peter & Horn, 2005; Sherlin, 2002) described the student and institutional characteristics predictive of college student persistence, but little is known about the routes that students, particularly those who are first-generation, take in pursuit of a bachelor's degree. What is known is that first-generation students earn bachelor's degrees at lower rates than continuing-generation students (Choy, 2002).

Cabrera and colleagues (2005) posited that the likelihood of a student earning a four-year degree was related to the particular pathway followed. For example, students who acquired high levels of academic resources (e.g., college preparatory curriculum, college counseling) in high school and entered a four-year institution immediately after high school were more likely to complete bachelor's degrees than students who only acquired moderate levels of academic resources or enrolled initially at two-year

institutions. The current study built upon the work of Cabrera and colleagues (2005) and other scholars by identifying and describing additional pathways defined by type of first institution enrolled and actions during college. This study explored how first-generation, some-college, and continuing-generation students moved through the postsecondary pipeline, and how their chances for earning a bachelor's degree at four-year and two-year institutions changed when taking into account selected background characteristics, familial support, and high school academic preparation.

## Methods

This study employed a quantitative approach by conducting a secondary data analysis with data from the BPS:96/01. Descriptive analyses and logistic regression were used to address the research questions. The U. S. Department of Education's National Center for Education Statistics sponsored the national study. The BPS study utilized baseline data from the National Postsecondary Student Aid Survey (NPSAS:96) to track students who began postsecondary education for the first time in the 1995-1996 academic year, with an initial follow up in 1998 and a final follow up in 2001 (Wine, Heuer, Wheelless, Francis & Dudley, 2002).

While all participants in the BPS:96/01 study began postsecondary education in 1995-1996, the students did not necessarily graduate from high school in the same year because the dataset included students who delayed entry to higher education. The current study utilized information from the baseline survey (the NPSAS:96) and both follow up surveys to identify and examine the direct and indirect paths that students with the aspirations of earning a bachelor's degree followed over six academic years.

The sample was limited to students who began postsecondary education for the first time in 1995-1996 at two-year, four-year, or proprietary institutions expecting to earn a bachelor's degree. Participants with educational goals of less than a bachelor's degree (2,475 cases) were excluded from this study because its focus is on students who aspire to the bachelor's degree. However, excluding these cases did change some characteristics of the sample. For example, the number of cases beginning postsecondary education at for-profit institutions was drastically reduced. This decrease was logical because proprietary institutions offer a number of certification and non-degree programs, and students attend these institutions for many reasons other than earning a bachelor's degree. There were also slight differences between the samples when considering parents' education level and race. Fewer first-generation students and students of color aspired to earn a bachelor's degree.

To answer the research questions, this study conducted descriptive analyses to explore 12 direct and indirect routes that students followed to earn a bachelor's degree, and to examine how bachelor's degree attainment rates differed along these pathways. Once the sequences were identified and described, this study used logistic regression analyses to determine whether the probability of earning a bachelor's degree at four-year and two-year institutions changed when controlling for certain background characteristics, familial support, and high school academic preparation. Figure 3.1 highlights the conceptual model and is more fully explained in chapter three.

Logistic regression was used to answer the final research question. This test seeks to estimate the maximum likelihood that an event will occur, is used with a binary dependent variable, and isolates the effects of each independent variable on the

dependent variable (Cabrera, 1994; Thompson, 2006; Wright, 2000). Logistic regression is appropriate for this study because the dependent variable only has two potential outcomes and this test seeks to isolate the effects of the independent variables on bachelor's degree attainment.

A quantitative methodology is the ideal approach to use for this type of study because it allows for the illustration of routes that a large sample of students pursued in aspiring to earn bachelor's degrees. While a quantitative approach neglects the more substantive personal accounts of students' pursuits that a qualitative methodology would solicit, the statistical analyses allow the findings to be generalized to a larger population. Moreover, the quantitative analyses conducted in this study could be useful in developing subsequent qualitative studies capable of better illuminating the personal and social meanings of these results. The methodology and methods proposed for this study are explained in more detail in chapter three.

### Implications

The current research study has implications for policy and practice by assisting policymakers and educators in creating services and programs to retain a diverse student body. This research addresses the common misconception that the path to degree completion is the same for all students (e.g., enter postsecondary education immediately after high school, enroll at a four-year institution on a full-time basis, and graduate in four years). An understanding of various postsecondary pathways that students pursue with the goal of attaining a bachelor's degree will assist institutions of higher education in supporting students with different persistence behaviors. The longitudinal nature of

the current study highlights the importance of supporting students through degree completion and at multiple institutions rather than only to year two and at a single college or university.

While numerous theoretical models exist to explain college student persistence and persistence-related behaviors (Astin, 1993; Bean & Eaton, 2000; Tierney, 1992; Tinto, 1993), one model that is comprehensive enough to explain the direct and indirect postsecondary pathways of diverse groups of students is noticeably absent. One step toward the development of such a model is to examine the persistence of specific student populations (Sherlin, 2002). Examining how actions and attainments differ among first-generation, some-college, and continuing-generation students will help scholars and policymakers understand the unique needs of these groups. The current research adds to the existing persistence models by examining more closely persistence and attainment behaviors of a more diverse population, over an extended period of time. Widely referenced models like Tinto (1993) and Astin (1993) were originally developed for, and tested on, a traditional student population from year one to year two of college. While a majority of attrition occurs during the first year of college, simply helping students persist to year two does not mean that students will continue on to degree attainment. The public and private social and economic benefits of higher education are only realized with the attainment of a bachelor's degree, so it is important to think of persistence as a longitudinal process.

### Summary

This chapter introduced the purpose of the current research study, which was to examine several direct and indirect paths that students pursue with the intention of

earning a bachelor's degree and to better understand how success rates along these paths differ by parents' education level. Additionally, this study explored how the probability of success at four-year and two-year institutions changed when controlling for selected background characteristics, familial support, and high school academic preparation. This chapter also included the research questions and the justification for the study. Chapter two presents a review of the relevant literature regarding this topic and chapter three more fully describes the methodology that guided this study. Chapter four describes the results of the study and chapter five includes a discussion of the results and implications for future research.

## CHAPTER II

### LITERATURE REVIEW

#### Introduction

This chapter describes the theoretical and conceptual framework that guided the inquiry of this study. This literature review referenced several areas of research. The first portion of this chapter synthesizes the persistence and involvement theories of Tinto (1993), Bean and Metzner (1985), and Astin (1993), which were consulted when forming the conceptual model used in this study. The current study built upon traditional persistence models by examining bachelor's degree attainment across multiple institutions over six years, therefore sections on institutional versus system persistence and time to degree are also addressed. The second section of this chapter describes factors that affect the persistence of first-generation students, the primary population of interest for the current research study. The benefits of earning a college degree, especially for disadvantaged students, are addressed. Because the current research focuses on attainment differences between groups based on parents' education level, the third section of this chapter highlights the role of parental involvement and familial support. The final section of the literature review describes and synthesizes existing research on pathways to degree attainment. Specifically, the work of Carroll (1989), Hearn (1992), Cabrera, Burkum, and La Nasa (2005), Adelman (1999, 2006), and Goldrick-Rab (2006) serve as the foundation for the current research regarding how students move through the postsecondary pipeline in pursuit of a bachelor's degree. This

section first addresses prior research the aforementioned authors, and then reviews pertinent literature on the factors used to develop the 12 pathways for the current research study.

### Persistence and Involvement Theories

The conceptual model for this study was based upon general concepts from the work of Tinto (1993) and Bean and Metzner (1985) regarding persistence and Astin's (1993) research on student involvement. While all four scholars offer components pertinent to first-generation students, no model completely addresses persistence at multiple institutions over six years to degree completion or the wide range of diverse characteristics of first-generation students. Therefore, after reviewing the most pertinent components of Tinto's (1993), Bean and Metzner's (1985), and Astin's (1993) work, this section will provide justification for tracking persistence across institutions and over six years.

#### *Tinto's Longitudinal Model of Institutional Departure*

Tinto (1975, 1987, 1993) asserted that the decision to persist occurs over time, making the process longitudinal in nature. His model addressed departure within one institution rather than the overall system of higher education and focused on the process by which students voluntarily withdraw. Tinto did not focus on students who were academically dismissed. Traditional-age students who were enrolled full-time appeared to be the most relevant sample in which to test his model.



Tinto (1993) posited that students enter postsecondary education with an array of attributes: family background characteristics, skills and abilities, and prior schooling. These attributes influence their educational goals and commitments, both individual and institutional. Additionally, the number and scope of external obligations influence one's goals and commitments. These pre-entry attributes, goals, and undertakings affect students' academic and social systems, which must be integrated for students to persist at the institution. Academic and social integration, or lack thereof, leads students to revisit their educational goals and loyalties, while taking external restraints into account, before making a decision to depart the institution (Tinto).

Tinto (1975, 1987, 1993) broadly linked student departure with Durkheim's theory of suicide. Both student departure and suicide, Tinto argued, are forms of voluntary withdrawal from a community and reflect on the community itself as well as the individual.

It does so not so much because voluntary leaving may be thought of as a form of educational suicide, but because it highlights the ways in which the social and intellectual communities that make up a college come to influence the willingness of students to stay at that college (Tinto, 1993, p. 104).

Although colleges and universities comprise a broad array of communities distinct from the social structures Durkheim referenced, Tinto (1993) used this analogy to underscore that students play a role in shaping their postsecondary communities as well as being influenced by them. Durkheim's work, however, alluded to more of a conformation model, meaning that individuals who fail to adhere to society's demands may choose departure over conforming. Tinto (1993) argued that the persistence process of college

students was interactive and fluid and that Durkheim's work failed to address how individuals decide to take their own lives; his work only addressed the conditions that led to it. Tinto (1993), on the other hand, was interested in exploring how students decided to depart their postsecondary institution.

In response to critiques, Tinto (1975) revised his model twice (1987, 1993) by expanding it and further defining the concepts of social and academic integration. He addressed the effects of race, class, and gender on persistence. In his second revision (1993), he offered the term "membership" as a conceptual alternative to "integration", though integration still remained a key component of the model. To better clarify the transformation that occurs when students enroll in higher education, Tinto (1993) consulted the 1960s work of cultural anthropologist Arnold Van Gennep and his rites of passage concept. Van Gennep's work addressed the belief that one experiences a separation, transition, and incorporation process when moving from one place to another. The periods of separation and transition can involve a lack of norms and direction, which can leave individuals feeling misguided and lost. Relinquishing ties to the old community can lead the person to depart the new community before fully accepting their norms and being completely incorporated. Van Gennep posited that to ameliorate the loneliness and anxiety associated with change, ceremonies and rituals exist to ease the transition of individuals from one place to another (Tinto, 1993). Tinto (1993) applied this concept to postsecondary persistence. He argued that students who were unable to successfully separate from external communities and adapt the social and academic norms of higher education were less likely to persist in the academy. Academic and social integration, he argued, were directly related to one's decision to depart (Tinto).

## Critiques of Tinto's Model

One major criticism of Tinto's model is that it ignores the unique needs and support systems of diverse student groups, such as first-generation students, by advocating that students separate from external communities (Tierney, 1992). These communities that Tinto recommends that students leave behind are the same groups that could provide first-generation students unyielding motivation and support to persist (London, 1989, 1992, 1996; Rendon, 1992). In addition, asserting that all students must experience the rite of passage into academe imposes on these students the norms and values of the dominant White, middle-class community in order to succeed (Tierney). This critique is especially pertinent for first-generation students, many of whom are students of color. Tierney also argued that Tinto used anthropological terms (rite of passage and cultural transformation) out of context and that these terms are much more deeply rooted when used in anthropology.

Of the 15 propositions in Tinto's (1993) model, only five are supported empirically (Braxton, 2000). Additionally, none of the model's central hypotheses are supported equally across all institution types. Researchers argue that Tinto's model is most applicable to traditional four-year, residential institutions, but not to commuter institutions, or two-year colleges. And the model's inability to address system persistence fails to paint a holistic picture of college student persistence (Braxton, 2000). These drawbacks are especially concerning when applying the model to a first-generation student population that tends to represent more minority students and a wide variety of institution types.

### *Astin's Theory of Student Involvement*

Astin's (1993) student involvement theory asserted that the college environment has a significant impact on student departure. He created a basic I-E-O model, which stands for input, environment, and output. The idea behind this model is that the input (e.g., a student and his/her pre-entry characteristics) will interact with the environment (e.g., the institution) to produce the output (e.g., the dependent variable of study, such as involvement or persistence). Increased opportunities for students to involve themselves in the college environment strengthen the likelihood that students will persist. Environmental factors, such as opportunities to live and work on campus and the amount of financial aid that is offered to students, lead to involvement and engagement in the campus community and therefore to persistence. Astin's (1977) original theory was developed by studying longitudinal data of college attrition with a nationally representative sample of students across two-year and four-year institutions.

While Astin's model is technically not a theory related to college student persistence, it is often cited in persistence studies because of Astin's proposition that a direct relationship exists between involvement and persistence (Sherlin, 2002). This model could be applied to a number of types of institutions, which is particularly relevant to this research and to other efforts to study first-generation students.

### *Bean and Metzner's Nontraditional Student Attrition Model*

Bean and Metzner (1985) defined nontraditional students to include those who are older than 25 years, reside off-campus, or attend on a part-time basis. Bean and Metzner asserted that environmental variables are much more important and social variables less

important to nontraditional students. Because nontraditional students reside off-campus or attend classes part-time, they identify less with the social community of the institution; therefore, social integration is less crucial to their persistence. Nontraditional students spend more time in the environment external to the campus, so logically, they are more affected by external factors, such as jobs, non-college peers, and family than traditional students. Tinto (1993) argued that external factors could discourage persistence, but for nontraditional students, support from external communities aids their persistence.

Therefore, it is important that nontraditional students draw upon these resources as necessary, particularly because separating from negative external factors may prove nearly impossible. If a nontraditional student's children are sick or family is not supportive of the resources expended on earning a degree, then these forces may overpower the educational commitment that the student has made (Bean & Metzner).

This model is particularly pertinent to first-generation students, who are nontraditional by nature. Even traditionally aged, full-time, first-generation attendees are nontraditional in their own families as they are the first to pursue a bachelor's degree.

Like Tinto's (1993) model, Bean and Metzner's (1985) model fails to address system persistence. In studying the persistence process, it is important to address the fact that students may begin at one institution and finish at another institution. Although transferring institutions is associated with lower degree-completion rates, the longer that students persist, the more opportunities they have to transfer (Peter & Cataldi, 2005).

### *Institutional vs. System Persistence*

Persistence means different things to various stakeholders. To the university president, a student who departs, whether to transfer to another institution or to leave higher education altogether, is considered a dropout. Institutions of higher education rarely have the means to track students beyond their own institution, so individuals who leave are considered part of the institution's attrition. This departure signifies lost income and time from the perspective of college administrators. To the policymaker, a student who leaves one institution to attend another is a persister. That student can still be considered successful in higher education by earning a college degree. To students, transferring to another institution does not make them a college dropout; attending another institution is normally considered a step toward meeting their educational goals.

Tinto (1993) posited that postsecondary departure can be defined in two ways. Institutional departure occurs when a student leaves a particular college or university. System departure happens when a student leaves higher education altogether. Not all students who leave institutions of higher education are considered dropouts. Students who transfer are really system persisters, as would be students who stop out but return to a different institution at some point. At the institutional level, students who drop out, stop out, or transfer are considered part of the institution's attrition, as they signify a loss to the college or university in terms of financial resources and personnel. At the institutional level, system persistence is nearly impossible to track. Most persistence studies focus solely on one institution, as system persistence may be beyond the scope of the data. It is important to note the difference between institutional and system persistence, otherwise some students may be inaccurately labeled as dropouts (Sherlin,

2002). The current research focused on persistence at four-year, two-year, and for-profit institutions nationwide.

*Year One to Year Two vs. Year One to Degree Attainment*

A majority of attrition occurs in the first year of postsecondary education (Tinto, 1993) when students face many transitions: adjusting to postsecondary academic rigor, living away from family, and adapting to the cultural norms of academe. If a student persists to the second year of college, then he or she is more likely to earn a degree (Tinto). But some students continue to leave postsecondary education during and after the second year (Bradburn, 2002; Horn & Kojaku, 2001). In fact, Ishitani (2006) found that first-generation students were more likely to drop out in year two than year one of college. During the second year of college, first-generation students were over eight times more likely to drop out than continuing-generation students.

Some scholars (Adelman, 1999; Cabrera et al., 2005; DesJardins et al., 2002) have argued that policymakers need to focus their efforts on retaining students through degree completion, rather than just through the first year. Higher education results in a number of costs to students: tuition, fees, books, living expenses, time, and foregone earnings (Perna, 2005). A student who drops out of higher education sacrifices many public and private benefits associated with a college degree, while facing the realization of foregone earnings, student loan repayment, and lost time. For the first-generation student, the effects of dropping out at any point in the college experience can be more severe. Some first-generation students pursue a college degree to support their family financially and they take pride in being the first in their family to attend college.

Additionally, failure to earn the degree can exacerbate the guilt and pressure that some family members put on first-generation students to succeed (London, 1989, 1992, 1996). The current research examined bachelor's degree attainment over a six-year window of time.

### *Time to Degree*

A four-year degree is somewhat of a misnomer in that it assumes continuous enrollment and full credit loads, which are not the reality for today's college-going population (Adelman, 1999). In a study of individuals who attained bachelor's degrees, Hill and Owings (1986) found that less than half earned the degree in four years. Most participants in their study took an extra year to earn the degree. Slightly less than one-quarter of participants took six or more years to earn the degree. Knepper (1988) posited that on average students took eight months longer to complete the bachelor's degree than the normal four years. Although Adelman (1999) examined degree attainment over ten years, he found that the average time to complete a bachelor's degree was five academic years, or 4.72 calendar years from the time of matriculation. This figure decreased for students who had high levels of academic resources or who were continuously enrolled. Adelman (1999) examined the mean time to a bachelor's degree based on a number of factors, including: number of institutions, continuity of enrollment, academic resources, SES, and aspirations. Students who were not continuously enrolled averaged just over 7 years to complete the degree, but for all other characteristics, the average time to degree fell below six years.



In terms of time to degree for those who begin postsecondary education at community colleges, Glass and Bunn (1998) posited that, given sufficient time to complete degrees, a large majority of those who successfully transfer from two-year to four-year institutions will earn the bachelor's degree. Just over half of students who transferred earned a bachelor's degree within four years of enrolling at the baccalaureate-granting institution. An additional third of students earned the degree within seven years of transferring. Depending on the point in their academic career when students transfer to a four-year institution, it can take them a significant amount of time to finally earn the degree.

Ishitani (2006) examined postsecondary persistence and time to degree attainment of first-generation students. While these students were significantly less likely than continuing-generation students to earn bachelor's degrees in the fourth or fifth years of college, no significant differences between the two groups existed when looking at degree attainment over six years. Additionally, Ishitani (2006) posited that first-generation students were more likely than continuing-generation students to drop out of college during year two, but after the sophomore year, the risk of departure for first-generation students decreased.

The current research study utilized a dataset that includes information for six academic years. Additionally, all cases in the dataset began postsecondary education in the first year of the study as the BPS followed the cohort of students who all matriculated in the 1995-1996 academic year, regardless of when these students graduated from high school. While this six-year window does limit the number of degree attainers eligible for analysis, research has shown that of students who complete a bachelor's degree, most do

so within six years of their matriculation to higher education (Adelman, 2000; Hill & Owings, 1986; Knepper, 1988). This time window may be insufficient to adequately analyze degree completers who initially enrolled at two-year institutions, because the transfer process can prolong bachelor's degree attainment.

### Factors Affecting the Persistence of First-Generation Students

Research has shown that numerous factors affect the postsecondary persistence of first-generation students and that first-generation students are less likely to persist to degree attainment than continuing-generation students (Choy, 2002; Ishitani, 2006; Nunez & Cuccaro-Alamin, 1998). The following section highlights the literature regarding the role of the following factors as related to the persistence of first-generation students: background characteristics; academic preparation; campus, social and academic experiences; and institutional fit.

#### *Background Characteristics*

First-generation students are truly pioneers in their own right. As the first in their family to pursue a bachelor's degree, they are often forced to navigate academe on their own without the preparation and insight that continuing-generation students possess. York-Anderson and Bowman (1991) assessed differences between first-generation and continuing-generation students in their knowledge about postsecondary education. First-generation students reported weaker family support regarding their pursuit of a bachelor's degree and they also demonstrated less knowledge about the college experience. This

lack of knowledge left these students feeling stressed and misguided. The researchers argued that a lack of college knowledge negatively affects persistence, which could be one reason why first-generation students depart postsecondary education at higher rates than do other students (York-Anderson & Bowman).

Some scholars speculate that many first-generation students rely on an inner strength to navigate the collegiate environment, one that is unfamiliar to them and their family. Dennis, Phinney, and Chuateco (2005) studied the role of motivation and environmental social supports in predicting college outcomes of 100 minority first-generation students. They asserted that personal characteristics, such as motivation and social supports provided by family and peers, positively influenced students' academic persistence and achievement. This research also assumed that a first-generation student would maintain close ties to supportive family and friends, and would not separate from these external commitments as Tinto (1993) suggested.

First-generation students carry their skills and resources acquired through high school with them into postsecondary education. Gibbons and Shoffner (2004) examined how high school counselors can assist prospective first-generation students prior to college entrance by using social cognitive career theory as a basis for counseling. Ideally, first-generation students who matriculate with an idea of how their interests, abilities, and future career path intersect will be more likely to persist toward the bachelor's degree. This understanding is especially pertinent to first-generation students, many of whom enter academe because they view the college degree as a stepping stone to a better life (Fallon, 1997).

### *Academic Preparation and Experiences*

Academic experiences seemed the most salient for first-generation students. Fallon (1997) asserted that individuals who grow up in an environment where education is valued appreciate taking courses and advancing their education simply for the sake of learning. First-generation students often view a bachelor's degree as the path to a better life or a particular career. Therefore, some first-generation students fail to see the value in taking liberal arts courses for their own educational and cultural development and instead focus on courses pertaining to their major or career. Some first-generation students take a pragmatic approach. They hesitate to change majors due to the extra time needed and the added cost to complete a degree (Fallon). These students persist in order to pursue a particular career.

Lohfink and Paulsen (2005) asserted that first-generation students deemed academic involvement more important to their educational persistence than social involvement in clubs and organizations. However, the researchers argued that academic involvement is most effective when first-generation students feel validated in the classroom, which is a way of affirming to these students that they possess the competencies necessary to do the work, and that their opinions have value and are worthy of respect and attention from faculty (Lohfink & Paulsen).

Terenzini, Springer, Yaeger, Pascarella, and Nora (1996) posited that first-generation students differed from continuing-generation students on both pre-college characteristics and college experiences. While the latter group made larger gains in math skills during the first year, first-generation and continuing-generation students were roughly equal in terms of development of reading and critical thinking skills after the first

year of college. These gains, however, were credited to different experiences culturally, socially, and academically between the two groups (Terenzini et al., 1996).

### *Social Experiences*

While much of the literature on first-generation students and persistence focuses on academic factors or institutional fit, two studies did address students' social experiences. Lohfink and Paulsen (2005) found that first-generation students who were satisfied socially were far more likely to persist than first-generation students who were not satisfied socially.

When examining extracurricular involvement, first-generation students demonstrated more significant development than their peers in the area of critical thinking. Pascarella, Pierson, Wolniak, and Terenzini (2004) posited that those who were involved in extracurricular activities also held more firm degree plans and possessed a strong internal locus of control. These out of class, on-campus, involvement opportunities impacted first-generation students. Ironically, other types of involvement such as work, volunteering, and intercollegiate athletics negatively affected first-generation students. The researchers hypothesized that this negative relationship existed because these activities were time-intensive and distracted students from their academics (Pascarella et al.).

### *Campus Experiences*

Pike and Kuh (2005) studied the personal accounts of first-generation students to examine how their campus experiences affected their learning and development. They argued that first-generation students were less likely to demonstrate engagement in the overall college experience and struggled to successfully integrate diverse college experiences, which posed implications for their persistence. Compared to continuing-generation students, these students perceived the college environment as less supportive and reported making less progress in their learning and intellectual development. Pike and Kuh attributed most of these differences between first-generation and continuing-generation students to educational aspirations and students' place of residence when attending college. The researchers argued that living on campus played a crucial role in helping students to feel engaged and integrated with the campus and, therefore, persist. Campus residency immersed students in the experience and made it difficult to avoid others who looked and acted differently from themselves.

Pascarella and colleagues (2004) estimated net differences between first-generation students and their peers on various dimensions of their academic and social experiences and on cognitive, psychosocial, learning, and status attainment outcomes. The researchers questioned whether certain academic or social experiences influenced the differences in psychosocial and cognitive outcomes between first-generation and continuing-generation students. While overall, net differences between the two groups remained small, Pascarella and colleagues found that first-generation students fell behind continuing-generation students after the second and third years on educational degree

plans and academic performance, which affected their time to degree and their persistence.

Employing a qualitative methodology, Orbe (2004) examined whether status as first-generation students affected their interactions with others. He was also interested in whether first-generation status played a salient role in students' lives. Orbe found that the level to which students identified as first-generation students varied by population. Those who identified as co-cultural group members (first-generation as well as their own race/ethnicity) appeared to internalize the importance of their status as the first in their family to pursue a bachelor's degree. Orbe also determined that a lack of communal identity and pride existed among first-generation students as a whole.

Casey (2005) studied the experiences of working class students, many of whom are first-generation, on college campuses. She argued that working class students' needs are often ignored because these students are not easily identified on campus:

Students from backgrounds in which education is simply not valued, or in which it is an alien arena, have every reason to hide that fact and to assume that perspectives shaped by those circumstances are illegitimate. The association of college with empowerment, prestige, and upward mobility casts their personal experience as irrelevant. In short, unlike other nonmainstream students, lower-class students are defined as "other" not by those cultural hegemonies of race, gender, and sexuality that the academy prides itself on deconstructing, but by the norms of the academy itself (Casey, 2005, p. 35).

She posited that the characteristic that makes the working class student different from other students is implicitly defined as lack (i.e., of money, access to resources, or

educational opportunities), which is what the academy purports to erase. These considerations are especially pertinent to first-generation students, many of whom come from low-income backgrounds and who pursue a bachelor's degree to obtain resources and benefits that were not available to their parents.

Bui (2002) examined background characteristics of students, reasons for pursuing higher education, and first-year experiences of first-generation students and compared the results to those of continuing-generation students. The data showed that first-generation students worried more about failing out of college and making ends meet financially. First-generation students also perceived that they devoted more hours to studying. However, in some areas there were no differences between the perceptions of first-generation and continuing-generation students. For example, first-generation students expressed an equivalent amount of comfort as continuing-generation students with making decisions on their own, feeling accepted on campus, and knowing about the academic programs and their requirements (Bui).

Ishitani (2006) examined students' persistence by year and analyzed when students are most likely to depart, and the predictors that lead to their departure. Additionally, Ishitani studied attainment differences by parents' education level. The author posited that students who received work study were almost half as likely to depart higher education as students who received no financial aid. This type of monetary support not only helped students pay tuition bills, it also engaged students in the college experience. Ishitani argued that first-generation students are especially needy of this type of support.



### *Institutional Fit*

One study examined first-generation, nontraditional students who transferred from a community college to a four-year institution (Byrd & MacDonald, 2005). The researchers questioned the definition of college readiness, the participants' skills and abilities that contributed to their college success, and whether first-generation students were generally viewed from a perspective of strength rather than weakness. Byrd and MacDonald asserted that a student's level of preparation cannot be accurately measured by standardized tests. They employed a qualitative approach for their study and the following themes emerged: college readiness skills and abilities, background factors, and nontraditional student self concept. Their study clarified that life experiences contributed to college readiness for the adult learner. These life experiences such as working, having children, and managing a family counterbalanced deficits due to poor academic preparation. Several participants cited feeling more confident returning to the classroom as an adult than they would have had they matriculated immediately after high school (Byrd & MacDonald). These participants credited their life experience with providing them enough confidence and discipline to complete their coursework at a community college and transfer to a four-year institution. A community college was therefore the right "fit" for them and they felt that they were equipped to transfer to a four-year institution successfully.

Also concerned with factors that led to educational persistence, Lohfink and Paulsen (2005) compared determinants of first-year to second-year persistence for first-generation and continuing-generation students. Key findings showed differences between the persistence-related characteristics, behaviors, and experiences of first-

generation and continuing-generation students. For example, attending public colleges or universities and larger institutions were deemed beneficial in retaining students whose parents did not hold college degrees. Neither of these characteristics affected the persistence of continuing-generation students. The researchers attributed this finding to the fact that private institutions were more competitive due to selectivity, required higher tuition, and attracted a wealthier student population, all of which potentially caused stress for first-generation students. Although large institutions are sometimes associated with a lack of personal attention, the researchers concluded that large, public institutions might have more resources to allocate for programs targeted toward first-generation students. Additionally, large public institutions often attract more diverse student bodies, therefore making first-generation students (many of whom are students of color) more comfortable (Lohfink & Paulsen). However, Ishitani (2006) posited that public institutions were significantly associated with student departure. Students who enrolled at private institutions were retained at significantly higher rates.

#### External Commitments: The Important Role of Parents and Family

While Tinto (1993) viewed external commitments as hindrances to students' persistence, Bean and Metzner (1985) recognized the important support and guidance that friends and family provide for some students. This section will explore the roles of parents and family, especially as they pertain to first-generation students who pursue bachelor's degrees. This section will also highlight several advantages that having a parent with college experience provides.

### *Key Influences: Parents and Siblings*

Because first-generation students break the family norm by attending college, their actions sometimes create repercussions for family dynamics, which ultimately affect their persistence and degree attainment. London (1989) conducted a qualitative study of first-generation students' pursuit of a college degree and how their aspirations created shifts and conflicts in the family. Parental pressure served as either a negative or a positive influence. Parents who possessed the desire to attend college, but not the opportunity, imposed their own goals and objectives upon their children. In other words, some parents lived vicariously through their children by insisting that they attend college. This encouragement assisted some individuals to overcome obstacles and persist, but also caused others to pursue a bachelor's degree based on their parents' interests and desires rather than their own, which ultimately proved detrimental for those students. Other parents reacted with jealousy or felt abandoned when their children pursued a goal that they considered unnecessary (London). Consequently, they withheld their financial and emotional support, with dire implications for their children's persistence toward a college degree. Students in this situation felt as though they had to give up their family, that they had to lose in order to gain, and often questioned whether a college degree and its benefits were worth the sacrifice. London's study provided deeper insight to the struggles, challenges, and alienation that first-generation students faced when making the move to college. Even when first-generation students benefited from familial support that helped them to succeed in college, family struggles occasionally ensued throughout life because of the societal divide between the college-educated and the working class

(Reisberg, 1999). A number of first-generation students cited a feeling of loss; they were forced to give up the life in which they were most familiar.

In Roberts and Rosenwald's (2001) qualitative study on the effects of upward mobility, siblings of first-generation students either lauded or resented their brother or sister for taking a nontraditional path. Pursuit of a college degree sometimes fueled sibling rivalry; it motivated younger siblings to attend college or it discouraged them from it simply for the sake of wanting to follow their own path in life. Roberts and Rosenwald (2001) posited:

Socially stationary brothers and sisters embody what the upwardly mobile might have, could have, or should have become (or remained)... Siblings can serve as the enduring reminder of the road not taken... for the upwardly mobile student, the sibling who pursues what he abandoned and spurns what he idealizes may remain like a doppelganger, painfully recalling to consciousness alternate choices and possibilities that would otherwise be consigned to the margins of awareness (p.104).

Contentious relationships among siblings, as with parents, can cause first-generation students to feel as though they are trying to balance competing identities. Alternatively, being the first in the family to attend college can serve as a positive role model for younger siblings, and ultimately provide the support systems and confidence needed to pursue a bachelor's degree themselves. Sherlin (2002) posited that having an older sibling with college experience benefited first-generation students in two distinct ways. Having an older sibling with college experience increased first-generation students' knowledge about financial aid as well as their level of social involvement.

Other research focused on the positive effects that can occur for a family or a community when a student is the first to attend college (Orbe, 2004). Some first-generation students shared that they received special treatment from their parents, siblings, and even their community for being the first to attend college. Mothers cooked the student's favorite meals during visits and younger siblings either called or sent letters and packages to their older siblings in college. Church communities prayed for the students in the congregation who went off to college. Often, first-generation students said that they were labeled in the community as the person who "knows about college" and were expected to answer questions about the experience from all types of community members (Orbe, 2004).

Lopez and Turley (2006) investigated the influence that parents have on when and where their children apply to college. The scholars posited that parents have both direct and indirect influences on their children as in terms of when and where they attend college. Parents who encouraged their children to take a break after high school to work or to attend college close to home most likely did not complete bachelor's degrees themselves and tended to be of a lower SES.

While parent and sibling relationships can serve as a source of support or tension, it is important to understand how these relationships affect first-generation students and their pursuit of educational goals. Parents and siblings demonstrate their support of students in college in various ways: college preparation advice and services, emotional support, and financial assistance while in college. Additionally, older siblings who already have some postsecondary experience can mentor younger brothers and sisters not only to attend college, but also to persist to bachelor's degree completion. The current

research study utilized two indicator variables of familial support as control variables: whether or not parents paid the student's tuition during the 1995-1996 academic year, and whether or not a student had at least one sibling with postsecondary education experience.

### *The Advantages that College Experience Provides*

The current research study examined bachelor's degree attainment outcomes between first-generation, some-college, and continuing-generation students. Previous research has shown that while some-college and first-generation students are both considered at risk compared to continuing-generation students, having a parent with college experience provides a slight advantage over first-generation students in several ways (Choy, 2000, 2002; Sherlin, 2002).

Students whose parents have college experience are almost twice as likely to enroll in higher education when compared to students whose parents have only a high school diploma or less (Choy, 2000, 2002). Sherlin (2002) sought to develop an empirically supported definition of first-generation students by comparing first-generation, some-college, and continuing-generation students on a number of academic, financial, environmental, institutional, and collegiate experience variables. First-generation students differed significantly from continuing-generation students on every single variable. Although first-generation and some-college students shared many characteristics, the two groups differed significantly on several financial variables, SAT score, and residence during the first year of college. Some-college students reported a higher average household income, greater levels of financial assistance, a higher SAT

score, and were more likely to live on campus during college. As such, Sherlin (2002) analyzed the three groups separately and did not combine the some-college group with the first-generation group. Similarly, the current research study acknowledged that some-college students are likely to have advantages over first-generation students. Therefore, the current study examined all three groups' pathways through postsecondary education separately.

### Pathways to Degree Attainment

While the study of postsecondary persistence has been present in the extant literature for decades, a more recent avenue of research has examined how students actually move through the educational pipeline. Scholars have focused on where students enroll and earn degrees, and the myriad exits, re-entries, transitions, and breaks that may occur before degree completion. As Cohen (2003) posited, "... the path to the baccalaureate is not smooth, nor does it follow a single direction" (p. 10). The current research builds upon the work of six main studies (Adelman, 1999, 2006; Cabrera, Burkum & La Nasa, 2005; Carroll, 1989; Goldrick-Rab, 2006; Hearn, 1992) that focused on various pathways to the baccalaureate or enrollment and attendance patterns in higher education. These studies were consulted to develop the pathways in the conceptual model for the current research study. This section includes the background literature on postsecondary pathways to degree attainment and literature on additional variables used in the current research study.

### *Background Research on Postsecondary Pathways*

The first study used nationally representative data from the High School and Beyond survey for high school graduates in 1980 to identify patterns in students' persistence related to when they entered postsecondary education, whether they enrolled with full-time or part-time status, and students' transfer and stop out behaviors (Carroll, 1989). Termed the "persistence track", Carroll defined the most traditional path to degree attainment as one where students enrolled in a four-year institution immediately after high school graduation, maintained a full-time status with no breaks in attendance, and earned a bachelor's degree within four years (p. 2). This pathway represents the ideal situation for both students and institutions. Students experience no break in the learning curve between high school and college, which ultimately benefits both students and the institution; this pathway also seems to be the most time and cost efficient. However, noting that a number of students increasingly earn degrees by following paths that deviate from the norm, Carroll studied students' "movement onto, along, and from the traditional persistence track" (p. 3) and examined differences by gender, race, SES, and institutional sector. Carroll's work organized students into four different tracks within six years after high school. Three of the tracks either directly or indirectly led to bachelor's degree attainment: students who started off track, students who left the persistence track, and students who remained on the persistence track. The fourth track indicated no degree attainment, either as a result of failing to enroll in postsecondary education or dropping out without returning.

Carroll (1989) found that fewer than one in ten students who began their postsecondary career "off-track" (e.g., entered a less than four-year institution,



matriculated on a part-time basis, or delayed entry) earned a bachelor's degree within six years of high school graduation. Only one in four students who began college immediately after high school, but subsequently left the persistence track, earned a degree. Changing enrollment to part-time status, stopping out, or transferring to a less than four-year institution decreased a student's chances of earning a bachelor's degree by almost half (Carroll).

Significant differences in routes to the baccalaureate existed between racial, gender, and SES groups. Asian students were the most likely to start their postsecondary career on the persistence track, as were women and students from a high SES (Carroll, 1989). However, whatever advantage women held over men as they began postsecondary education dissipated by the end of the fourth academic year as their cumulative rates of persistence equaled those of male students. In other words, while women began higher education with an advantage over men, they did not finish their college career with any advantage at all. High SES students started and persisted on track at a rate five times that of low SES students. While parents' education level was included in the SES composite, it was not examined individually as it was in the current study.

Of all students who deviated from the traditional persistence track, approximately one-half stopped out and nearly one-quarter dropped out (Carroll, 1989). African-American students were more likely than any other racial group to drop out while low SES students were three times more likely to depart higher education permanently than students from a high SES. In terms of degree attainment, Carroll posited that roughly one-half of those who started on track attained bachelor's degrees within six years compared to less than 10% of those who started off track.

The second study, also using data from the High School and Beyond class of 1980 graduating seniors, examined how background factors, academic factors, and educational aspirations determined the following nontraditional enrollment patterns: part-time status, delayed entry, and nondegree enrollment (Hearn, 1992). Hearn hypothesized that students who choose nontraditional enrollment patterns are those who encounter ascriptive influence (those who face pressure because of traditional social or cultural roles), socioeconomic constraint, academic marginality, and consistent nontraditionality (those who pursue other nontraditional enrollment options). Based upon the three nontraditional enrollment options, Hearn found that students embark on one of 13 possible postsecondary pathways within two years of high school graduation. Twelve paths were constructed from a combination of “two possible course-load levels (part-time or full-time), two possible timing patterns (traditionally timed attendance or delayed attendance), and three possible institutional types (non-degree-granting institution, two-year institution, or four-year institution)” (Hearn, 1992, p. 664). The other path included not attending, which included the largest percentage of participants. The next-largest group followed the traditional path. Five pathways drew very few participants, less than 1% each, but were still included in his model to represent every available pathway option based upon his variables of interest.

Using descriptive, discriminant, and logistic regression analyses, Hearn (1992) found that students pursuing the three nontraditional enrollment patterns were characterized by a lower level of SES, academic credentials, and educational aspirations. But the effects of race and gender varied by enrollment pattern. For example, men were much more likely than women to delay entry, but there were no gender differences

between full and part-time status. African-American high school graduates were more likely to delay entry, but once enrolled, they were more likely to do so full-time. While the effects of race and gender were not consistent across enrollment patterns, the effect of SES was fairly clear (Hearn, 1992).

Like Carroll (1989) and Hearn (1992), the third study focused on the progression of students from a low SES through the educational pipeline (Cabrera et al., 2005). These scholars examined the college paths of the 1980 high school sophomore cohort for 11 years post high school to mark two key milestones in higher education: transferring from a two-year institution to a four-year institution and persisting to bachelor's degree completion. Based on the level of academic resources gained in high school (low, medium, and high) and institution type of first postsecondary enrollment (four-year, two-year, or other), Cabrera and colleagues identified nine possible pathways to a four-year degree. Deemed Academic Resources-Institutional Choice paths, the scholars determined a strong correlation between the type of institution first entered and the level of academic resources gained in high school. The paths varied in their likelihood to lead students to a four-year degree. Similar to the traditional path or Carroll's (1989) persistence track, students who garnered a high level of academic resources in high school and entered a four-year institution were by far the most likely to earn a four-year degree (Cabrera et al.). In contrast, students who possessed low academic resources and entered two-year institutions were almost two-thirds less likely to earn a four-year degree in ten years. SES played a significant role in path choice. Students with a high SES were much more likely than students with a low SES to acquire high academic resources and enter a four-year institution. Regardless of academic preparation or first institution type,

students with a high SES were more likely to attain a four-year degree from all but one of the nine different pathways (Cabrera et al.).

Cabrera and colleagues (2005) found multiple determinants of successfully transferring from a two-year to a four-year institution. These factors included: SES, taking math and science courses, academic resources, educational aspirations, remedial education, financial aid, and not having children. Additionally, they found the following factors as determinants of bachelor's degree completion: SES, encouragement, academic resources, college aspirations, curricular choice, academic success, collegiate experiences, college path, financial aid, and not having children.

Of the nine different pathways to a four-year degree, highest SES students tended to follow the most successful routes while lowest SES students were more likely to follow the least successful tracks. However, as Cabrera and colleagues (2005) argued, "Not all pathways are equally accessible to all students" (p. 191). As the scholars posited, when pathways are partially determined by academic resources from high school, inequities present in high school will remain with students as they transition to postsecondary education. Lowest SES students would have been more likely to attend low-resource high schools, which affects the types of postsecondary institutions that they would be prepared to enter. While SES played a significant role in predicting transfer and degree completion, other factors can influence whether students will successfully navigate the pathway to the baccalaureate. Overall, the path that one follows can determine whether a four-year degree is attained or not (Cabrera et al.).

The fourth and fifth studies, while not specifically focused on postsecondary pathways, examined factors that contribute to bachelor's degree attainment among

students who attend four-year institutions (Adelman, 1999, 2006). Using nationally representative data from the 1980 sophomore cohort in the High School and Beyond dataset, Adelman (1999) studied students' enrollment, attendance, and bachelor's degree attainment patterns over eleven years post high school graduation. The variables that held the strongest relationship to degree completion included continuous enrollment (no breaks), transfer from two-year to four-year institutions, and college grades.

A considerable portion of Adelman's (1999) study focused on college attendance patterns, which is relevant to the other authors who wrote about pathways to the degree. One attendance pattern that served as the focus of his study and that differed from the work of previously mentioned scholars involved multi-institutional attendance, which occurs when students take classes at more than one institution during their college careers. However, attending multiple institutions does not necessarily mean that students transfer. One common example involves a student who is enrolled at a four-year institution who takes a course at a community college while home for the summer. Over 50% of students attend more than one institution over their undergraduate career, with those initially matriculating at highly selective four-year institutions and open-door institutions having the highest rates of multi-institutional attendance. However, Adelman (1999) posited that the number of institutions attended had no effect on degree attainment. Like Cabrera and colleagues (2005), Adelman found that students with bachelor's degree aspirations who enrolled in two-year institutions but never transferred to a four-year institution more often came from a lower SES. The likelihood of attaining a bachelor's degree increases by almost 10% once one earns thirty credits; of those who begin their postsecondary career at a highly selective college, 90% earn a bachelor's

degree. Seventy percent of those who transfer (from a two-year to a four-year institution) attain a bachelor's degree.

In 2006, Adelman published a follow-up study to his 1999 work using the National Education Longitudinal Study 1988/2000 (NELS:88/2000). He argued that the strongest predictor of bachelor's degree attainment was rigor of high school curriculum and that swirling among institutions (attending a number of institutions without formally transferring) proved detrimental to earning a bachelor's degree. Adelman's (2006) work also posited that continuous enrollment in higher education is crucial to moving forward; even enrolling part-time for a semester is better than taking a semester off from enrollment. Taking at least four credits during the summer positively influenced bachelor's degree attainment, especially for students of color.

While Adelman (1999, 2006) did not specifically reference pathways to degree attainment, much like the work of Carroll (1989), Hearn (1992), and Cabrera and colleagues (2005), he analyzed how transferring, attending multiple institutions, delaying entry, and maintaining continuous enrollment affected bachelor's degree attainment. His work identified a number of factors that displayed a strong relationship to degree completion.

Examining only students at four-year institutions, the sixth study identified four pathways to the baccalaureate, based on continuity of enrollment and number of institutions attended, and investigated whether social class differences were associated with the various pathways (Goldrick-Rab, 2006). The researcher used multinomial logit regression to predict the pathway that a student followed in order to determine if SES influenced the choice of path. Goldrick-Rab (2006) found that students from a

disadvantaged background are more likely to follow nontraditional pathways to earn a bachelor's degree; these pathways are less likely to lead students to degree attainment.

Several elements of the previous six studies are particularly relevant to the current research study. First, Carroll (1989) identified a traditional persistence track and compared deviations to that track, much as the current study attempted to do. All authors referenced thus far acknowledged the presence of the traditional, and most successful, path to bachelor's degree attainment. Second, Carroll noted that transfer and stop out are normally intertwined. Transferring to another institution can interrupt the persistence process if preceded by stop out. However, even though transfer and stop out present alternative routes from the traditional path, students can still earn degrees along these sequences; they just need additional time. As Hearn (1992) noted, 12 of his 13 pathways provided access to postsecondary education for students, even though some pathways were more predictive of degree attainment than others. The current study clustered transfer and stop out behaviors together as one deviation from the traditional path. Third, all six of these studies highlight the effects that SES has on postsecondary enrollment, persistence, and degree attainment, but fail to acknowledge specifically how parental education plays a role in keeping students on the persistence track. The current study focused more specifically on how parents' education affects students' institution of first enrollment, their actions while in college, and their bachelor's degree attainment. Fourth, these studies provide empirical evidence that the path to the baccalaureate is not a straightforward one for all students. Students can earn degrees by deviating from the traditional path, although it may prove costly in terms of time, resources, and chances for success.

### *Relevant Literature on Other Variables in the Model*

The conceptual model for the current research study includes pathways to the baccalaureate as differentiated by the institution of first enrollment (three options), and actions while in college (four options). This next section addresses persistence by institutional type and provides background information on proprietary institutions, transfer, and stop out.

#### *Persistence by institutional type.*

Several studies have addressed persistence and degree attainment rates by institution type. Students persist at higher rates at four-year private institutions than four-year public institutions (Barefoot, 2004; Ishitani, 2006). Adelman (1999, 2000) found that of students who began their postsecondary career at a highly selective institution, 90% earn a bachelor's degree. The most significant rates of dropping out occur at community colleges, although those data might be misleading considering that students enter those institutions for a variety of reasons. A large sector of students enter community colleges to transfer to four-year institutions, so their leaving the community college to transfer to a four-year college is actually a positive step in students' persistence through the system (Barefoot). Berkner and colleagues (2002) found that students who began their education at private institutions were more likely to complete their degree at their first institution of enrollment as opposed to students who began at public four-year institutions. Additionally, students at private four-year institutions were more likely to have finished their bachelor's degree in four years (52%) than students at public four-



year institutions (24%). Little research currently exists regarding persistence and degree completion rates of students at proprietary institutions.

*The importance of proprietary institutions.*

Other studies that focused on pathways to a four-year degree included the type of first institution attended as one of the key checkpoints that would determine a student's path. Carroll (1989) included three types of institutions: four-year, two-year, and less than two-year; Hearn (1992) broke down the categories as four-year, two-year, and vocational, while Cabrera and colleagues included four-year, two-year, and other. As demonstrated, the third category of institutional type has varied somewhat and little emphasis in the research to date has been placed on this category. The current research study specifically examined students' entry into four-year, two-year, and proprietary institutions. For-profit institutions (four-year and two-year) comprised their own category because they are a different type of institution from the traditional not-for-profits. Additionally, proprietary institutions are well known for serving nontraditional students, many of whom tend to be first-generation (Phipps et al., 2000). Forty-eight percent of students in proprietary schools are low-income, compared to only 26% at not-for-profit colleges and universities (Choy, 2000). Horn (1995) found that more African-American (20%) and Hispanic (15%) students enrolled in for-profit institutions than White (6%) or Asian (5%) students. For-profit institutions are an important topic for study, as they cater to first-generation, low-income, adult learners, and some minority groups, many of whom have delayed entry after high school. From a policy perspective, proprietary institutions compete with not-for-profit institutions for some forms of federal

student aid funding, yet few studies have examined students' persistence or success in these institutions.

Five main for-profit institutions educate more than 225,000 individuals annually at 275 college campuses (Ruch, 2001). For-profit education has increased access for adult learners and other nontraditional students by offering night and weekend classes and condensed academic terms. Students can take a three-credit class that only lasts six weeks rather than the traditional 10-week quarter or 15-week semester. This consideration alone encourages students to persist with their courses because they can attend class at times convenient to their work schedule and can move on to another course within a short time. Some institutions offer new class cycles monthly, as opposed to the semester or quarter system of traditional institutions. The sheer enrollment numbers alone are evidence that this type of educational pursuit is appealing to a substantial number of people (Ruch). The location of such institutions also makes this type of education accessible. Most for-profit institutions are conveniently located in urban areas, which not only make the institutions accessible to more people but also allow for quick and easy commuting after work for students. The University of Phoenix also offers distance education. Fischetti, Anderson, Watrous, Tanz, and Gwynne (1998) note, "4,700 students all over the world are taking classes and working toward Phoenix degrees while never leaving the comfort of their home computers, fax machines, and telephones" (p. 416).

Proprietary education remains relatively affordable compared to other types of institutions, especially considering that students attending for-profit schools are still eligible for the same amounts of federal financial aid available to students attending non-

profit institutions (Hittman, 1994). Ruch (2001) cited that the average cost per student at a for-profit institution is \$6,940, compared to \$17,026 for a public non-profit and \$23,063 for a private non-profit. Taking a business approach focused on efficiency, for-profit institutions make every effort to cut costs and then pass the savings along to their students, thereby making their institutions accessible financially.

For-profit institutions are very much market driven. Their courses and degree programs change quickly due to market research and other forms of assessment. They boast high job placement rates (DeVry's is 96%) because the programs are incredibly specific and targeted towards certain occupations (Ruch, 2001). This approach pleases employers who lobby higher education to take more of a job training approach. It also satisfies students who believe that they are earning a degree solely to prepare themselves for the work force.

While proprietary institutions provide educational access to a larger segment of the population, a number of negative aspects of the for-profit education approach exist. Proprietary education either occurs through distance learning or on campuses that are "sometimes little more than a few rented floors in a downtown office building" (Fischetti et al., 1998, p. 416). Absent are the learning and the student development opportunities that occur outside of the classroom on traditional college campuses. The college experience at a for-profit institution varies drastically from that at a not-for-profit institution. The five major for-profit companies have taken a mass production approach, where starting a new campus is similar to opening up another branch of a chain establishment. Course designers establish the content of each class and distribute the materials to the faculty, most of whom are adjunct (Fischetti et al., 1998). This business-

style approach contradicts the academic freedom and emphasis on student development present in the traditional academy.

Given the success proprietary institutions have had enrolling students, it is clear that these institutions will remain an important part of postsecondary education. Therefore, it is important to consider how these types of institutions play a role in a student's path to a college degree. The number of individuals who are served and the plethora of services provided increase access for a large segment of the population. For that reason alone, for-profit institutions appear to fill a gap in the educational system. But little research exists on the graduation rates of students at for-profits or the rates at which students transfer from proprietary schools to other types of institutions. The current study examined students with bachelor's degree aspirations who began their postsecondary path in the for-profit sector. Similar to community colleges, people attend proprietary institutions for a number of reasons (e.g., take one course for professional development, attain a certificate, earn an associate's or bachelor's degree). Many students who attend these types of institutions do not aspire to earn a bachelor's degree. Therefore, in the current study, the sample of students with bachelor's degree aspirations that begin their postsecondary career at a for-profit institution is small compared to the other institutional types, but much can be learned from examining the progress and attainment of these students.

#### *Transfer and stop out.*

When students transfer or stop out, they deviate from the traditional pathway to the baccalaureate. Transferring to another institution is often preceded by stopping out

(Carroll, 1989), so an indicator variable was created to link the two in the conceptual model used for this study (see Figure 3.1 in Chapter 3). If a student transfers, stops out, or does both, then he or she has left the traditional track to the baccalaureate and may earn the degree through alternate means. A traditional form of transfer involves moving from a two-year institution to a four-year institution. But students can also undergo lateral transfers, where they move between four-year institutions, or “reverse transfers” meaning that they leave a four-year institution to enroll in a less-than-four-year college or a for-profit school (Cohen, 2003; Horn & Kojaku, 2001; McCormick, 2003). As Cohen argued:

Looked at nationally, student transfer might best be viewed as a swirling relationship based on student situational characteristics rather than a linear process in which attendance follows a pattern of lower-division completion at one institution followed by matriculation and subsequent baccalaureate receipt at another (p.10).

Reverse transfer presents roadblocks to the bachelor’s degree, as the baccalaureate can only be earned at a four-year college or university. The conceptual model used in this study accounted for whether or not students transferred or stopped out, but did not consider changes in the status of institutions.

However, some scholars (Horn & Kojaku, 2001) define one pathway to a bachelor’s degree as continuous enrollment in any four-year institution. In other words, students enroll at a four-year institution and may transfer to other four-year colleges or universities, but cannot stop out or transfer to a less than four-year institution if they wish to remain on track. In following participants in the BPS:96/98 cohort three years after

matriculating to higher education, Horn and Kojaku found that slightly less than 40% of students who transferred to other institutions remained on track to earn a bachelor's degree compared to over 75% of students who stayed at their first four-year institution of attendance. This finding suggests that while some of these students transferred to a less-than-four-year institution (which put them "off track"), students who transferred were more likely to experience a break in enrollment than students who remained at their first institution of attendance. The researchers concluded that a relationship between stopping out and transferring institutions exists. Horn and Kojaku also examined patterns of transfer related to students' academic preparation in high school. They found that students who undertook a rigorous high school curriculum were more likely to transfer to selective institutions and much less likely to undergo a reverse transfer than their peers with a mid-level or core high school academic curriculum.

One path to the baccalaureate involves enrolling at a two-year college. In order to earn a bachelor's degree on this route, students must transfer to a four-year institution, but this path may include transferring to other types of institutions first, or stopping out. In fact, community colleges attract a fair number of high school graduates due to their accessibility and low cost. Cabrera and colleagues (2005) posited almost 25% of students from high academic resource high schools enrolled in two-year institutions, and these were the students who were seemingly best equipped to enter a four-year college. The two-year institution enrollments increased as the level of high school resources decreased (Cabrera et al.).

But some scholars critique the role that community colleges play in earning a bachelor's degree. Alfonso's (2006) research suggested that two-year institutions

significantly reduced the probability of earning a bachelor's degree when compared with four-year institutions, even when controlling for nontraditional pathways, educational aspirations, and self-selection into two-year or four-year institutions. In addition, nontraditional pathways were negatively associated with bachelor's degree attainment. Lee and Frank (1990) found that community college attendees comprised 40% of their college-going sample. But only one-fourth of these students had transferred to a four-year institution within four years of entering the community college. Of those students who majored in academically rigorous college programs, community college attendance was associated with a bachelor's degree attainment rate 10 to 20 percentage points less than students who enrolled immediately in a four-year institution. Lee and Frank posited that students who successfully transferred to a four-year institution had acquired better academic preparation in high school and came from higher SES families than those students who did not transfer. The researchers argued that the students who successfully transferred held the credentials that warranted direct entrance into a four-year institution in the first place, and they subsequently questioned the role that community colleges play in ameliorating social stratification in higher education.

Dougherty (1992) sought to explain the baccalaureate gap between students with bachelor's degree aspirations who initially enrolled in two-year colleges and four-year institutions. He asserted that students struggled to persist at three stages: the community college level, where students were more likely to drop out; the transfer stage, where students must successfully acclimate to a new institution; and the four-year institution, where the academic curriculum is likely to increase in rigor. Dougherty concluded that a significant gap exists in bachelor's degree attainment for students who initially enroll in

two-year and four-year colleges, even when controlling for differences in pre-entry characteristics, such as race, gender, SES, and academic preparation, between the two groups of students. This finding poses troubling implications for minority and lower-income students who are more likely to enroll in two-year colleges.

Leigh and Gill (2003) questioned the argument that enrollment in a community college actually worked as a roadblock against students pursuing bachelor's degrees. They found that whether or not students successfully transferred was highly dependent on whether they enrolled in transfer or terminal programs as well as the number of years of schooling that the student desired. For students who desired a minimum of 16 years of school, community college attendance was actually found to increase students' average educational attainment up to one year (Leigh & Gill). Koker and Hendel (2003) also found that enrollment in a four-year transfer program or cohort was highly predictive of whether or not students successfully transferred and attained bachelor's degrees.

Extant research has shown that transferring institutions often follows a period of stopping out (Carroll, 1989). A stop out indicator variable was included in this study because first-generation students are twice as likely as continuing-generation students to take a break from their studies at their initial institution of enrollment (Warburton et al., 2001). Stopping out is a somewhat common action for college students. O'Toole, Stratton, and Wetzel (2003) found that roughly half of all students in their sample stopped out for at least one term in the five years of the study. While this behavior extended the amount of time needed to earn the degree, a majority of the students in their study who stopped out did eventually earn the degree. Adult learners are more likely to stop out, due to external commitments, a full-time career, or other life circumstances



(Smart & Pascarella, 1987). Because first-generation students are more likely to be adult learners than continuing-generation students, stopping out constitutes an important reality for many of these students. While it will extend the amount of time needed to earn the degree, this break period may be necessary for some students to complete the degree.

### Summary

This chapter presented the theoretical and conceptual framework for the current research study. The work of Tinto (1993), Astin (1993) and Bean and Metzner (1985) provided a foundation for understanding college student persistence. Factors that affect the persistence of first-generation students were explored, as were the role of parents and siblings. The current study builds upon the postsecondary pathways work of Carroll (1989), Hearn (1992), Adelman (1999, 2006), Cabrera and colleagues (2005), and Goldrick-Rab (2006). Literature was reviewed on other aspects of the conceptual model, such as institution type, transfer, and stop out, to provide support for the decisions to include these variables in the study.

## CHAPTER III

### METHODOLOGY

#### Introduction

Numerous studies have identified predictors of bachelor's degree attainment for different groups (Adelman, 1999, 2000; Alexander et al., 1982; Arbona & Nora, 2007; Berkner et al., 2002; Cabrera et al., 2005; DesJardins et al., 2002; Hearn, 1992; Horn & Maw, 1995; Ishitani, 2006; Koker & Hendel, 2003; Peter & Cataldi, 2005; Swail et al., 2005). Much is already known about factors that positively and negatively influence students' persistence, eventually leading to bachelor's degree attainment. What still remains unclear is how students move through the postsecondary pipeline and how their rates of success vary by pathway and parents' education level.

The current study examined students' progress toward a bachelor's degree by identifying a number of direct and indirect pathways that students followed with the intention of earning a bachelor's degree. Specifically, this study focused on the differences in bachelor's degree attainment rates between first-generation, some-college, and continuing-generation students on paths within and across institutions. The current research study addressed three goals. First, examining degree attainment patterns of first-generation, some-college, and continuing-generation students highlighted differences between the groups, such as where students enrolled in college, how they moved through the educational pipeline, and when and where they attained degrees. Second, this study added to the available research on pathways by identifying myriad routes that students

followed in pursuit of a bachelor's degree, some of which did not lead to bachelor's degree attainment. Specifically, this study examined differences in how first-generation, some-college, and continuing-generation students progressed toward a bachelor's degree. Previous research has focused on the persistence of students from a low SES, of which parental education was considered. But few studies have examined how students' movements through higher education and bachelor's degree attainment rates differ by parents' education level. Finally, by using nationally representative, longitudinal data, this study assessed factors across institution types and time. Few studies concentrate on persistence across multiple institutions. Such an examination provides a more accurate analysis of how students move through higher education with the intentions of earning a bachelor's degree.

The following research questions guided this study:

1. What are the direct and indirect paths that first-generation, some-college, and continuing-generation students follow to attain a bachelor's degree within six years of entering college?
2. What are the success rates associated with pathways within and across institution types? Do success rates vary for first-generation, some-college, and continuing-generation students?
3. When controlling for selected background characteristics, familial support, and high school academic preparation, to what extent does the probability of earning a bachelor's degree vary among first-generation, some-college, and continuing-generation students at four-year and two-year institutions?

This chapter describes the research methodology and methods utilized for the current study. First, the dataset used for this analysis is described in detail. Then, the methods for statistical analysis are shared. Finally, this chapter addresses the conceptual model and includes complete descriptions of each variable.

### Database

This research study utilized nationally representative data from the BPS: 96/01 conducted by the Department of Education's National Center for Education Statistics in 1996, 1998, and 2001. This study followed a cohort of students who began postsecondary education in the 1995-1996 academic year. Even though all participants began higher education at the same time, they finished high school in different years. Unlike previous longitudinal, nationwide studies, the BPS:96/01 sample included participants who delayed entry to postsecondary education (Wine et al., 2002). The base year sample was drawn from another study conducted by the National Center for Education Statistics, the 1995-1996 National Postsecondary Aid Study (NPSAS:96), which focused on the ways that students and families financed postsecondary education.

Using a sample of NPSAS:96 participants who began college in 1995-1996 as first-time students, the BPS study conducted follow up interviews in the spring of 1998 (the end of the cohort's third academic year) and in the spring of 2001 (the end of the cohort's sixth academic year). The BPS:96/01 included six academic years of data, whereas a previous BPS study, 90/94, only included five academic years of data collection. BPS:96/01 focused on the postsecondary experiences, persistence, and attainment of the cohort, as well as employment among students who dropped out of

higher education (Wine et al., 2002). The sample included traditional and nontraditional students at four-year, two-year, less than two-year, and for-profit institutions.

Policymakers often use these data to address questions relevant to students' persistence in, and experiences with, higher education.

The BPS:96/01 study employed a two-stage sampling design in which eligible institutions were first identified and then eligible students were selected within those institutions. To be consistent with previous NPSAS studies, NPSAS:96, and subsequently BPS:96/01, included only those institutions located in the United States or Puerto Rico that offer courses open to students who have finished secondary education. Additionally, these institutions must offer at least one program of study, not including correspondence courses, that involves at least three months or 300 contact hours of instruction. With these restrictions, the sampling frame consisted of 9,468 institutions that were eligible for NPSAS:96 (Riccobono, Whitmore, Gabel, Traccarella, Pratt, & Berkner, 1997). Wine and colleagues (2002) reported, "Sample institutions were selected for NPSAS:96 with probabilities proportional to composite measures of size based on overall sampling rates by type of institution and type of student" (p.9).

To be eligible for NPSAS:96 and for the BPS:96 cohort, students were required to begin their postsecondary career at a NPSAS:96 sample institution during the 1995-1996 academic year. Students could not be concurrently enrolled in postsecondary education and high school, nor solely enrolled in a GED or other high school completion program. Students must have enrolled in an academic program, course, or occupational or vocational program between May 1, 1995 and April 30, 1996. All students were required to be first-time beginners, meaning that they had not previously enrolled in a

postsecondary institution. However, students who enrolled for one or most postsecondary courses after high school, but had not actually completed a course, were also considered first-time beginners and were eligible for the BPS:96 cohort (Wine et al., 2002). Of the 12,400 students eligible for the BPS:96 cohort, 10,300 completed the BPS:96/98 interview (83%). The BPS:96/2001 sample consisted of students who completed the BPS:96/98 interview, plus almost 1,800 NPSAS:96 respondents who were identified as first-time beginners of postsecondary education, but who did not complete the BPS:96/98 interview. After excluding respondents who had died since their last interview, the sample of eligible students for BPS:96/2001 included 12,100 students. However, the baseline sample of students who actually participated in all three waves of data collection consisted of 8,934 cases (86%). The final sample for BPS:96/01 represented all students who began postsecondary education in 1995-1996 (Wine, et al.).

Data collection occurred in three phases for NPSAS:96, which served as the base year for BPS:96/2001. First, information on students' financial aid was retrieved from the National Student Loan Data System (NSLDS) and the Department of Education Central Processing System (CPS), two units that track federal financial aid applications. Second, data were obtained from students' institutions through Computer Assisted Data Entry (CADE). Third, students and a smaller sample of parents were interviewed through computer assisted telephone interviews with respondents (CATI). The interviews were conducted at the end of the students' first year of college, between May and December 1996 (Riccobono et al., 1997).

For the first follow up survey in 1998 and the second follow up survey in 2001, information collected from the NPSAS for the base year of BPS was preloaded into the

database. The first follow up survey assessed students' experiences and persistence in postsecondary education (Wine, Whitmore, Heuer, Biber, & Pratt, 2000). The final follow up survey included the following sections: postsecondary enrollment and degree attainment, undergraduate education experiences, post baccalaureate education experiences (for those who had completed a bachelor's degree), employment information (if no degree had been earned or for the first job after earning a degree), and updated family and personal information (Wine, et al., 2002). To locate respondents from NPSAS:96 and BPS:96/98, researchers used a telephone and address matching process, mailed information to parents or known contacts months before the data collection began, and conducted searches through the Department of Motor Vehicles in several states. Intensive tracing was conducted by the Tracing Operations Unit through credit bureau checks and field locating (Wine et al., 2002).

Researchers utilized CATI and in person interviews (CAPI) to collect data for both follow up surveys. Prior to data collection, a staff was trained on the purpose of the study, confidentiality requirements, administrative procedures, and cooperation techniques. They were also provided hands-on practice time. Data collection for the follow up surveys occurred between February and November of 1998 and 2001. For the first follow up, interviewers averaged 15 calls per respondent and 23 calls per non-respondent, resulting in over 17,000 hours of interview time (Wine et al., 2000). For the second follow up, interviewers made an average of 19 calls per respondent and 34 calls per non-respondent, which resulted in over 15,000 hours of interview time (Wine, et al., 2002). The BPS:96/2001 survey required approximately 18 minutes to complete, which is less time than was required for the BPS:96/98 or the NPSAS:96 surveys. BPS:96/2001

respondents who were reached, but refused to participate (18%) were turned over to refusal conversion specialists who were successfully able to complete an interview with 74% of the cases. In addition, field interviews were conducted with those for whom no phone number was available. For BPS:96/2001, almost 12% of the cases were assigned to field interviewers. Eighty percent of those field cases were located and contacted, with 90% of that group completing an interview. Non-response incentives were offered to those who were hard to contact or refused to participate. The combined overall response rate for BPS:96/2001 was just over 88% (Wine et al., 2002).

The BPS:96/01 dataset has a number of strengths and several weaknesses related to the current research study. This survey tracked a large number of cases over six academic years in institutions across the country. Few datasets exist that contain nationally representative, longitudinal data. The purpose of this national study was to examine postsecondary persistence and degree attainment for a cohort representative of all students who entered postsecondary education in the mid 1990s, a goal similar to the current study.

However, the dataset is limited because some variables contain a large amount of missing data, which creates challenges for choosing solid measures of the constructs of interest. Missing data can make interpretation and analysis difficult. Additionally, participants self-reported some of the key variables, such as parental education level, which could lead to inaccurate information.

This dataset has several delimitations to consider. First, the sample included a cohort of students that began postsecondary education in the 1995-1996 academic year. All of these students earned a high school diploma or a GED at some point before the fall



of 1995, thereby making them eligible for higher education. Second, this dataset included cases that represented all types of postsecondary institutions across the United States and Puerto Rico. But for this particular analysis, the number of cases attending four-year or two-year institutions greatly exceeded the number of cases attending for-profits. Because the number of cases that expressed bachelor's degree aspirations and attended a proprietary institution is small, results applicable to for-profits should be interpreted with caution. Finally, this dataset contained only six academic years of data. A number of students take longer than six years to earn a degree, so this study only analyzes those that complete a bachelor's degree in a traditional number of years.

### Sample

A number of data filters were employed to build an analytic sample representative of the focus of the study. The sample for this study was limited to those students who participated in all three waves of data collection for the BPS:96/2001 and indicated aspirations of a bachelor's degree or higher at the time that they were first interviewed, at the end of their first year of college. A total of 6,459 cases met these criteria and served as the baseline sample. Cases that indicated a race of American Indian (51) or Other (41) were removed because these groups were too small to analyze individually. Cases that were missing data for parents' educational attainment (223) or students' degree attainment by 2001 (5) were excluded. Because parents' and students' educational attainment are the primary independent and dependent variables, respectively, mean substitution or other missing data techniques were not appropriate to use with these cases (Croninger & Douglas, 2005). Additionally, cases missing data for availability of

SAT/ACT score (79) were removed. Two cases were removed because of obvious typographical errors. The final analytic sample consisted of 6,074 cases. Table 3.1 highlights the means of each variable in the baseline and the analytic samples. Differences between the two samples were minor, and the analytic sample reflected the baseline sample from which it was drawn.

A number of techniques were employed to investigate missing data for the cases in the final analytic dataset. While roughly 30% of cases did not include an SAT/ACT score, a dummy coded variable indicated the availability of the SAT/ACT score for each case. If a score was unavailable, the student did not take either test because test score data were provided by Educational Testing Services (ETS) and ACT, and from the students themselves. Therefore, these scores were not actually missing; the student simply did not take the test. Cases that were missing the SAT/ACT score availability were excluded and were not included in the analytic sample. The indicator variable regarding score availability served the same purpose as a missing data flag and was entered into each logistic regression model to offset the effects of mean substitution for cases with no scores (Cohen et al., 2003). The cases that did not take the test could have been excluded from the sample, but were retained because each case expressed aspirations of earning a bachelor's degree.

For the delay entry variable, only four cases were initially marked as missing data. All four cases listed an age of 18, which fell below the average age of students who did not delay entry (which was 18.5). Therefore, these four cases were considered as having not delayed entry and were recoded as such.

Table 3.1  
*Descriptive Statistics of Baseline and Analytic Samples*

Variables	Baseline Sample (n=6,459)	Analytic Sample (n=6,074)
<b>Dependent Variable</b>		
Bachelor's Degree Attainment (%)	35.8	36.1
<b>First Institution of Attendance</b>		
Four-Year (comparison, %)	48.3	48.5
Two-Year (%)	46.2	46.0
For-Profit (%)	5.5	5.5
<b>Actions During College</b>		
No Movement (comparison, %)	48.0	48.3
Transfer (%)	19.7	20.0
Stop Out (%)	14.4	13.7
Transfer & Stop Out (%)	17.9	18.1
<b>Control Variables</b>		
<u>Race</u>		
White (comparison, %)	72.1	73.6
African-American (%)	12.3	12.3
Hispanic (%)	8.9	8.7
Asian (%)	5.3	5.3
<u>Gender</u>		
Male (comparison, %)	47.2	47.0
Female (%)	52.8	53.0
<u>Parents' Financial Support</u>		
Parents paid tuition during 1995-1996 academic year (%)	54.7	49.6
<u>High School Academic Preparation</u>		
SAT/ACT score	898.4	900.9
Didn't take SAT/ACT (%)	30.4	33.9
Delay Entry (%)	28.2	28.0
1994 Household Income (Median) <sup>†</sup>	41,669	40,278
Sibling College Attendance (%)	45.4	45.8

<sup>†</sup> Variable is listed in dollars. For the analyses, the variable is transformed and standardized.  
 SOURCE: Beginning Postsecondary Survey 1996/2001

Mean substitution and missing data flags were utilized to retain the remaining cases with missing data. Table 3.2 highlights the percentage of missing data on two remaining variables: parents paid tuition in 1995-1996 and sibling college attendance. Because each variable had a minimal amount of missing data, mean substitution and missing data flags were an appropriate technique (Croninger & Douglas, 2005).

While the variables are defined in more detail later in this chapter, Table 3.3 highlights the breakdown of the sample on all variables by parents' education level. The sample consisted of just over one-third first-generation students, roughly 23% some-college students, and nearly 44% continuing-generation students. To analyze mean differences among groups, two comparisons were made for each variable: first-generation versus some-college, and first-generation versus continuing-generation. Statistically significant mean differences are noted in Table 3.3.

The three groups earned bachelor's degrees at significantly different rates. Continuing-generation students were over twice as likely to earn a bachelor's degree as first-generation students. While the difference was less substantial, some-college students were still significantly more likely to earn bachelor's degrees than first-generation students.

A nearly equal percentage of the sample attended four-year and two-year institutions (49% and 46%, respectively), with a much smaller proportion attending for-profit institutions (6%). However, significant differences existed in how the three groups were distributed across institution types. Many more continuing-generation students attended four-year institutions, while more some-college and first-generation students attended two-year and proprietary institutions.

Table 3.2  
*Percentage Missing Data in Analytic Sample by Parents' Education Level (n=6,074)*

Variables	Continuing- Generation (43.9%)	Some- college (22.8%)	First- Generation (33.4%)	All Students (100%)
<b>Dependent Variable</b>				
Bachelor's Degree Attainment	0	0	0	0
<b>First Institution of Attendance</b>				
Four-Year (comparison)	0	0	0	0
Two-Year	0	0	0	0
For-Profit	0	0	0	0
<b>Actions During College</b>				
No Movement (comparison)	0	0	0	0
Transfer	0	0	0	0
Stop Out	0	0	0	0
Transfer & Stop Out	0	0	0	0
<b>Control Variables</b>				
<u>Race</u>				
White (comparison)	0	0	0	0
African-American	0	0	0	0
Hispanic	0	0	0	0
Asian	0	0	0	0
<u>Gender</u>				
Male (comparison)	0	0	0	0
Female	0	0	0	0
<u>Parents' Financial Support</u>				
Parents paid tuition during 1995-1996 academic year	3.1	2.9	4.9	3.6
<u>High School Academic Preparation</u>				
SAT/ACT score	0	0	0	0
Didn't take SAT/ACT	0	0	0	0

Table 3.2  
*Percentage Missing Data in Analytic Sample by Parents' Education Level (n=6,074)*  
*Continued*

Variables	Continuing- Generation (43.9%)	Some- college (22.8%)	First- Generation (33.4%)	All Students (100%)
Delay Entry	0	0	0	0
1994 Household Income	0	0	0	0
Sibling College Attendance	2.7	1.8	2.6	2.5

SOURCE: Beginning Postsecondary Survey 1996/2001

Significant differences existed among the three groups regarding actions during college. Some-college students had the lowest average of no movement, which differed significantly from first-generation students. First-generation students transferred at significantly lower rates, but stopped out at significantly higher rates than the other two groups. First-generation students stopped out at double the rate of continuing-generation students.

Several significant differences existed in the background characteristics of the groups. First-generation students included nearly double the percentage of African-American students and nearly four times the number of Hispanic students compared to continuing-generation students. Some-college and first-generation students had more women, whereas men comprised the majority in the continuing-generation group.

Table 3.3

*Descriptive Statistics of Analytic Sample by Parents' Education Level (n=6,074)*

Variables	Continuing- Generation (43.9%)	Some-College (22.8%)	First-Generation (33.4%)	Total (100%)
<b>Dependent Variable</b>				
Bachelor's Degree Attainment (%)	51.6***	27.0*	22.1	36.1
<b>First Institution of Attendance</b>				
Four-Year (comparison, %)	61.5***	39.9	37.4	48.5
Two-Year (%)	35.8***	55.1	53.2	46.0
For-Profit (%)	2.7***	5.0***	9.4	5.5
<b>Actions During College</b>				
No Movement (comparison, %)	51.3	41.1**	49.2	48.3
Transfer (%)	21.4*	21.6	16.9	20.0
Stop Out (%)	9.0***	15.6	18.6	13.7
Transfer & Stop Out (%)	18.3	21.8**	15.2	18.1
<b>Control Variables</b>				
<u>Race</u>				
White (comparison, %)	80.7***	74.5***	63.6	73.6
African-American (%)	8.9***	14.8	15.1	12.3
Hispanic (%)	4.2***	7.1	15.9	8.7
Asian (%)	6.2	3.5	5.4	5.3
<u>Gender</u>				
Male (comparison, %)	52.5***	42.6	42.7	47.0
Female (%)	47.5***	57.4	57.3	53.0

Table 3.3

*Descriptive Statistics of Analytic Sample by Parents' Education Level (n=6,074) Continued*

Variables	Continuing- Generation (43.9%)	Some-College (22.8%)	First-Generation (33.4%)	Total (100%)
<u>Parents' Financial Support</u>				
Parents paid tuition during 1995-1996 academic year (%)	48.7	51.7	49.4	49.6
<u>High School Academic Preparation</u>				
SAT/ACT score	957.6***	843.2	834.8	900.9
Didn't take SAT/ACT (%)	30.9*	36.7	36.0	33.9
Delay Entry (%)	16.9***	26.9***	43.3	28.0
1994 Household Income (Median) <sup>†</sup>	40,446	40,000	40,247	40,278
Sibling College Attendance (%)	43.5*	45.0	49.2	45.8

\* p&lt;.05; \*\* p&lt;.01; \*\*\* p&lt;.001

The following comparisons were made:

First-generation and Some-College

First-generation and Continuing-generation

<sup>†</sup> Variable is listed in dollars. For the analyses, the variable is transformed and standardized.

SOURCE: Beginning Postsecondary Survey 1996/2001



Continuing-generation students scored noticeably higher on the SAT/ACT, and they were also more likely to take the test, indicating higher levels of college preparation. Additionally, double the percentage of first-generation students delayed entry to college when compared to continuing-generation students. First-generation students also reported a higher percentage of siblings with collegiate experience than did continuing-generation or some-college students. Household income did not differ significantly between groups, which contradicts other research that posits that first-generation students are more likely to come from a low-income background (Striplin, 1999). The median household income in 1994 was approximately \$40,000 a year for each group.

The BPS sample was drawn to represent all first-time college attendees in 1995-1996 nationwide. Certain subgroups were over sampled to increase their likelihood of being represented in the overall sample. A number of cross-sectional and panel weights were developed in order to maintain external validity and to control for over and under sampling of certain populations. The current research utilized a normalized panel weight to analyze longitudinal data from students who completed all three surveys in 1996, 1998, and 2001 (Wine, et al. 2002). However, because of the nesting structure of the data (institutions were sampled and then students were sampled within those institutions), using the sample weights alone could lead to an underestimation of standard errors, which increases the chance of type I error (Thomas et al., 2005). Therefore, the statistical analyses were conducted with AM software provided by the American Institutes for Research. This software is designed for use with data from complex samples and provides a more appropriate calculation of standard errors by using a Taylor-series approximation (American Institutes for Research, 2007).

## Statistical Analysis

Descriptive analyses and logistic regression were used to answer the research questions for this study. Descriptive statistics, including chi-square, t tests, and analysis of variance (ANOVA) were used to describe the sample and to test for significant differences between groups. To answer the first research question, the sample was filtered by group (i.e., first-generation, some-college, or continuing-generation). The frequencies at which students moved along each step of each path were calculated, recorded, and expressed as percentages. A step consisted of forward movement along a pathway as depicted in Figure 3.1, such as attending a four-year institution, transferring, or earning a bachelor's degree. These analyses aided in describing the frequency with which a particular group pursued a certain path or step of a path.

Similar descriptive analyses were used to answer the second research question. The percentages of each step of each pathway were multiplied to obtain the cumulative percentage of bachelor's degree attainment for the entire path, both within and across institutions. These success rates for first-generation, some-college, and continuing-generation students were compared for each path.

The third research question investigated the extent to which differences in bachelor's degree attainment rates among groups were altered with the introduction of variables such as selected background characteristics, familial support, high school academic preparation, and actions during college. Because the dependent variable of the study is dichotomous, the current study used logistic regression to answer the third research question. Logistic regression uses log odds to predict the maximum likelihood that an event will occur and is used with a binary dependent variable (Cabrera, 1994;

Thompson, 2006; Wright, 2000). In the current study, the dependent variable is bachelor's degree attainment (1=yes). Logistic regression estimates the probability of the dependent variable occurring for each group or case by assuming that the relationship between the dependent and independent variables can be represented by an S curve, or the logistic distribution (Cabrera). Because many college outcomes are dichotomous in nature, logistic regression is the most appropriate test to use (Cabrera).

Wright (2000) posited that five main conditions must be met for a logistic regression analysis to be considered valid. First, the dependent variable must be dichotomous. Bachelor's degree attainment, the dependent variable for the current study, met this condition (1=yes). Second, the outcomes must be statistically independent; there can only be one outcome for each case. In the current study, one earns a bachelor's degree or not. Third, the model should be correctly specified to contain all relevant predictors and no irrelevant predictors. While the selected control variables for the current study were chosen based on a thorough literature review and the accessibility of certain variables in the dataset, Wright argued, "In practice, however, the specificity assumption is rarely met" (p.220). Fourth, the categories of the dependent variable must be mutually exclusive and collectively exhaustive. The current study meets this fourth assumption because the two categories of the dependent variable are: 1=yes (earned bachelor's degree) and 0=no (did not earn bachelor's degree). Every case is a member of one and only one of these two categories. Either students earned a bachelor's degree or they did not. Fifth, larger samples are required for logistic regression than for linear regression. Wright recommends at least 50 cases per predictor variable. Considering that the current study contains over 6,000 cases, the dataset meets this requirement.

Log odds coefficients represent the change in log odds of the dependent variable associated with a one-unit change in the independent variable. Odds ratios (Exp (b)) reflect the number of cases that cited one outcome of the dependent variable divided by the number of cases that cited the other option of the dependent variable. Odds are not as straightforward as probabilities and can be difficult to interpret correctly (Osborne, 2006). However, to ease the interpretation, the log odds coefficients in this study were converted to Delta p statistics, which estimate the overall change that an independent variable has on a dependent variable. One other benefit of reporting Delta p statistics is that one can ascertain the relative magnitude of changes across variables if the variables are measured in a similar unit (Cabrera, 1994).

Cabrera (1994) offered several indicators to assess the goodness of fit of a logistic regression model. A decrease in scaled deviance ( $G^2$  or  $-2 \log$  likelihood) with each block of the model indicates that variables are being added to improve the model. Additionally, the ratio of scaled deviance to degrees of freedom ( $G^2/df$ ) below 2.5 indicates an improved model. The block  $\chi^2$  statistic determines whether the independent variables as a group are related to the dependent variable. Substantial reduction in the  $\chi^2$  statistic provides support for the full model. The percentage of cases correctly predicted (PCP) compares the number of cases predicted to be zero versus the number of cases predicted to be one. A high percentage of cases correct reflects a more predictive model. This statistic provides an overall indicator of fit similar to  $R^2$  in OLS regression. Finally, researchers can use pseudo  $R^2$ , but Cabrera (1994) cautioned against using this statistic as the sole indicator of model fit. In OLS regression, researchers rely on  $R^2$  to indicate how well a set of independent variables explain the variance in a dependent variable.

However, in logistic regression, “pseudo  $R^2$  represents, at most, the proportion of error variance that an alternative model reduces in relation to a null model” (Cabrera, 1994, p. 242). The current research study utilized the following four indicators to assess goodness of fit of the model:  $G^2$ ,  $G^2/df$ , block  $\chi^2$ , and PCP.

Two logistic regression analyses were conducted to answer the third research question. The same logistic regression test was used with all cases that began postsecondary education at four-year institutions and with all cases that began at two-year institutions. Logistic regression was used to answer this research question to determine if bachelor’s degree attainment differences existed among groups when controlling for selected background characteristics, familial support, high school academic preparation, and actions during college. In addition, interaction variables were entered into the model to determine whether the effects of parents’ education level varied by race, delay entry, SAT/ACT score, and the did not take test indicator.

Cohen, Cohen, West, and Aiken (2003) posited that in logistic regression, an interaction signifies the added amount over and above what the two variables could predict separately. Similar to ordinary least squares (OLS) regression, when considering using interaction terms in a logistic model, the regression of the logit of one variable depends on the value of the second variable, and vice versa. It should be noted that interaction terms could be significant in an OLS model, but not significant in a logistic model, or vice versa, depending on the scale of the dependent variable. Cohen and colleagues (2003) encouraged researchers to, “trust the results of the logistic regression model, which is more suited to the properties and error structure of binary outcome data” (p.494). The scholars also noted that interaction discrepancies between logistic and OLS

models were a part of the broader issue of model consistency across linear and nonlinear models.

The format of the logistic regression models were as follows:

Model 1: Parents' Education Level

Model 2: Background Characteristics

Familial Support

High School Academic Preparation

Model 3: Actions During College

Model 4: Interactions

Parents' Education Level by Race

Parents' Education Level by Delay Entry

Parents' Education Level by SAT/ACT Score

Parents' Education Level by Did Not Take Test

For Model 4, a forward, stepwise method was used. Only significant interactions were retained in the model. The variables that comprised each model are described in more detail later in this chapter.

### Conceptual Pathways Model

The conceptual model for the current research study (see Figure 3.1) highlights the direct and indirect paths to the bachelor's degree that serve as the main focus of this study. These paths were differentiated by two main checkpoints: type of first institution attended and actions during college. Three types of institutions were included in this study: four-year, two-year, and for-profit. The actions variables included: did not move,

transferred at least once, stopped out at least once, or transferred and stopped out at least once. The model consisted of 12 total pathways, not all of which led to bachelor's degree attainment. In Figure 3.1, the pathways are numbered from 1 to 12, starting at the top of the figure with 1 and working downward to 12 at the bottom of the figure. Pathway 1 occurred when students enrolled initially at a four-year institution, did not move or take breaks during their enrollment, and earned a bachelor's degree. Pathway 1 represented a direct path to the bachelor's degree because a student could earn the degree directly from the first institution attended. A direct path assumed that one began postsecondary education at an institution capable of awarding bachelor's degrees. In this model, only two direct pathways existed: pathway 1 and pathway 9. The other pathways in this model all represented indirect routes to bachelor's degree attainment or pathways that did not lead to bachelor's degree attainment.

Pathways 2, 3, and 4 also involved beginning college at a four-year institution. However, students deviated from the direct route illustrated in path 1 to transfer (path 2), stop out (path 3), or do both (path 4).

Paths 5 through 8 occurred at two-year institutions. All of these pathways were considered indirect routes because they required starting at two-year institutions, which do not award bachelor's degrees. Earning a bachelor's degree when matriculating at a two-year institution required a transfer, so only paths 6 and 8 were valid sequences. Pathways 5 and 7 resulted in dead-end routes. Attaining a bachelor's degree along these routes was not possible.

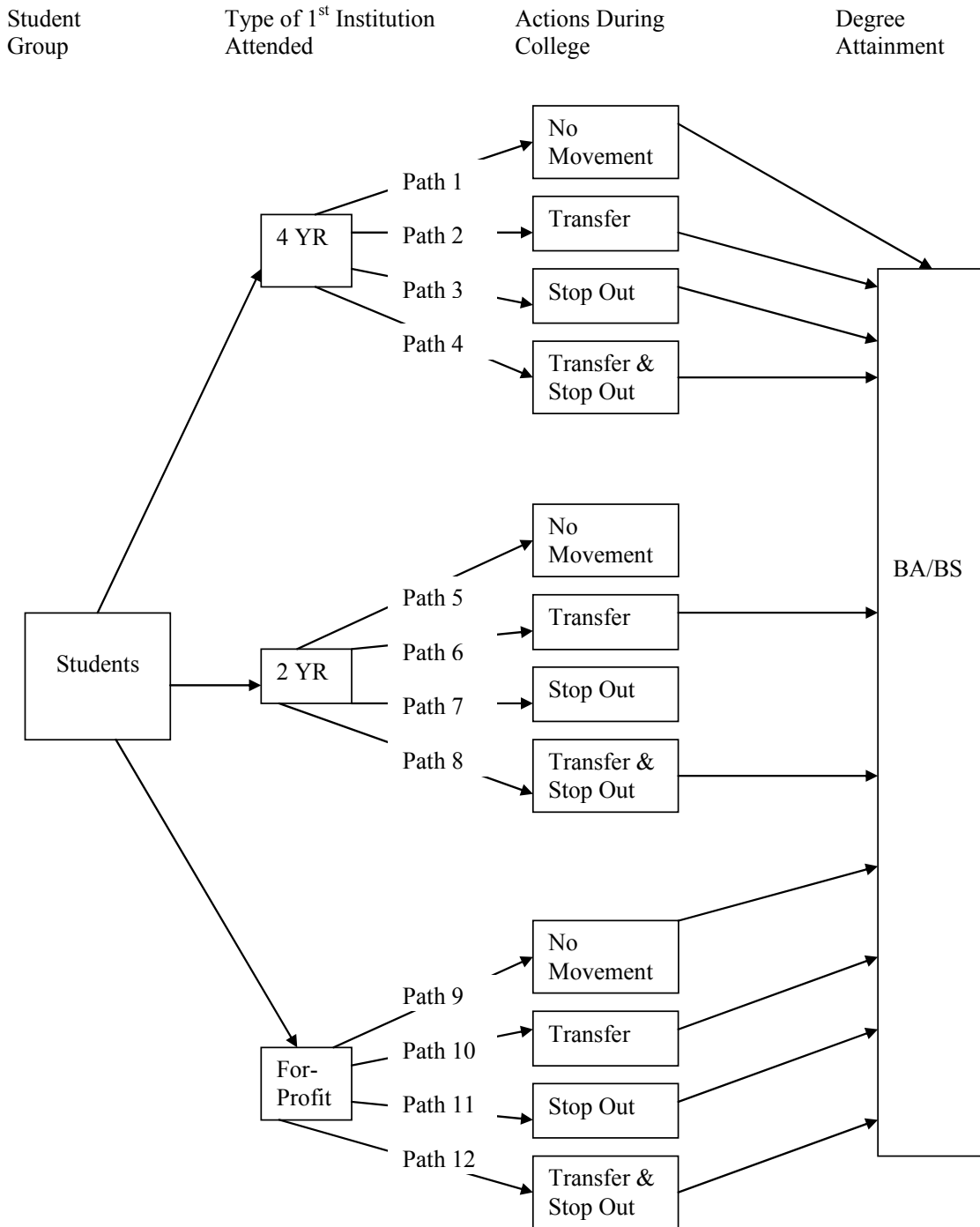


Figure 3.1. Conceptual model of postsecondary pathways for all students.



Paths 9 through 12 represented sequences that began at for-profit institutions. Because all types of proprietary institutions (four-year, two-year, and less than two-year) were included in this category, success along pathway 9 assumed that a student matriculated at a proprietary institution that awards bachelor's degrees. In this particular sample, only 14% of all cases in the proprietary sector matriculated at a bachelor's degree granting for-profit institution. Given this assumption, pathway 9 is the only other direct route to the bachelor's degree in the model. Pathways 10, 11, and 12 are all indirect routes because they involved a deviation from the direct path.

### Variables

In the logistic regression analyses, all categorical variables were dummy-coded and all continuous variables were standardized. As previously mentioned, the dependent variable for each analysis is binary. For a more thorough description of all variables used in the analyses, please refer to Table 3.4.

#### *Dependent Variable*

The dependent variable of the current study was bachelor's degree attainment (1=yes; 36.1%). This variable was derived from a question that asked for students' highest level of educational attainment as of June 2001, which was the end of the sixth academic year since the study's inception. The responses to the original question ranged from "no attainment" to "bachelor's degree" and were self-reported by participants (Wine et al., 2002). This original variable was recoded into a binary variable that indicated

whether or not a student earned a bachelor's degree by June 2001. Although a student may have earned a lesser degree or certificate, these outcomes were beyond the scope of this particular research study and were not considered. Any student who earned a lesser degree, was still enrolled at the end of six years, or had dropped out of postsecondary education was coded as not having earned a bachelor's degree. This use of a binary dependent variable to indicate bachelor's degree attainment followed the example of a number of other studies in which bachelor's degree attainment was the primary focus (Arbona & Nora, 2007; Cabrera et al., 2005; Hearn, 1992; Koker & Hendel, 2003; Lohfink & Paulsen, 2005).

### *Independent Variables*

A number of independent variables were used to control for the effects of parents' education level on bachelor's degree attainment. While the variables included in the model are by no means comprehensive of all potential control variables, selected background characteristics, familial support, high school academic preparation, and actions during college were explored. This section outlines the descriptions for each of the independent variables used in the current study.

#### *Parents' education level.*

Information regarding parents' education level was taken from a parents' survey collected during the base-year survey (NPSAS:96), and from students' surveys when direct information from parents was unavailable. The variable in the baseline survey represented the aggregated educational level of the parent with the greater educational

attainment. This variable was also edited when at least one parent's occupational and educational reports were discrepant (Riccobono et al., 1997). The variable in the baseline survey offered four educational attainment outcomes for parents: high school diploma or less, some-college experience, bachelor's degree, or post baccalaureate degree. For the purposes of the current study, this variable was recoded into three indicator variables: first-generation (33.4%), some-college (22.8%), and continuing-generation (43.9%). First-generation students consisted of students whose parents attained a high school diploma or less. This group was excluded from the model and used as the comparison group because they were the main population of interest in the study. The focus of the inquiry was to determine if attainment differences existed between first-generation and continuing-generation students, and first-generation and some-college students. Cases with a parent that attained some-college experience, but no degree, were considered some-college students. The two highest levels of attainment (bachelor's and post baccalaureate) were recoded into one category, which represented continuing-generation students (at least one parent held a bachelor's degree or higher).

While a number of studies examined differences only between first-generation and continuing-generation students (Chen, 2005; Nunez & Cuccaro-Alamin, 1998; Pascarella et al., 2004; Terenzini et al., 1996; Warburton et al., 2001), some recent work has also evaluated the characteristics of some-college students (Choy et al., 2000; Sherlin, 2002). Sherlin argued that first-generation students should be classified as only those whose parents have no college experience. The some-college group, while sharing several characteristics in common with first-generation students, differed significantly on enough variables that Sherlin posited that they should comprise their own group. The

attainment of some-college students is often higher than first-generation students, but lower than continuing-generation students (Choy; Sherlin). To advance knowledge regarding whether any college experience makes a difference, the current study examined bachelor's degree attainment differences among all three groups.

*Control variables.*

The following control variables were inserted into Model 2: race, gender, delay entry, household income, sibling college attendance, parental financial support, and high school academic preparation. A number of studies examined race, gender, and SES or household income as key background characteristics (Adelman, 1999, 2000, 2006; Astin, 1993; Bean & Metzner, 1985; Tinto, 1993). Because parents' educational level was included in the SES composite, a household income variable was used instead of the SES composite. In addition, delay entry was examined because first-generation students are much more likely to delay entry than the other two groups (Striplin, 1999). Sibling college attendance and parental financial support were included in the model because research has shown that familial involvement and support in one's educational endeavors can be especially important for first-generation students (London, 1989, 1996; Roberts & Rosenwald, 2001). High school academic preparation was included because of its ability to predict whether students attend, where they enroll, and their level of success (Adelman, 1999, 2006).

The data regarding race, gender, delay entry, and household income in the baseline study were obtained from financial aid records and interviews with students. The race variable in the baseline survey was recoded into four indicator variables for

White (73.6%), Asian (5.3%), African-American (12.3%), and Hispanic (8.7%) students. Cases that cited a race of American Indian (0.8%) or Other (0.6%), were excluded due to small sample sizes. Because they were the largest group, White students were excluded from the analyses and served as the comparison group. Two indicator variables were created for gender: male (comparison group; 47%) and female (53%). Because the two groups were roughly equal in size, either one could be used for the comparison group. For the current study, male students were used as the comparison group. Delay entry was included as an indicator variable (1=yes; 28%). The household income variable indicated the annual income in 1994 of the independent students and the parents of dependent students. This information came from the Free Application for Federal Student Aid (FAFSA) or was self-reported by parents and students. Because this continuous variable was positively skewed, it was transformed and standardized.

An indicator variable for sibling college attendance was included in order to control for the effects of at least one older sibling attending college. For first-generation students, having an older sibling that attended college might influence their actions and experiences in the academy. This information was obtained at the time of the baseline survey, and participants were asked to list the number of brothers and sisters who had experienced postsecondary education.

Table 3.4  
*Variables Used to Model Pathways to Bachelor's Degree Attainment*

Variable	Definition
<b>Dependent Variable</b>	
Bachelor's Degree Attainment	Recoded into a binary variable that indicated if a student earned a bachelor's degree by 2001 (1=yes)
<b>Independent Variables</b>	
<u>Background</u>	
Parents' Education Level	Recoded into three binary variables that describe the education level of the parent with the most education. First-generation (neither parent has college experience; 1= yes; comparison group); Some-college (at least one parent has postsecondary experience, but does not hold a bachelor's degree; 1=yes); Continuing-generation (at least one parent holds a bachelor's degree or higher; 1=yes).
<u>Institution Type of First Enrollment</u>	
Type of first institution of attendance in 1995-1996	Four-year not-for-profit (comparison group; 1=yes), Two-year or less-than-two-year not-for-profit (1=yes), For-profit (1=yes)
<u>Actions During College</u>	
No Movement Indicator	Did not transfer or stop out at all during the time window of the study (1=yes)
Transfer Indicator	Transferred institutions at least once, either by moving upward, downward, or laterally (1=yes)
Stop Out Indicator	Took a break from enrollment at least one time for a minimum of one semester or quarter (1=yes)
Transfer and Stop Out Indicator	Combined transfer <i>and</i> stop out at least once (1=yes)

Table 3.4  
*Variables Used to Model Pathways to Bachelor's Degree Attainment Continued*

Variable	Definition
<u>Control Variables</u>	
Race	White (comparison group; 1=yes), Asian (1=yes), African-American (1=yes), Hispanic (1=yes)
Gender	Male=0, Female=1
Delay Enrollment Indicator	Indicator variable of whether or not a student delayed entry to postsecondary education from high school (1=yes)
Indicator of Parental Financial Support	Indicator variable of whether or not students' parents paid their tuition during the 1995-1996 academic year (1=yes) A missing data flag is also included to offset the effects of mean imputation for missing data.
1994 Household Income	The transformed, standardized household income in 1994 of independent students or the parents of dependent students
Sibling College Attendance	Indicator variable of whether students had at least one sibling enrolled in or who had attended postsecondary education (1=yes) A missing data flag is also included to offset the effects of mean imputation for missing data.
College Preparation in High School	Two variables: derived SAT or ACT score (continuous variable, standardized), and an indicator for students who did not take either test (SAT or ACT) (1=yes/did not take either test)

SOURCE: Beginning Postsecondary Survey 1996/2001

Because of its positive skew, this continuous measure was converted to an indicator variable with one or more siblings with college experience set equal to one (43.8%). Although Sherlin (2002) did not find sibling college attendance to be a significant predictor of persistence from year one to year two, he did argue that this

variable positively influenced first-generation students' knowledge of financial aid, which could have a more direct effect on their overall attainment.

A measure of parents' financial assistance was included, which was intended to serve as an indicator of parental support. London (1989) posited that financial assistance was one source of parental support. The participants self-reported these data during the base year survey. This variable indicated whether or not parents paid students' tuition in the first year of enrollment (1=yes; 49.6%).

Finally, two measures of high school academic preparation were included: SAT/ACT score and a dummy-coded variable indicating that a student did not take either test. These measures were gathered from the baseline survey. ETS and ACT provided test score information and indicated if students took one of the two tests. SAT/ACT score is a standardized, continuous variable that indicates test scores. All ACT scores were changed to SAT scores using a conversion table (Wine et al., 2002). Finally, due to a large number of missing scores from students who did not take the test, an indicator variable was included that shows whether or not an SAT/ACT score was available for each case (1=no; 33.9%). Mean substitution was used to calculate scores for students who did not take the test. To reduce the mean effect, this indicator variable was included in the logistic regression model (Cohen et al., 2003). This variable could also be considered an indicator of students' motivation to attend an institution that required a standardized test score to gain admission. Bowen, Kurzweil, and Tobin (2005) posited that students whose parents are college-educated are seven times more likely than first-generation students to earn a standardized test score that will gain them entry into a selective, four-year institution.



### *Actions During College.*

Students' actions once enrolled in higher education were classified by four indicator variables: no movement, transfer, stop out, and transfer *and* stop out. The action that served as the primary path for a particular institution was used as the comparison group in the logistic regression analyses.

These data were obtained in steps during the first two follow up surveys in 1998 and 2001, respectively. Students' transfer and stop out behaviors were tracked by each academic year. These data were obtained from institutions and self-reported by students. The indicator variables for transfer and stop out were constructed by collapsing the data for each year into an overall indicator for whether the student transferred (1=yes; 20%), stopped out (1=yes; 13.7%), did not move (1=yes; 48.3%) or combined transferring with stopping out (1=yes; 18.1%). A transfer could involve an upward movement (moving from a two-year to a four-year), a lateral movement (transferring within the same sector), or a downward transfer (moving from a four-year to a two-year institution). A downward transfer failed to lead students to bachelor's degree attainment because it involves moving to an institution that does not award bachelor's degrees.

Carroll's (1989) work highlighted the importance of examining transferring, stopping out, and combining the two behaviors. Because students who begin at a two-year institution must transfer to earn a bachelor's degree (Adelman, 1999, 2006; Alfonso, 2006; Cabrera et al., 2005), this variable was important to consider in a study of pathways. Additionally, Warburton and colleagues (2001) posited that first-generation students were much more likely to take a break from enrollment than other students. Adelman (2006) argued that continuous enrollment served as one of the strongest

predictors of bachelor's degree attainment. Even reducing to part-time enrollment for a quarter or semester was better than not enrolling.

*Interaction terms.*

In order to explore the effects of parents' education level across different groups, several interaction terms were examined. First, because first-generation students represent a diverse group of races and ethnicities, parents' education level and race interaction terms were created and entered first into Model 4. Second, because first-generation students delay entry to postsecondary education at higher rates than other students, an interaction term of parents' education and delay entry was examined. Third, to explore whether the effects of parents' education differed across SAT/ACT scores and students who did not take the test, additional interaction terms were examined.

### Summary

This chapter addressed the methodology and methods that were employed in the current research study. Data were used from the baseline and first two follow up surveys of the BPS:96/01. Descriptive analyses and logistic regression were conducted to answer the research questions. These analyses highlighted the paths that students follow over six years with the intention of earning a bachelor's degree.

## CHAPTER IV

### RESULTS

#### Introduction

This study utilized descriptive analyses and logistic regression to answer three research questions. The first question, which sought to identify the pathways followed by first-generation, some-college, and continuing-generation students, was addressed by mapping potential routes to a bachelor's degree based on two key checkpoints: type of first institution attended and actions during college. Three options existed for the type of first institution attended by students: beginning college at a four-year institution, a two-year institution, or a for-profit institution. Actions during college consisted of four possible options: did not move, transferred at least once, stopped out at least once, or transferred *and* stopped out at least once. Based on these variables, this study identified and analyzed 12 pathways for first-generation, some-college, and continuing-generation students. Frequencies at each step along each pathway were calculated for each group of students. This mapping of sequences to examine percentages of students at various steps along the pathways is consistent with the work of other researchers (Cabrera et al., 2005; Carroll, 1989; Hearn, 1992).

Results of the second research question addressed the success rates along pathways both within and across institutions and by parents' education level. To answer this question, the percentages of students at each step along a pathway were multiplied to obtain the cumulative percentage of students who attained a bachelor's degree. These

cumulative percentages were calculated separately for first-generation, some-college, and continuing-generation students both within and across institutions to compare the performance of the three groups within similar institutions and across the institutional categories. The cumulative percentages of first-generation, some-college, and continuing-generation students were compared along each complete pathway, as well as their bachelor's degree attainment rates when starting at a particular type of institution. A number of studies have examined degree attainment differences by SES or race (Cabrera et al., 2005; Carroll, 1989; Goldrick-Rab, 2006; Hearn, 1992), but few studies have focused on these differences along pathways between first-generation, some-college, and continuing-generation students.

After examining bachelor's degree attainment differences among groups along the 12 pathways, question three examined the effects of background characteristics, familial support, high school academic preparation, and actions during college on bachelor's degree attainment. Logistic regression tests investigated whether bachelor's degree attainment differences among groups at four-year and two-year institutions dissipated when control variables were taken into consideration. Because the dependent variable, bachelor's degree attainment, is dichotomous (1=yes), logistic regression was the most appropriate statistical test for this study (Cabrera, 1994; Thompson, 2006; Wright, 2000). The multivariate analyses were conducted with close to 95% of the analytic sample: first, with all cases that began postsecondary education at four-year institutions and again with all cases that began college at two-year institutions. The for-profit sector was excluded from the logistic regression analyses due to a small number of total cases (6% of the analytic sample) that matriculated at those institutions. In addition to the control and

actions variables, this study included interaction terms to determine if the effects of parents' education level varied by race, delay entry, and SAT/ACT participation and score.

### Results by Research Question

This chapter presents the findings for each of the three research questions. The results are categorized by each question and summarized at the end of the chapter.

#### *Research Question 1: Direct and Indirect Paths*

The first research question sought to identify the direct and indirect pathways that first-generation, some-college, and continuing-generation students follow to earn a bachelor's degree in six years. Figure 3.1 in Chapter 3 outlined the 12 pathways identified in this study based on two different checkpoints: type of first-institution attended and actions during college. Upon entering college, students matriculated into one of three types of institutions: four-year institutions, two-year institutions, and for-profit institutions. Once enrolled at their first institution, students were faced with four potential actions: remain at the same institution (no movement); transfer to a new institution; take a break from enrollment (stop out); and transfer *and* stop out. The options at the two checkpoints created 12 different pathways, two of which could lead directly to bachelor's degree attainment, eight that could lead indirectly to bachelor's degree attainment, and two that failed to lead to bachelor's degree attainment.

The terms direct and indirect were used descriptively to depict pathways for this study. A direct path indicated that students matriculated in an institution that awarded bachelor's degrees and remained enrolled until degree completion. Direct paths were the most straightforward way to earn a bachelor's degree. Of the 12 pathways proposed in the conceptual model (see Figure 3.1), only two pathways were considered direct: pathway 1, enrollment in a four-year institution and no movement, and pathway 9, enrollment in a for-profit institution and no movement. The direct approach in pathway 9 assumed that the for-profit institution was also a four-year institution that awarded bachelor's degrees. While four-year, two-year, and less than two-year proprietary institutions exist, all for-profit institution types were grouped into the same category for this study because of the small sample sizes for each group. However, of students entering higher education through the for-profit sector, only 14% of cases initially matriculated in a bachelor's degree granting institution. An indirect pathway involved a deviation from the direct route by transferring, stopping out, doing both, or by initially enrolling in a two-year institution. Pathways 2, 3, 4, 6, 8, 10, 11, & 12 comprised the indirect pathways (see Figure 3.1). Two pathways in the model failed to lead to bachelor's degree attainment in every case. Students following pathways 5 and 7 never enrolled in a bachelor's degree granting institution and did not transfer, thereby eliminating any possibility of attaining a bachelor's degree.

The pathways were first explored with the full analytic dataset (all students) to illustrate the basic attendance, action, and completion patterns. To better understand the pathways by first-generation, some-college, and continuing-generation status, the analytic sample was filtered by each group, and percentages for each step of each path were

recorded. Examining the map of pathways by group illustrates how the different routes taken by first-generation, some-college, and continuing-generation students potentially influence their likelihood for bachelor's degree attainment.

*All students.*

Figure 4.1 illustrates the movement of all students along each pathway. Recall from Figure 3.1 that the pathways are numbered from 1-12, beginning with number 1 at the top and ending with number 12 at the bottom of the figure. Pathways 1-4 take place at four-year institutions, pathways 5-8 occur at two-year institutions, and pathways 9-12 involve for-profit institutions. As indicated by Figure 4.1, nearly equal percentages of all students initially enrolled in four-year institutions (49%) and two-year institutions (46%), while a much smaller percentage of students (6%) enrolled in for-profit colleges.

The four-year, no movement route led to the highest rate of success for students. Roughly 65% of students enrolled in four-year institutions pursued this route with 78% of those who did earning a bachelor's degree (pathway 1). A smaller percentage of students at four-year institutions transferred (13%), stopped out (9%) or transferred and stopped out (13%). Of these students, transferring had the highest rate of degree attainment (48%), followed by stopping out (30%) and transferring and stopping out (13%).

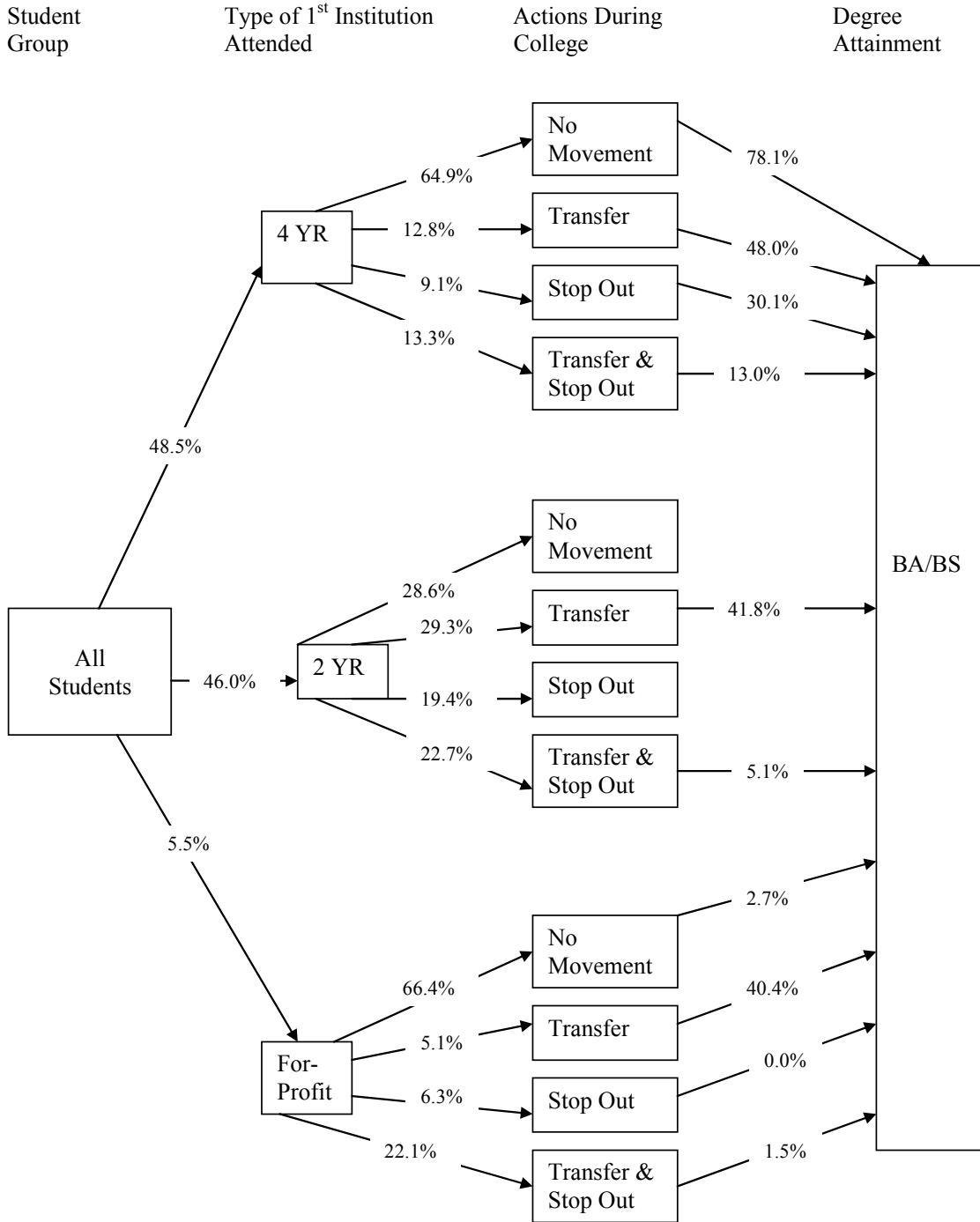


Figure 4.1. Postsecondary pathways for all students.



At two-year institutions, the most frequently taken paths involved no movement (pathway 5) or transferring to a four-year institution (pathway 6). More than half (58%) of all students took one of these routes, though only transferring resulted in any students (42%) attaining a bachelor's degree within six years. Another 19% of students stopped out without earning a degree and 23% combined transferring with stopping out. Of the latter group, only 5% earned a bachelor's degree.

In the for-profit sector, 66% of students showed no movement (pathway 9), with smaller percentages of students transferring and stopping out (23%), stopping out (6%), and transferring (5%). Of these routes, the least followed (pathway 10, transfer) resulted in the highest percentage of bachelor's degree attainment (just over 40%). The other three paths, all more frequently followed, resulted in no more than 3% of students succeeding in earning a bachelor's degree.

After examining the group as a whole, the analytic sample was filtered by parents' education level to better understand the actions of first-generation, some-college, and continuing-generation students. The following subsections describe each group's movements along all pathways.

#### *First-generation students.*

Figure 4.2 illustrates the movement of first-generation students along each pathway. Unlike the full analytic sample, fewer first-generation students (37%) matriculate at four-year institutions, with just over half (53%) attending two-year institutions. A larger proportion (9%) also enrolls at for-profit colleges and universities, a figure nearly double that of the full analytic sample. Of those who enter a four-year

institution, just over 60% remain enrolled in their first institution of attendance. Of those, 61% earn a bachelor's degree, making pathway 1 the most successful route for bachelor's degree attainment at four-year institutions. Of first-generation students who attend a four-year institution and transfer, just over 40% earn a bachelor's degree in six years. Stopping out and combining transferring with stopping out lessens the chances that a first-generation student will earn a bachelor's degree to roughly 23% and 8% respectively.

Considering that the majority of first-generation students begin their postsecondary careers at two-year institutions, it is worth noting that only 37% of these students follow one of the two paths that lead to a bachelor's degree: transferring (pathway 6) or combining transferring with stopping out (pathway 8). The percentage of students who took one of these paths in the full analytic sample is noticeably higher, approximately 52%. Upon entering two-year institutions, the most common action for first-generation students is not moving (37%), followed by stopping out (26%), transferring (22%) and transferring and stopping out (14%). Of the students who transfer, 36% earn a bachelor's degree. A substantially smaller percentage of students (6%) succeed in attaining a bachelor's degree by following pathway 8 (transferring and stopping out).

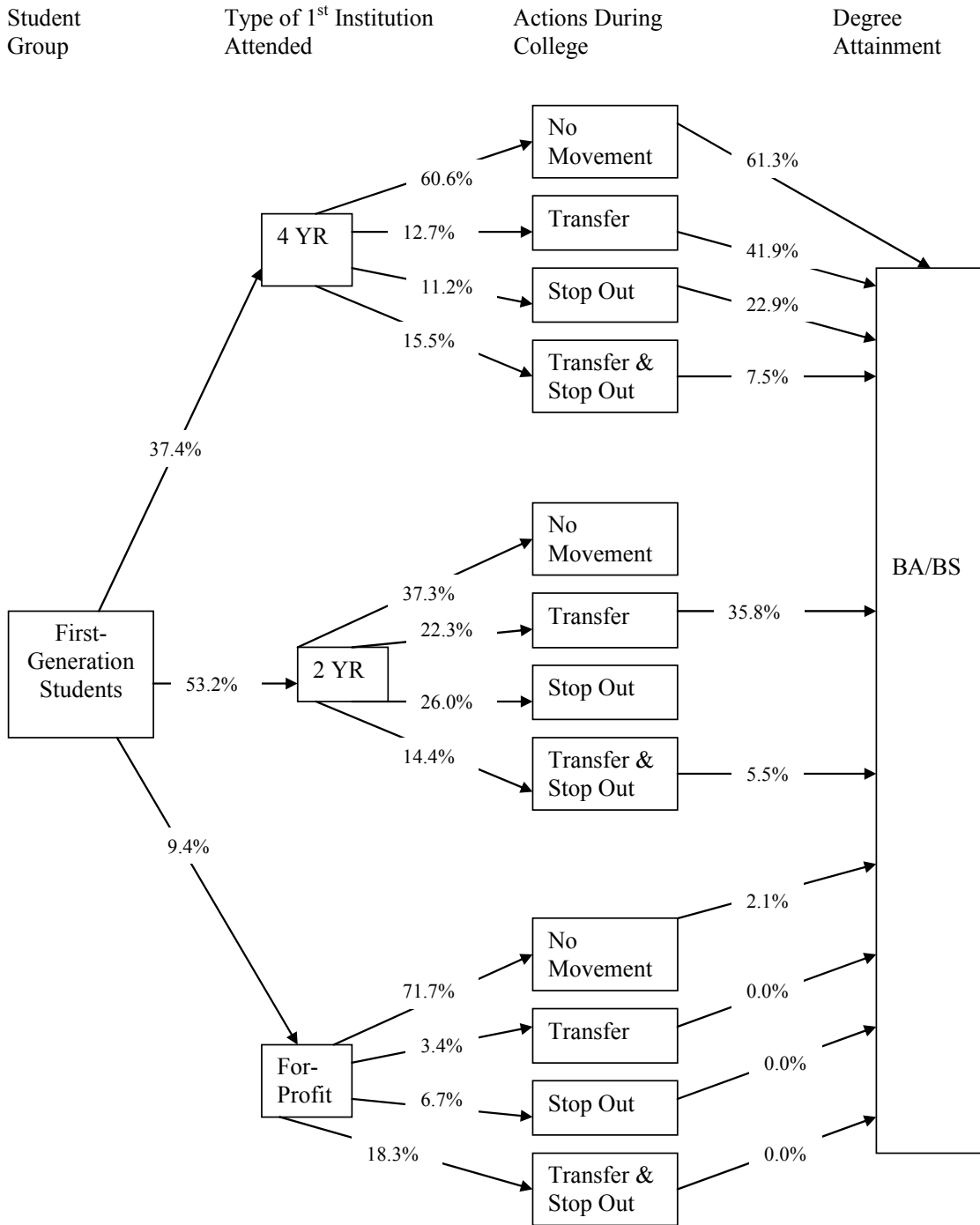


Figure 4.2. Postsecondary pathways for first-generation students.

Nine percent of first-generation students matriculate at proprietary institutions. Nearly three-quarters (72%) of this group remained at their initial institution, the only path that resulted in any first-generation student earning a bachelor's degree. However, the rates of success along this path were extremely low; only 2% of students who remained at their institution of enrollment earned a bachelor's degree. None of the students in this group who transferred, stopped out, or combined transferring with stopping out earned a bachelor's degree.

As with the overall population of students, the highest rates of bachelor's degree attainment for first-generation students resulted from students who attended four-year institutions but did not move. This finding is important to consider as four-year institutions are *not* the most highly attended academy for first-generation students.

*Some-college students.*

Figure 4.3 illustrates the movement of some-college students along each pathway. Nearly 40% of some-college students initially matriculated at four-year institutions, with 55% entering two-year colleges, and 5% enrolling in the for-profit sector. This breakdown is similar to first-generation enrollments, though noticeably fewer some-college students enroll in for-profit institutions. At four-year institutions, the majority of some-college students (59%) remained at their initial institution of attendance. The remaining students transferred (13%), stopped out (10%), or did both (18%). Nearly three-quarters (71%) of some-college students who remained at their initial four-year institution earned a bachelor's degree. Students at four-year institutions who transferred,

stopped out, or did both earned a bachelor's degree at substantially lower rates (46%, 24%, and 10%, respectively).

As mentioned, the largest proportion of some-college students entered the academy at two-year institutions (55%). Of those, 29% transferred, which led to the highest rates of bachelor's degree attainment from this type of institution. One-third of those who transferred earned a bachelor's degree within six years. Of some-college students who combined transferring with stopping out, only 3% earned bachelor's degrees. Almost half of all some-college students found themselves on fruitless pathways at two-year institutions: no movement (26%) and stopping out (20%). These figures were slightly lower than those for first-generation students.

For some-college students at for-profit institutions, the sequence that resulted in the highest rate of bachelor's degree completion involved transferring. Although transfers composed the smallest percentage of the some-college group (only 6%), 72% of those students earned a bachelor's degree. Of students who began at a for-profit institution, the largest percentage of students experienced no movement (59%), while the second largest percentage combined transferring with stopping out (26%). However, the rates of success along both of these paths were low. No more than 6% of students along each of these paths earned a bachelor's degree. A smaller percentage of students stopped out (9%) and never earned a bachelor's degree.

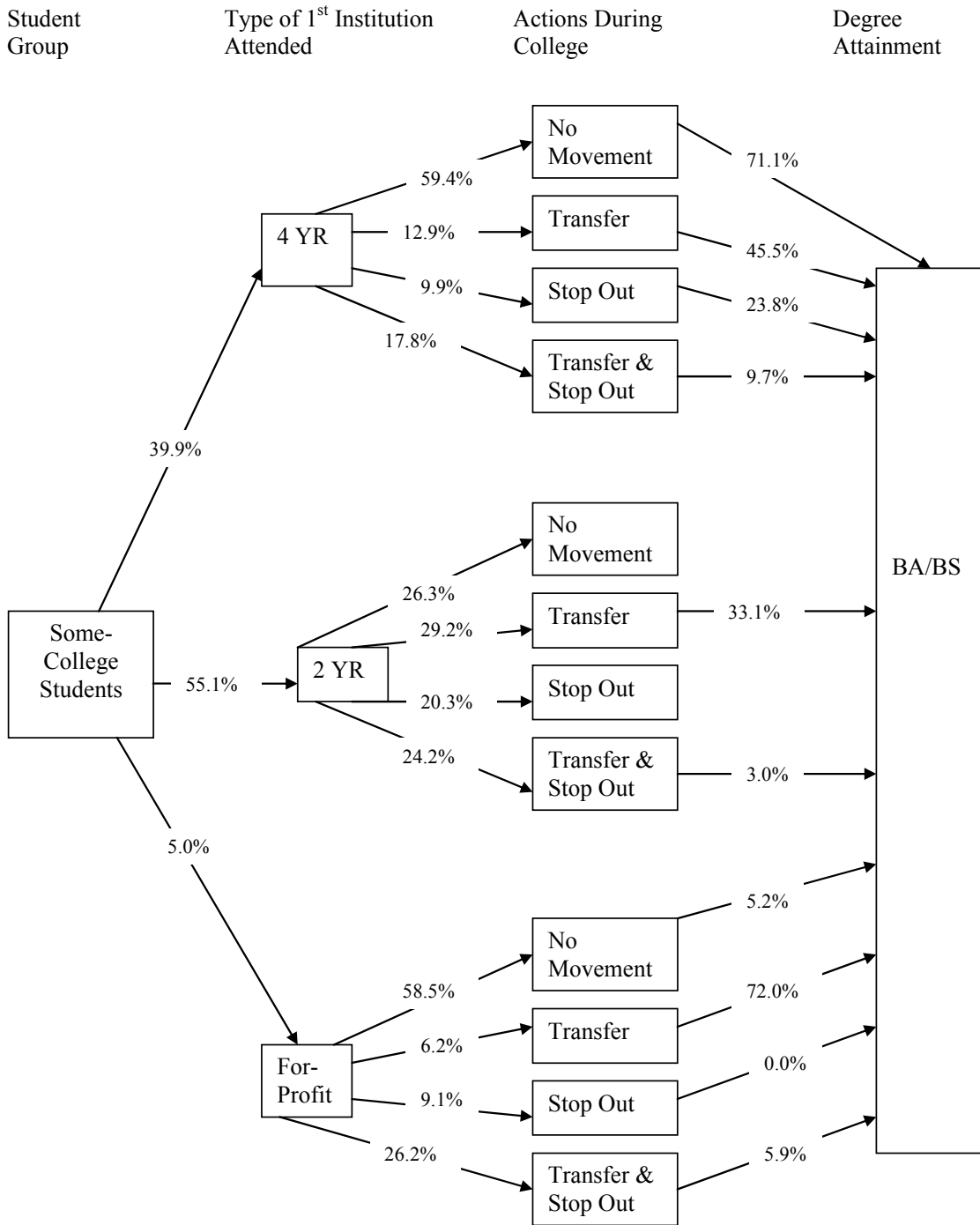


Figure 4.3. Postsecondary pathways for some-college students.

As with all other students, the highest rates of bachelor's degree attainment for some-college students involved attending a four-year institution and persisting until degree attainment. The second pathway with the highest success rate was attending a two-year institution and transferring, though the success rate for students who did so was considerably lower than for students who pursued the first pathway.

*Continuing-generation students.*

Figure 4.4 illustrates the movement of continuing-generation students along each pathway. Almost two-thirds of continuing-generation students began their college careers at four-year institutions (62%), with just over one-third entering two-year institutions (36%). Not quite 3% of continuing-generation students began college at proprietary institutions. This breakdown differs from what was observed in Figures 4.1, 4.2 and 4.3 in that many more continuing-generation students matriculated in four-year institutions than did the overall sample, first-generation students, or some-college students.

At four-year institutions, 69% of continuing-generation students remained enrolled at their initial institution of attendance (pathway 1). Of those at four-year institutions who did not move, 87% earned a bachelor's degree. This pathway resulted in the highest rates of bachelor's degree attainment for continuing-generation students. Of students at four-year institutions who transferred (13%), just over half were successful in earning a bachelor's degree within six years. The attainment rates decreased for students who stopped out (8%) or transferred and stopped out (11%). The attainment rate for these students was 37% and 19% respectively.

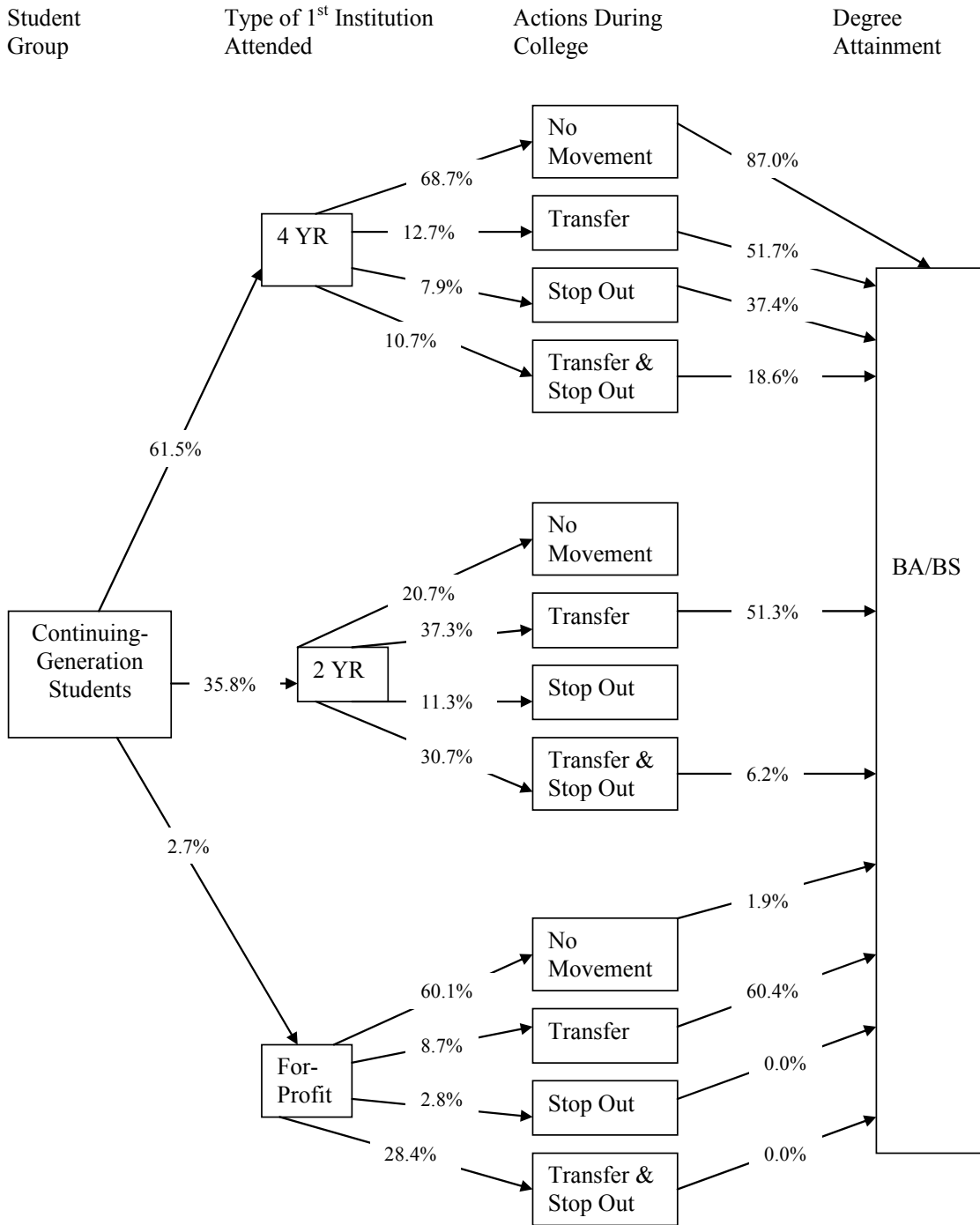


Figure 4.4. Postsecondary pathways for continuing-generation students.



The majority of continuing-generation students that entered two-year institutions followed pathways that led to bachelor's degree attainment (pathways 6 and 8). The largest percentage of students transferred (37%) or combined transferring with stopping out (31%). Bachelor's degree attainment rates along these two paths, however, differed substantially. Whereas 51% of continuing-generation students who transferred earned a bachelor's degree within six years, only 6% of students who combined transferring with stopping out succeeded in doing so. Nearly one-third of continuing-generation students embarked upon paths at two-year institutions that failed to lead to bachelor's degree attainment; however, fewer continuing-generation students followed these pathways than first-generation students or some-college students.

At for-profit institutions, the path that involved transferring appeared to be the most successful route for continuing-generation students, with 60% of such students earning a bachelor's degree. However, only 9% of continuing-generation students followed this path. The most frequently followed path at proprietary institutions involved no movement (60%), but very few students on this pathway earned a bachelor's degree (2%). No continuing-generation students who stopped out or who combined transferring with stopping out succeeded in earning a bachelor's degree.

Now that the pathways for all students and for each group have been described, the next research question addresses the success rates of these sequences by parents' education level. Although the prior text identifies general similarities and differences in the pathways among groups, subsequent text quantifies differences and similarities by comparing cumulative percentages of bachelor's degree attainment along each pathway both within and across institutions.

*Research Question Two: Success Rates Along Pathways by Institution Type and Parents' Education Level*

The second research question explored the bachelor's degree attainment rates associated with the pathways identified for research question one and how these success rates differed by parents' education level. To answer this research question, the percentages at each step along each path were multiplied to obtain the cumulative percentage of students who earned a bachelor's degree. These cumulative percentages were analyzed in two ways. First, the percentages of students who attained bachelor's degrees were examined *within* institutions; second, cumulative percentages were calculated *across* institutions (i.e., including first-institution type in the calculation of the rate of success). Success rates for each pathway were examined by comparing results for first-generation, some-college, and continuing-generation students. This section addresses the similarities and dissimilarities in success rates among all three groups both within and across four-year, two-year, and for-profit institutions.

*Cumulative percentages within four-year institutions.*

A number of differences occurred among first-generation, some-college, and continuing-generation students at four-year institutions. Table 4.1 highlights the bachelor's degree attainment rates along the possible pathways at four-year institutions (paths 1-4 in Figure 3.1).

Table 4.1 shows the cumulative success rates for each group in earning a bachelor's degree at four-year institutions (paths 1-4 in Figure 3.1). The first row of the table depicts the percentage of each group that initially enrolled in a four-year institution.

As noted earlier, continuing-generation students were the most likely to attend a four-year institution (62%), followed by some-college students (40%) and first-generation students (37%). Given that students entered a four-year institution, the cumulative percentages in the next four rows of the table depict the bachelor's degree attainment rate for each group for pathways 1-4. While Figures 4.1 through 4.4 listed the percentages of students at each step along a pathway, Table 4.1 shows the success rates for students at four-year institutions who completed all of the steps leading to a bachelor's degree. The bottom row of Table 4.1 shows the total percentage of students, regardless of pathway, who attained a bachelor's degree at four-year institutions for each group of students.

The most successful pathway to bachelor's degree attainment for students attending a four-year institution was no movement (pathway 1). Continuing-generation students had the highest success rate of 60%, followed by some-college students (42%) and first-generation students (37%). Although no movement was the most successful pathway for all students, the success rate for first-generation students was 23 percentage points lower than the success rate for continuing-generation students.

Table 4.1  
*Cumulative Percentages of Earning a Bachelor's Degree Within Four-Year Institutions (n=4,917)*

Pathways at 4 YR Institutions	Continuing- Generation	Some- College	First- Generation	All Students
Attending a Four-Year Institution	61.5	39.9	37.4	48.5
1: No Movement, BA	59.8	42.2	37.1	50.7
2: Transfer, BA	6.6	5.9	5.3	6.1
3: Stop Out, BA	3.0	2.4	2.6	2.7
4: Transfer & Stop Out, BA	2.0	1.7	1.2	1.7
Total for Paths 1-4	71.4	52.2	46.2	61.2

SOURCE: Beginning Postsecondary Survey 1996/2001

The percentages of students earning a bachelor's degree along the other three paths varied less by group, but the rates of success overall were fairly low. However, continuing-generation students were still slightly more successful along pathways 2, 3, and 4. When considering all of the pathways together, 71% of continuing-generation students earned a bachelor's degree when starting at a four-year institution. Some-college students and first-generation students had substantially lower success rates (52% and 46% respectively), mostly attributable to their lower success rates along pathway 1.

*Cumulative percentages within two-year institutions.*

Table 4.2 highlights the cumulative success rates of earning a bachelor's degree after initially enrolling at two-year institutions (paths 5-8 in Figure 3.1). As the first row of the table indicates, more than half of all first-generation (53%) and some-college students (55%) enrolled in a two-year institution at the beginning of their postsecondary career, compared to roughly one-third of all continuing-generation students (36%). Given that students entered a two-year institution, the cumulative percentages in the next four rows of the table depict the bachelor's degree attainment rate for each group for pathways 5-8. The bottom row of Table 4.2 shows the total percentage of bachelor's degree attainment for all students who started at two-year institutions.

While degree attainment rates were relatively low for all groups compared to cases that began at four-year institutions, continuing-generation students earned bachelor's degrees at double the rates of some-college and first-generation students. On pathway 6, transferring, 19% of continuing-generation students earned bachelor's degrees, whereas 10% of some-college students and 8% of first-generation students

succeeded in doing so. On pathway 8, transferring and stopping out, 2% of continuing-generation students earned bachelor's degrees, whereas less than 1% of some-college and first-generation students succeeded in doing so. When all of the possible pathways are considered together, 21% of continuing-generation students attained a bachelor's degree, 10% of some-college students did so, and 9% of first-generation students successfully completed degree requirements within six years.

Table 4.2  
*Cumulative Percentages of Earning a Bachelor's Degree Within Two-Year Institutions (n=842)*

Pathways at 2 YR Institutions	Continuing-Generation	Some-College	First-Generation	All Students
Attending a Two-Year Institution	35.8	55.1	53.2	46.0
5: No Movement, BA	--	--	--	--
6: Transfer, BA	19.1	9.7	8.0	12.2
7: Stop Out, BA	--	--	--	--
8: Transfer & Stop Out, BA	1.9	0.7	0.8	1.2
Total for Paths 5-8	21.0	10.4	8.8	13.4

SOURCE: Beginning Postsecondary Survey 1996/2001

*Cumulative percentages within for-profit institutions.*

There were also differences in success rates among first-generation, some-college, and continuing-generation students at proprietary institutions. However, because of the low number of cases in the analytic sample that matriculated at for-profit institutions (n=315), these results should be interpreted with caution. It is also important to note that all types of proprietary institutions were considered together in this analysis.

Therefore, four-year, two-year, and less-than-two-year for-profit institutions were clustered together. Because four-year proprietary institutions were included in this group, it was possible for a student to enroll at a proprietary institution, not move, and earn a bachelor's degree. Success along pathway 9 (see Figure 3.1) assumed that students had enrolled in a for-profit institution that awarded bachelor's degrees. However, only 14% of students in this sector initially matriculated in a bachelor's degree granting for-profit institution. Approximately 85% of all students entering the proprietary sector began at a two-year or a less-than-two-year for-profit institution, which required a transfer to earn a bachelor's degree.

Table 4.3 shows the total percentage of bachelor's degree attainment for all groups when starting at for-profit institutions (paths 9-12 in Figure 3.1). First-generation students were most likely to enroll in for-profit institutions (9%) followed by some-college students (5%); continuing-generation students were the least likely (3%). While degree attainment rates were relatively low for all groups compared to cases that began at four-year or two-year institutions, some-college students emerged with the highest rates of degree attainment along these paths (9%). First-generation students experienced very little success at for-profit institutions, with only 2% of the group earning a bachelor's degree. Roughly 6% of continuing-generation students succeeded along these pathways.

Table 4.3  
*Cumulative Percentages of Earning a Bachelor's Degree Within For-Profit Institutions*  
*(n=315)*

Pathways at For-Profit Institutions	Continuing- Generation	Some- College	First- Generation	All Students
Attending a For-Profit Institution	2.7	5.0	9.4	5.5
9: No Movement, BA	1.1	3.0	1.5	1.8
10: Transfer, BA	5.3	4.5	0.0	2.1
11: Stop Out, BA	0.0	0.0	0.0	0.0
12: Transfer & Stop Out, BA	0.0	1.5	0.0	0.3
Total for Paths 9-12	6.4	9.0	1.5	4.2

SOURCE: Beginning Postsecondary Survey 1996/2001

When considering the individual pathways, the most successful routes were no movement (pathway 9) or transferring (pathway 10). Approximately 2% of continuing-generation students reached degrees by maintaining continuous enrollment in a for-profit institution, followed by 3% of some-college students and 2% of first-generation students. Indeed, pathway 9 was the only pathway that led to degree attainment for first-generation students. Among students who transferred, 5% of continuing-generation students and some-college students earned a bachelor's degree. The largest percentage of students beginning higher education matriculated at a two-year or a less-than-two-year for-profit institution, which required a transfer to earn a bachelor's degree. Pathway 11, for this sample at least, became a dead-end route because no student succeeded along this path, whereas transferring and stopping out led to a bachelor's degree for only 2% of some-college students. No other students attained a bachelor's degree along this pathway.

*Cumulative percentages across all institutions.*

Answering research question two also involved examining the cumulative percentages for all paths across all institutional types. This approach compared the success rates for bachelor's degree attainment across both checkpoints (initial institution type *and* possible actions subsequent to enrollment). The percentages for each step (institution type, action, bachelor's degree attainment) of each path were multiplied to calculate the cumulative percentage of first-generation, some-college, and continuing-generation students who attained a bachelor's degree. These percentages represent the probability of success for students with aspirations to attain a bachelor's degree when they begin their postsecondary careers. Table 4.4 records these cumulative percentages for each pathway and each group across all checkpoints.

In Table 4.4, the pathways are clustered together by institution type. After each set of routes, a total column reflects the cumulative bachelor's degree attainment rates for each group on all paths associated with that institution. The difference between these figures and the percentages in Tables 4.1 (four-year institutions), 4.2 (two-year institutions), and 4.3 (for-profit institutions) is that the first step of each path, type of institution of first enrollment, has been multiplied with the other two steps, actions during college and bachelor's degree attainment rate. The previous tables focused on percentages only *within* certain types of institutions, whereas this final summary takes into account all steps along all pathways. The bottom row in the table reflects the actual percentage of students who earned a bachelor's degree across all the possible pathways identified in Figure 3.1.



Table 4.4

*Cumulative Percentages of Earning a Bachelor's Degree Across Institutions (n=6,074)*

Pathways	Continuing- Generation	Some- College	First- Generation	All Students
1: 4YR, No Movement	36.8	16.9	13.9	24.6
2: 4YR, Transfer	4.0	2.3	2.0	3.0
3: 4YR, Stop Out	1.8	0.9	1.0	1.3
4: 4YR, Transfer & Stop Out	1.2	0.7	0.4	0.8
Total for Paths 1-4	43.8	20.8	17.3	29.7
5: 2YR, No Movement	0.0	0.0	0.0	0.0
6: 2YR, Transfer	6.9	5.3	4.2	5.6
7: 2YR, Stop Out	0.0	0.0	0.0	0.0
8: 2YR, Transfer & Stop Out	0.7	0.4	0.4	0.5
Total for Paths 5-8	7.6	5.7	4.6	6.1
9: For-Profit, No Movement	0.0	0.2	0.1	0.1
10: For-Profit, Transfer	0.1	0.2	0.0	0.1
11: For-Profit, Stop Out	0.0	0.0	0.0	0.0
12: For-Profit, Transfer & Stop Out	0.0	0.1	0.0	0.0
Total for Paths 9-12	0.1	0.5	0.1	0.2
Total for All Paths	51.5	27.0	22.0	36.0

SOURCE: Beginning Postsecondary Survey 1996/2001

First-generation, some-college, and continuing-generation students shared several characteristics and a few differences. Pathway 1 led to the highest rates of bachelor's degree attainment for all groups, followed by pathway 6. Pathway 1 included the highest rate of success as a direct route to the baccalaureate, and pathway 6 led to the highest rate of success as an indirect sequence. Although pathway 1 remained the most successful route for first-generation and some-college students, the rate of success for these groups along this pathway was less than one-half the rate of success for continuing-generation students. Whereas 37% of continuing-generation students who took this route attained a

bachelor's degree, only 17% of some-college students and 14% of first-generation were equally successful. The differences in degree attainment rates along pathway 6 were less severe, but continuing-generation students (7%) still earned bachelor's degrees at higher rates than some-college (5%) and first-generation students (4%) along this route.

At four-year institutions, transferring, stopping out, or doing both appeared to be a substantial impediment to bachelor's degree attainment for all groups. The rates of success decreased with each action, and were especially low for students who combined transferring with stopping out. Although a low percentage of continuing-generation students were successful along pathways 2, 3, and 4, these pathways were even less positive for some-college and first-generation students.

As previously mentioned, pathways 5 and 7 at two-year colleges did not lead to bachelor's degree attainment. One other path that resulted in no case earning a bachelor's degree was attending a for-profit institution and stopping out. While it is theoretically possible to attain a bachelor's degree after a break in enrollment at a for-profit institution, no one in the analytic sample did so. Overall, the degree completion rates at for-profit institutions were extremely low. The success rate for students initially enrolling at a proprietary institution was nearly zero. This finding held true for all groups.

A key finding of these descriptive analyses is that even if first-generation students follow the most successful route (pathway 1), they still earn bachelor's degrees at substantially lower rates than continuing-generation students. When all groups take the same actions of entering a four-year institution and not moving, continuing-generation students earn degrees at 26 and 16 percentage points higher than first-generation and

some-college students, respectively (see Figures 4.2, 4.3, and 4.4). When taking into account the likelihood of matriculating at a four-year institution and not moving for each group along pathway 1, first-generation students earn bachelor's degrees at one-third the rate of continuing-generation students (see Table 4.4). The striking finding is that bachelor's degree attainment rates cannot be fully explained by a student's pathway. Differential consequences existed for students who followed the same paths, most notably at four-year institutions. Because noticeable attainment differences existed among first-generation, some-college, and continuing-generation students at four-year and two-year institutions, logistic regression was used to explore alternative explanations. The for-profit sector was not investigated with logistic regression because the number of cases beginning postsecondary education at proprietary institutions was too low to provide any conclusive results.

*Research Question Three: Degree Attainment Differences with the Introduction of Selected Control Variables*

The third research question investigated whether bachelor's degree attainment differences among groups remained when controlling for selected background characteristics, familial support, and high school academic preparation. Descriptive analyses indicated that first-generation, some-college, and continuing-generation students earned bachelor's degrees at four-year and two-year institutions at different rates. Therefore, the first logistic regression analysis was conducted with all cases that entered postsecondary education at four-year institutions (n=4,917). The second logistic regression analysis was conducted with all cases that matriculated at two-year institutions

(n=842). The for-profit sector was not investigated with logistic regression because of a small sample size (n=315). In addition to the control variables, the logistic regression models included actions during college (e.g., transferring) and selected interaction terms. This section outlines the results of the logistic regression analyses by type of institution.

Before conducting the logistic regression tests, correlations were computed for all variables in the four-year sample and two-year sample to investigate potential covariance. Appendix A details the bivariate correlations for all variables in the four-year institution sample, which includes all cases that began postsecondary education at a four-year institution. Appendix B lists the bivariate correlations for all variables for the cases that began college at two-year institutions. Relatively low correlations between variables existed, most likely because all but two continuous variables in the model were dummy-coded (household income and SAT/ACT score).

For those who began postsecondary education at four-year institutions, the dependent variable, bachelor's degree attainment, was slightly correlated with approximately three-quarters of the variables. Regarding these correlations, the lowest significant correlation occurred with "did not take the SAT/ACT" indicator ( $r=-.029$ ). The highest significant positive correlation existed with the "no movement" variable ( $r=0.470$ ). Bachelor's degree attainment was negatively correlated with first-generation and some-college status, but positively correlated with continuing-generation status.

For students who began college at two-year institutions, bachelor's degree attainment was slightly correlated with roughly half of the variables, and the lowest significant correlation occurred with Hispanic students ( $r=-0.071$ ). The highest significant correlation existed with transfer ( $r=0.536$ ). At two-year institutions,

bachelor's degree attainment was significantly negatively correlated with first-generation status and positively correlated with continuing-generation status.

*Four-year institutions.*

Even the introduction of control variables failed to completely explain bachelor's degree attainment differences between first-generation and continuing-generation students at four-year institutions. Although the models do not exhaust all of the possible explanations for between group differences in the probability of degree attainment, they include basic factors, such as academic preparation and family background characteristics, often associated with bachelor's degree attainment (Adelman, 1999, 2006; Ishitani, 2006; Lofink & Paulsen, 2005). Table 4.5 highlights the results of the logistic regression analysis. The table is organized to reflect the four progressively more complex models: parents' education level, control variables, actions during college, and interaction terms. Because first-generation students are the primary group of interest, they are the reference group for Model 1. In Model 2, White students are the reference group because they comprise the majority of the sample and male students are used as a comparison to stay consistent with previous research. In Model 3, the no movement variable is the reference group because it was the primary path at four-year institutions. Interaction terms regarding parents' education and race, delay entry, and SAT/ACT score and participation were entered into Model 4 in a forward stepwise method. Only significant interaction terms were retained in Model 4. For ease of interpretation, log odds coefficients were converted to Delta p statistics, which allow for the discussion of the change in probability associated with a unit increase in independent variables. Four

indicators were referenced to measure the goodness of fit of the models, and are included in the bottom section of Table 4.5. Appendices C, D, E, and F contain the log odds, standard errors, and odds ratios for each logistic regression model at four-year institutions.

Even when controlling for family background characteristics, familial support, and high school academic preparation, continuing-generation students were more likely to earn a bachelor's degree at four-year institutions than first-generation students. Being a continuing-generation student increased the probability of earning a bachelor's degree by 13.8 percentage points over being a first-generation student. While some-college students were 5.5 percentage points more likely to earn a bachelor's degree than first-generation students in Model 1, the addition of control variables in Model 2 mitigated this effect. The control variables also decreased some of differences between continuing-generation students and first-generation students in Model 1, but these variables failed to explain all of the advantage because the continuing-generation term was still significant in Model 4.

Table 4.5

*Change in Probability of Earning a Bachelor's Degree when Matriculating at Four-Year Institutions (n=4,917)<sup>†</sup>*

	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>	<u>Model 4</u>
	Parents' Education Level	Control Variables	Actions During College	Interactions
Constant	-0.037*	-0.001	0.163***	0.173***
Parents' Education Level				
Some-college	0.055*	0.012	0.036	0.035
Continuing-generation	0.208***	0.133***	0.155***	0.138***
Race				
Asian		0.047	0.039	0.042
African-American		-0.057	-0.073	-0.066
Hispanic		-0.076*	-0.092*	-0.090*
Gender (female)		0.095***	0.097***	0.098***
Delay Entry		-0.249***	-0.277***	-0.338***
Parents' Financial Support		-0.013	-0.009	-0.009
Missing: Parents' Support		-0.003	-0.023	-0.027
Household Income <sup>††</sup>		0.001	-0.002	-0.003
Sibling College Attendance		0.030	0.038	0.040
Missing: Sibling College Attendance		0.098	0.088	0.083
SAT/Converted ACT Score <sup>††</sup>		0.106***	0.089***	0.081***
Did Not Take SAT/ACT		-0.039*	-0.048*	-0.051*
Transfer			-0.329***	-0.333***
Stop out			-0.447***	-0.448***
Transfer & Stop out			-0.551***	-0.551***
Interaction: Continuing-generation by Delay Entry				0.136*
Interaction: Some-college by SAT/ACT				0.057*

Table 4.5

*Change in Probability of Earning a Bachelor's Degree when Matriculating at Four-Year Institutions Continued (n=4,917)<sup>†</sup>*

	<u>Model 1</u> Parents' Education Level	<u>Model 2</u> Control Variables	<u>Model 3</u> Actions During College	<u>Model 4</u> Interactions
G <sup>2</sup>	6297.24***	5762.67***	4666.87***	4649.53***
Df	4914	4902	4899	4897
G <sup>2</sup> /df	1.281	1.176	0.953	0.949
PCP	63.2%	68.9%	78.1%	78.4%
Block X <sup>2</sup> , df	268.38, 2***	534.57, 12***	1095.80, 3***	6.81, 1**
Model X <sup>2</sup> , df	268.38, 2***	802.95, 14***	1898.75, 17***	1916.09, 19***
Baseline p	0.613			

<sup>†</sup> The dependent variable is the log odds of earning a bachelor's degree within six years of enrollment in postsecondary education (1=yes, 0=no). Log odds have been converted to Delta p statistics. Baseline p indicates the probability of earning a bachelor's degree for the entire sample.

<sup>††</sup> Variable is standardized.

The models are specified to represent the most common path at four-year institutions. Therefore, the no movement term is excluded from Model 3 and serves as the comparison group.

\* p<.05; \*\* p<.01; \*\*\* p<.001

SOURCE: Beginning Postsecondary Survey 1996/2001



Several of the control variables are worth highlighting. The probability of Hispanic students earning a bachelor's degree was 9 percentage points lower when compared to White students (see Model 4). Women were 10 percentage points more successful than men in terms of earning bachelor's degrees at four-year institutions. Those who delayed entry were 34 percentage points less likely to earn a bachelor's degree than those who entered college immediately after high school. However, the significant interaction term in Model 4 indicated that delaying entry had less of an effect for continuing-generation students than for other groups. The higher a student's SAT/ACT score, the more likely that student was to earn a bachelor's degree at a four-year institution. For every one unit increase in SAT/ACT score ( $SD=1$ ), the probability of earning a bachelor's degree increased by 8 percentage points. The SAT/ACT score played a larger role for some-college students than for the other two groups of students, as evidenced by the significant interaction term in Model 4. This finding could be due to variation based on SAT/ACT scores within populations, but requires additional analysis to confirm such a hypothesis. Students who did not take the SAT/ACT were not as successful as those who did. Students who failed to take the SAT/ACT experienced a decrease in the probability of earning a bachelor's degree by 5 percentage points when compared to those who did take the test.

The results for various actions mirror those identified by the descriptive analyses. Students who transferred experienced a decrease in the probability of earning a bachelor's degree by 33 percentage points when compared to students who did not move from their first institution of attendance. Stopping out appeared even more detrimental to bachelor's degree attainment. Students who stopped out encountered a decrease in the

probability of earning a bachelor's degree by 45 percentage points. Students who both transferred and stopped out experienced the largest decrease in the probability of earning a bachelor's degree, a decrease of roughly 55 percentage points. At four-year institutions, deviations from the most direct path to the bachelor's degree (no movement) had substantial and significant negative effects on bachelor's degree attainment. Nonetheless, even though actions during college accounted for the largest percent of change in the probability of degree attainment, neither these variables nor the control variables fully explained differences in bachelor's degree attainment between first-generation and continuing-generation students.

Table 4.5 also includes the goodness of fit indicators for each model. In logistic regression, scaled deviance ( $G^2$ ) that decreases with the addition of variables indicates an improved model fit (i.e., the additional variables are related to the dependent variable). The model with the smaller scaled deviance with an associated  $p$ -value of less than 0.001 indicates the best fitting model. Table 4.5 indicates that the scaled deviance decreases across models, from 6,297 in the first model to 4,649 in the final model. The largest decrease occurs from Model 2 to Model 3 with the introduction of the actions during college.

The ratio of scaled deviance to degrees of freedom ( $G^2/df$ ) is another indicator of model fit. Cabrera (1994) recommended that this ratio fall under 2.5 to be considered an indicator of model fit. Table 4.5 indicates that each of the four logistic regression models meets this criterion.

The percentage of cases correctly reported serves as another indicator of model fit (Cabrera, 1994). This measure involves comparing the number of cases in the model

predicted to be 0 (no bachelor's degree) and 1 (earned bachelor's degree) for the total sample. Table 4.5 indicates that the percentage of cases correctly predicted increased with each model, from 63% in the first model to 78% in the final model.

The chi square statistics are the fourth indicators of model fit used in this study. The block chi square statistic tests whether the independent variables as a group have an effect on the dependent variable (Cabrera, 1994). These statistics indicate that the variables in Model 3 (actions during college) offered the largest contribution to the model's fit, followed by the control variables (Model 2). Overall, these goodness of fit indicators satisfy statistical standards for model specification and imply reasonable fit with the dependent variable, bachelor's degree attainment.

#### *Two-year institutions.*

Fewer significant differences emerged in the logistic regression analysis conducted with all cases that matriculated at two-year institutions. However, several results were clear. Table 4.6 highlights the results of the logistic regression analysis conducted with all cases that began postsecondary education at two-year institutions. As with the previous logistic regression model, log odds coefficients were converted to Delta p statistics for ease of interpretation. Four indicators measured the goodness of fit of the model. Appendices G, H, and I contain the log odds, standard errors, and odds ratios for each logistic regression model at two-year institutions.

Similar to the logistic regression test conducted with the four-year institution group, this analysis consisted of four progressively more complex models: parents' education level, control variables, actions during college, and interaction terms. Because

first-generation students are the primary group of interest, they were used as the reference group for Model 1. In Model 2, White students and male students served as the reference or comparison groups. In Model 3, the transfer variable was specified as the reference group because it was the primary path for students who attained a bachelor's degree at two-year institutions. Interaction terms regarding parents' education and race, delay entry, SAT/ACT score, and SAT/ACT participation were entered into Model 4 in a forward stepwise method. In this particular analysis, none of the interaction terms were significant, so they were eliminated from the model. The final model includes parents' education level, selected control variables, and actions during college.

Until the addition of the action variables in Model 3, continuing-generation students were significantly more likely than first-generation students to earn a bachelor's degree. In the first model, continuing-generation students were 17 percentage points more likely to earn a bachelor's degree than first-generation students. The addition of control variables in Model 2 lessened this effect to 11 percentage points. Adding the actions during college variables in Model 3 mitigated any significant differences between first-generation and continuing-generation students. No significant differences existed between some-college and first-generation students in any of the models.

Table 4.6  
*Change in Probability of Earning a Bachelor's Degree When Matriculating at Two-Year Institutions*  
 (n=842)<sup>†</sup>

	<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>
	Parents' Education Level	Control Variables	Actions During College
Constant	-0.119***	-0.114***	-0.063
Parents' Education Level			
Some-college	0.023	-0.012	-0.044
Continuing-generation	0.166**	0.110*	0.075
Race			
Asian		-0.011	-0.062
African-American		-0.091*	-0.097*
Hispanic		-0.083	-0.085
Gender (female)		0.076*	0.103*
Delay Entry		-0.101**	-0.070
Parents' Financial Support		0.041	0.047
Missing Data Flag: Parents' Support		-0.003	-0.062
Household Income <sup>††</sup>		0.001	-0.004
Sibling College Attendance		0.024	0.051
Missing Data Flag: Sibling College Attendance		-0.004	-0.003
SAT/Converted ACT Score <sup>††</sup>		0.030	0.034
Did Not Take SAT/ACT		-0.023	-0.006
No Movement			-0.134***
Stop out			-0.134***
Transfer & Stop out			-0.123***
G <sup>2</sup>	642.54***	586.26***	370.58***
Df	839	827	824
G <sup>2</sup> /df	0.766	0.709	0.450
PCP	86.6%	86.6%	89.5%
Block X <sup>2</sup> , df	21.20, 2***	56.28, 12***	215.68, 3***
Model X <sup>2</sup> , df	21.20, 2***	77.48, 14***	293.16, 17***
Baseline p	.134		

<sup>†</sup> The dependent variable is the log odds of earning a bachelor's degree within six years of enrollment in postsecondary education (1=yes, 0=no). Log odds have been converted to Delta p statistics. Baseline p indicates the probability of earning a bachelor's degree for the entire sample.

<sup>††</sup> Variable is standardized.

The models are specified to represent the most common path at two-year institutions. Therefore, the transfer term is excluded from model 3 and serves as the comparison group.

No interactions were significant in these models.

\* p<.05; \*\* p<.01; \*\*\* p<.001; SOURCE: Beginning Postsecondary Survey 1996/2001

A significant difference emerged between African-American and White students in Model 2 and Model 3. African-American students were 10 percentage points less likely to earn a bachelor's degree than White students. Women were over 10 percentage points more likely to earn bachelor's degrees than men (a result consistent with the results for four-year institutions). In Model 2, students who delayed entry were 10 percentage points less likely to earn a bachelor's degree than students who did not delay entry; this significant difference, however, was mitigated with the addition of the actions during college variables in Model 3.

All three of the actions during college variables were significant in Model 3. Students who remained at their first institution of attendance and who stopped out were 13 percentage points less likely to earn a bachelor's degree than students who transferred. Students who combined transferring and stopping out were 12 percentage points less likely to earn a bachelor's degree. Similar to the analysis of cases at four-year institutions, the actions during college variables explained a greater change in probability of bachelor's degree attainment than did any other set variables. The magnitude of these effects, however, are noticeably smaller for this population of students than for the population of students who attended four-year institutions.

Table 4.6 included the goodness of fit indicators for the regression models for two-year institutions. The scaled deviance ( $G^2$ ) decreased with the addition of each set of variables, which indicated that variables were added to the model that helped to improve its fit. The largest decrease occurred in Model 3, the actions during college variables. Additionally, the ratio of scaled deviance to degrees of freedom ( $G^2/df$ ) fell under 2.5 for each model, which also indicated model fit. The percentage of cases correctly reported

either remained constant or increased with each model, which served as another indicator of fit. The fourth indicator of fit included the chi square statistics. These statistics indicated that actions during college (Model 3) contributed most to model fit (Cabrera, 1994).

### Summary

This chapter provided a summary of the findings for each research question. Question one sought to identify and describe direct and indirect pathways to bachelor's degree attainment for first-generation, some-college, and continuing-generation students. Although first-generation students matriculated at two-year institutions more frequently, they earned a higher percentage of bachelor's degrees at four-year institutions along pathway 1 (see Figure 3.1). The same finding emerged for some-college students. Continuing-generation students, on the other hand, were more likely to initially enroll at four-year institutions. They too experienced the highest degree of bachelor's attainment rates along pathway 1.

Findings from the second research question highlighted bachelor's degree attainment rates along pathways within and across institutions, and analyzed these success rates by parents' education level. A number of differences emerged among first-generation, some-college, and continuing-generation students. While the pathways that led to the highest rates of degree completion were the same for all groups (pathways 1 and 6), the actual bachelor's degree attainment rate differed substantially among groups. Overall, the rate of degree attainment for continuing-generation students was substantially higher than the rate of degree attainment for some-college and first-

generation students. The pathways that students followed after high school did not fully explain the differences in success rates between continuing-generation, some-college, and first-generation students.

The third research question investigated whether or not attainment differences among groups remained with the introduction of selected control variables, actions during college, and selected interaction terms. At four-year institutions, a statistically significant difference in bachelor's degree attainment existed between first-generation and continuing-generation students, even after all variables were introduced into the final model. No differences were found, however, at two-year institutions after the introduction of variables that tapped students' actions during college.

Chapter five will elaborate on and discuss the findings of the research questions. In addition, implications, recommendations for future research, and limitations of the study will be addressed.



## CHAPTER V

### DISCUSSION

#### Introduction

This study contributes to the existing scholarship on pathways to degree attainment and students' movements through the postsecondary pipeline toward earning a bachelor's degree. Prior research (Cabrera et al., 2005; Carroll, 1989; Goldrick-Rab, 2006; Hearn, 1992) identified routes to degree attainment based upon particular variables of interest and then analyzed attainment differences by SES. The current study examined a number of direct and indirect paths that students followed to earn a bachelor's degree over six academic years, focusing specifically on how the success rates along these routes differed by parents' level of education. The current study first identified and mapped pathways based on type of first institution attended and actions during college, and then analyzed attainment differences along these pathways by institution and parents' education level. The current study also added to the extant literature about first-generation students, much of which is focused on describing background characteristics and basic attainment differences between groups, but not on the pathways that students who desire a bachelor's degree pursue (Bui, 2002; Engle et al., 2006; Hsiao, 1992; Ishitani, 2006; Kojaku et al., 1998; Nunez & Cuccaro-Alamin, 1998; Pascarella et al., 2004; Rodriguez, 2003; Saenz et al., 2007; Sherlin, 2002; Terenzini et al., 1996; York-Anderson & Bowman, 1991). Data from the base-year and first two follow-ups of the BPS:96/01 were used to answer the following research questions:

1. What are the direct and indirect paths that first-generation, some-college, and continuing-generation students follow to attain a bachelor's degree within six years of entering college?
2. What are the success rates associated with pathways within and across institution types? Do success rates vary for first-generation, some-college, and continuing-generation students?
3. When controlling for selected background characteristics, familial support, and high school academic preparation, to what extent does the probability of earning a bachelor's degree vary among first-generation, some-college, and continuing-generation students at four-year and two-year institutions?

This chapter summarizes the findings for each research question. The chapter also addresses the implications of the study and includes sections on contributions to policy and practice, limitations of the study, and recommendations for future research.

### Discussion of Findings Related to Research Questions

Descriptive analyses and logistic regression were used to answer the research questions. The first two questions involved plotting students' pathways and examining differences in success rates among first-generation, some-college and continuing-generation students. The last question used logistic regression to explore whether attainment differences among groups remained after the inclusion of selected control variables. This section will summarize the findings by question.

### *Research Question 1: Direct and Indirect Paths*

The first research question sought to identify direct and indirect pathways that first-generation, some-college, and continuing-generation students followed to earn a bachelor's degree in six years. Similar to how other scholars have mapped pathways by tracking students through various checkpoints of interest (Cabrera et al., 2005; Carroll, 1989; Goldrick-Rab, 2006; Hearn, 1992), this study identified possible routes to degree attainment by institutional type at first enrollment (four-year, two-year or for-profit institutions) and by actions taken during college (no movement, transferred, stopped out, or transferred and stopped out). The resulting model (Figure 3.1, in Chapter 3) consisted of 12 different pathways, ten of which potentially led to bachelor's degree attainment. Of the routes that led to bachelor's degree attainment, two sequences were considered direct and eight were considered indirect.

The full analytic sample was first analyzed in order to generally illustrate students' attendance patterns and actions. Nearly equal percentages of students enrolled in four-year and two-year institutions, with a small percentage matriculating at for-profit institutions (only 6%). The most frequently taken path to bachelor's degree attainment involved matriculating and remaining continuously enrolled at a four-year institution. Slightly more than three-quarters of students who followed this path earned bachelor's degrees. The next most frequently taken path involved students who matriculated at a two-year institution and transferred to another institution, though almost equal numbers of students in two-year institutions showed no movement, transferred and stopped out or simply stopped out. The least frequently taken path was associated with attending a for-profit institution.

When examining the postsecondary routes pursued by first-generation, some-college, and continuing-generation students, similarities and differences existed among groups. While continuing-generation students were more likely to initially enroll at four-year institutions, the largest percentage of first-generation and some-college students began college at two-year institutions. However, only one-third of the first-generation students who entered a two-year institution pursued routes that led to bachelor's degree attainment (pathways 5 & 7 in Figure 3.1). This percentage was substantially lower for first-generation students than it was for some-college students (47%) or continuing-generation students (68%). Although first-generation and some-college students more frequently began college at two-year institutions, their most successful pathway for earning a bachelor's degree was to enroll at a four-year institution and not move. Once enrolled in a four-year institution, first-generation and some-college students were just about as likely to pursue the most positive route to degree attainment (pathway 1) as continuing-generation students.

These findings support previous research in several ways. In the current study, a larger percentage of first-generation students began their college careers at two-year and proprietary institutions, which is consistent with previous research (Phipps et al., 2000; Striplin, 1999). Carroll's (1989) traditional path, or persistence track, produced the highest rates of attainment for all groups. This route (pathway 1 in Figure 3.1) led to the highest rates of bachelor's degree attainment for every group in the current study. A number of researchers argued that this route is the fastest, most direct route to the bachelor's degree with the highest rates of success (Adelman, 1999, 2006; Cabrera et al., 2005; Carroll, 1989; Hearn, 1992), and the findings of this study support that assertion.

Although the literature suggests that multi-institutional attendance and transferring have become more common in recent years (Cohen, 2003; Horn & Kojaku, 2001; McCormick, 2003), few studies have explored how these behaviors affect bachelor's degree attainment rates. Although transferring is a viable route to degree attainment, the traditional route (pathway 1 in Figure 3.1) was the most successful path to a bachelor's degree for all three groups. Even though the literature indicated that more students transfer or attend multiple institutions, the current study suggests that deviating from the initial four-year institution results in a lower bachelor's degree attainment rate for all groups. However, the current study included upward, downward, and lateral transfers. The lower degree attainment rates at a four-year institution that were associated with transferring could be attributed to the students who embarked on a downward transfer, which virtually eliminated students' opportunities for bachelor's degree attainment. Although the most common form of transfer from a four-year institution involved a lateral move, a smaller percentage of cases did transfer to a non-bachelor's degree-granting institution, which could affect the success rates along paths.

Students were far less successful following the only other direct pathway in the conceptual model (pathway 9 in Figure 3.1). This sequence was rarely followed by students, despite providing, in theory, a direct route to a bachelor's degree. Roughly 4% of all students took this route, and of that group only a fraction were successful. Transferring from one's initial for-profit institution, though it was a pathway taken less often, offered a higher likelihood of bachelor's degree attainment. This finding poses important consequences for first-generation students, who matriculate at for-profit

institutions at nearly double and triple the rates of some-college and continuing-generation students, respectively (Phipps et al., 2000).

The most successful indirect path involved matriculating at a two-year institution and transferring (pathway 6, Figure 3.1). In the current study, of all students who attended two-year colleges and transferred, about one-third of first-generation and one-half of continuing-generation students earned a bachelor's degree within 6 years. More students may eventually finish along this route, but require more than six years to complete the degree. This lower attainment rate for pathway 6 when compared to pathway 1 supports extant research on bachelor's degree attainment and community colleges (Alfonso, 2006; Lee & Frank, 1990).

*Research Question Two: Success Rates Along Pathways by Institution Type and Parents' Education Level*

The second research question compared bachelor's degree attainment rates along pathways by institution type and parents' education level. Cumulative percentages of the steps of each pathway were compared for all three groups, first within and then across four-year, two-year, and for-profit institutions. These analyses revealed the consequences of where students begin postsecondary education, as well as the repercussions of students' actions during college. Overall, the most important observation that can be derived from these findings is that differences in the pathways that students pursue do not fully explain differences in the success rates among first-generation, some-college, and continuing-generation students.

A larger percentage of continuing-generation students began college at four-year institutions than did some-college or first-generation students, and continuing-generation students also earned bachelor's degrees at higher rates than the other groups examined in this study. Even when continuing-generation students stopped out while at a four-year institution, a larger percentage of this group earned degrees compared to the other two groups. Although all three groups experienced decreasing success rates in earning a bachelor's degree at four-year institutions as students transferred, stopped out, or combined transferring with stopping out, these actions were less detrimental for continuing-generation students than for other students.

At two-year institutions, only two pathways legitimately led to bachelor's degree attainment. More first-generation and some-college students initially matriculated at two-year institutions when compared to continuing-generation students. But, as mentioned earlier, first-generation and some-college students, to a lesser degree, were less likely than continuing-generation students to pursue routes that ultimately led to bachelor's degree attainment. As with students who attended four-year institutions, continuing-generation students who attended two-year institutions had higher success rates than some-college and first-generation students, regardless of the path. Especially in four-year and two-year institutions, continuing-generations students had a significant advantage in attaining a bachelor's degree over their counterparts.

While the cumulative percentages of earning a bachelor's degree along a particular path were initially analyzed within institutions, cumulative percentages across institutions were also considered. This analysis revealed several important findings that relate to previous research. First, the type of institution where one initially enrolls

matters a great deal (Lohfink & Paulsen, 2005). Once institution of first enrollment was factored into the cumulative percentage for the path, the likelihood of earning a bachelor's degree decreased substantially for some-college and first-generation students. Students who began their college careers at four-year institutions experienced much higher rates of bachelor's degree attainment than did students who enrolled at two-year or for-profit colleges. This is an important finding considering that more first-generation and some-college students matriculate at two-year and for-profit institutions rather than four-year institutions (Choy, 2002; Striplin, 1999). The pathways at for-profit institutions especially resulted in low attainment rates, which is an important consideration for first-generation students, who attended these institutions at nearly double and triple the rates than some-college and continuing-generation students, respectively.

Stopping out impeded bachelor's degree attainment for all groups, although it appeared to have more of an effect at for-profit institutions than four-year institutions. No student at a for-profit, regardless of parents' education level, earned a bachelor's degree after stopping out. Students who stopped out at four-year institutions managed to earn the degree, although at lower rates than those who transferred or remained enrolled continuously at their first institution. Even though it is possible that some students who stopped out may have eventually earned a bachelor's degree, but outside the six-year window of the study, the absence of any successful case is striking.

As mentioned previously, one key finding of these descriptive analyses is that even if first-generation students embarked on the most successful route (pathway 1), they were substantially less likely than continuing-generation students to earn a bachelor's degree (61% versus 87%). Degree attainment rates cannot be fully explained by a



student's choice of path. Therefore, logistic regression was warranted to explore bachelor's degree attainment differences among groups.

*Research Question Three: Degree Attainment Differences with the Introduction of Selected Control Variables*

The third research question investigated whether bachelor's degree attainment differences among groups remained when controlling for selected background characteristics, familial support, and high school academic preparation. Actions during college and interactions between variables were also considered. Two logistic regression analyses were conducted with all cases that began postsecondary education at four-year institutions and two-year colleges, respectively. Cases that began postsecondary education in the for-profit sector were excluded from a logistic regression analysis because of a small sample size.

Although the small attainment difference between some-college students and first-generation students at four-year institutions vanished after including a number of control variables, a significant difference in attainment rates remained between first-generation and continuing-generation students. The final model indicated that continuing-generation students were roughly 14 percentage points more likely to attain a degree than first-generation students, regardless of family background, academic preparation, or actions taken during college. This finding supports the work of Choy (2002), Ishitani (2006), and Lohfink and Paulsen (2005), who posited that continuing-generation students were significantly more likely than first-generation students to earn bachelor's degrees within six years of enrollment. Actions during college had the

strongest relationship to degree attainment. Students who transferred, stopped out, or did both were all much less likely than students who remained continuously enrolled at their first institution of attendance to earn bachelor's degrees at four-year institutions. This finding supports previous work on postsecondary pathways and bachelor's degree attainment rates (Adelman, 2006; Cabrera et al., 2005; Carroll, 1989; Goldrick-Rab, 2006; Hearn, 1992; Horn & Kojaku, 2001; Swail et al., 2005). Nonetheless, while these actions influenced degree attainment, neither the control variables nor differences in these actions explained why first-generation students might have lower bachelor's degree attainment rates than continuing-generation students attending four-year institutions.

At two-year institutions, there were some noticeable differences in the basic findings. Without any control or action variables in the model, there was no difference in degree attainment rates between first-generation students and some-college students. There was a difference, however, between first-generation and continuing-generation students (roughly 17 percentage points). Nonetheless, after including the action variables in the model, differences in attainment rates between first-generation and continuing-generation students were mitigated. No movement, stopping out, or transferring and stopping out, all helped to explain differences in attainment rates. This result is consistent with the descriptive analyses that found first-generation students much less likely than continuing-generation students to pursue successful routes to degree attainment at two-year institutions.

Although not the focus of the study, several findings associated with the control variables support previous research and are worth noting. Hispanic students had lower attainment rates than White students, which is a finding in accordance with previous

research (Arbona & Nora, 2007; Horn, 1995; Perna, 2005; Swail et al., 2005). But in the current study, this effect was only evident in four-year institutions. This pattern of effects was just the opposite for African-American students, who had lower rates of attainment than White students, but only in two-year institutions. The actual number of African-American and Hispanic students in the sample enrolled in two-year institutions was quite low (108 or fewer cases for each group), which could influence the reliability of this finding. Female students were more likely to earn a bachelor's degree in both types of institutions, a finding consistent with Adelman's (1999, 2000, 2006) work. Delaying entry had a negative effect on degree attainment but only in four-year institutions, and these effects were greatest for first-generation and some-college students. SAT/ACT scores had a positive effect on degree attainment but only in four-year institutions, and these effects were strongest for some-college students. Finally, not taking the SAT/ACT had a negative effect on degree attainment, but, again, only in four-year institutions. One potentially meaningful, although non-significant, finding involved the influence of students' siblings with college experience. In the current study, having a sibling with college experience did not significantly affect a student's bachelor's degree attainment rate. Although qualitative studies have cited the strong influence that siblings can have, especially on first-generation college students (London, 1989; Roberts & Rosenwald, 2001), these assertions were not supported by the dataset used in the current study.

## Conclusions

Analyzing the routes that students with bachelor's degree aspirations follow to earn a bachelor's degree leads to a better understanding of where students initially enroll

in postsecondary education, their actions after enrollment, and their rates of success along various pathways. The current study advances knowledge about this topic by: 1) identifying and describing 12 postsecondary pathways that are differentiated by type of first institution of enrollment (three options) and actions during college (four options); 2) examining differences in success rates among first-generation, some-college, and continuing-generation students along each pathway both within and across institutions; and 3) examining degree attainment differences among groups at four-year and two-year institutions when taking into consideration selected background characteristics, familial support, high school academic preparation, and actions during college. At least three main conclusions can be drawn from the results of the research questions.

First, the type of institution where a student matriculates matters. Students who begin their college careers at four-year institutions are more likely to earn a bachelor's degree than students who begin college at other institutions. This finding supports previous research (Adelman, 1999; Cabrera et al., 2005; Hearn, 1992). The results from research question two demonstrate that, for the most part, all students earn bachelor's degrees at a higher rate on paths at four-year institutions than all students on paths at other institutions. The only exception to this finding is that students who enter two-year institutions and transfer earn bachelor's degrees at higher rates than students at four-year institutions who transfer, stop out, or do both. The overall success rate for earning a bachelor's degree along the most successful path (pathway 1, no movement at a four-year institution) was four times the success rate of earning a bachelor's degree along the second most successful path (pathway 6, transferring from a two-year institution).

Success rates for students who entered for-profit institutions were extremely low (well below 1%).

Some students were more likely to enroll in institutions associated with higher rates of bachelor's degree attainment. Continuing-generation students matriculated at four-year institutions at a rate over 20 percentage points higher than some-college or first-generation students, who were much more likely to enter two-year and proprietary institutions. Therefore, the majority of first-generation and some-college students in the analytic sample automatically began college at an institution associated with lower rates of bachelor's degree attainment. Although they looked at SES broadly rather than solely by parents' education level, Cabrera and colleagues (2005) argued that the most advantaged group tended to follow the most fortuitous pathways and the least advantaged group pursued the routes associated with lower levels of success. The findings of the current research study support this assertion, particularly in two-year institutions where continuing-generation students were much more likely to pursue routes that could lead to a bachelor's degree.

Considering that first-generation and some-college students entered four-year institutions at lower rates than continuing-generation students raises the question of whether these institutions are equally accessible to all groups of students. Although this study did not directly examine access to postsecondary institutions, some findings are consistent with the literature that has examined this issue. For example, a larger percentage of some-college and first-generation students failed to take the SAT/ACT in this study. Taking a college entrance examination is a part of the college preparation process, and first-generation students are less likely than continuing-generation students

to perform those necessary tasks (Warburton et al., 2001). Additionally, first-generation students scored significantly lower on the SAT/ACT than did continuing-generation students, potentially inhibiting enrollment at their preferred four-year institutions.

The literature has shown that first-generation students are much more likely to enter two-year colleges and for-profit institutions (a finding consistent with the results of this study), possibly due to an interest in maintaining close proximity to home and family ("Characteristics of first-generation college students", 1998; London, 1989, 1996; Lopez-Turley, 2006; Nunez & Cuccaro-Alamin, 1998; Warburton et al., 2001). Additionally, because first-generation students tend to be older when they matriculate, have children, work full-time, and possess different educational goals compared to continuing-generation students, a two-year or for-profit institution may be a better fit (Striplin, 1999). Although some of these factors may represent legitimate differences in educational choices between first-generation and continuing-generation students, it would seem unlikely that first-generation students have equal access to the institutions associated with the highest rates of bachelor's degree attainment (Cabrera et al., 2005).

Second, students' actions after enrolling in an institution affect their chances for bachelor's degree attainment. Actions that students exhibited during college were even more important in two-year institutions, though differences in the consequences of actions were more similar between groups of students. Students who attended two-year institutions must transfer in order to earn a bachelor's degree. Not transferring from a two-year institution guaranteed that a student would not attain a bachelor's degree. Two-thirds of first-generation students and one-half of some-college students at two-year institutions failed to transfer – that is, failed to take a path that could lead to a bachelor's

degree. On the other hand, only one-third of continuing-generation students failed to do so. These findings support the work of Dougherty and Kienzl (2006). These scholars posited that attending a community college decreased the educational aspirations of students with a low SES, and thus fewer low-income students successfully transferred to four-year institutions. The findings of the current study indicate that some students may not have equal access to the same types of guidance regarding transferring to a four-year institution. Students possibly entered two-year institutions with bachelor's degree aspirations, but remained at the institution to earn a lesser degree, such as an associate's degree or a certificate. These reasons why this might occur are beyond the scope of the current study, but warrant further consideration.

Deviation from the most successful path in an institution lowered everyone's rate of degree attainment, though not always by the same amount. At four-year institutions, the sequences involving transferring, stopping out, and a combination of transferring and stopping out were not as successful as the pathway of continuous enrollment. Some-college and first-generation students were somewhat more likely than continuing-generation students to exhibit these actions, and, when they did so, the effects were more detrimental to degree attainment than for continuing-generation students.

Third, differential consequences existed for students who followed the most successful paths. These consequences were most evident for students at four-year institutions who remained continuously enrolled (pathway 1). Even when first-generation and some-college students pursued the most successful path in the study, they still attained degrees at lower attainment rates than continuing-generation students (-16 and -26 percentage points, respectively). While to a lesser extent, the same finding held

true for students on pathway 6 at two-year institutions. First-generation and some-college students who transferred earned degrees at lower rates than continuing-generation students (-15 and -18 percentage points, respectively). First-generation and some-college students did not experience the same level of benefits as continuing-generation students along the two pathways most closely associated with bachelor's degree attainment. These findings suggest that a student's path selection fails to completely explain differences in bachelor's degree attainment. Groups that attain bachelor's degrees at lower rates along these pathways may need additional support services in order to succeed.

### Implications

The results of this research study pose several implications for research, policy, and practice. This section will describe recommendations for policy and practice, identify limitations of the study, and highlight potential avenues for future research.

#### *Recommendations for Policy and Practice*

Although the study design does not permit detailed policy recommendations, it is possible to identify possible actions consistent with the goal of better supporting the postsecondary aspirations of students who desire to attain a bachelor's degree. The overarching recommendation from this study is that policymakers and higher education administrators need to create programs and policies to sustain *all* students with bachelor's degree aspirations both before and during their postsecondary experiences. Improving



retention efforts for at-risk students could potentially begin to reduce the bachelor's degree attainment inequalities that were evident in this study. This section outlines several policy considerations and practice-based strategies geared to assist students in attaining their educational goals. While some programs and policies suggested below already exist in selected areas, the results of the current research study suggest that current programs are insufficient to guarantee that all students who desire a bachelor's degree are actually able to obtain one.

*Continue postsecondary guidance and counseling after matriculation to college.*

The three main findings of the study raise potential issues about students' access to postsecondary guidance and counseling *after* high school. All of the students in this study expressed a desire to attain a bachelor's degree, yet some students were better able to navigate their way through the various pathways identified in this study. First-generation and some-college students were especially likely to pursue dead-end paths in two-year institutions. Although these actions may occur for reasons other than a lack of guidance (e.g., financial or familial necessity), they may also occur because students have less contact with people who can help them identify resources and persist to degree attainment (York-Anderson & Bowman, 1991). These differences in pathways *within* institutions may well represent another way in which students' access to resources and support systems influence discrepancies in degree attainment rates for first-generation, some-college, and continuing-generation students.

Dougherty and Kienzl (2006) argued that to be successful, especially in transferring from two-year to four-year institutions, students need continued guidance

and counseling about postsecondary education after matriculating. The college preparation efforts should not end once a student enrolls in a higher education. Simply getting students to the door of the academy is not enough. Students, especially those most at-risk, often need additional counseling about what it takes to be successful in college. This additional guidance could occur in myriad forms: individual advising sessions, mentoring programs, introductory courses, or learning communities (Dougherty & Kienzl). Specific programs are described in context of the recommendations below.

*Create more effective supports for first-generation students who attend four-year institutions.*

The results of this study suggest that first-generation students need to be better supported at each institution type, but most notably at four-year institutions. Although first-generation students were somewhat more likely to take actions during college that reduced the probability of degree attainment, a more striking finding was the difference in success rates for students who took the same actions, including pursuing the most positive path of no movement. Although an examination of why first-generation students were less successful than continuing-generation students, even when they followed the most direct path, was not an aspect of this study, these results suggest that the experiences of first-generation students at four-year institutions may be an equally important consideration in improving the likelihood of degree attainment for this group of students.

Research has shown that first-generation students demonstrate lower levels of knowledge about postsecondary education than other students, likely due to limited

access to guidance, resources, and mentoring to which students with more educated parents are exposed (Thayer, 2000; Vargas, 2004; York-Anderson & Bowman, 1991). One suggestion for administrators at four-year institutions is to provide additional counseling and advising sessions that are specifically targeted toward first-generation students and how to help them successfully navigate the academy. These sessions could occur through summer bridge programs, new student orientation, first-year learning communities or courses, or academic advising sessions (Rendon, 1992; London, 1992).

California State University in Sacramento implemented an effective early intervention focused on career counseling in a course designed specifically for first-year, first-generation students. This career model allowed students to identify links between their academic endeavors at the institution with their anticipated career path. This effort was particularly pertinent and useful for first-generation students because they often aspire to earn a bachelor's degree strictly for career purposes (Ayala & Striplin, 2002).

Other four-year institutions have created specialized learning communities for first-generation students by using integrated course clusters. For example, an entry-level math class was clustered with a course on study skills. This cluster was team-taught and students received credit for both courses (Thayer, 2000). This approach allowed students to earn academic credit while participating in a course designed to better their academic habits and performance. Additionally, a number of Student Support Services units, a federally funded TRIO program aimed at retaining low-income, first-generation students, created learning communities to help students form supportive peer groups that extend outside the classroom (Thayer) This support from peers was instrumental in helping the students form a community and a support network on campus.

While these suggestions for four-year institutions are by no means all-inclusive or exhaustive, more efforts need to be made to provide additional support for first-generation students who desire a bachelor's degree. First-generation students encompass every race and ethnicity, gender, socioeconomic background, and a wide range of ages. This unique population has distinct goals, motivations, and constraints (Ayala & Striplin, 2002). Thayer (2002) argued that effective support strategies for first-generation students are likely to work for the general population as well, but not vice versa.

*Improve articulation agreements between two-year and four-year institutions.*

Although the path that leads to the greatest rates of bachelor's degree attainment involves initially matriculating at four-year institutions, it is important to acknowledge that not all students with bachelor's degree aspirations have the desire or the resources to attend a four-year institution. For personal, practical, cultural, or financial reasons, a two-year institution may be a better fit for the student. A two-year college may be the only option for first-generation students, who often take classes while working full-time or have a number of external family commitments (Institute for Higher Education Policy, 1998; Pike & Kuh, 2005). While two-year institutions often market themselves as a springboard to four-year institutions, successfully transferring to a four-year institution is an impediment for many students (Alfonso, 2006; Bradburn et al., 2001; Cohen, 2003; Dougherty, 1992; Hoachlander et al., 2003; Lee & Frank, 1990; Leigh & Gill, 2003; Nora, 1993; Pascarella et al., 2003; Striplin, 1999).

The current research study suggests that the second most successful pathway to bachelor's degree attainment involved enrolling at a two-year institution and transferring.

While many students enter two-year institutions with the intentions of transferring, a large proportion of students do not succeed along this path, for myriad reasons (Bradburn et al., 2001; Cabrera et al., 2005; Cohen, 2003; Dougherty, 1992; Glass & Bunn, 1998; Hoachlander et al., 2003; Lee & Frank, 1990; Leigh & Gill, 2003). Four-year and two-year institutions could work more collaboratively to facilitate the transfer process for students with bachelor's degree aspirations. These institutions could develop and improve articulation agreements that would establish a set curriculum for students to follow in order to smoothly transfer to a four-year institution without losing a substantial number of credits (Anderson, Sun, & Alfonso, 2006). First-generation and some-college students could especially benefit from increased counseling and mentoring about the transfer process, both from the sending and receiving institutions (Anderson et al.), so as to avoid pursuing paths that are an impediment to degree attainment.

*Stress college preparation and persistence in K-12 reform initiatives.*

Research has shown that college preparatory activities often begin as early as the seventh grade. In addition, high school academic achievement strongly predicts students' enrollment and performance in postsecondary education (Adelman, 1999, 2006; Cabrera et al., 2005; Cabrera & La Nasa, 2001). Because a student's pathway is somewhat determined by actions prior to entering college (Cabrera et al., 2005), the next two recommendations are focused toward college preparation efforts that occur while students are still in high school.

The first policy recommendation pertaining to students still in high school suggests promoting high school reform movements that have the greatest potential to not

only improve students' college access, but also their postsecondary success. Specifically, these efforts should be directed toward low-income and first-generation students so as to better support their aspirations for a bachelor's degree.

A number of high school reform programs emphasize the need for a more rigorous curriculum, or one that aligns the basic high school curriculum with the minimum academic entry requirements at postsecondary institutions. Martinez and Kloppet (2005) suggested implementing four reform efforts with low-income and minority high school students, many of whom are first-generation: 1) provide access to a rigorous academic curriculum; 2) personalize the learning environments for students; 3) balance the academic and social support; and 4) align the high school and postsecondary curricula.

These suggestions, especially if considered at high schools that serve low-income and first-generation students, would contribute to students being more academically prepared to enter postsecondary education and ideally, to persist once enrolled. A more rigorous high school curriculum could be complemented with additional counseling on college related issues: types of institutions, financial aid, applications, how to transfer to a bachelor's degree granting institution, and persisting towards the bachelor's degree once enrolled. These counseling efforts should also be focused towards parents, who play a key role in students' postsecondary enrollment and attainment (London, 1989, 1992). High school counselors can emphasize to parents and students the importance of following a pathway that leads to bachelor's degree attainment, if that is the student's intention (Fallon, 1997). If a student plans to enter a four-year institution, counselors can stress the importance of finding the right fit and remaining continuously enrolled. If a

two-year institution appears to be the better option, high school counselors can advise students to begin working towards transferring right away (Fallon). While the high school reform movement is beyond the scope of this study, this recommendation simply suggests that policymakers discuss ways to prepare students to successfully navigate the academy to earn the bachelor's degree as part of existing and emergent school reforms.

*Increase partnerships between postsecondary institutions and low-income high schools.*

Because of the lack of variability in household income for first-generation, some-college, and continuing-generation students in this study, the second policy recommendation geared toward students still in high school is strictly supported by the literature rather than directly by the data from the current study. Past researchers have posited that first-generation students are more likely to come from a low-income background and to attend a low-resource high school (Adelman, 1999, 2006; Cabrera et al., 2005; Striplin, 1999). A number of initiatives designed to increase access to college have been developed over the past few decades. One strategy allows high school students to earn college credit while still in high school. This approach has been implemented through a number of methods: advanced placement (AP) courses, dual enrollment, and middle and early college high schools (Lerner & Brand, 2006). These programs provide rigorous courses that represent postsecondary standards, and allow students to earn college credits while still in high school, thus enabling them to start early on their college degree requirements. Additionally, some programs facilitate students attending classes on a college campus, which provides them first-hand exposure to the

college environment and could help students feel more comfortable there. The Bill and Melinda Gates Foundation has been especially supportive of funding middle and early college high schools (Hendrie, 2005; Manzo, 2006).

Traditionally, high-achieving students who were already college-bound have been the main group to take advantage of these opportunities (Lerner & Brand, 2006), so these programs are more likely to assist first-generation students if they are also accessible to students who attend low-income high schools (which likely include more first-generation students). Institutions of higher education could partner with more low-income high schools to develop these opportunities for students to take courses for college credit and gain greater exposure to college life. This exposure to academe might help to build students' academic profiles, increase their confidence in their abilities to attend such institutions and their knowledge of postsecondary education, and better prepare students with bachelor's degree aspirations to persist to degree attainment.

### *Limitations of the Study*

As with any research study, several limitations exist. First, the BPS:96/01 included only participants that matriculated to higher education for the first-time in 1995-1996, so the current study only analyzes persistence behaviors from a sample in which every case was initially enrolled in postsecondary education. This study did not attempt to examine an entire high school cohort and analyze postsecondary enrollment patterns among all students, as previous research has done (Cabrera et al., 2005; Hearn, 1992; Adelman, 1999, 2006). Because this entire cohort began postsecondary education, it could be considered somewhat privileged.



Second, the sample was limited to cases that cited bachelor's degree aspirations, which altered several characteristics of the sample. It is possible that some students changed their goals and did obtain a bachelor's degree, but were not included in the sample due to an initial lack of bachelor's degree aspirations. Including this group of students in the analysis could modify the study's findings.

Third, participants self-reported much of the information in the dataset, including the dependent variable, bachelor's degree attainment, which can lead to inaccuracies. Past research has argued that students are often unfamiliar with their parents' education level, occupation, or household income (Adelman, 1999). While relevant portions of the self-reported data were cross-checked with financial aid application information, some discrepancies still existed. For example, little variability in household income existed among groups, which could be due to the inaccuracy of self-reported data (Adelman). The lack of variability in household income among groups is inconsistent with previous research, which posited that first-generation students tend to come from low-income backgrounds compared to the other groups (Striplin, 1999). These discrepancies, though not a pervasive characteristic of the dataset, may have influenced some findings.

Fourth, the time span of these data involved only six academic years. While Adelman (1999) reported that the mean elapsed time for the cohort in his study to attain a degree was up to five years, a time span of more than six years to track degree attainment may paint a more accurate and somewhat different picture of who actually finishes the degree and who does not. For students who transfer or stop out, six years of tracking persistence to degree attainment may be insufficient.

Fifth, this study does not consider all possible postsecondary pathways. It does not consider other routes that could exist by focusing on additional variables (e.g., enrolling at a part-time or full-time basis). An explicit set of pathways not included in the study include variations in for-profit institutions. Although only a small number of students pursued this route, it is possible that some types of for-profit institutions are more successful than others in helping students attain a bachelor's degree. Nonetheless, the pathways identified by the study represent some of the major routes through which students pursue postsecondary education.

Sixth, the quantity and quality of measures of high school academic performance and college preparation were limited in the dataset. SAT/ACT scores were used, but other measures, had they been available, would have better represented the construct of academic preparation. Unfortunately, data regarding students' high school coursework, grades, or extracurricular participation were quite limited in the BPS dataset. Despite the limitations of this study, its contribution to the literature on pathways to degree attainment and first-generation students make it an important endeavor.

### *Recommendations for Future Research*

The current study built upon prior research that focused on postsecondary pathways and persistence and attainment patterns. In addition, it contributed to the literature by analyzing the success rates of first-generation, some-college, and continuing-generation students along these pathways, an avenue of research that was relatively unexplored for these populations. However, this study is only one small effort to analyze bachelor's degree attainment differences among groups. More research is needed to

better understand how these groups move through postsecondary education and attain success. This section describes five avenues for future research.

First, the results of the current study suggest that differential consequences existed for students following the same path. First-generation and some-college students who pursued the route associated with the highest rates of bachelor's degree attainment still earned degrees at substantially lower rates than continuing-generation students. However, the scope of this study does not address why these differences occurred among groups. Therefore, additional research is needed to better understand the differences in bachelor's degree attainment rates among groups within pathways. These discrepancies were most evident along the no movement pathway at four-year institutions. However, substantial attainment differences still existed among groups on the transfer route at two-year institutions. Further investigation of the pathways that are the most successful, as well as the routes most frequently followed, could possibly attempt to explain the attainment differences that exist among groups. The findings of the current study support the assertion that differences in bachelor's degree attainment rates could be attributed to differences in students' college experiences once enrolled. Previous research (Adelman, 1999, 2006; Cabrera et al., 2005; Ishitani, 2006) has posited that a number of constructs predict bachelor's degree attainment: academic, financial, social, and environmental. While the investigation of these constructs was beyond the scope of the current study, future research could focus on how one or more of these areas affect bachelor's degree attainment for different groups of students on the same pathway.

Second, the time window for the study was limited to six academic years. Although scholars have advocated that the mean time to bachelor's degree completion,

even for at-risk groups, is less than six years (Adelman, 1999; DesJardins et al., 2002; Ishitani, 2006), more than six years of data would allow for the analysis of students who took longer to complete the degree. For the purposes of the current study, students who were still enrolled at the end of six years were coded as not having earned a bachelor's degree, and were grouped in the same category as students who dropped out. A longer period of time would potentially show that some of the indirect pathways to bachelor's degree attainment are actually more successful than they appeared to be in this study.

Third, this study identified 12 postsecondary pathways based on type of first institution enrolled and actions during college. In addition, this study only examined one outcome variable, bachelor's degree attainment. Future research could expand the number of pathways to incorporate students who earn lesser degrees, such as certificates or associate's degrees. While these particular outcomes were beyond the scope of the current study, studying these outcomes may reveal more information about how students earn degrees at other types of institutions. A particularly interesting study would be to examine students with bachelor's degree aspirations at two-year institutions and evaluate their rates of associate's degree or certificate attainment instead of bachelor's degree attainment. This analysis could indicate that these institutions are extremely effective at helping students earn degrees other than the bachelor's.

Fourth, additional research is needed on degree attainment at for-profit institutions. Because for-profit institutions have expanded so rapidly and serve a large number of students, little academic research exists regarding students' success at for-profits. This potential research has important policy implications in that proprietary institutions compete for the same federal student aid funds as not-for-profit institutions

(Phipps et al., 2000; Ruch, 2001). The number of cases in the analytic dataset for the current study was too low to warrant any substantial conclusions that could be generalized to all students with bachelor's degree aspirations at for-profits. One should examine the rates of success of students at proprietary institutions who strive to earn an associate's degree or a certificate. In the current study, not many students who began at for-profits earned a bachelor's degree. However, the attainment rates for students earning certificates or associate's degrees could potentially be higher.

Fifth, a quantitative approach, such as the one used in the current study, is useful for analyzing attendance and degree attainment patterns across multiple institution types nationwide. But this approach excludes the consideration of students' motivation and the actual processes that contribute to outcomes (e.g., the reasons why so few first-generation students take actions in two-year institutions that lead to a bachelor's degree). The descriptive analyses in the current study illustrated where students attended and how they moved through postsecondary education, but these analyses fail to answer the question of why students attend a particular institution or why they take a break in enrollment. While these questions were beyond the scope of the current study, additional research could build upon the current work on pathways to degree attainment by using a qualitative framework to answer more holistic questions about the personal and social meanings behind students' persistence behaviors.

### Final Thoughts

In summary, this study of students' movements along postsecondary pathways and bachelor's degree attainment differences by parents' education level contributes to

the literature on postsecondary education. Descriptive analyses explored 12 postsecondary pathways based on type of institution of first enrollment and actions during college. Cumulative percentages within and across institutions were calculated for different groups of students as they moved along each path. Multivariate analyses revealed that continuing-generation students earned bachelor's degrees at significantly higher rates than first-generation students at four-year institutions. Even the addition of selected background characteristics, familial support, high school academic preparation, actions during college, and interactions to the model failed to completely mitigate the positive effects associated with continuing-generation status. At two-year institutions, the effects of parents' education level on degree attainment were less pronounced. Once actions during college were introduced in the model, the effects of parents' education level dissipated.

This study supports the overarching recommendation that policymakers and higher education administrators need to develop policies and practices that will better support all students with bachelor's degree aspirations. Even though all students in the current study cited goals of earning a bachelor's degree, over half of the students failed to embark on the two pathways most frequently followed by students to the baccalaureate – remaining in a four-year institution until graduation or transferring from a two-year institution. Although other pathways also led to the baccalaureate, these two pathways were more frequently followed and had the highest success rates within institutions.

Even students who did follow the two most successful pathways earned degrees at substantially different rates, which indicates that path selection fails to fully explain differences in bachelor's degree attainment. These discrepancies were especially

apparent at four-year institutions, which suggest that four-year institutions should develop additional support services for first-generation students with bachelor's degree aspirations. Additionally, students' actions after enrolling matter a great deal, most notably at two-year institutions, where a greater percentage of first-generation and some-college students embarked upon pathways that did not lead to bachelor's degree attainment. These populations could benefit from increased access to college counseling and guidance after matriculating to postsecondary education, especially regarding the transfer process. Four-year and two-year institutions could work to develop or enhance articulation agreements that would facilitate a smoother transfer for students between institutions.

One interesting aspect of this study involves the composition of the analytic sample. All students in the analytic sample indicated aspirations of earning a bachelor's degree during their first year of college and enrolled in higher education during the 1995-1996 academic year. This sample of students differs from samples in previous research in that other studies examined a high school cohort, many of whom never enrolled in postsecondary education (Cabrera et al., 2005; Carroll, 1989; Hearn, 1992). Although all students in the current study enrolled in higher education during the 1995-1996 academic year, only 36% earned a bachelor's degree within six academic years, a disturbingly low rate of success. College enrollments in the United States are predicted to escalate over the next decade, with an increase in the number of minority and first-generation students attending college. Institutions of higher education need to be better prepared to support and effectively shepherd these groups through the postsecondary pipeline to bachelor's degree attainment (Anderson, 2003; Carnevale & Fry, 2002). This preparation begins

with understanding how students move through that pipeline. Much can be learned from further analysis of postsecondary pathways and students' enrollment, actions, and attainment patterns.



## APPENDICES

Appendix A. Bivariate Correlations for Four-Year Institutions (n=4,917)

	BA	First-gen	Some Col	Cont-gen	White	Asian	Af Amer	Hispanic
BA	1							
First-gen	-0.182***	1						
Some Col	-0.089***	-0.282***	1					
Cont-gen	0.230***	-0.658***	-0.537***	1				
White	0.112***	-0.140***	-0.021	0.139***	1			
Asian	0.047**	0.008	-0.050***	0.032*	-0.460***	1		
Af Amer	-0.119***	0.077***	0.072***	-0.124***	-0.626***	-0.095***	1	
Hispanic	-0.088***	0.134***	-0.006	-0.113***	-0.472***	-0.072***	-0.098***	1
Male	-0.071***	-0.007	-0.056***	0.051***	0.037**	0.020	-0.066***	0.000
Female	0.071***	0.007	0.056***	-0.051***	-0.037**	-0.020	0.066***	0.000
Del Entry	-0.230***	0.168***	-0.006	-0.143***	-0.071***	-0.008	0.048**	0.069***
Par Supp	-0.017	0.008	0.011	-0.016	-0.016	0.006	-0.005	0.028*
M_P Sup	0.010	-0.007	-0.023	0.024	0.035*	-0.018	-0.023	-0.014
Income	-0.004	0.016	-0.013	-0.004	0.016	-0.010	-0.023	0.012
Sibs, PSE	0.017	0.028	0.016	-0.036*	-0.031*	0.006	0.031*	0.007
M_Sibs	0.027	0.018	-0.036*	0.012	-0.032*	0.020	0.035*	-0.009
SAT/ACT	0.303***	-0.249***	-0.126***	0.318***	0.231***	0.093***	-0.292***	-0.118***
No test	-0.029*	-0.027	0.018	0.009	-0.027	0.005	0.018	0.018
No Move	0.470***	-0.053***	-0.055***	0.090***	0.043**	0.020	-0.047**	-0.034*
Transfer	-0.104***	-0.001	0.002	-0.001	-0.003	-0.003	-0.010	0.021
Stop out	-0.203***	0.043**	0.012	-0.047**	-0.019	0.022	0.011	-0.003
TR & SO	-0.387***	0.039**	0.065***	-0.086***	-0.041**	-0.044**	0.067***	0.029*

Appendix A. Bivariate Correlations for Four-Year Institutions continued (n=4,917)

	Male	Female	Del Entry	Par Supp	M_P Sup	Income	Sibs, PSE	M_Sibs
BA								
First-gen								
Some Col								
Cont-gen								
White								
Asian								
Af Amer								
Hispanic								
Male	1							
Female	-1.000***	1						
Del Entry	0.030*	-0.030*	1					
Par Supp	-0.003	0.003	-0.002	1				
M_P Sup	-0.001	0.001	-0.005	0.011	1			
Income	-0.006	0.006	0.022	0.041**	-0.004	1		
Sibs, PSE	-0.005	0.005	-0.004	0.078***	-0.135***	0.001	1	
M_Sibs	0.015	-0.015	0.023	-0.015	0.077***	0.031*	0.005	1
SAT/ACT	0.057***	-0.057***	-0.156***	-0.026	0.033*	-0.024	-0.019	0.007
No test	0.018	-0.018	0.010	-0.049**	-0.003	-0.109***	0.019	0.006
No Move	-0.021	0.021	-0.067***	-0.013	0.021	0.011	0.003	0.014
Transfer	-0.003	0.003	-0.022	-0.020	-0.007	-0.009	-0.023	0.007
Stop out	0.025	-0.025	0.097***	0.030*	-0.012	-0.012	0.017	0.001
TR & SO	0.010	-0.010	0.034*	0.012	-0.012	0.003	0.003	-0.027

Appendix A. Bivariate Correlations for Four-Year Institutions continued (n=4,917)

	SAT/ACT	No test	No Move	Transfer	Stop out	TR & SO
BA						
First-gen						
Some Col						
Cont-gen						
White						
Asian						
Af Amer						
Hispanic						
Male						
Female						
Del Entry						
Par Supp						
M_P Sup						
Income						
Sibs, PSE						
M_Sibs						
SAT/ACT	1					
No test	0.012	1				
No Move	0.201***	0.001	1			
Transfer	-0.081***	0.002	-0.520***	1		
Stop out	-0.064***	-0.007	-0.431***	-0.121***	1	
TR & SO	-0.150***	0.002	-0.531***	-0.149***	-0.124***	1

SOURCE: Beginning Postsecondary Survey 1996/2001

Appendix B. Bivariate Correlations for Two-Year Institutions (n=842)

	BA	First-gen	Some Col	Cont-gen	White	Asian	Af Amer	Hispanic
BA	1							
First-gen	-0.108**	1						
Some Col	-0.054	-0.485***	1					
Cont-gen	0.161***	-0.571***	-0.441***	1				
White	0.131***	-0.150***	0.030	0.126***	1			
Asian	-0.033	0.031	-0.041	0.006	-0.373***	1		
Af Amer	-0.093**	0.018	0.033	-0.049	-0.618***	-0.077*	1	
Hispanic	-0.071*	0.183***	-0.052	-0.139***	-0.554***	-0.069*	-0.114**	1
Male	-0.048	-0.122***	-0.058	0.180***	0.018	0.111**	-0.041	-0.060
Female	0.048	0.122***	0.058	-0.180***	-0.018	-0.111**	0.041	0.060
Del Entry	-0.201***	0.245***	-0.063	-0.192***	-0.079*	0.119**	0.067	-0.040
Par Supp	0.034	0.004	0.012	-0.015	-0.050	-0.064	0.129***	-0.021
M_P Sup	-0.032	0.131***	-0.019	-0.116**	0.054	-0.027	-0.044	-0.013
Income	0.013	-0.013	-0.005	0.018	-0.006	0.002	-0.055	0.067
Sibs, PSE	0.028	0.055	-0.028	-0.030	0.032	-0.094**	0.030	-0.013
M_Sibs	0.013	0.006	-0.014	0.007	0.026	0.001	-0.022	-0.015
SAT/ACT	0.046	0.100**	-0.061	-0.045	0.136***	0.031	-0.155***	-0.056
No test	-0.062	-0.003	0.051	-0.045	-0.030	0.057	-0.001	0.005
No Move	-0.249***	0.152***	-0.032	-0.126***	-0.028	-0.069*	0.067	0.018
Transfer	0.536***	-0.121***	-0.001	0.126***	0.064	0.018	-0.072*	-0.030
Stop out	-0.193***	0.132***	0.014	-0.148***	-0.009	-0.019	-0.046	0.077*
TR & SO	-0.132***	-0.156***	0.023	0.139***	-0.031	0.073*	0.049	-0.059

Appendix B. Bivariate Correlations for Two-Year Institutions continued (n=842)

	Male	Female	Del Entry	Par Supp	M_P Sup	Income	Sibs, PSE	M_Sibs
BA								
First-gen								
Some Col								
Cont-gen								
White								
Asian								
Af Amer								
Hispanic								
Male	1							
Female	-1.000***	1						
Del Entry	-0.023	0.023	1					
Par Supp	0.007	-0.007	0.029	1				
M_P Sup	0.031	-0.031	0.100**	-0.011	1			
Income	0.008	-0.008	-0.075*	-0.088*	-0.004	1		
Sibs, PSE	-0.032	0.032	0.036	0.023	-0.126***	-0.059	1	
M_Sibs	0.040	-0.040	-0.038	0.035	0.068*	0.092**	-0.005	1
SAT/ACT	0.078*	-0.078*	0.163***	0.045	0.056	-0.014	0.085*	0.046
No test	0.003	-0.003	0.094**	-0.021	-0.006	-0.045	-0.089*	-0.089*
No Move	-0.045	0.045	0.102**	-0.001	0.053	-0.058	0.037	-0.008
Transfer	0.029	-0.029	-0.233***	0.043	0.010	0.053	-0.052	0.016
Stop out	-0.074*	0.074*	0.163***	0.045	-0.022	0.012	-0.020	-0.032
TR & SO	0.088*	-0.088*	-0.010	-0.088*	-0.048	-0.006	0.036	0.022

Appendix B. Bivariate Correlations for Two-Year Institutions continued (n=842)

	SAT/ACT	No test	No Move	Transfer	Stop out	TR & SO
BA						
First-gen						
Some Col						
Cont-gen						
White						
Asian						
Af Amer						
Hispanic						
Male						
Female						
Del Entry						
Par Supp						
M_P Sup						
Income						
Sibs, PSE						
M_Sibs						
SAT/ACT	1					
No test	-0.027	1				
No Move	0.000	0.078*	1			
Transfer	-0.018	-0.061	-0.408***	1		
Stop out	0.083*	-0.017	-0.311***	-0.316***	1	
TR & SO	-0.059	-0.001	-0.343***	-0.349***	-0.266***	1

SOURCE: Beginning Postsecondary Survey 1996/2001

Appendix C. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor's Degree when Matriculating at Four-Year Institutions (Model 1; n=4,917)<sup>†</sup>

	Log Odds	S. E.	Exp(B)
Constant	-0.152	0.066	0.859*
Parents' Education Level			
Some-college	0.240	0.105	1.271*
Continuing-generation	1.061	0.084	2.889***

<sup>†</sup> The dependent variable is the log odds of earning a bachelor's degree within six years of enrollment in postsecondary education (1=yes, 0=no).

\* p<.05; \*\* p<.01; \*\*\* p<.001; SOURCE: Beginning Postsecondary Survey 1996/2001



Appendix D. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor's Degree when Matriculating at Four-Year Institutions (Model 2; n=4,917) †

	Log Odds	S. E.	Exp(B)
Constant	-0.004	0.110	0.996
Parents' Education Level			
Some-college	0.051	0.109	1.052
Continuing-generation	0.619	0.092	1.857***
Race			
Asian	0.203	0.169	1.225
African-American	-0.237	0.130	0.789
Hispanic	-0.311	0.145	0.733*
Gender (female)	0.427	0.078	1.532***
Delay Entry	-1.020	0.121	0.361***
Parents' Financial Support	-0.054	0.078	0.947
Missing Data Flag: Parents' Support	-0.012	0.202	0.989
Household Income <sup>††</sup>	0.003	0.037	1.003
Sibling College Attendance	0.130	0.078	1.139
Missing Data Flag: Sibling College Attendance	0.442	0.249	1.556
SAT/Converted ACT Score <sup>††</sup>	0.482	0.040	1.619***
Did Not Take SAT/ACT	-0.163	0.083	0.850*

† The dependent variable is the log odds of earning a bachelor's degree within six years of enrollment in postsecondary education (1=yes, 0=no).

†† Variable is standardized.

\* p<.05; \*\* p<.01; \*\*\* p<.001; SOURCE: Beginning Postsecondary Survey 1996/2001

Appendix E. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor's Degree when Matriculating at Four-Year Institutions (Model 3; n=4,917) †

	Log Odds	S. E.	Exp(B)
Constant	0.781	0.131	2.184***
Parents' Education Level			
Some-college	0.156	0.129	1.169
Continuing-generation	0.737	0.107	2.089***
Race			
Asian	0.169	0.207	1.184
African-American	-0.300	0.153	0.741
Hispanic	-0.377	0.159	0.686*
Gender (female)	0.435	0.088	1.546***
Delay Entry	-1.140	0.136	0.320***
Parents' Financial Support	-0.039	0.089	0.962
Missing Data Flag: Parents' Support	-0.096	0.226	0.908
Household Income <sup>††</sup>	-0.009	0.042	0.991
Sibling College Attendance	0.163	0.090	1.177
Missing Data Flag: Sibling College Attendance	0.391	0.273	1.479
SAT/Converted ACT Score <sup>††</sup>	0.396	0.045	1.487***
Did Not Take SAT/ACT	-0.199	0.095	0.820*
Transfer	-1.385	0.115	0.250***
Stop out	-2.077	0.164	0.125***
Transfer & Stop out	-3.174	0.153	0.042***

† The dependent variable is the log odds of earning a bachelor's degree within six years of enrollment in postsecondary education (1=yes, 0=no).

†† Variable is standardized.

The model is specified to represent the most common path at four-year institutions. Therefore, in model 3, the no movement term is excluded and serves as the comparison group.

\* p<.05; \*\* p<.01; \*\*\* p<.001; SOURCE: Beginning Postsecondary Survey 1996/2001

Appendix F. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor's Degree when Matriculating at Four-Year Institutions (Model 4; n=4,917) †

	Log Odds	S. E.	Exp(B)
Constant	0.841	0.134	2.318***
Parents' Education Level			
Some-college	0.149	0.133	1.160
Continuing-generation	0.643	0.113	1.902***
Race			
Asian	0.181	0.208	1.198
African-American	-0.270	0.155	0.764
Hispanic	-0.367	0.162	0.693*
Gender (female)	0.440	0.089	1.552***
Delay Entry	-1.431	0.190	0.239***
Parents' Financial Support	-0.038	0.090	0.963
Missing Data Flag: Parents' Support	-0.111	0.231	0.895
Household Income <sup>††</sup>	-0.011	0.042	0.989
Sibling College Attendance	0.171	0.089	1.186
Missing Data Flag: Sibling College Attendance	0.369	0.273	1.446
SAT/Converted ACT Score <sup>††</sup>	0.358	0.050	1.430***
Did Not Take SAT/ACT	-0.211	0.095	0.810*
Transfer	-1.405	0.115	0.245***
Stop out	-2.083	0.162	0.125***
Transfer & Stop out	-3.182	0.152	0.042***
Interaction: Continuing-generation by Delay Entry	0.632	0.278	1.881*
Interaction: Some-college by SAT/ACT	0.248	0.107	1.281*

† The dependent variable is the log odds of earning a bachelor's degree within six years of enrollment in postsecondary education (1=yes, 0=no).

†† Variable is standardized.

The model is specified to represent the most common path at four-year institutions. Therefore, in model 3, the no movement term is excluded and serves as the comparison group.

\* p<.05; \*\* p<.01; \*\*\* p<.001; SOURCE: Beginning Postsecondary Survey 1996/2001

Appendix G. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor's Degree when Matriculating at Two-Year Institutions (Model 1; n=819)<sup>†</sup>

	Log Odds	S. E.	Exp(B)
Constant	-2.340	0.227	0.096***
Parents' Education Level			
Some-college	0.187	0.362	1.206
Continuing-generation	1.017	0.294	2.766**

<sup>†</sup> The dependent variable is the log odds of earning a bachelor's degree within six years of enrollment in postsecondary education (1=yes, 0=no).

\* p<.05; \*\* p<.01; \*\*\* p<.001; SOURCE: Beginning Postsecondary Survey 1996/2001

Appendix H. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor's Degree when Matriculating at Two-Year Institutions (Model 2; n=819) <sup>†</sup>

	Log Odds	S. E.	Exp(B)
Constant	-2.041	0.421	0.130***
Parents' Education Level			
Some-college	-0.105	0.386	0.901
Continuing-generation	0.735	0.310	2.086*
Race			
Asian	-0.096	0.656	0.909
African-American	-1.229	0.512	0.293
Hispanic	-1.053	0.549	0.349*
Gender (female)	0.542	0.274	1.720*
Delay Entry	-1.513	0.437	0.220**
Parents' Financial Support	0.317	0.273	1.373
Missing Data Flag: Parents' Support	-0.030	0.726	0.971
Household Income <sup>††</sup>	0.007	0.124	1.007
Sibling College Attendance	0.191	0.268	1.210
Missing Data Flag: Sibling College Attendance	-0.036	0.787	0.965
SAT/Converted ACT Score <sup>††</sup>	0.240	0.200	1.272
Did Not Take SAT/ACT	-0.215	0.284	0.806

<sup>†</sup> The dependent variable is the log odds of earning a bachelor's degree within six years of enrollment in postsecondary education (1=yes, 0=no).

<sup>††</sup> Variable is standardized.

\* p<.05; \*\* p<.01; \*\*\* p<.001; SOURCE: Beginning Postsecondary Survey 1996/2001

Appendix I. Log Odds, Standard Errors, and Odds-Ratios for the Change in Probability of Earning a Bachelor's Degree when Matriculating at Two-Year Institutions (Model 3; n=819) †

	Log Odds	S. E.	Exp(B)
Constant	-0.71	0.517	0.492
Parents' Education Level			0.637
Some-college	-0.451	0.443	1.704
Continuing-generation	0.533	0.381	0.503
Race			
Asian	-0.688	0.824	0.251
African-American	-1.381	0.572	0.330*
Hispanic	-1.109	0.595	2.010
Gender (female)	0.698	0.331	0.444*
Delay Entry	-0.811	0.502	1.428
Parents' Financial Support	0.356	0.328	0.593
Missing Data Flag: Parents' Support	-0.522	0.763	0.963
Household Income <sup>††</sup>	-0.037	0.162	1.467
Sibling College Attendance	0.384	0.336	0.973
Missing Data Flag: Sibling College Attendance	-0.027	0.949	1.307
SAT/Converted ACT Score <sup>††</sup>	0.268	0.213	0.946
Did Not Take SAT/ACT	-0.055	0.329	0.000
No Movement	-15.738	0.228	0.000***
Stop out	-15.723	0.250	0.074***
Transfer & Stop out	-2.609	0.384	0.492***

† The dependent variable is the log odds of earning a bachelor's degree within six years of enrollment in postsecondary education (1=yes, 0=no).

†† Variable is standardized.

The model is specified to represent the most common path at two-year institutions. Therefore, in model 3, the transfer term is excluded and serves as the comparison group.

No interaction terms were significant.

\* p<.05; \*\* p<.01; \*\*\* p<.001; SOURCE: Beginning Postsecondary Survey 1996/2001

## REFERENCES

- ACT Incorporated. (2002). College graduation rates steady despite increase in enrollment [On-line]. Available: <http://www.act.org/news/releases/2002/11-15-02.html>.
- ACT Incorporated. (2004). Percentage of four-year college students who earn a degree within five years of entry [On-line]. Available: [http://www.act.org/path/policy/pdf/retain\\_charts.pdf](http://www.act.org/path/policy/pdf/retain_charts.pdf).
- ACT Incorporated. (2006). National collegiate retention and persistence to degree rates [On-line]. Available: [http://www.act.org/path/policy/pdf/retain\\_2006.pdf](http://www.act.org/path/policy/pdf/retain_2006.pdf).
- Adelman, C. (1999). *Answers in the tool box: Academic intensity, attendance patterns, and bachelor's degree attainment*. Jessup, MD: U.S. Department of Education.
- Adelman, C. (2000). *More than 13 ways of looking at degree attainment*. Trenton, NJ: New Jersey State Department of Higher Education, Trenton. Offices of Community Colleges Programs.
- Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college*. Washington, DC: U.S. Department of Education.
- Alexander, K. L., Riordan, C., Fennessey, J., & Pallas, A. M. (1982). Social background, academic resources, and college graduation: Recent evidence from the national longitudinal survey. *American Journal of Education*, 90, 315-333.

- Alfonso, M. (2006). The impact of community college attendance on baccalaureate attainment. *Research in Higher Education, 47*, 873-903.
- American Institutes for Research. (2007). AM statistical software. Retrieved August 27, 2007, from <http://am.air.org/about2.asp>
- Anderson, E. L. (2003). Changing U.S. demographics and American higher education. In J. E. King, E. L. Anderson & M. E. Corrigan (Eds.), *Changing student attendance patterns: Challenges for policy and practice* (pp. 3-12). San Francisco: Jossey-Bass.
- Anderson, G. M., Sun, J. C., & Alfonso, M. (2006). Effectiveness of statewide articulation agreements on the probability of transfer: A preliminary policy analysis. *The Review of Higher Education, 29*, 261-291.
- Arbona, C., & Nora, A. (2007). The influence of academic and environmental factors on Hispanic college degree attainment. *The Review of Higher Education, 30*, 247-269.
- Astin, A. W. (1977). *Four critical years*. San Francisco: Jossey-Bass.
- Astin, A. W. (1993). *What matters in college? Four critical years revisited* (1st ed.). San Francisco: Jossey-Bass.
- Ayala, C., & Striplen, A. (2002). A career introduction model for first-generation college freshmen students. In G. R. Walz, R. Knowdell & C. Kirkman (Eds.), *Thriving in challenging and uncertain times* (pp. 57-62). Greensboro, NC: ERIC Clearinghouse on Counseling and Student Services.
- Barefoot, B. O. (2004). Higher education's revolving door: Confronting the problem of student drop out in US colleges and universities. *Open Learning, 19*, 9-18.



- Bean, J. P., & Eaton, S. B. (2000). A psychological model of college student retention. In J. Braxton (Ed.), *Reworking the student departure puzzle* (pp. 48-61). Nashville: Vanderbilt University Press.
- Bean, J. P., & Metzner, B. S. (1985). A conceptual model of nontraditional undergraduate student attrition. *Review of Educational Research*, 55, 485-540.
- Berkner, L., He, S., & Cataldi, E. F. (2002). *Descriptive summary of 1995-96 beginning postsecondary students: Six years later* (No. NCES 2003151). Washington, DC.
- Bowen, H. R. (1997). *Investment in learning: The individual and social value of American higher education*. Baltimore: The Johns Hopkins University Press.
- Bowen, W. G., Kurzweil, M. A., & Tobin, E. M. (2005, February 25). From 'Bastions of Privilege' to 'Engines of Opportunity'. *The Chronicle of Higher Education*, p. B18.
- Bradburn, E. M. (2002). *Short-term enrollment in postsecondary education: Student background and institutional differences in reasons for early departure, 1996-98* (No. NCES 2003153). Washington, DC: National Center for Education Statistics.
- Bradburn, E. M., Hurst, D. G., & Peng, S. (2001). *Community college transfer rates to four-year institutions using alternative definitions of transfer* (No. NCES2001197). Washington, DC: National Center for Education Statistics.
- Braxton, J. M. (2000). *Reworking the student departure puzzle* (1st ed.). Nashville: Vanderbilt University Press.

- Bui, K. V. T. (2002). First-generation college students at a four-year university: Background characteristics, reasons for pursuing higher education, and first-year experiences. *College Student Journal*, 36, 3-11.
- Byrd, K. L., & MacDonald, G. (2005). Defining college readiness from the inside out: First-generation college student perspectives. *Community College Review*, 33(1), 22-37.
- Cabrera, A. F. (1994). Logistic regression analysis in higher education: An applied perspective. In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (pp. 225-256). New York: Agathon Press.
- Cabrera, A. F., Burkum, K. R., & La Nasa, S. M. (2005). Pathways to a four-year degree: Determinants of transfer and degree completion. In A. Seidman (Ed.), *College student retention: A formula for student success* (pp. 155-209). Westport, CT: American Council on Education/Praeger Series on Higher Education.
- Carnevale, A. P., & Fry, R. A. (2002). The demographic window of opportunity: College access and diversity in the new century. In D. E. Heller (Ed.), *Condition of access: Higher education for lower income students* (pp. 137-152). Westport, CT: American Council on Education/Praeger.
- Carroll, C. D. (1989). *College persistence and degree attainment for 1980 high school graduates: Hazards for transfers, stopouts, and part-timers* (No. CS 89-302). Washington, DC: National Center for Education Statistics.
- Casey, J. G. (2005). Diversity, discourse, and the working-class student. *Academe*, 91(4), 33-36.

- Characteristics of first-generation college students. (1998). *Journal of Adolescent & Adult Literacy*, 42, 220-221.
- Chen, X. (2005). *First-generation students in postsecondary education: A look at their college transcripts* (No. NCES 2005171). Washington, DC: National Center for Education Statistics.
- Choy, S. (2000). *Low-income students: Who they are and how they pay for their education* (No. NCES 2000169). Washington, DC: National Center for Education Statistics.
- Choy, S. (2002). *Findings from the Condition of Education 2001: Students whose parents did not go to college* (No. NCES 2001126). Washington, DC: National Center for Education Statistics.
- Choy, S., Horn, L., Nunez, A., & Chen, X. (2000). Transition to college: What helps at-risk students and students whose parents did not attend college. *New Directions for Institutional Research*, 107, 45-63.
- Cohen, A. M. (2003). *The community colleges and the path to the baccalaureate* (No. CSHE.4.03). Berkeley, CA: Center for Studies in Higher Education.
- Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Publishers.
- Croninger, R. G., & Douglas, K. M. (2005). Missing data and institutional research. In P. D. Umbach (Ed.), *Survey research. Emerging Issues. New directions for institutional research #127* (pp. 33-50). San Francisco: Jossey-Bass.

- Dennis, J. M., Phinney, J. S., & Chuateco, L. I. (2005). The role of motivation, parental support, and peer support in the academic success of ethnic minority first-generation college students. *Journal of College Student Development, 46*, 223-236.
- DesJardins, S. L., McCall, B. P., Ahlburg, D. A., & Moye, M. J. (2002). Adding a timing light to the "tool box". *Research in Higher Education, 43*, 83-114.
- Dougherty, K. J. (1992). Community colleges and baccalaureate attainment. *The Journal of Higher Education, 63*, 188-214.
- Dougherty, K. J., & Kienzl, G. S. (2006). It's not enough to get through the open door: Inequalities by social background in transfer from community colleges to four-year colleges. *Teachers College Record, 108*, 452-487.
- Engle, J., Bermeo, A., & O'Brien, C. (2006). *Straight from the source: What works for first-generation college students*. Washington, DC: The Pell Institute for the Study of Opportunity in Higher Education.
- Fallon, M. V. (1997). The school counselor's role in first generation students' college plans. *School Counselor, 44*, 384-394.
- First generation collegians lag behind. (1997, September 1). *USA Today Magazine, 126*, 2628.
- Fischetti, M., Anderson, J., Watrous, M., Tanz, J., & Gwynne, P. (1998, March/April). University of Phoenix: Beat 'em or join 'em. *University Business, 414-419*.

- Gibbons, M. M., & Shoffner, M. F. (2004). Prospective first-generation college students: Meeting their needs through social cognitive career theory. *Professional School Counseling, 8*, 91-97.
- Glass, J. C., Jr., & Bunn, C. E. (1998). Length of time to graduate for community college students transferring to senior institutions. *Community College Journal of Research and Practice, 22*, 239-264.
- Goldrick-Rab, S. (2006). Following their every move: An investigation of social-class differences in college pathways. *Sociology of Education, 79*, 61-79.
- Hearn, J. C. (1992). Emerging variations in postsecondary attendance patterns: An investigation of part-time, delayed, and nondegree enrollment. *Research in Higher Education, 33*, 657-687.
- Hendrie, C. (2005, January 5). Gates foundation expands support for 'early college' high schools. *Education Week*, p. 9.
- Hill, S., & Owings, M. (1986). *Completion time for bachelor's degrees*. Washington, DC: National Center for Education Statistics.
- Hittman, J. A. (1994). The impact of proprietary schools on the viability of community colleges. In D. A. Clowes & E. M. Hawthorne (Eds.), *Community colleges and proprietary schools: Conflict or convergence?* (pp. 17-25). San Francisco: Jossey-Bass.
- Hoachlander, G., Sikora, A., & Horn, L. (2003). *Community college students: Goals, academic preparation, and outcomes* (No. NCES 2003164). Washington, DC: National Center for Education Statistics.

- Horn, L. (1995). *Minority undergraduate participation in postsecondary education* (No. NCES 95166). Washington, DC: National Center for Education Statistics.
- Horn, L. (1999). *Stopouts or stayouts? Undergraduates who leave college in their first year* (No. NCES 1999-087). Washington, DC: National Center for Education Statistics.
- Horn, L., & Berger, R. (2005). *College persistence on the rise? Changes in 5-year degree completion and postsecondary persistence rates between 1994 and 2000* (No. NCES 2005156). Washington, DC: National Center for Education Statistics.
- Horn, L., & Kojaku, L. K. (2001). *High school academic curriculum and the persistence path through college: Persistence and transfer behavior of undergraduates 3 years after entering four-year institutions* (No. NCES 2001163). Washington, DC: National Center for Education Statistics.
- Horn, L., & Maw, C. (1995). *Minority undergraduate participation in postsecondary education* (No. NCES 95-166). Washington, DC: National Center for Education Statistics.
- Hsiao, K. P. (1992). *First-generation college students* (No. EDO-JC-00-04). Washington, DC: Office of Education Research and Improvement.
- Inman, W. E., & Mays, L. (1999). The importance of being first: Unique characteristics of first generation community college students. *Community College Review*, 26(4), 3-23.

- Institute for Higher Education Policy. (1998). *Reaping the benefits: Defining the public and private value of going to college*. Washington, DC: Institute for Higher Education Policy.
- Institute for Higher Education Policy. (2005). *The investment payoff: A 50-state analysis of the public and private benefits of higher education*. Washington, DC: Institute for Higher Education Policy.
- Ishitani, T. T. (2006). Studying attrition and degree completion behavior among first-generation college students in the United States. *The Journal of Higher Education, 77*, 861-885.
- Knepper, P. (1988). *Student progress in college*. Washington, DC: National Center for Education Statistics.
- Kojaku, L. K., Nunez, A., & Malizio, A. (1998). *Descriptive summary of 1995-1996 beginning postsecondary students: With profiles of students entering 2-to four-year institutions*. Washington, DC: U.S. Department of Education Office of Educational Research and Improvement.
- Koker, M., & Hendel, D. D. (2003). Predicting graduation rates for three groups of new advanced-standing cohorts. *Community College Journal of Research and Practice, 27*, 131-146.
- Lee, V. E., & Frank, K. A. (1990). Students' characteristics that facilitate the transfer from two-year to four-year colleges. *Sociology of Education, 63*, 178-193.
- Leigh, D. E., & Gill, A. M. (2003). Do community colleges really divert students from earning bachelor's degrees? *Economics of Education Review, 22*, 23-30.

- Lerner, J. B., & Brand, B. (2006). *The college ladder: Linking secondary and postsecondary education for success for all students*. Washington, DC: American Youth Policy Forum.
- Lohfink, M. M., & Paulsen, M. B. (2005). Comparing the determinants of persistence for first-generation and continuing-generation students. *Journal of College Student Development, 46*, 409-428.
- London, H. B. (1989). Breaking away: A study of first-generation college students and their families. *American Journal of Education, 97*, 144-170.
- London, H. B. (1992). Transformations: Cultural challenges faced by first-generation students. In L. S. Zwerling & H. B. London (Eds.), *First generation college students: Confronting the cultural issues* (pp. 5-11). San Francisco: Jossey-Bass Inc.
- London, H. B. (1996). How college affects first-generation students. *About Campus, 1*(5), 9-13.
- Longanecker, D. A., & Blanco, C. D. (2003). Public policy implications of changing student attendance patterns. In J. E. King, E. L. Anderson & M. E. Corrigan (Eds.), *Changing student attendance patterns: Challenges for policy and practice* (pp. 51-68). San Francisco: Jossey-Bass.
- Lopez-Turley, R. N. (2006). When parents want children to stay home for college. *Research in Higher Education, 47*, 823-846.
- Manzo, K. K. (2006, June 7). N. C. gets gates grant. *Education Week*, p. 25.



- Martinez, M., & Klopott, S. (2005). *The link between high school reform and college access and success for low-income and minority youth*. Washington, D.C.: American Youth Policy Forum and Pathways to College Network.
- McCormick, A. C. (2003). Swirling and double-dipping: New patterns of student attendance and their implications for higher education. In J. E. King, E. L. Anderson & M. E. Corrigan (Eds.), *Changing student attendance patterns: Challenges for policy and practice* (pp. 13-24). San Francisco: Jossey-Bass.
- Nora, A. (1993). Two-year colleges and minority students' educational aspirations: Help or hindrance? In J. C. Smart (Ed.), *Higher education: Handbook of theory and research* (Vol. 9, pp. 212-247). New York: Agathon Press.
- Nunez, A., & Cuccaro-Alamin, S. (1998). *First-generation students: Undergraduates whose parents never enrolled in postsecondary education* (No. NCES 98-082). Washington, DC: National Center for Education Statistics.
- O'Toole, D. M., Stratton, L. S., & Wetzel, J. N. (2003). A longitudinal analysis of the frequency of part-time enrollment and the persistence of students who enroll part time. *Research in Higher Education*, 44, 519-537.
- Osborne, J. W. (2006). Bringing balance and technical accuracy to reporting odds ratios and the results of logistic regression analyses. *Practical Assessment, Research & Evaluation*, 11(7), 1-6.
- Pascarella, E., & Terenzini, P. T. (2005). *How college affects students volume 2: A third decade of research*. San Francisco: Jossey-Bass.
- Pascarella, E. T., Pierson, C. T., Wolniak, G. C., & Terenzini, P. T. (2004). First-generation college students. *Journal of Higher Education*, 75, 249-284.

- Pascarella, E. T., Wolniak, G. C., Pierson, C. T., & Terenzini, P. T. (2003). Experiences and outcomes of first generation students in community colleges. *Journal of College Student Development, 44*, 420-429.
- Perna, L. W. (2005). The benefits of higher education: Sex, racial/ethnic, and socioeconomic group differences. *The Review of Higher Education, 29*, 23-52.
- Peter, K., & Cataldi, E. F. (2005). *The road less traveled? Students who enroll in multiple institutions* (No. NCES 2005157). Washington, DC: National Center for Education Statistics.
- Peter, K., & Horn, L. J. (2005). *Gender differences in participation and completion of undergraduate education and how they have changed over time* (No. NCES 2005169). Washington, DC: National Center for Education Statistics.
- Phipps, R. A., Harrison, K. V., & Merisotis, J. P. (2000). *Students at private, for-profit institutions* (No. 2000-175). Washington, DC: National Center for Education Statistics.
- Pike, G. R., & Kuh, G. D. (2005). First- and second-generation college students: A comparison of their engagement and intellectual development. *Journal of Higher Education, 76*, 276-300.
- Porter, K. (2002). *The value of a college degree*. Washington, DC: ERIC Clearinghouse on Higher Education.
- Reisberg, L. (1999, January 15). To help Latino students, a college looks to parents. *The Chronicle of Higher Education*, p. A43.
- Rendon, L. I. (1992). From the barrio to the academy: Revelations of a Mexican American "scholarship girl". In L. S. Zwerling & H. B. London (Eds.), *First*

- generation college students: Confronting the cultural issues* (pp. 55-64). San Francisco: Jossey-Bass Inc.
- Riccobono, J. A., Whitmore, R. W., Gabel, T. J., Traccarella, M. A., Pratt, D. J., & Berkner, L. K. (1997). *National postsecondary student aid study, 1995-1996 (NPSAS:96) methodology report* (No. NCES 98073). Washington, DC: National Center for Education Statistics.
- Roberts, J. S., & Rosenwald, G. C. (2001). Ever upward and no turning back: Social mobility and identity formation among first-generation college students. In J. P. McAdams, R. Josselson & A. Lieblich (Eds.), *Turns in the road: Narrative studies of lives in transition*. Washington, DC: American Psychological Association.
- Rodriguez, S. (2003). What helps some first-generation students succeed? *About Campus*, 8(4), 17-22.
- Ruch, R. S. (2001). The financing of for-profit higher education. In *Higher education, inc.: The rise and fall of the for-profit university* (pp. 74-105). Baltimore: Johns Hopkins University Press.
- Saenz, V. B., Hurtado, S., Barrera, D., Wolf, D., & Yeung, F. (2007). *First in my family: A profile of first-generation college students at four-year institutions since 1971*. Los Angeles: University of California.
- Sherlin, J., Jr. (2002). *Understanding the system persistence of first generation college students through path modeling*. Unpublished doctoral dissertation, University of Maryland, College Park, MD.

- Smart, J. C., & Pascarella, E. T. (1987). Influences on the intention to reenter higher education. *The Journal of Higher Education*, 58, 306-322.
- Striplin, J. (1999). *Facilitating transfer for first generation community college students*. Los Angeles: ERIC Clearinghouse for Community Colleges.
- Swail, W. S., Cabrera, A. F., Lee, C., & Williams, A. (2005). *Latino students and the educational pipeline: A three-part series*. Washington, DC: The Educational Policy Institute.
- Terenzini, P. T., Springer, L., Yaeger, P. M., Pascarella, E. T., & Nora, A. (1996). First-generation college students: Characteristics, experiences, and cognitive development. *Research in Higher Education*, 37, 1-22.
- Thayer, P. B. (2000, May). Retention of students from first generation and low income backgrounds. *Opportunity Outlook*, 2-8.
- Thomas, S. L., Heck, R. H., & Bauer, K. W. (2005). Weighting and adjusting for design effects in secondary data analyses. *New Directions for Institutional Research*, 127, 51-72.
- Thompson, B. (2006). *Foundations of behavioral statistics: An insight-based approach*. New York: The Guilford Press.
- Tierney, W. G. (1992). An anthropological analysis of student participation in college. *Journal of Higher Education*, 63, 603-618.
- Tinto, V. (1975). Drop out from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, 45, 89-125.
- Tinto, V. (1987). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago: University of Chicago Press.

- Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition* (2nd ed.). Chicago: University of Chicago Press.
- Vargas, J. H. (2004). *College knowledge: Addressing information barriers to college*. Boston, MA: College Access Services: The Education Resources Institute.
- Warburton, E. C., Bugarin, R., & Nunez, A. (2001). *Bridging the gap: Academic preparation and postsecondary success of first-generation students* (No. NCES 2001-153). Washington, DC: National Center for Education Statistics.
- Wine, J. S., Heuer, R. E., Wheelless, S. C., Francis, T. L., & Dudley, K. M. (2002). *Beginning postsecondary students longitudinal study: 1996-2001 (BPS:1996/2001) methodology report*. Washington, DC: National Center for Education Statistics.
- Wine, J. S., Whitmore, R. W., Heuer, R. E., Biber, M., & Pratt, D. J. (2000). *Beginning postsecondary students longitudinal study first follow-up 1996-98 (BPS:96/98) methodology report* (No. NCES 2000-157). Washington, DC: National Center for Education Statistics.
- Wright, R. E. (2000). Logistic regression. In L. G. Grimm & P. R. Yarnold (Eds.), *Reading and understanding multivariate statistics* (pp. 217-244). Washington, DC: American Psychological Association.
- York-Anderson, D. C., & Bowman, S. L. (1991). Assessing the college knowledge of first-generation and second-generation college students. *Journal of College Student Development*, 32, 116-122.