



AN ABSTRACT OF THE DISSERTATION OF

Kristie J. Bowen for the degree of Doctor of Philosophy in Education presented on November 30, 2015.

Title: Predictors of Completion: The Influence of Academic and Non-Academic Environmental Factors on Baccalaureate Completion Among Community College Transfer Students

Abstract approved: \_\_\_\_\_  
Earl P. Johnson

Research examining disparity between baccalaureate completion among “native” and community college transfer students has gained attention in recent years. Current and prior research has identified important pre-college and demographic characteristics with a positive relationship to baccalaureate completion. Yet few studies have focused on the influence of nonacademic and academic environmental factors specific to first time beginning community college transfers. The theoretical perspectives guiding this quantitative study included Bean and Metzner’s (1985) Conceptual Model of Nontraditional Undergraduate Student Attrition and Astin’s (1984) I+E=O model and Theory of Involvement. Drawing upon data from the Beginning Postsecondary Student Longitudinal Study (BPS:04/09), this study investigated the relationship between a set of theoretically grounded variables and the baccalaureate completion of community college first time beginners who first accessed postsecondary education during the fall of 2003-2004. The final analytical sample for this study included 6,300 panel respondents whose first institution of higher education was a public 2-year college and who subsequently transferred to a 4-year institution and earned a bachelor’s degree by June 2009. Binary logistic regression was applied using PowerStats which is the online statistical tool used by NCES. The findings suggest that the

following seven factors have a statistically significant positive relationship to baccalaureate completion among community college transfer students over six years: student postsecondary plans that include transfer to a 4-year institution, high school grade point average, meeting with faculty outside the classroom, meeting often with an academic advisor, parental education, part-time employment while enrolled, and student baccalaureate aspirations. The findings of this study should be of interest to policymakers at the state and national levels and with key stakeholders in two and four year colleges in expanding the support and collaboration among all institutions of higher education as they seek to continue facilitating the transfer process and promote long-term educational success for community college transfer student baccalaureate aspirants.

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Predictors of Completion: The Influence of Academic and Non-Academic Environmental  
Factors on Baccalaureate Completion Among Community College Transfer Students

by  
Kristie J. Bowen

A DISSERTATION

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degree of

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Doctor of Philosophy dissertation of Kristie J. Bowen presented on  
November 30, 2015

APPROVED:

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Major Professor, representing Education

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Dean of the College of Education

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Dean of the Graduate School

I understand that my dissertation will become part of the permanent collection of Oregon State University libraries. My signature below authorizes release of my dissertation to any reader upon request.

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Kristie J. Bowen, Author

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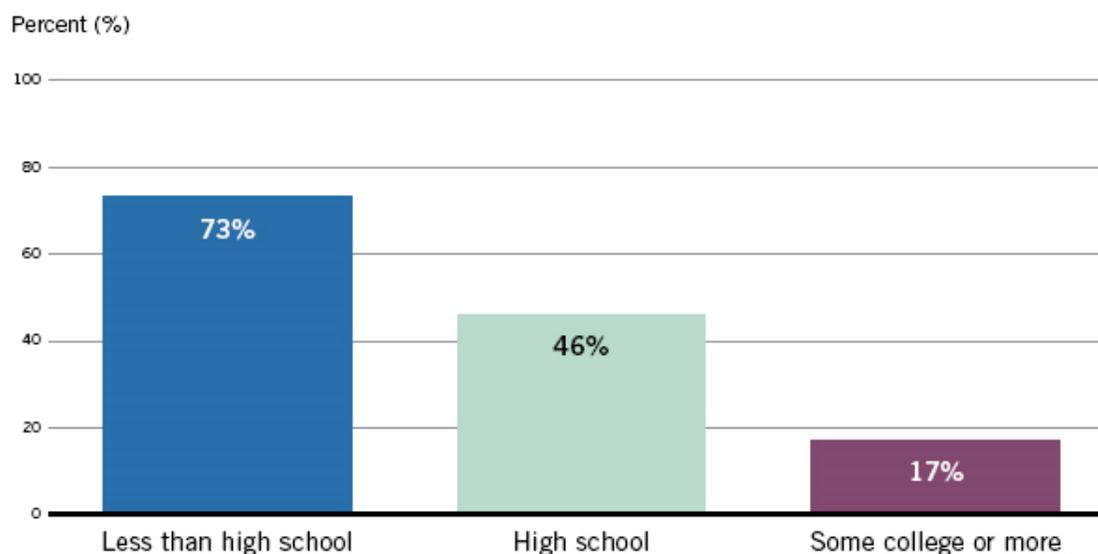
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Predictors of Completion: The Influence of Academic and Non-Academic Environmental Factors on Baccalaureate Completion Among Community College Transfer Students

### Chapter I: Purpose and Significance

In the global economy of today, educational level is directly linked to earning potential and the upward mobility of the American population. However, there are millions of individuals in the United States who lack the advanced level of education that can provide them with access to the twenty-first century workplace. The 2000 U.S. census reported that more than 34 million adults over the age of 18 lacked a high school education (McCabe, 2000). Data published by the National Center for Children in Poverty (figure 1.1) reveals that the majority of children living in poverty have parents who work full-time but lack a high school education.

#### Low-income children with parents employed full-time, by parents' education, 2006



© National Center for Children in Poverty ([www.nccp.org](http://www.nccp.org))  
Parents' Low Education Leads to Low Income, Despite Full-Time Employment

Figure 1.1 Low income children with parents employed full-time

There is also clear evidence that the American economy is becoming more reliant on college-educated workers and that this trend will continue. By 2007, 59% of employed Americans

needed a postsecondary credential or degree; it is anticipated that this figure will grow to two-thirds of all employed Americans by the year 2018 (AACC, 2012).

In order to address these challenge, in 2009 President Barack Obama set a goal for the U.S. of having the highest college graduation rate in world by the year 2020 (Obama, 2009). He also emphasized the critical role that community colleges play in providing access and opportunities for attaining a bachelor's degree. For thousands of students each year, the community college represents a critical pathway for furthering their education and offering them the promise of an affordable and flexible pathway to a bachelor's degree.

The growth of the undergraduate postsecondary student population in the United States has been well documented in research by the National Center for Education Statistics (NCES) over the past three decades. According to NCES, undergraduate enrollments in degree granting postsecondary institutions reached nearly 18.2 million students by the fall of 2008 (NCES 2009). This was confirmed in research by Snyder (2008) who reported that the transition of the undergraduate population has resulted in a remarkably different postsecondary population than represented by the traditional (18-24) student of the past. This population is referred to by Snyder as the "new traditional." Comprised of adult learners (students older than 22) these "new traditional" undergraduates represent 84% of the higher education population in the United States.

A recent report by the National Student Clearinghouse (Shapiro, D., Dunder, A., Chen, J., Ziskin, M., Park, E., Torres, V., & Chiany, Y. C., 2012) looked at 1.9 million first-time degree-seeking students who enrolled fall 2006, at two and four-year institutions to examine baccalaureate completion rates. Results of this report indicate that the completion rate for students who began their undergraduate college experience at four-year institutions (also referred

to as “native” students) was 60.6% compared to 36.3% for students whose college experience began at a two-year institution. And while this disparity is well established in prior research, there is not consensus on what may be influencing the difference in outcomes between students who begin their postsecondary experience at a 4-year institution and those whose first postsecondary experience begins at a community college.

Despite over four decades of research on student persistence and completion, and the development of important theoretical models related to undergraduate educational experiences, baccalaureate completion rates for community college transfers in the U.S. have shown relatively little change and continue to remain low when compared with the rates of baccalaureate completion rates of native students (Doyle, 2006; Ishitani, 2003; McPhail, 2011; NCES, 2011; Renn & Reason, 2013; Shapiro et al., 2012; Tinto, 2006). In addition, nearly 80% of students who attend community college indicated an intention to transfer to a four-year institution to complete a bachelor’s degree (McPhail, 2011). However, as illustrated previously, their completion rates are much lower than the native student undergraduate population.

Over the past several decades, scholarly research in higher education has identified numerous individual student demographics and pre-college characteristics that influence undergraduate student persistence and completion (Astin, 1984; Ishitani, 2003; Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996). In addition to individual demographics and student pre-college characteristics, some research has suggested that by analyzing how student non-academic and academic environmental factors interact with individual student demographics and pre-college characteristics, additional insight into predictors of student persistence and completion may be identified (Astin, 1984; Astin & Antonio, 2012; Bean & Metzner, 1985; Cabrera, Castaneda, Nora, & Hengstler, 1993; Renn & Reason, 2013; Wood, Nevarez, & Hilton,

2012). Community college students account for nearly half of all undergraduate enrollments in the U.S. (Cataldi, Green, Henke, Lew, Woo, Shepherd, & Siegel, 2011; Leader, 2010; McPhail, 2011; Shapiro et al., 2012).

Responding to the current national focus on college completion (NCES, 2011; Shapiro et al., 2012), is difficult for many colleges and universities. Researchers Banta, Busby, Kahn, Black, and Johnson (2007) reflecting on the challenging fiscal environment for colleges and universities at the beginning of the 21<sup>st</sup> century stated that “both public and private institutions face difficult choices that may determine their very survival” (p. 183). Given an environment emphasizing the completion agenda, limited fiscal resources, and record numbers of community college students reporting baccalaureate attainment as their educational goal, the fact that when compared to their native counterparts, so few community college transfer students actually persist to baccalaureate attainment is one that warrants further examination.

### **Purpose**

The purpose of this study is to examine the effects of nonacademic and academic environmental factors on baccalaureate completion among community college transfer students over six years. Specifically, after controlling for student pre-college characteristics and demographics, this study examined the effect of nonacademic and academic environmental factors on baccalaureate completion for community college transfer students over six years. With this purpose in mind, the following two research questions guided this study.

### Research Questions

1. For first time beginners who start their postsecondary experience at a 2-year institution and then transfer to a 4-year institution to earn a bachelor's degree, what is the effect of non-academic environmental factors on completion over six years? And, of the non-academic environmental factors identified as statistically significant, which have a positive relationship to baccalaureate completion over six years?

*H<sub>01</sub>*: After controlling for student pre-college characteristics and demographics, non-academic environmental factors have no influence on community college transfer student baccalaureate completion over six years. Analysis of these factors provided additional data on community college transfer students who successfully complete a bachelor's degree over the six-year period studied and served as a foundation for the investigation into factors that may predict completion.

2. For first time beginners who start their postsecondary experience at a 2-year institution and then transfer to a 4-year institution to earn a bachelor's degree, what is the effect of academic environmental factors on completion over six years? And, of the academic environmental factors identified as statistically significant, which have a positive relationship to baccalaureate completion over six years?

*H<sub>02</sub>*: After controlling for student pre-college characteristics and demographics, academic environmental factors have no influence on community college transfer student baccalaureate attainment over six years. Analysis of these factors provided additional data on community college transfer students who successfully complete a bachelor's degree over the six-year period studied and served as a foundation for the investigation into factors that may further predict completion.

**Personal disclosure**

As a former community college transfer student, I feel strongly about this research study for three main reasons. The first of these is that I believe in the power of education to transform lives, and that the community college provides opportunity and access to millions of students to higher education, many of whom may not have otherwise had the opportunity to achieve their educational goals. It was because of this belief in the power of education that I began working in higher education in 2005 as an academic advisor in order to provide support those seeking transformation through education. The second reason, is that through my work at community colleges and four-year institutions, I see students, faculty, staff, and administrators working diligently to provide quality education and support services for students, yet for so many students, there is no achievement of their ultimate goal of a bachelor's degree. The number of students not completing continues to increase, and students continue to struggle while balancing school, work, family obligations, and financing their education. The third and final reason is that despite the challenges facing community college transfer students, some students do succeed after transferring and achieve their educational goal of earning a bachelor's degree. It is my hope that this research will provide applicable data that will support the success of community college transfer students by identifying factors that may contribute to their persistence and eventual degree attainment.

### **Significance of the Study**

The results of this study have significant implications for internal and external stakeholders in public higher education and for community colleges in particular. Preparing students for transfer to a four-year institution to complete a bachelor's degree is one of many important functions of the community college (Cohen & Brawer, 2009). In recent years, community colleges have seen a significant increase in the number of students enrolling with the intent to transfer and complete a bachelor's degree at a four-year institution (Cataldi et al., 2011; Kirk-Kuwaye & Kirk-Kuwaye, 2007; U.S. Department of Education, 2005), and the National Center for Education Statistics projects a slow but steady increase in undergraduate enrollment through the year 2016 (NCES 2004). At the same time, there has been increased focus on the importance of completion in higher education, along with a national challenge for increasing the number of students earning a bachelor's degree by the year 2020 (National Center for Public Policy and Higher Education, 2011; Shapiro et al., 2012).

#### **Low completion among community college transfers**

Of additional significance is research that has demonstrated that students who transfer from the community college to the university and complete a bachelor's degree are just as academically successful as their "native" counterparts (Cohen & Brawer, 2009; Leader, 2010; Spellman, 2007; Townsend & Wilson, 2006; Wyatt, 2011). There are numerous scholarly studies documenting the differences in completion rates between native students and first time beginners who begin their college experience at the community college and then transfer with the intention of completing a bachelor's degree. Some studies on persistence and completion have speculated about the effects of "transfer shock" on community college transfer students (Doyle, 2006; McPhail, 2011; National Center for Public Policy and Higher Education, 2011; Spellman, 2007;

Townsend & Wilson, 2006; Wyatt, 2011), and the impact that institutional differences have on students transferring from the community college to the university. *Transfer shock* is defined as the tendency of students transferring from a 2-year community college to a 4-year institution to experience a temporary drop in grade point average (Hills, 1965).

Researchers have also suggested that a major contributing factor in the lower completion rates of transfer students may be linked to something referred to as the “transfer penalty” (Leader, 2010). This term is defined as the cost of community college transfer coursework that the receiving institution will not accept, and that the student must then re-take in order to complete a bachelor’s degree. Estimates of the cost of these “lost” credits have been as high as *\$10 billion annually* (Leader, 2010). Current research has shown that the transfer policies of the receiving institution can have a significant impact on the success of the community college transfer student (Doyle, 2006). For example, Doyle found that 82% of transfer students earned a bachelor’s degree in the period observed when the four-year receiving institution accepted all of a community college student’s credits, and 42% earned their degree when the institution accepted only some of their credits.

At the time of this study, a review of current literature and theory on college student persistence indicated that very little is known about environmental factors that may influence the disparity in persistence and completion between degree-seeking community college transfer students and “native” students. Given the fact that the number of first-time beginning community college students who indicate an intent to transfer to a 4-year institution in order to attain a bachelor’s degree continues to increase, and the fact that nearly half of all undergraduates in the U.S. begin their postsecondary experience at a community college, community colleges and four-year institutions should be concerned about the factors influencing the lack of persistence of

this student population (Cataldi et al., 2011; Kirk-Kuwaye & Kirk-Kuwaye, 2007; U.S. Department of Education, 2005). Community college administrators should also have an interest in the results of this study since a large majority of their students enroll with the intent to transfer and earn a bachelor's degree (Shapiro et al., 2012). State and national policy makers have made it clear that their goal is to increase the number of bachelor's degrees earned in the U.S., and that this goal is important not only to the individual who seeks to improve their socioeconomic status and upward mobility, but that it is imperative to our nations' economy, and global competitiveness (McPhail, 2011).

### **Summary of Purpose and Significance**

The purpose of this study was to examine the effects of nonacademic and academic environmental factors on baccalaureate completion among community college transfer students over six years. As mentioned previously, this study seeks to identify the effect of non-academic and academic environmental factors on baccalaureate completion among community college transfer students over six years. Despite the important role that the community college plays in preparing students for transfer to a four-year institution in order to complete a baccalaureate degree, and the research indicating that nearly 80% of students attending a community college indicate they intend to transfer, completion rates for this student subpopulation remain low when compared to students who begin their postsecondary experience at a 4-year institution. Scholarly research in higher education has clearly identified characteristics of undergraduate students considered "at-risk" for not completing a bachelor's degree after transfer to a four-year institution (Astin, 1984; Bean & Metzner, 1985; Cabrera, Castaneda, Nora, & Hengstler, 1992; Ishitani, 2003; Pascarella & Terenzini, 1998, 2005; Renn & Reason, 2013; Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996). In addition, numerous studies have also identified which

institutional characteristics may hamper student completion (Cohen & Brawer, 2009; Hills, 1965; Pascarella & Terenzini, 1998; Spellman, 2007; Wyatt, 2007). However, there exists a gap in the research pertaining to environmental factors that may contribute to the disparity between students who begin their postsecondary experience at a 4-year institution (also known as “native” students) and students who begin their postsecondary experience at a community college and then transfer to a four-year institution to complete a bachelor’s degree. Because community colleges have historically contributed to the educational preparation of a large segment of the undergraduate population – in fact, this is central to many, if not all community college mission statements – and in light of the decline in community college transfer students *not* completing a bachelor’s degree, an in-depth investigation into this phenomenon was warranted.

## **Chapter II: Literature Review**

The purpose of this chapter is to provide context and structure for the reader in the areas of community college transfer student baccalaureate completion. To further this effort, a review of prior research and theory on persistence and completion of undergraduate degree-seeking students provides a foundation for understanding the complexities of this issue. The results of this review help guide the study of the population of interest: first time degree-seeking undergraduates who begin their postsecondary experience at a community college and transfer to a four-year institution to complete a bachelor's degree.

### **Approach to Review of Literature**

The research questions previously identified in Chapter 1 were used as a foundation from which to begin exploration of this topic. In an effort to further examine and identify areas of interest for this review and develop the researchers understanding of the current and past research in this field, the following questions helped guide this review of literature:

1. What foundational research on undergraduate student persistence, completion, and retention has been developed over the past 40 years?
2. Of the research identified, what academic and non-academic environmental factors have been previously identified that may influence persistence and completion of community college transfer students?
3. How have the early persistence, completion, and retention models changed over time as the student demographics have changed?
4. Which theoretical framework(s)/model(s) exist that may help explain or predict community college student persistence and completion?

The Oregon State University Research Database was used in searching for the literature used in this study. My initial review began by gathering information on major theories on community college transfer student persistence and completion. Data base searches were conducted utilizing *Academic Search Premier*, *ERIC*, *OSU online*, *EBSCO Host*, *PQDT Dissertation database*, and *Google Scholar*, using the following key words: (a) community college transfer student; (b) undergraduate completion; (c) persistence; (d) undergraduate enrollment; (e) bachelor's degree attainment; (f) first-time beginners, and (g) undergraduate attrition. Many additional sources were discovered in the reference sections of various dissertations on similar topics, which then led me to other relevant research and resources. Sources cited in this literature review include both refereed and non-refereed journal articles in both electronic and paper format; quantitative and qualitative studies were reviewed. In addition, published dissertations retrieved by accessing Oregon State University's library, books in my personal library, and other scholarly publications were accessed.

### **Organization of Review of Literature**

Section one provides definitions to many of the key terms used throughout this review, a brief discussion of scholarly research on the topic of student *intent*, followed by considerations for secondary data analysis. Section two provides a thorough description of the BPS:04/09 Longitudinal Study including sampling, weights, data conditioning, and survey design. The third section provides an overview of the community college and the important role it plays in the preparation of transfer students. Section four provides an overview and summary of major theories in undergraduate persistence and completion, including a brief narrative of their historical development. Section five represents an examination of the two theoretical

perspectives guiding this study, Bean and Metzner's (1985) Conceptual Model of Nontraditional Undergraduate Student Attrition, and Astin's (1984) I+E=O model and Theory of Involvement.

### **Definition of Terms**

The following terms were identified as important to the context of this research and crucial for any further analysis of this scholarly topic:

*Academic environmental variables:* Refers to intervening experiences a student has within the college environment that can be controlled or changed. For example, study habits, academic advising, absenteeism, course availability, program fit, and interaction with faculty Astin & Antonio, 2012).

*Attrition:* Refers to a student who fails to re re-enroll at an institution in consecutive terms (Seidman, 2012).

*Completion:* Refers to completing a degree or certificate; for the purposes of this study, completion refers to earning a bachelor's degree at the end of the BPS:04/09 Longitudinal Study.

*Input variable:* Refers to the personal qualities the student brings to the educational institution, for example student demographics, gender, socioeconomic status, ethnicity, high school GPA, etc. (Astin & Antonio, 2012).

*Community college transfer student:* For the purposes of this study, undergraduate students who begin their postsecondary education at a community college and then transfer to a four-year institution.

*Enrollment intensity:* Defined as whether a student is enrolled full or part-time.

*Native student:* A student who graduated from high school and enrolled directly into a four-year college or university.

*Non-academic environmental variables:* For the purposes of this study, defined as experiences and interactions that students have outside of the educational environment. Examples of non-academic environmental variables are being employed while enrolled, enrollment intensity (full or part-time), family responsibilities, and outside encouragement, etc. (Astin & Antonio, 2012; Wang, 2009).

*Non-traditional student:* Defined as older (usually over the age of 24), attending part-time, and/or not living on campus, work full or part-time while enrolled, and may have dependents other than a spouse (Bean & Metzner, 1985; Renn & Reason, 2013).

*Persistence:* Refers to the desire and action of a student to stay within the system of higher education from beginning year through degree completion (Berger, Ramirez, & Lyons, 2012).

*Retention:* For the purposes of this study, the definition of retention is enrollment from fall term of the first year of enrollment to the fall of the next year.

*Transfer student:* In general, this refers to the movement of a student from one postsecondary institution to another. However, this term is often used to describe students who begin their postsecondary education at a community college with the goal of eventually obtaining a baccalaureate degree from a four-year institution (Cohen & Brawer, 2009).

## **Defining Student Intent**

Student self-reported educational intentions may indicate whether or not students will return or re-enroll (Summers, 2003). In their 1983 study of college withdrawal in a non-residential university setting, Pascarella, Duby, and Iverson introduced the concept of intent and emphasized that it was the strongest variable in predicting student persistence or departure. In her 1992 study of community college persistence, Pricilla Mutter found that *intent* to persist most often leads to persistence. Several earlier studies have also documented a positive link between intent and persistence (Bean, 1983; Voorhees, 1987; Mulligan & Hennessy, 1990) and all indicate that intent to stay or leave is predictive of enrollment behaviors and are a critical variable associated with persistence.

## **Considerations for Secondary Data Analysis**

There are many things to consider when utilizing secondary data analysis instead of primary data analysis. In contrast to secondary data analysis, primary data analysis consists of data analysis in which the same individual team of researchers designs, collects, and analyzes the data (Boslaugh, 2007; Thomas & Heck, 2001; and Vartanian, 2010). Secondary data analysis is “in the broadest sense, analysis of data collected by someone else” (Boslaugh, 2007). Analysis of secondary data can also include “any data that are examined to answer a research question other than the question(s) for which the data were initially collected” (Vartanian, 2010). Secondary data comes for many sources including large government-funded data sets, university/college records, statewide or district-level K-12 school records, or author’s websites. Information contained within the data can be quantitative or qualitative, restricted, unrestricted for public use, and use direct (e.g., biomarker data) and indirect observations (e.g., self-report).

### **Data Source**

This study used national data derived from a database sponsored by the National Center for Education Statistics (NCES): the 2004-2009 Beginning Postsecondary Students (BPS:04/09) Longitudinal Study, which is a representative sample of American undergraduate students beginning higher education for the first time in 2003-2004 (Berkner & Choy, 2008). The BPS:04/09 study provides data on first-time beginners (FTBs) and the issues students encounter in “enrollment, persistence, progress, and attainment in postsecondary education” (Cominole, Wheelless, Dudley, Franklin, & Wine, 2007). Utilizing the BPS Longitudinal Study data provides a unique opportunity to examine community college students as the FTB cohort is tracked regardless of when they completed high school or how many institutions they attend.

### **Sample**

Data for the BPS:04/09 was derived from the 2003-04 National Postsecondary Student Aid Study (NPSAS:04). According to NCES, the NPSAS:04 sample is representative of an estimated 19 million students attending U.S. colleges and universities in 2003-2004. The NPSAS:04 consists of a sample of 90,000 undergraduate, graduate, and professional students in about 1,600 postsecondary institutions that are eligible for federal financial aid (Radford, Berkner, Wheelless, & Shepherd, 2010). Of those 90,000 students, 23,900 undergraduates were classified as FTBs during the base-year NPSAS:04 survey and comprised the sample for the BPS:04/09 cohort. Of the 23,900 sample members, approximately 18,640 (81%) were determined to be eligible for inclusion in the BPS:04 cohort (Cominole et al., 2007). The longitudinal data drawn from the BPS:04/09 study is a representative sample of about 4 million undergraduate students beginning postsecondary education in the U.S. for the first time in 2003-2004 (Berkner & Choy, 2008).

BPS:04/06 is the first follow up study of this cohort focused primarily on “continued education and experience, education financing, entry into the workforce, the relationship between experiences during postsecondary education and various societal and personal outcomes, and returns to the individual and to society on the investment in postsecondary education” (Cominole et al., 2007, p. 111). Approximately 16,500 of the 18,540 eligible students in the BPS:04/09 sample had sufficient data from either the NPSAS:04, BPS:04/06, BPS:04/09 interviews or other sources to be considered panel respondents. This dataset is the most recent longitudinal study of first-time beginning students and appropriate for the research questions of this study since the primary purpose is to analyze baccalaureate completion of FTBs who begin their postsecondary experience at a community college and then transfer to a four-year institution in order to complete a bachelor’s degree. (Cominole et al., 2007).

### **Survey Design and Institution Sample**

The BPS:04/09 Methodology Report provides information on the two-stage design used by NCES researchers to identify the first-time beginning student sample. The two-stage process began with institutions selected in the first stage from the population of eligible institutions and students selected in the second level. Eligible institutions were defined as those institutions that qualified for Title IV financial aid that (a) offered an educational program designed for high school graduates, (b) offered at least one academic, occupational or vocational program lasting longer than three months or 300 clock hours, (c) offered courses or programs to more than organization employees, and (d) were located in the United States, the District of Columbia, or Puerto Rico (Cominole et al., 2007, p. 5). In order to identify these institutions, researchers used a sampling frame comprised of Integrated Postsecondary Education Data System (IPEDS) Institutional Characteristics (IC) file and header file information and 2003/2004 fall enrollment

information (Cominole et al, 2007, p. 6). NCES researchers used this design to extract an institution sample for BPS:04/09 that consisted of 1,630 institutions that met design eligibility requirements. From this sample of institutions, researchers identified a base-year sample of approximately 23,090 students as first-time beginning students (Cominole et al., 2007, p. 21).

### **First-time Beginning Student Sample**

From the base-year sample of 23,900 students provided by the institution data, the first challenge for researchers was to identify a sample that could be located, available to participate in each of the three interviews planned for the study, and verify their eligibility as first-time beginning students. The BPS:04/06 Methodology Report outlined the data response rates that were affected by each of these challenges. From the original sample of 23,900 students identified from the institution data, 20,580 or 89% were located by the researchers. Of these students located, approximately 18,640 were determined to be eligible to participate in BPS:04/06. Of the 18,640 eligible students, 16,580 were identified as meeting the survey design eligibility criteria for first-time beginning students who responded to the interview, while 2,060 were eligible but did not respond to the interviewers. From the original sample of students identified as eligible to participate in the interviews, which included both students who could be located and those who could not be located, the unweighted response rate was 80%. By contrast, from those eligible students that were located by interviewers, nearly 90% or 14,900 completed the full BPS:04/06 interview. (Cominole et al., 2007).

### **Weighting**

To account for the uneven probabilities associated with students who were eligible but did not respond, NCES developed statistical analysis weights. In addition, the original BPS:04/06 sample of 23,900 eligible students were derived from the NPSAS base study that

included statistical analysis weights in the institution data since “The statistical analysis weights compensated for the unequal probability of selection of institutions and students in the NPSAS:04 sample” (Cominole et al., 2007, p. 67). Therefore, the student sample was weighted to account for the population of students who were eligible but did not respond in BPS:04/06 using methodology consistent with the NPSAS:04. The BPS:04/06 Methodology Report outlined how the student weight was computed as a component of this process (Cominole et al., 2007). In addition, this data set contained the same variation estimation strategy used in NPSAS:04 known as bootstrap variance estimation to analyze the variance in this sample (Cominole et al., 2007, p. 75).

### **Data Collection Instrument**

The data collection instrument developed by NCES researchers for use beginning with the NPSAS:04 base-year interviews differed from previous instruments used to collect data for the BPS series in that respondents had the option to complete a self-administered Internet web interview. Additionally, NCES researchers used the web interview as a foundation to conduct computer assisted telephone interviews (CATI) and computer assisted personal interviews (CAPI). The content and data elements were essentially the same as the previous BPS series developed by a Technical Review Panel with input from NCES. The data elements comprised sections that included information on the student’s (a) BPS eligibility and enrollment in 2003-2004 (non-respondents to 2004 interview only), (b) enrollment since 2004, (c) characteristics of current or last undergraduate enrollment, (d) employment regarding respondents no longer enrolled, (e) current demographics, (f) student loan and other debt, and (g) civic participation.

NCES researchers acquired the data for BPS:04/06 in three specific phases using a series of incentive levels to encourage students to complete the survey and ensure an acceptable

response rate. During each phase of data collection, the student had the option to select a self-administered web interview. The first phase consisted of an early response incentive phase with a \$30 incentive for completing the survey. The second phase used computer-assisted telephone interviewing (CATI) to collect the data for which the students received a \$20 incentive. The final phase or non-response collection phase provided students with a \$30 incentive if they completed the survey. The response rates varied for each phase from a high 47% during the first phase, 23% during the second phase of data collection, and a 29% response rate for the final phase of collection. Overall, of the approximately 81% of eligible sample members, 80% responded to the interview (Cominole et al., 2007).

### **Data Conditioning**

Data collected for BPS:04/09 contained a primary analysis file developed from multiple sources with over 800 variables. As stated earlier, quality control for the student data began after the beginning of the data collection period according to established procedures from the base-year study. Where appropriate, NCES investigated anomalous values using data collections and logical recodes to resolve the anomaly. In addition, throughout the data collection period, NCES reviewed interim files for quality control. The resultant data files are available as restricted research files, or unrestricted public use data accessible through the PowerStats online data analysis system (Cominole et al., 2007).

Post-data collection editing incorporated a variety of quality control checks and examinations to identify and confirm appropriate skip patterns. The multistage process used by NCES to clean the data included (a) blank or missing data was replaced with -9 for all variables in the instrument database, (b) legitimate skips were identified using instrument source code, (c) variable formatting and logical recodes were reviewed by expert coders, (d) one-way frequency

distributions for all categorical variables and descriptive statistics for all continuous variables were examined with outlier values replaced with a -6 (out of range), and (e) one-way frequencies were regenerated and examined. NCES used data perturbation procedures to protect individual confidentiality that were approved by the NCES Disclosure Review Board (Cominole et al., 2007).

NCES used statistical imputation procedures for all variables in PowerStats with missing data. The imputation methodology used by NCES included two steps (a) logical or deterministic imputation, and (b) weighted hot-deck imputation. The goal of the imputation process was to replace missing data with data that were valid in all cases. Imputation diagnostics included three checks, (a) overall imputation checks, (b) imputation checks by class of variables, and (c) multivariate consistency checks. During these checks, indications of substantial deviation from the weighted sums or identified inconsistencies resulted in a rerun and revision. The BPS Methodology Report contained information on the specific results of the imputation process by variable. Overall, the relative biases by variable were small, with about half containing a relative bias of less than five percent (Cominole et al., 2007, p. 66).

### **Community College: Pathway to the Baccalaureate**

Community college students account for nearly half of all undergraduate enrollments in the U.S., and this percentage is expected to increase (Cataldi et al., 2011; Leader, 2010; McPhail, 2011; Shapiro et al., 2012). In addition, nearly 80% of students who attend community college indicate an intention to transfer to a four-year institution to complete a bachelor's degree (McPhail, 2011). Preparing student to transfer to a four-year institution to complete a bachelor's degree is one of many important functions of the community college (Cohen and Brawer, 2009). In recent years, the community college has seen significant increases in the number of students

enrolling with the intent to transfer and complete a bachelor's degree (Cataldi et al., 2011; Kirk-Kuwaye & Kirk-Kuwaye, 2007; U.S. Department of Education, 2005). At the same time, there has been an increased focus on the importance of completion in higher education, along with a national challenge for increasing the number of students earning a bachelor's degree by the year 2020 (National Center for Public Policy and Higher Education, 2011; Shapiro et al., 2012).

Postsecondary students begin their education at a community college for a variety of reasons; in fact, for many students the community college provides an opportunity they might not have elsewhere. Students from low-income families often choose the community college for its affordability; first-generation students are also attracted to the community college because of its open enrollment policies and access to student services personnel and small class size; others choose the community college because of its flexible schedule and course offerings which allows them to work full or part-time and still be able to care for their families. In addition, with the rising cost of university tuition, many students find themselves nearly priced out of a college degree and choose to complete their first two years of coursework at the community college in order to afford a bachelor's degree (American Association of Community Colleges, 2012; Doyle, 2006; Geiger & Heller, 2011; Leader, 2010; National Center for Public Policy in Higher Education, 2011; Swail, 2002; U.S. Department of Education, 2005). However, the persistence rate of these transfer students has continued to decline (U.S. Department of Education, 2005).

### **Characteristics of Community College Students**

In order to have a better understanding of community college students, it is important to examine the demographics of this postsecondary population. Preparing students for transfer to a university to complete a bachelor's degree has been a central tenant of the American community college mission since its inception (Cohen & Brawer, 2009). In the United States, there are

around eleven hundred community colleges, and they enroll nearly half of the undergraduate students annually – an estimate of nearly 11 million (Shapiro et al., 2012). Students enrolled at the community college share several similar background characteristics. Community college students are more likely to be low-income, the first in their family to enroll in postsecondary education (also referred to as first-generation), be female, and be a member of an underserved/underrepresented racial or ethnic group (National Center for Public Policy and Higher Education, 2011). Recent national data on college enrollment and income reveal that 44 percent of low-income students (defined as earning income of less than \$25,000 per year) enroll at a community college after high school. This same research also indicates that 38 percent of community college students can be classified as first-generation.

### **Overview of Major Theories of Persistence**

The last four decades have seen a substantial increase in the number of research studies related to student persistence and completion – and during this time, the demographics of higher education have also evolved. Earlier research on retention focused primarily on the traditional student at four-year colleges and research institutions (Astin, 1984; Bean & Metzner, 1985; Pascarella & Terenzini, 1979; Spady, 1970; Tinto, 1975). There is a continued desire to understand more accurately the factors associated with persistence and attrition rates in higher education – the need to know exactly why students choose to leave or stay in college has never been greater.

There is considerable discussion in the literature on higher education on how to define “persistence” (Pascarella & Terenzini, 1998, 2005; Reason, 2009; Renn & Reason, 2013; Terenzini et al.; Tinto, 2006). A cursory review of these studies highlights the ambiguity and complexity in defining this term as an outcome of interest. Many researchers use the terms

retention and persistence interchangeably – however, each of these terms describe a different phenomenon. Retention describes the institutional goal of *retaining* students, which is often used and presented as a measure of institutional quality (Renn & Reason, 2013). Persistence is an individual phenomenon whereby a student *persists* to the completion of their identified educational goal. However, because students may identify their goals differently than the institution, it is possible for students to successfully persist without being retained. For the purposes of this study, the term “persistence” will be used to describe an individual students’ level of goal attainment, and more broadly includes progress towards that goal.

### **Student Persistence**

One of the most influential models developed to explain college persistence was Tinto’s Theory of Departure (1975). Tinto’s seminal work introducing a model of social and academic integration is seen as the foundation for much of today’s current theories on student retention, and is the model most often used in retention research. Tinto developed his model based on earlier research by Spady (1970) who applied concepts of Durkheim’s (1961) work with social isolation and its impact on suicide to his own theory on student attrition as the result of non-assimilation. Spady’s study was based on longitudinal data from 683 first year students attending the University of Chicago in 1965. Spady asserted that the interaction between the student and the institution is what allows the student to successfully assimilate into the social and academic environment. The extent to which the student feels an attachment or a bond with the institution is the basis for social success in this model.

This research was followed by Tinto’s (1975) model of student integration in which he expanded Spady’s model to explain how and why students drop out of college. Tinto further asserted that it is the individual characteristics the students bring with them to college that

influence their initial levels of commitment to the institution – and ultimately whether or not they persist and complete. Those characteristics include ethnicity, secondary school achievements (i.e., GPA), family support and encouragement, and socioeconomic status. Tinto further argued that it was these “pre-college” characteristics that directly affected whether, or to what degree, the student would become integrated into the campus’s academic and social communities that would directly influence the persistence and completion of individual students (Tinto, 1975).

Pascarella and Terenzini (1979) integrated both Spady’s (1970 and Tinto’s (1975) research to further study students who dropped out of college. Their longitudinal study included a simple random sample of 1,905 incoming freshmen students at a large residential University in New York State. The findings of their research supported both Spady’s (1970) and Tinto’s (1975) findings that identify the complexity of the influences on student persistence. In addition to the need for social and academic integration, they found that what happens to a student during the first year of college may be more important than the student characteristics, aspirations, or aptitudes that a student brings to college.

In a more recent review of persistence related research, Tinto (2006) acknowledged that while much has been done to improve the understanding of what influences student persistence, simply understanding what those factors are has not led to an increase in undergraduate student completion rates. The most significant findings, according to Tinto (2006) is that higher education now recognizes that students from different backgrounds (e.g., race, ethnicity, socioeconomic status) will be affected by the same institutional factors in different ways – including efforts and interventions designed to impact their completion. In other words, the significance of institutional context cannot be ignored (p.4), and that students’ interactions with their environments matter.

### **Astin's I+E=O Model of Student Involvement**

Astin's model of student involvement sought to describe how students develop during the college experience, and involves three elements which influence a students' persistence or continued enrollment: 1) student demographics and prior experiences (inputs); 2) environment including the experiences encountered during college; 3) student characteristics including knowledge, attitudes, and beliefs after college (Pascarella & Terenzini, 2005). This model provides a framework for examining student inputs and environment within and outside of the college environment, with outcomes measured as academic achievement, retention, and graduation rates. According to Astin (1993), failure to control for input variables will result in an inaccurate determination of the college environment as a predictor of student persistence. Astin also identified student precollege characteristics including high school performance (such as grade point average, SAT scores, etc.), demographics (e.g., ethnicity and gender), and student attitudes and behaviors (e.g., motivation and expectations) as inputs. The environmental phase focuses on a treatment or intervention implemented by the institution (e.g., academic advising, meeting with faculty). Finally, as part of the model, outcomes can be categorized as academic, attitudinal, cognitive, or developmental (Astin, 1993), or in the case of this study, baccalaureate completion. Astin writes, "The basic purpose of the [I+E=O] model is to assess the impact of various environmental experiences by determining where students grow or change differently under varying environmental conditions" (p.7).

According to Astin's (1984) theory, college outcomes are viewed as functions of three sets of elements. Theory of involvement explains the dynamics of how students change or develop. The three elements include:

- Inputs - demographics, student background, previous experiences

- Environment - range of experiences encountered during college
- Output (or outcomes) - characteristics, knowledge, attitudes, beliefs, values, etc. that exist after college.

I-E-O inputs are presumed to shape outcomes directly and indirectly based on each individual's unique characteristics. Environment includes experiences within the institutional environment and encompasses all aspects of the institution that the student may come into contact with including faculty, administrators, student services personnel, other students, and community partners of the institution (Pascarella & Terenzini, 2005)

### **Bean's Student Attrition Model**

Bean's (1980) conceptual model of student of undergraduate student attrition drew an analogy between employee turnover in the workplace and students who leave college. Bean's model incorporated the previous research of Price (1977) and includes four categories of variables: a) drop out (dependent variable), b) satisfaction and institutional commitment, c) organizational predictors, and d) background variables. Bean concluded that similar factors that lead to employee dissatisfaction and the resulting turnover such as routinization, communication, commitment to goal, and institutional quality were the same ones that affected the attrition rates of students.

This model also emphasizes the important role of behavioral *intentions* as predictors of persistence behavior. It presumes that beliefs shape attitudes, which in turn influence behavioral intention, which Bean believed were affected by a student's experiences with the quality of education received, friends, and overall campus quality. Beans model is significant for its contribution to better understanding the persistence process for undergraduate nontraditional students. A number of studies have shown a student's aspirations or intention of attaining a

bachelor's degree is a strong indicator of student transfer and retention (Dougherty & Kienzl, 2006; Tinto, 1975; Velez & Javalgi, 1987; Voorhees, 1987). Research has also shown that students who indicate they plan to attend a four-year institution are more likely to transfer (Velez & Javalgi, 1987), and that the actual process of transferring to a four-year institution was “partially an expression of the individual's goals and intentions” (p. 92).

### **Bean and Metzner's Model of Non-traditional Undergraduate Student Attrition**

Building on Bean's prior work and conceptual model, Bean and Metzner (1985) developed an attrition model to explain departure of non-traditional undergraduates, stating that “no theoretical model has been available to guide attrition research on the non-traditional student enrolled in institutions of higher education” (p. 485). Bean and Metzner (1985) argued that the primary difference in the attrition process between traditional and non-traditional students is that non-traditional students are more affected by the external environment than by social integration variables. They further posited that since the scholarly literature overwhelmingly suggested that social integration was not an important factor in the attrition process for non-traditional students, it would not be included in their model. In order to include environmental factors, Bean and Metzner capitalize on Bean's previous framework to include nontraditional students. They classified nontraditional students based on residency, age, and enrollment status, and they studied nontraditional students in both the two-year and four-year environments. They placed less emphasis on social integration and incorporated outside factors, including career and family obligations. The focus of their model shifted from what is happening to the student on campus to what is happening in the student life off campus, acknowledging that various factors influence a student's decision to persist are outside the control of the institution (Bean & Metzner, 1985). Environmental variables external to the college campus consist of finances, hours of

employment, outside encouragement, family responsibilities, and opportunities to transfer (Bean & Metzner, 1985).

## Summary

The purpose of this study was to examine the effects of non-academic and academic environmental factors on baccalaureate completion among community college transfer students over six years. As noted throughout this literature review, there are a number of themes that emerged which reflect the importance of this research topic in higher education for the two-year and four-year institutions. The first section illustrated the important function of the community college in preparing students for transfer, and the increasing population of students who begin their postsecondary experience at a community college who intend to transfer to a 4-year institution in order to complete a bachelor's degree (National Center for Education Statistics, 1995, 2003). However, at the time of this research, very few studies existed that had examined bachelor degree completion among first-time beginners whose first postsecondary experience began at a community college. With increased national focus on retention and completion, policymakers, educators, and the public are increasingly calling for accountability and improved graduation rates from postsecondary institutions (Anderson, Alfonso & Sun, 2006; Yang, 2008). Section two provided an overview of research related to undergraduate persistence and completion, and the development of several important theories surrounding student attrition. However, many of these theories and most literature on student departure examined four-year university students, neglecting those who successfully make the transition from the community college to a four-year institution. Section three provided an overview of the two theoretical perspectives guiding this study and their use as a lens in understanding the nontraditional student's unique challenges with regards to student inputs and environmental factors within the context of persisting to bachelor degree attainment.

### **Chapter III: Design of the Study**

The purpose of this study was to examine the effect of non-academic and academic environmental factors on baccalaureate completion among community college transfer students over six years. Secondary data acquired from the National Center for Education Statistics (NCES) 2004/2009 Beginning Postsecondary Students Longitudinal Study (BPS:04/09) served as the data source for this study. Specifically, after controlling for student pre-college characteristics and demographics, this study examined the effect of nonacademic and academic environmental factors on baccalaureate completion for community college transfer students over six years. This chapter contains a description of the research design, acquisition of data, data conditioning, and procedures used for analysis. For the purposes of this study, completion is defined as completing a bachelor's degree over six years.

As illustrated in Chapter 1, and demonstrated in Chapter 2, scholarly research has generally overlooked the importance of environmental variables and their effect on postsecondary completion for students who transfer from a 2-year institution to a 4-year institution to earn a bachelor's degree. Prior research has identified non-academic environmental factors external to the institution such as working while enrolled, family obligations, and life circumstances, etc. that detract students from their academic commitments, and may limit their ability to progress towards degree attainment (Bean & Metzner, 1985; 1998; Wood & Turner, 2011), and academic environmental factors such as meeting with an academic advisor, study habits, enrollment intensity, and contact with faculty (Bean & Metzner, 1985; Pascarella & Terenzini, 2005; Wood & Turner, 2011). With this purpose in mind, the following research questions, independent variables, dependent variables, and null hypothesis were developed for this study as follows:

1. For first time beginners who start their postsecondary experience at a 2-year institution and then transfer to a 4-year institution to earn a bachelor's degree, what is the effect of non-academic environmental factors on baccalaureate completion over six years? And, of the non-academic environmental factors identified as significant, which have a positive relationship to baccalaureate completion over six years?

*Dependent variable:* baccalaureate completion over six years

*Non-academic environmental variables:* job while enrolled, dependents under the age of 25, marital status, help from parents with living expenses, and considered undergraduate education worth the cost.

*H<sub>01</sub>:* After controlling for student pre-college characteristics and demographics, non-academic environmental factors have no relationship to community college transfer student baccalaureate completion over six years.

2. For first time beginners who start their postsecondary experience at a 2-year institution and then transfer to a 4-year institution to earn a bachelor's degree, what is the effect of academic environmental factors on baccalaureate completion over six years? And, of the academic environmental factors identified as significant, which have a positive relationship to baccalaureate completion over six years?

*Dependent variable:* baccalaureate completion over six years

*Academic environmental variables:* meeting with an academic advisor, meeting with faculty outside of the classroom, satisfaction with choice of major, study group participation, highest degree ever expected to attain, and enrollment intensity.

*H*<sub>02</sub>: After controlling for student pre-college characteristics and demographics, academic environmental factors have no influence on community college transfer student baccalaureate completion over six years.

### **Philosophical Approach**

This study was guided by a post-positivist orientation which relies on research that is quantifiable, generalizable, and reproducible to support findings, acknowledge biases, and unlike a positivist approach, make recommendations within the context of the research study (Trochim, 2006; Vogt, 2007). The post-positivist lens views all research, including educational research as scientific, and as such, should be guided by the best knowledge currently available. As opposed to positivism, the post-positivist view acknowledges that research cannot be entirely unbiased, and that the theoretical perspective of the researcher does, to a certain degree, influence their viewpoint and interpretation of results (Phillips & Burbules, 2000). When researching the various philosophical approaches to research design, I was drawn to quantitative analysis, but felt that the positivist approach was too rigid to allow for the contextual perspective that is so critical in educational research.

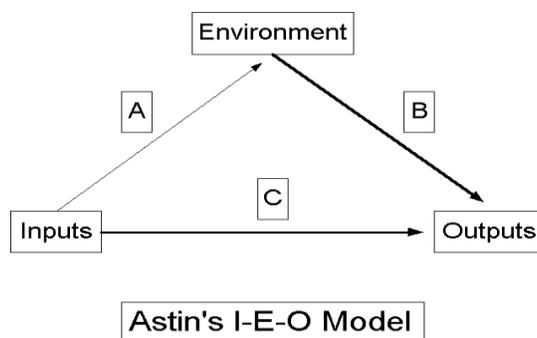
As the dominant philosophical view for over 400 years, positivism's historical roots are grounded in the belief that all science falls under one method based in physical sciences and mathematics (Denzin & Lincoln, 2005). The emphasis in positivist research is logic, rigor, and mathematical practices and correlation control (Bredo & Feinsberg, 1982), and a strict belief that there should be separation between the researcher and the theory. In other words, observation and theory are independent of each other, with no allowances for practical application or individual interpretation.

A shift from positivism to post-positivism began during the middle of the twentieth century when critics suggested that there was not neutral observation free from theory (Trochim, 2006), further asserting that there are no differences between common sense and scientific reasoning. The post-positivist lens suggests that there is no neutral observation free from theory. Trochim (2006) also suggests that the post-positivist blends the methodology and thought process of scientists for a more holistic view and common sense logic used in everyday life, arguing that scientific reasoning and common sense are essentially the same process.

### **Guiding Theoretical Perspectives**

Two theoretical perspectives guided this study and were used in the selection of variables. The first theoretical perspective used is Alexander Astin's (1984) Theory of Involvement (Figure 3.1). According to Astin's (1984) theory, college outcomes cannot be accurately assessed by student precollege characteristics and demographics alone, but should be viewed as functions of three sets of elements. Astin's Theory of involvement explains the dynamics of how individual student characteristics (inputs) and the experiences or interactions related to the educational institution (environment) that contribute to a measurable change in student development, knowledge, understanding, and goal attainment over time (outcome). The three elements include:

- Inputs (I) - demographics, student background, pre-college experiences
- Environment (E) - range of experiences encountered during college
- Outcome (O)- characteristics, knowledge, attitudes, beliefs, values, etc. that exist after college.



*Figure 3.1.* Astin's I+E=O Theory of Involvement

Inputs (I) are presumed to shape outcomes (O) directly and indirectly based on each individual's unique characteristics. Environmental (E) factors include experiences within the institutional environment and encompasses all aspects of the institution that the student may come into contact with including faculty, administrators, student services personnel, other students, and community partners of the institution (Pascarella & Terenzini, 2005). More recently, Astin and Antonio (2012) further emphasized the importance of knowing what “particular” environmental experiences each student has “in order to determine which experiences have an impact on student persistence and completion (p. 23). Within this context, environmental factors are defined as experiences that the student has while enrolled and can include academic and non-academic variables (Bean & Metzner, 1985).

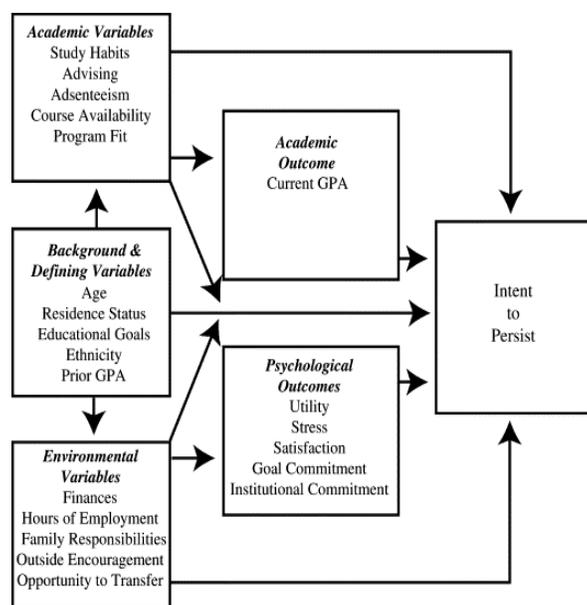
The second theoretical perspective used in this study was Bean and Metzner's Model of Nontraditional Undergraduate Student Attrition (1985) which is a conceptual model designed to examine the attrition of nontraditional undergraduate students. This model, represented in Figure 3.2, evolved in response to previous research by Tinto (1975) and Pascarella and Terenzini (1979), which focused on traditional students at four-year institutions. Bean and Metzner argued that Tinto's model relied too heavily on social integration to explain student attrition. Instead of focusing on social integration as a determinant of attrition, Bean and Metzner's model focused

on interaction with the *external environment* by stressing the importance of variables including finances, hours of employment, outside encouragement, and family responsibilities.

Built on the previous work of Bean (1980, 1982), this model is based on organizational turnover which took into account employee attitude and behavioral interactions. As a predictor of persistence behavior, this student attrition model is analogous to employee turnover in work organizations, and is also identified by the notion that beliefs shape attitudes, and attitudes influence behavioral intent. Bean and Metzner also established that environmental variables are more important than academic variables, with the exception of nontraditional students, in which the academic environment is important (Killbride, 1997).

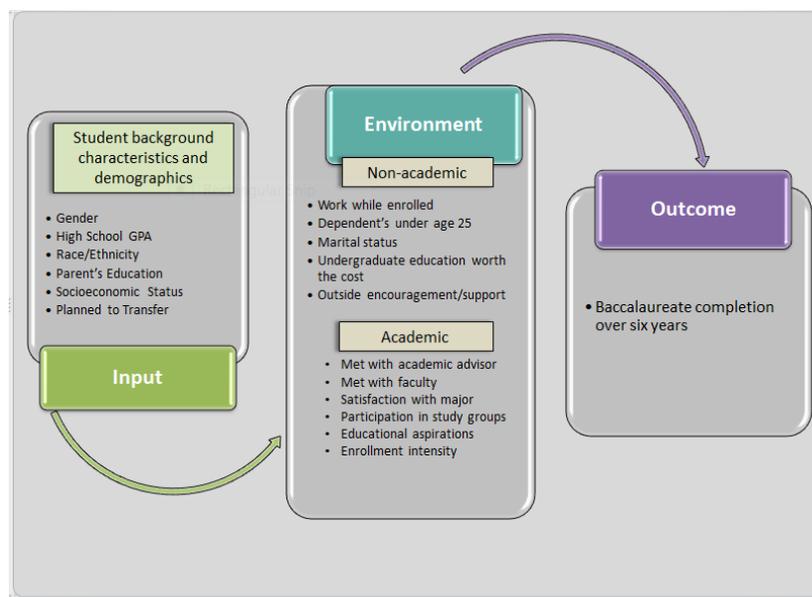
Complementing Astin's (1984) model, Bean and Metzner's theory of student attrition emphasizes the importance of considering the nontraditional student's unique challenges with regards to student inputs and environmental factors within the context of persisting to degree attainment. In fact, Bean and Metzner argue that the underlying dropout process differs for traditional and nontraditional students. This model also highlights the important role of behavioral intentions as a predictor of persistence behaviors. The nontraditional student model posits dropout decisions are influenced by one or more of the following variables: a) pre-college characteristics and demographics, b) environmental variables, c) academic variables, d) academic outcomes, e) students intent to leave, and f) social integration (Bean & Metzner, 1985). Students' background characteristics are at the core of the model and include gender, ethnicity, socioeconomic status, employment status, enrollment intensity, and high school performance. These characteristics determine students' social and academic integration needs through the influence each has on students' non-collegiate attachments, collegiate interactions, and academics. In sum, the experiences produced through the interaction between these variable sets

(pre-college characteristics and demographics, nonacademic and academic environmental variables, and social integration) shapes students' educational attitudes (Bean & Metzner, 1985). In turn these attitudinal outcomes impact academic outcomes and behavioral intentions, which ultimately affect students' dropout decisions (Bean & Metzner, 1985).



*Figure 3.2.* Bean & Metzner's Model of Nontraditional Undergraduate Student Attrition

Figure 3.3 provides a visualization of the two theoretical perspectives guiding this study, Bean and Metzner's (1985) Conceptual Model of Nontraditional Undergraduate Student Attrition, and Astin's (1984) I+E=O model and Theory of Involvement. Using elements from these two theories helped guide the selection of variables used in this study. Both Astin (1984) and Bean and Metzner (1985) agreed that environment was critical in identifying factors influence student outcomes. Utilizing Astin's (1984) I+E=O model allows for examining student inputs and environment (non-academic and academic) with outcomes measured as academic achievement, which for the purposes of this study is baccalaureate completion.



*Figure 3.3* Theoretical Perspective

## Research Methods

The purpose of this study is to examine the effect of academic and non-academic environmental factors on baccalaureate completion among community college transfer students over six years. Specifically, student pre-college characteristics and demographics along with non-academic and academic environmental factors are examined for their effect on community college transfer student baccalaureate attainment over six years. The research procedures used in this study are identified below. They include research design, population, data collection, and analysis.

## Research Design

Postpositivist research methods are most often associated with a quantitative approach. This study uses both descriptive and inferential methods to measure the degree of association between factors supporting baccalaureate completion among community college transfer students over six years. According to Creswell (2012) descriptive statistics present information that helps researchers to examine the data to determine overall trends. In order to establish a

description of initial control variables, a frequency analysis was first conducted which included demographic control variables: gender, high school GPA, race/ethnicity, parents' education, educational aspirations, and income. This was followed by a binary logistic regression to evaluate the existence, direction, and strength of the relationship between each of the independent variables and the dependent variable.

**Data collection.** Data for this study was obtained from a nationally representative sample of first-time beginning college students collected by NCES in their 2004/2009 Beginning Postsecondary Students Longitudinal Study (BPS:04/09) available for public use at <https://nces.ed.gov/>. The data collected from BPS:04/09 included variables representing student individual characteristics, non-academic environmental variables, and academic environmental variables identified in prior research. The dependent variable of the study, community college transfer student baccalaureate completion over six years was operationally defined as 1) students who began their postsecondary experience in the fall of 2003 at a community college, and 2) completed a bachelor's degree by June of 2009. The outcome is dichotomous and was coded either yes or no (0=no, 1=yes). In addition, this study utilized Astin's (1984) Model of Student Involvement (I-E-O) and Bean & Metzner's (1985) Conceptual Model of Nontraditional Undergraduate Student Attrition as guiding theoretical perspectives for examining the effects of non-academic and academic environmental factors on baccalaureate completion among community college transfer students over 6 years.

### **Beginning Postsecondary Students (BPS: 04/09) Longitudinal Study**

The Beginning Postsecondary Students (BPS:04/09) Longitudinal Study is initially administered to first-time beginners in the 2003-04 academic year, and consists of first-time beginners identified in the 2003-04 National Postsecondary Student Aid Study (NPSAS:04), with

the first follow-up at three years (2006) and the second follow-up six years later (2009). The first follow-up survey (BPS:04/06) captured academic progress and persistence, focusing on students' continued educational experience, educational financing, workforce participation, and the relationship between postsecondary education participation and societal/personal outcomes (Cominole et al., 2007). The second follow-up survey (BPS:04/09) assessed completion rates, focusing on bachelor's degree completion, while continuing to collect information pertaining to education and employment, including the transition to post-college employment. NPSAS:04 is a nationally representative sample of about 90,000 undergraduate, graduate, and first-professional students in about 1,600 institutions in the U.S., District of Columbia, and Puerto Rico who are eligible to participate in federal Title IV student aid programs. Approximately 18,640 respondents were identified in the NSPAS:04 survey as first-time beginning postsecondary students and became the sample for the BPS:04/09 longitudinal study. The population for this study was delimited to the 6,300 respondents who were first time beginners at a community college during the fall 2003-04 academic year. The BPS:04/09 data is a nationally representative sample of undergraduates entering postsecondary education for the first time, making it one of the largest longitudinal studies to date of undergraduates in the U.S., and provides researchers with the opportunity to analyze a large number of individual student characteristics.

### **PowerStats**

The NCES website gives researchers two options for analyzing the BPS data: 1) apply for authorization to obtain the restricted data file from NCES, or 2) accept the NCES data usage agreement and use the web-based software data analysis on their website <http://nces.ed.gov/datalab/>. It was determined that the free access NCES provides to the public for their web-based software application called PowerStats would be sufficient for my analysis.

The PowerStats program allows the user to create tables, as well as run correlational analyses including linear or logistic regression on the BPS:04/9 data set as well as eight other national datasets while protecting the anonymity of the respondents.

PowerStats produces the design-adjusted standard errors required to determine statistical significance of differences in the estimates. PowerStats also provides the user with a detailed description of how each variable was created, and in cases where an item comes directly from an interview the question wording is also provided. The output in PowerStats includes table estimates (either in percentages or means), the proper standard errors, and weighted sample sizes for the estimates. If the number of valid cases is too small to produce a reliable estimate (determined to be fewer than 30 cases), PowerStats prints the double dagger symbol instead of the estimate (Radford, Berkner, Wheelless, & Shepherd, 2010).

PowerStats runs regression models in the same manner as SPSS. A separate program like SPSS would be advantageous in situations where a researcher would need to create many new variables from the raw data. For the purposes of this study, using PowerStats for data analysis would not result in any significant disadvantage over using SPSS because it is unnecessary to create multiple variables. Using PowerStats for this study will produce the same output without having to undergo significant processes in order to obtain the restricted data file.

This analysis used PowerStats to analyze data using logistic regression and was conducted using a series of two blocks of variables which are described in Table 3.1. After controlling for student input (demographic) variables, non-academic environmental and academic environmental variables were entered in blocks in the following order:

Control variables: Student pre-college characteristics and demographics (input variables)

Block 1: Undergraduate experiences while outside the college environment (non-academic environmental variables)

Block 2: Undergraduate experiences while in the college environment (academic environmental variables)

Logistic regression is a statistical technique used to examine whether a binary outcome has a significant predictive relationship with one or more independent variables. Logistic regression is an appropriate method of analysis for this study for several reasons. First, it allows for two or more regression equations, the first containing only input measures which allows for the examination of how much of the variance on the outcome is attributed to those input variables only. Second, it also allows for “control” of the input variable effects when adding environmental variables to the equation (Astin & Antonio, 2012). By controlling for the effects of input variables, regression analysis allowed the researcher to determine what effect the environmental variables have on the outcome, i.e., eliminating the correlation between input and outcome (Astin, 1991). Third, the dependent variable for this study, baccalaureate completion over six years, is a dichotomous outcome, making logistic regression analysis an appropriate method for this study. Descriptive statistics provided an overview of the data sample and yielded a snap shot of the distribution of variables so that initial themes and patterns could be observed (Creswell, 2012).

***Interpretation.*** Logistic regression results can be reported in several formats (e.g., logged odds, odds, odds ratios, and probabilities) (Pampel, 2000). The standard logistic regression coefficients are generated in terms of logged odds. While logged odds are additive and linear (identical to least squares regression), the natural logarithm of the odds (i.e., logged odds) lacks a meaningful metric. To alleviate the difficulty of interpretation, researchers commonly report

odds ratios (Tabachnick & Fidell, 2007). Odds ratios reflect the relative likelihood of an outcome occurring for a comparison group compared to a reference group (Hosmer & Lemeshow, 2000).

An odds ratio of one signifies that both (comparison and referent) groups have equivalent likelihood of an outcome occurring; odds ratios greater than one indicate an increased likelihood for one group as compared to the other, and values below one represent a reduced likelihood of an outcome occurring.

Table 3.1

*List of variables used in the study*

Name	Description
<i>Dependent</i>	
ATHTY6Y	Indicates highest level of degree attained through 2009
**LEVEL	Filter applied to DV: First institution level 2003-2004
<i>Control Variables</i>	
GENDER	Student gender
RACE	Indicates students race/ethnicity
GPA	High school grade point average
PAREduc	Parents highest level of education
PCTPOV	Indicates the total 2002 income as a percentage of the federal poverty level thresholds for 2002
TR4PLNY1	Planned to transfer to a 4-year institution
<i>Independent</i>	
<i>Non-academic</i>	
JOBENR	Worked while enrolled (2004): (exclude work study)
DEPANY09	Student has dependents under the age of 25
SMAR06	Student marital status as of 2006
UGEWC09	Considered undergraduate education worth the cost
PARHELPC	Received help with living expenses from parents
<i>Academic</i>	
FREQ06C	Frequency of meeting with academic adviser
FREQ06A	Frequency of contact with faculty outside of the classroom
SATMAJ09	Satisfaction with undergraduate major or course of study
FREQ06G	Frequency of study group participation
ENRSTAT	Enrollment intensity during 2003-2004 academic year
DGEVR06	Highest degree ever expected 2006

Source: U.S. Department of Education National Center for Education Statistics, Beginning

Postsecondary Students Longitudinal Study, Second Follow-up (BPS:04/09).

## **Data analysis**

In order to describe the relationship between an outcome (dependent) variable and one or more explanatory (independent) variables, statistical regression methods are used. Binary logistic regression was applied to data from NCES public website using their online statistical tool called PowerStats. One of the strengths of PowerStats is the ability to create a logistic regression model using either a weighted least squares linear regression (WLS) or logistic (logit) regression.

Since outcome of interest (dependent variable) of this study is baccalaureate completion among community college transfer students over six years (yes/no) was a dichotomous variable, logistic regression was selected as the appropriate analysis (Creswell, 2012). In addition, Kleinbaum, Kupper, Niam, and Muller (2008) also concur that when the dependent variable is dichotomous, logistic regression analysis is the most logical technique for researchers to apply.

## **Variables used in this study**

As mentioned previously, this study used elements of Astin's (1984) Model of Student Involvement and Bean and Metzner's (1985) Model of Nontraditional Undergraduate Student Attrition, to help guide the selection of variables. The dependent variable used in this study is baccalaureate completion over six years among FTBs who began their postsecondary experience at a community college and transferred to a four-year institution. Control variables include undergraduate student demographics and pre-college characteristics of gender, race, high school GPA, parental education, income, and if the student planned to transfer to a 4-year institution. Non-academic environmental variables include worked while attending school, had dependents under age 25, marital status, considered undergraduate education worth the cost, and received help with living expenses from parents. Academic environmental variables include academic advising, contact with faculty outside of the classroom, satisfaction with choice of major, study

habits (i.e., participation in study groups), bachelor's degree aspirations, and enrollment intensity. The following section will provide a brief description of each variable used in this study and is followed by Table 3.2 which summarizes variable coding.

### **Dependent Variable**

**Bachelor's degree attainment through 2009.** The dependent (outcome) variable was operationalized as a dependent, dichotomous variable for this study. This variable was derived from the PowerStats variable ATHTY6Y, defined as *Highest Degree Attained Through 2009* (a) attained bachelor's degree, (b) attained associate's degree, (c) attained certificate, or (d) no degree. For this study the responses available for ATHTY6Y were dummy coded into a new variable ATTAINMENT with (0) representing the reference category and (1) representing the comparison category. The new value label and values for ATTAINMENT are: (0) = Did not attain a bachelor's degree (consisting of "no degree, certificate, associate's degree,") and (1) = Bachelor's degree attained through 2009.

### **Student pre-college characteristics and demographic variables**

Student pre-college characteristics and demographics used in this study represented gender, race/ethnicity, high school GPA, parents' education, income, and whether or not the student planned to transfer to a 4-year institution.

**Gender.** The variable gender was derived from the PowerStats variable GENDER and was based on a student's response to the question "Are you male or female?" Of the students in this sample, 42.6% were male and 57.4% were female.

**Ethnicity.** Ethnicity was derived from the PowerStats variable RACE with the values of 1 = White, 2= Black or African American, 3 = Hispanic or Latino, 4 = Asian, 5 = American Indian or Alaska Native, 6 = Native Hawaiian/other Pacific Islander, 7 = Other, and 8 = More

than one race. Of the students in this sample, 61.5% White, 13.8% Black or African American, 15% Hispanic or Latino, 4.7% Asian, and 5% Other.

**High School Grade Point Average.** High school grade point average was derived from the PowerStats variable HCGPAREP representing the students' response to the question "What was your high school grade point average?" The data sources for this variable include the self-reported high school grade point average on the standardized test date, from the College Board and ACT scores for students 24 years of age or younger. Of the students in this sample, 26.88% skipped this question, 24% A- to A, 25.8% B to A-, 10.7% B- to B, 9.2% C to B-, 2.3% C- to C, 0.7% D to C-, and 0.1% D- to D.

**Parental Education.** Parental education was derived from the PowerStats variable PAREDUC that represented the students' response to the question "What is your parent's highest level of education?" The PowerStats variable PAREDUC contained responses that included (a) do not know parent's education, (b) did not complete high school, (c) high school diploma or equivalent, (d) vocational or technical training, (e) less than two years of college, (f) associate's degree, (g) two or more years of college but no degree, (h) bachelor's degree, (i) master's degree or equivalent (first-professional degree), and (j) doctoral degree or equivalent. Of the students in this sample, 2.7% of the respondents did not know their parent's education level, 7.7% did not complete high school, 27% had a high school diploma or equivalent, 4% had vocational or technical training, 7.8% had less than two years of college, 7.3% had earned an associate's degree, 5.5% had two or more years of college but no degree, 20.2% had earned a bachelor's degree, 12.2% had earned a master's degree or equivalent, 2% had earned first-professional degree and 3.2% a doctoral degree or equivalent.

**Income.** The PowerStats continuous variable PCTPOV indicates the total 2002 income as a percentage of the federal poverty level thresholds for 2002 and was derived from PowerStats variables CINCOME AND HSIZE. The 2002 calendar year income was used to determine federal financial aid eligibility for the 2003-2004 academic year based on family size, total income, and dependency. This variable refers to the family size and income of the parents of dependent students (DEPEND=1) or the respondents own family if independent (DEPEND=2). A value of 100 or less means that the respondent's family is at or below the federal poverty level threshold for that family size. The maximum is set at 1,000 (ten times poverty threshold).

**Transfer to 4-year institution plans.** Student plans to transfer to a 4-year institution was derived from the PowerStats variable TR4PLNY1 representing whether or not the student indicated that they planned to transfer to a 4-year institution as of 2003-04. The PowerStats variable TR4PLNY1 contained responses that included a) did not plan to transfer to a 4-year institution, and b) planned to transfer to a 4-year institution. Of the students in this sample, 72.6% indicated they did not plan to transfer to a 4-year institution and 27.4% indicated that they did plan to transfer to a 4-year institution.

### **Non-Academic Environmental Variables**

**Worked While Enrolled.** Student employment intensity was derived from the PowerStats variable JOBENR2, and represents the students' answer to the question, "How many hours per week did you work during the 2003-2004 academic year," excluding work-study. Full-time is defined as 35 or more hours per week, and part-time is any amount less than 35 hours per week. PowerStats variable JOBENR contained responses that included (a) No job, (b) Part-time, and (c) Full-time. Of the students in this sample, 36.9% indicated they had no job, 41.5%

indicated they worked part-time while enrolled in school, and 21.5% worked full-time while enrolled in school.

**Dependents under the age of 25.** The PowerStats variable DEPANY09 was derived from the 2009 student interview in response to the question “Did you have dependent children under the age of 25 that you supported financially?” PowerStats variable DEPANY09 contained responses that included (a) No, and (b) yes. Of the students in this sample, 66.7% of respondents indicated that they did not have dependents under the age of 25 and 33.3% indicated they did have dependents under the age of 25.

**Marital status.** Marital status was derived from the PowerStats variable SMAR06 which represented the students’ marital status as of 2006. This PowerStats variable contained five categories representing (1) Single, never married, (2) Married, (3) Separated, (4) Divorced, and (5) Widowed. Of the students in this sample, 78.5% of the respondents indicated they were single, 15.8% married, 1.5% separated, 3.93% divorced, and .031% widowed.

**Undergraduate education worth the cost.** The PowerStats variable UGEWC09 represented the students’ response to the question, “Do you consider an undergraduate education worth the cost?” Of the students in this sample, 79.30% of respondents indicated they considered an undergraduate education worth the cost, and 20.70% indicated they did not.

**Help from parents with living expenses.** The PowerStats variable PARHELPC represented the students’ response to the question “Did your parents/guardians help you financially by paying for living expenses other than housing (such as food, transportation) during the 2003-2004 academic year?” Of the students in this sample, 57.5% of respondents indicated they did not receive financial help from parents/guardians with living expenses during the 2003-

2004 academic year, and 42.5% of respondents indicated they did receive financial help from parents/guardians with living expenses during the 2003-2004 academic year.

### **Academic Environmental Variables**

**Academic Advising.** Academic advising was derived from the PowerStats variable FREQ06C that represented the student's response to the question "How often did you meet with an advisor concerning academic plans during the 2003-2004 academic year?" The PowerStats variable FREQ06C contained responses that included: (a) Never, (b) Sometimes, and (c) Often. Of the students in this sample, 13.9% of respondents indicated they never met with an advisor, 50% indicated they sometimes met with an advisor, and 15.9% indicated they often met with an academic advisor.

**Met informally with faculty outside classroom.** Contact with faculty was derived from the PowerStats variable FREQ06A that represented the student's response to the question "How often did you have informal or social contact with faculty members outside of the classroom?" The PowerStats variable FREQ06A contained responses that included (a) Never, (b) Sometimes, and (c) Often. Of the students in this sample, 45.6% indicated they never met with a faculty member outside of the classroom, 26.9% indicated they sometimes met with a faculty member outside of the classroom, and 7.34% indicated they often met with a faculty member outside of the classroom.

**Satisfaction with Major.** Student satisfaction with choice of major or course of study was derived from the PowerStats variable SATMAJ09, that represented the student's response to the question "Are you satisfied with your choice of major or course of study?" Of the students in this sample, 14.5% of respondents indicated that they were not satisfied with their choice of

major or course of study, and 85.46% respondents indicated that they were satisfied with their choice of major or course of study

**Participated in a study group outside of classroom (Study Habits).** Indicators of study habits were derived from the PowerStats variable FREQ06G that represented the students' response to the question "How often do you attend study groups outside of the classroom?" The PowerStats variable FREQ06G contained responses that included: (a) Never, (b) Sometimes, and (c) Often. Of the students in this sample, 29.11% never attended a study group outside of the classroom, 38.82% sometimes attended a study group outside of the classroom, 11.90% often attended a study group outside of the classroom, and 20.18% skipped the question.

**Student Educational Goals or Aspirations.** Student educational goals or aspirations were derived from the PowerStats variable DGEVR06 that represented the student's response to the question "What is the highest level of education that you expect to ever complete?" The PowerStats variable DGEVR06 contained responses that included: (a) No degree, (b) Undergraduate certificate or diploma, (c) Associate's degree, (d) Bachelor's degree, (e) Post-baccalaureate certificate/program, (f) master's degree, (g) Post-master's certificate, (h) Professional degree, and (i) Doctoral degree. Of the students in this sample, 4.76% expected no degree, 6.61% expected an undergraduate certificate or diploma, 11.91% expected an associate's degree, 30.67% expected a bachelor's degree, 0.76% expected a post-baccalaureate certificate or program, 30.61% expected a master's degree, 0.42% expected a post-master's certificate, 5.72% expected a professional degree, and 8.54% expected a doctoral degree.

**Enrollment Intensity.** Enrollment intensity was derived from the PowerStats variable ENRSTAT that represented the student's response to the question "What was your enrollment pattern during the 2003-2004 academic year?" The PowerStats variable ENRSTAT contained

responses that included: (a) Enrolled mostly full-time, (b) Enrolled mostly part-time, and (c) Enrolled full-time & part-time equally. Of the students in this sample, 73.79% indicated they had enrolled mostly full-time, 23.19% indicated that they had enrolled mostly part-time, and 3.02% indicated that they had enrolled full-time and part-time equally.

Table 3.2

*Variables and Coding*

Variables	Coding Description
<i>Dependent Variable</i>	
Baccalaureate completion by June 2009	0=no 1=yes
<i>Pre-college Characteristics and Demographics</i>	
Gender: Female	0=no 1=yes
Race: White (reference group)	0=no 1=yes
Race: Black or African American	0=no 1=yes
Race: Hispanic or Latino	0=no 1=yes
Race: Asian	0=no 1=yes
Parent's highest level of education (bachelor's degree or higher)	0=no 1=yes
High school GPA (range: A to A-, A- to B, B to B-, C to B-)	0=no 1=yes
Income as a percent of poverty	Continuous
Planned to transfer to a 4-year institution	0=no 1=yes
<i>Non-academic Environmental Variables</i>	
Worked full-time while enrolled (exclude work-study)	0=no 1=yes
Worked part-time while enrolled (exclude work-study)	0=no 1=yes
Dependent children	0=no 1=yes
Marital status (married)	0=no 1=yes
Received help from parents with living expenses	0=no 1=yes
Felt that undergraduate education worth the cost	0=no 1=yes
<i>Academic Environmental Variables</i>	
Met with an academic advisor	0=no 1=yes
Met with faculty outside of classroom	0=no 1=yes
Participated in study groups outside of classroom	0=no 1=yes
Highest degree ever expected to earn (bachelor's degree)	0=no 1=yes
Enrollment intensity (full-time)	0=no 1=yes

Source: Derived from U.S. Department of Education National Center for Education Statistics

Beginning Postsecondary Students Longitudinal Study, Second Follow-Up (BPS:04/09).

## **Limitations**

Several limitations of this study should be considered. Data for this study is derived from the National Center for Education Statistics (NCES), 2004/2009 Beginning Postsecondary Student Longitudinal Study (BPS:04/09) and therefore contains limitations related to the use of secondary data. The institutional information collected through NCES for the BPS:04/09 does not account for all of the important environmental factors that may have a direct or indirect impact on students, and is limited in variables that may provide specific information about students' undergraduate experiences that could help explain persistence and completion behavior. While the BPS:04/09 utilized institutional records and national databases for data collection, surveys were also used. This study relied on participant self-reported information to account for student employment participation, college integration, and post-college labor market characteristics, including salary. The advantage of self-reported data collection is that it may gather information that may be unobtainable in other ways (e.g., views and opinions). However, the reliability of self-reported data is commonly questioned due to the potential for subjects' inaccurate recall, non-descript accounts, exaggerations, and deception. This doesn't mean that self-reported data are invalid, but it suggests the data collection cannot always be trusted (Ericsson & Simon, 1993).

**Test of reliability.** To examine BPS:04/09 data collection reliability, the NCES tested subjects' response consistency (Wine, Cominole, & Caves, 2009). After the BPS:04/09 field test, a subsample of subjects (n=300) was re-interviewed using a subset of initial interview items. Reliability assessments were made using subjects' field test and re-interview responses. For discrete variables, reliability was assessed as the percentage of exact matches between the paired responses. For continuous variables, reliability was assessed if the association between subjects'

initial interview and re-interview responses were within one standard deviation. The tests of association used for continuous variables included Cramer's phi (estimates the strength between two nominal variables), Kendall's tau-*b* (asses the strength between three or more ranked items), and Pearson's *r* (estimates the correlation between two interval/ratio variables). Through the reliability assessments, NCES found that the BPS:04/09 produced high quality data and consistently reliable results (Wine, Cominole, & Caves, 2009).

In conclusion, a final limitation, data from the BPS: 04/09 cohort does not include a comprehensive set of student experience variables and was limited by the longitudinal response rate, and relies upon data obtained from self-reported survey questions. In other words, these two studies are designed to collect student and institution data that are not specific to student persistence and attainment. However much of what is collected can be analyzed within the context of this study.

### **Protection of Human Subjects**

In line with any research project, the protection of human subjects is addressed through the use of de-identified data collected through the National Center for Education Statistics. Both student researcher and the principal investigator have received CITI training and certification. Although the current study is using existing and de-identified data, appropriate forms have been submitted to the Oregon State University Institutional Review Board and appropriate procedures have been approved.

### **Summary of the Design of the Study**

This chapter defined the data, analytical sample, variables, and statistical technique that will be used to examine the effects of non-academic and academic environmental factors on baccalaureate completion among community college transfer students over six years. Specifically, after controlling for student pre-college characteristics and demographics, this study seeks to identify factors with a statistically significant positive relationship to baccalaureate completion for community college transfer students over six years. This study involved a secondary analysis of the BPS:04/09 data using binary logistic regression analysis. Prior research in higher education has examined academic and social integration factors predictive of student persistence and completion, and many important theories emerged during the past four decades that support the findings of these studies. However, scholarly research at the time of this study has generally overlooked the importance of academic and non-academic environmental factors on the persistence and completion among community college transfer students. This study seeks to address this gap in the research on this increasing undergraduate population by examining the effect of environment on baccalaureate completion among community college transfer students over six years.

## Chapter IV: Results

Using a set of theoretically grounded predictor variables, the purpose of this study is to examine the effect of nonacademic and academic environmental factors on baccalaureate completion among community college transfer students over six years. This study addresses two research questions: (1) For first time beginners who start their postsecondary experience at a 2-year institution and then transfer to a 4-year institution to earn a bachelor's degree, what is the effect of non-academic environmental factors on completion over six years? And, of the non-academic environmental factors identified as statistically significant, which have a positive relationship to baccalaureate completion over six years? (2) For first time beginners who start their postsecondary experience at a 2-year institution and then transfer to a 4-year institution to earn a bachelor's degree, what is the effect of academic environmental factors on completion over six years? And, of the academic environmental factors identified as statistically significant, which have a positive relationship to baccalaureate completion over six years?

### Overview of the Results

In response to these two research questions, this section presents the results of the binary logistic regression analysis used to analyze the relationship between the independent variables and the binary outcome variable of baccalaureate completion over six years. The findings reveal that after controlling for student pre-college characteristics and demographics, the environmental variables *meeting often with an academic advisor, informal faculty contact outside the classroom, working part-time while enrolled, and bachelor's degree aspirations* were found to be statistically significant and are predictive of baccalaureate completion over six years among community college transfer students.

To identify if students used in this sample differed significantly in individual characteristics, frequency proportions were examined to provide an initial analysis (Table 4.1). Of the students in this sample nearly respondents were predominantly white (61.5%), female (57.4%), over one-third (37.4%) came from households with at least one parent who completed a bachelor's degree, slightly under one-third (27.4%) reported they planned to transfer to a 4-year institution, and half of the respondents self-reported a high school grade point average of 3.0 or higher.

Table 4.1

*Student pre-college characteristics and demographics(n=6,300)*

Independent Variable	Category	N.	%
Gender	Female	3,620	57.4
	Male	2,680	42.6
Race/Ethnicity	White	3,877	61.5
	Black or African American	869	13.8
	Hispanic or Latino	939	14.9
	Asian	297	4.7
	American Indian or Alaska Native	40	0.6
	Native Hawaiian/Other Pacific Islander	255	4.0
	Islander		
Parents Education	Bachelor's Degree or Higher	2,378	37.8
	Associate's Degree	461	7.3
	Some college but no degree/certificate	1,095	17.4
	HS diploma or equivalent	1,710	27.1
	Did not complete HS	488	7.7
	Don't know parent's education level	168	2.7
High School GPA	{skipped}	1,693	26.9
	3.5 – 4.0	1,521	24.2
	3.0 – 3.4	1,627	25.8
	2.5 – 2.9	674	10.7
	2.0 – 2.4	587	9.3
	1.9 and below	198	3.2

Income as % of poverty	At or below poverty level	391	6.2
	101 – 150% above poverty level	485	7.7
	151 – 200% above poverty level	668	10.6
	201% and above poverty level	819	13.0
	202% and above poverty level	3,937	62.5
Planned to transfer to 4-year	Yes	1,725	27.4
	No	4,575	72.6

Source: Derived from U.S. Department of Education National Center for Education Statistics, Beginning Postsecondary Students Longitudinal Study (BPS:04/09).

**Statistical Analysis.** The BPS:04/09 data were analyzed using a logistic regression model. To accurately calculate beta coefficients and/or standard errors, the NPSAS:04 (and by extension, the BPS:04/09) violation of simple random sampling was taken into account using variance estimation. The logistic regression analysis utilized NCES specified balanced repeated replication that involved sampling and replicate weights. Entering the student pre-college characteristics and demographic variables into a binary logistic regression to predict baccalaureate attainment resulted in a significant degree of improvement of fit over the null (i.e., intercept only) model. The deviance from the null model due to the control variables was 103656.664 in the  $-2 \log$  likelihood metric, or .167 in pseudo  $R^2$  terms. The chi-square  $p$ -value with 11 df for this set of variables was  $<.001$ . Table 4.2 presents the regression coefficients for these variables and the results of the tests of their significance. Of the students in this sample, the results from the regression model suggest that the odds of completing a bachelor's degree improved with higher academic performance in high school. Compared to the odds of students in this sample who did not plan to transfer, the odds of completing a bachelor's degree for students who indicated an intent to transfer is nearly five and three-quarters times greater ( $p<.001$ , OR=5.735).

Table 4.2

*Regression coefficients – Student pre-college characteristics and demographics*

Control Variable	B	SE	p	OR
Gender Male	-.034	.017	.046	.792
Race/White	.043	.022	.056	1.449
Race/Black or African American	-.015	.020	.453	.754
Race/Hispanic or Latino	-.027	.016	.096	.768
Race/Asian	-.046	.022	.041	.508
Parents' highest level of education (bachelor's degree)	.082	.020	<.001	1.758
High School GPA/A- to A	.147	.027	<.001	4.619
High School GPA/B to A-	.114	.021	<.001	3.203
High School GPA/B- to B	.054	.015	<.001	2.436
High school GPA/C to B-	.015	.017	.373	1.565
Income as percent of poverty level 2003-04	.037	.020	.062	1.000
Transfer to 4-year institution plans 2003-04	.197	.016	<.001	5.735

Source: Derived from U.S. Department of Education National Center for Education Statistics,

Beginning Postsecondary Students Longitudinal Study (BPS:04/09). Computations by

PowerStats on June 15, 2015.

In addition, the odds of completing a bachelor's degree for students who indicated they had a parent who had earned a degree is nearly one and three-quarters times greater ( $p < .001$ ,  $OR = 1.758$ ), than for students who indicated that they did not have a parent who had earned a degree.

### Findings

The following section presents findings of the logistic regression analysis conducted using NCES's PowerStats for the 11 nonacademic and academic independent variables included in this study. These variables are: (a) job while enrolled, (b) dependent children, (c) marital status, (d) financial help from parents, (e) indicated that undergraduate education worth the cost, (f) met with academic advisor, (g) met with faculty outside the classroom, (h) satisfaction with

choice of major, (i) participated in study groups, (j) highest degree ever expected to complete, (k) and enrollment intensity.

### **Inferential Data**

For each of the two research questions, binary logistic regression is used to analyze the relationship between the nonacademic and academic (environmental) independent variables and the binary outcome or dependent variable of community college transfer student baccalaureate completion over six years. Logistic regression is an appropriate method for this study because the dependent variable is dichotomous (yes/no). The outputs resulting from conducting a binary logistic regression analysis provide information about the existence of a relationship between the independent (predictor) variables and the likelihood of change in the dependent variable. Of interest in the first part of the output produced by logistic regression is the beta-value (B-value). The beta-value provides information about the direction of the relationship. A positive value indicates that as the independent variable increases so does the likelihood of the dependent variable, in this case, baccalaureate completion for community college transfer students over six years.

Logistic regression also provides a significance value (sig). This value is the indicator of statistical significance or the probability of rejecting the null hypothesis. For the purposes of this study a significance level of  $p < .05$  has been established. This indicates that if the significance value is less than .05 then the null hypothesis should be rejected. In addition, logistic regression output also provides odds ratio (Exp B) information that describes the odds of the dependent event (baccalaureate completion for community college transfer students over six years) occurring given a change in the independent variable. Values greater than 1.0 indicate that the variable being examined increases the odds of the event occurring, and a value of exactly 1.0

indicates an *equal* likelihood of the event either occurring or not occurring; in this case, the event cannot be accurately predicted and the relationship is not statistically significant (Pallant, 2005).

It is possible that an indicator can have a high odds ratio which would suggest an increased likelihood but not demonstrate statistical significance.

## Results

### Research Question 1

For first time beginning college students who start their postsecondary experience at a 2-year institution and then transfer to a 4-year institution to earn a bachelor's degree, what is the effect of non-academic environmental factors on completion over six years? And, of the non-academic environmental factors identified as statistically significant, which have a positive relationship to baccalaureate completion over six years?

The deviance reflecting incremental effect of the nonacademic environmental variables on the prediction of baccalaureate attainment was 122280.931 in the -2 log likelihood metric and .198 in the pseudo  $R^2$  metric. The incremental chi-square  $p$ -value with 17 df for this set of variables was  $<.001$ . Consequently, the null hypothesis is rejected. Thus, nonacademic environmental variables contribute significantly to the prediction of baccalaureate attainment among community college transfer students after controlling for student pre-college characteristics and demographics. As seen in table 4.3, the results from the regression model indicate the existence of a nonlinear statistically significant positive relationship between working part-time while enrolled and baccalaureate completion over six years for community college transfer students. The regression coefficient for job while enrolled was 0.42 with an odds ratio of 1.267. Interpreting this coefficient suggests that the odds of completion for students who worked part-time while enrolled were nearly one and one-third (1.267) greater than for students who did not work part-time while enrolled.

Table 4.3

*Regression coefficients - nonacademic variables*

Nonacademic Environmental Variable	B	SE	<i>p</i>	Odds Ratio
Job while enrolled (part-time)	.042	.020	.037	1.267
Job while enrolled (full-time)	-.011	.016	.502	.848
Dependent children	-.120	.016	<.001	.314
Student's marital status	-.003	.016	.983	1.008
Help from parents (living expenses)	.013	.020	.514	1.022
Undergraduate education worth the cost	.027	.016	.088	1.313

Source: Derived from U.S. Department of Education National Center for Education Statistics,

Beginning Postsecondary Students Longitudinal Study (BPS:04/09). Computations by PowerStats on June 15, 2015.

PowerStats reports the result of logistic regression in terms of standardized regression coefficients (also called beta weights). Although standardized coefficients do not have any substantive interpretation, they share a single scale, and therefore can be compared with each other to assess relative magnitudes. The greater the absolute value of the beta weight, the greater the predicted change in the probability of the outcome given a 1-standard deviation change in the corresponding predictor variable, holding constant the other predictors in the model.

### Research Question 2

For first time beginning college students who start their postsecondary experience at a 2-year institution and then transfer to a 4-year institution to earn a bachelor's degree, what is the effect of academic environmental factors on completion over six years?

And, of the academic environmental factors identified as statistically significant, which have a positive relationship to baccalaureate completion over six years?

The deviance reflecting the incremental effect of the academic environmental variables on the prediction of baccalaureate attainment was 156143.919 in the -2 log likelihood metric and .252 in the pseudo  $R^2$  metric. The incremental chi-square  $p$ -value with 26 df for this set of variables was  $<.001$ . Consequently, the null hypothesis is rejected. Thus, academic environmental variables contribute significantly to the prediction of baccalaureate attainment among community college transfer students after controlling for student pre-college characteristics and demographics. As seen in table 4.4, the results from the regression model indicate the existence of a nonlinear statistically significant positive relationship between community college transfer student's likelihood of baccalaureate degree completion over six years and *meeting often with an academic advisor, meeting informally with faculty outside of the classroom* and baccalaureate degree aspirations.

Table 4.4

*Regression coefficients - academic variables*

Academic Environmental Variable	B	SE	$p$	OR
Meet with academic advisor: Never	-.027	.014	.059	.705
Meet with academic advisor: Often	.090	.021	$<.001$	2.001
Met informally with faculty outside classroom	.065	.022	.003	1.670
Satisfaction with choice of major or course of study	.020	.016	.212	1.278
Participation in study groups outside classroom: Never	-.007	.018	.684	.998
Participation in study groups outside classroom: Often	.036	.026	.172	1.325
Highest degree ever expected (bachelor's degree)	.068	.014	$<.001$	1.708
Enrollment Intensity: full- time	.093	.051	.069	1.731
Enrollment Intensity: part-time	-.019	.050	.712	.666

Source: Derived from U.S. Department of Education National Center for Education Statistics,

Beginning Postsecondary Students Longitudinal Study (BPS:04/09). Computations by PowerStats on June 15, 2015.

The results from the regression model indicate a nonlinear relationship exists between students' likelihood of baccalaureate completion and meeting informally with faculty outside the classroom. Of the students in this sample, compared to the odds of students who did not academically engage with faculty, the odds of baccalaureate completion were approximately one and one-third (OR=1.670,  $p=.008$ ) higher than for students who did not. The odds of completing a bachelor's degree were slightly over two (OR=2.001,  $p<.001$ ) times higher for students who met often with an academic advisor compared to students who indicated they did not. Of the students in this sample, the odds of baccalaureate completion were over one and one-third (OR=1.708,  $p<.001$ ) greater than for those who did not report baccalaureate completion as an educational goal.

**All Model Variables.** Table 4.5 presents the results of the 27 independent variables used in this study. Beyond statistical significance the data presented in table 4.6 is presented in ranked order of likelihood as identified by odds ratio (OR) value. When examining the entire model, there were 9 variables that had a statistically significant positive relationship to community college transfer student baccalaureate completion over six years: transfer to 4-year institution plans 2003-04, high school GPA A- to A, high school GPA B to A-, high school GPA B- to B, parent's highest level of education, job while enrolled (part-time), met informally with faculty outside classroom, met with academic advisor (often), highest degree ever expected to earn (bachelor's degree).

Table 4.5

*Regression coefficients - all variables*

Predictor Variable	Std.B	Sig.	OR
Transfer to 4-year institution plans 2003-04	.197	<.001	5.735
High School GPA/A- to A	.147	<.001	4.619
High School GPA/B to A-	.114	<.001	3.203
High School GPA/B- to B	.054	<.001	2.436
Met with academic advisor: Often	.090	<.001	2.001
Parents' highest level of education (bachelor's degree or higher)	.082	<.001	1.758
Enrollment intensity: full-time	.093	.069	1.731
Highest degree ever expected (bachelor's degree)	.068	<.001	1.708
Met informally with faculty outside classroom	.065	.003	1.670
Job while enrolled: Part-Time	.065	.003	1.576
High school GPA/C to B-	.015	.373	1.565
Race/White	.043	.056	1.449
Joined a study group outside classroom: Often	.036	.172	1.325
Undergraduate education worth the cost	.027	.088	1.313
Satisfaction with choice of major or course of study	.020	.212	1.278
Help from parents (living expenses)	.013	.514	1.022
Income as percent of poverty level 2003-04	.037	.062	1.000
Student's marital status	-.001	.983	1.008
Joined a study group outside classroom: Never	-.007	.536	.998
Job while enrolled: Full-Time	-.011	.502	.848
Gender (Male)	-.034	.046	.792
Race/Hispanic or Latino	-.027	.096	.768
Race/Black or African American	-.015	.453	.754
Met with academic advisor: Never	-.027	.059	.705
Enrollment intensity: part-time	-.019	.712	.666
Race/Asian	-.046	.041	.508
Dependent children	-.120	<.001	.314

Source: Derived from U.S. Department of Education National Center for Education Statistics,

Beginning Postsecondary Students Longitudinal Study (BPS:04/09). Computations by

PowerStats on June 15, 2015.

Beyond statistical significance, the data presented in Table 4.6 is listed in ranked order of likelihood as identified by the odds ratio value. When evaluating the model it is important to keep in mind that those indicators with an odds ratio value greater than 1.00 suggests that the variable being examined increases the odds of the event happening, in this case, baccalaureate

completion. Conversely, odds ratio values of exactly 1.00 indicate an *equal* likelihood of the event either occurring or not occurring, in other words the event cannot be accurately predicted.

### **Summary of Findings**

The current study used binary logistic regression to examine the effects of nonacademic and academic environmental factors on baccalaureate completion for community college transfer students over six years.

- The study identified a statistically significant relationship between 9 predictor variables and baccalaureate completion which are a) *Transfer to 4-year Institution plans 2003-04*, b) *High School GPA A- to A*, c) *High School GPA B to A-*, d) *High School GPA B- to B*, e) *Parents' Highest Level of Education*, f) *Job While Enrolled (part-time)*, g) *Meet Informally with Faculty Outside Classroom*, h) *Met with Academic Advisor (often)*, and *highest degree ever expected (bachelor's degree)*.

This chapter presented the study results for the two research questions guiding this study. The examination into the factors predicting community college transfer student baccalaureate completion was investigated using a binary logistic regression model. The findings suggest that student's plans to transfer to a 4-year institution remain the most significant predictor of baccalaureate completion. This research provides community college faculty and administrators additional information to support the completion of their students, specifically those who seek to transfer to a 4-year institution. The following chapter will provide a discussion of the findings and will address the results within the context of the literature.

## Chapter V: Discussion

As previously discussed in Chapter 1, the growth of the undergraduate postsecondary student population has been well documented in research by the National Center for Education Statistics (NCES) over the past three decades. According to NCES, undergraduate enrollments in degree granting postsecondary institutions reached nearly 18.2 million students by the fall of 2008 (NCES 2009) and community college students accounted for nearly half of these enrollments (Cataldi et al., 2011; Leader, 2010; McPhail, 2011; Shapiro et al., 2012). Nearly 80% of students who attend community college indicate an intention to transfer to a 4-year institution to earn a bachelor's degree (McPhail, 2011), however, data from NCES indicates that the completion rate for students who began their undergraduate college experience at four-year institutions (also referred to as "native" students) was 60.6% compared to 36.3% for those students whose college experience began at a two-year institution.

A review of current literature and theory on college student persistence indicates that very little is known about the environmental factors causing the disparity in persistence and completion between degree-seeking community college transfer students and "native" students. Given the fact that the number of first-time beginning community college students who indicate an intent to transfer to a 4-year institution in order to attain a bachelor's degree continues to increase, and that nearly half of all undergraduates in the U.S. begin their postsecondary experience at a community college, community colleges and four-year institutions should be concerned about the factors influencing the decline in completion of this student population (Cataldi et al., 2011; Kirk-Kuwaye & Kirk-Kuwaye, 2007; U.S. Department of Education, 2005). Community college administrators should have an interest in the results of this study since a large majority of their students enroll with the intent to transfer and earn a bachelor's degree

(Shapiro et al., 2012). State and national policy makers have made it clear that their goal is to increase the number of bachelor's degrees earned in the U.S., and that this goal is important not only to the individual who seeks to improve their socioeconomic status and upward mobility, but that it is imperative to our nations' economy, and global competitiveness (McPhail, 2011).

The purpose of this study is to examine the effects of non-academic and academic environmental factors on baccalaureate completion among community college transfer students over six years. Using elements from Astin's (1984) Model of Student Involvement and Bean & Metzner's Model of Non-Traditional Undergraduate Student Attrition, this study examined the effect of nonacademic and academic environmental factors on baccalaureate completion for community college transfer students over six years. The following section will discuss the findings of this study within the context of these larger issues.

### **Factors Affecting Student Completion**

Student persistence and completion is one of the most researched topics for college and university administrators and postsecondary scholars for years. The majority of prior research was conducted using traditional students at four-year institutions. However, the past decade has seen an increase in the growing body of research focused on persistence and completion of students at the community college (Boylan, Bonham, & Bliss, 1994; McCabe, 2003; Roueche & Roueche, 1999). Prior research by Bean and Metzner (1985) posits that the primary differences in the attrition process between traditional and non-traditional students is that non-traditional students are more affected by the external environment than by social integration variables. In fact, social integration factors were not included in their model of non-traditional undergraduate attrition. Instead, their model shifted from what is happening to the student on campus, to what is happening in the student life *off* campus. As such, non-academic environmental variables were

selected for this study using Bean and Metzner's Model of Non-Traditional Undergraduate Student Attrition as a guide for their selection.

The findings of this study contribute to this discussion by providing information on the impact of nonacademic and academic environmental variables on baccalaureate completion for a specific population of first-time beginners: community college transfer students who transfer to a 4-year institution to earn a bachelor's degree. Using binary logistic regression the current study identified that the independent variables of transfer to 4-year institution plans, high school grade point average, working part-time while enrolled, meeting often with an academic advisor, meeting with faculty outside the classroom, parental education, and baccalaureate aspirations all had statistically significant positive relationships to baccalaureate completion for community college transfer students over six years.

**Transfer to 4-year institution plans.** Results of the current study found that student transfer plans has a positive statistically significant relationship to baccalaureate completion over six years. It is important to qualify that students self-identified this intent, and that it is possible that students may misclassify themselves. However, as noted previously several studies have shown a positive link between student intent and persistence (Bean, 1983; Mulligan & Hennessy, 1990; Pascarella et al., 1983; Voorhees, 1987) and all indicated that intent to stay or leave is predictive of enrollment behaviors, are a critical variable associated with persistence, and can be the single best predictor of persistence for community college students. Research by Astin and Antonio (2012) found that student's expectations or self-predictions carry substantial predictive weight over time, and that most students have the ability to make estimates about what is likely to happen to them in college. Prior research by Mutter (1992) of community college student persistence confirms that intent may often predict persistence. Self-predictions have been found

to correlate with nearly every type of student outcome measure including persistence and completion, and can be the best single predictor of persistence for community college students (Bers & Smith, 1991).

**High school grade point average.** Results of this study suggest that high school grade point average has a positive statistically significant relationship to baccalaureate completion over six years. This study's findings on the effect of high school GPA confirms prior research that pre-college academic achievement reflect the student's future academic potential, intellectual ability, motivation, and persistence behaviors that lead to completion (Astin, 1993; Bean & Metzner, 1985; Pascarella & Terenzini, 1979; Tinto, 1975).

**Job while enrolled.** Results of the current study suggest that part-time employment while enrolled in college had a positive statistically significant relationship to baccalaureate completion over six years. This study's findings support Choy and Berker's (2003) conclusion that working in moderation (no more than 30 hours per week) encourages degree completion, compared to not working at all. Examined through Bean and Metzner's (1985) Model of Nontraditional Undergraduate Attrition, working nearly full-time (i.e., working 31 hours or more per week) during college negatively affects students' academic performance and persistence behaviors. It is important to note that the scope of this research only examined degree completion up to six years after the initial college enrollment. And while full-time employment and non-degree completion behaviors are negatively related, working in general may extend student's time-to-degree, working college students may not be dropping out of college, but may require more time to complete. In addition to needing more time to complete their degree, a high percentage community college transfer students may require one or more remedial, pre-college class

(Adelman, 2004; Bettinger & Long, 2005; Dowd, 2007), which may increase students' time-to-degree completion.

**Academic Advising.** Prior research support the findings of this study suggesting that students who meet often with an academic advisor have increased odds of completing a bachelor's degree (Astin, 1984; Bean, 1980; Bean & Metzner, 1985; and Pascarella & Terenzini, 1991). The connection between students and advisors is one of the few consistent and long-term relationships undergraduates have within the institution with those who represent it. Students' faculty change each term, but they typically meet with the same advisor. This allows the student to develop trust in their advisors and for advisors to help students identify needs and strengths (Habley, 1981; Peterson, Wagner, & Lamb, 2001).

**Met informally with faculty outside classroom.** Results of the current study found that meeting informally with faculty outside the classroom has a positive statistically significant relationship to baccalaureate completion over six years. These results correlate with prior research showing positive outcomes associated with faculty-student contact outside the classroom (Astin, 1993; Braxton, 2000; Levine & Cureton, 1998; Pascarella & Terenzini, 2005, and Volkwein, King, & Terenzini, 1986). Results of a 1993 longitudinal study by Astin which included a national sample of approximately 500,000 students and 1,300 institutions found that student-faculty interaction was significantly correlated with *every* academic achievement outcome examined, including persistence behaviors and degree attainment. Recent research by Schmid and Abell (2003) looked at faculty-student interactions and its relationship on student persistence among community college students. Results of their study indicate that regular faculty-student contact is one of the most important discriminating variables between returning and non-returning students. Faculty-student interaction outside the classroom has also been

associated with positive outcomes for different student *subpopulations*. For example, positive correlations between frequency of student-faculty contact and cognitive growth have been reported for *transfer students* (Volkwein, King, and Terenzini, 1986).

**Highest degree ever expected.** Results of this study suggest that student baccalaureate aspirations have a positive statistically significant relationship to baccalaureate completion over six years. These findings are consistent with recent research by Wang (2012) which found that given the strong correlation between students' attitudes, intentions, and behaviors (Bean, 1980; Eaton & Bean, 1995), baccalaureate aspirants' motivational characteristics" may well influence their intent to persist to their ultimate degree goals by virtue of transferring to 4-year institutions (Wang, 2012)." Students' educational goals at the time of entry are positively associated with educational attainment in a number of studies (Astin, 1975; Blecher, et al., 2002; Pascarella & Terenzini, 1991; Peng & Fetters, 1978). According to Tinto (1993), student educational and occupational goals have an impact on persistence, and a student's goal to graduate college is the *most* influential factor after academic ability is taken into account. Studies have provided fairly strong support for the proposition that initial commitment to the goal of graduation positively affects subsequent goal commitment, which in turn increases the likelihood of student persistence and completion in college (Braxton, Sullivan, & Johnson, 1997).

**Parental Education.** Results of this study suggest that parental education has a positive statistically significant relationship to baccalaureate completion over six years. One of the most important student background and demographic factors identified in the literature is parental education (Astin & Oseguera, 2005; Terenzini et al., 1996), and is a key predictive measure of both college enrollment and degree completion for students from all racial/ethnic or socioeconomic backgrounds. Many researchers contend that students with more educated parents

(i.e., parents with at least some post-secondary experience) tend to have an advantage over their first-generation peers in navigating the higher education landscape due to their greater access to financial, informational, and social resources (Pascarella, E. T, Pierson, C. T., Wolniak, G. C., & Terenzini, P. T., 2004). Since the likelihood of attending and graduating from college is strongly correlated to parental education, first-generation students face more difficult challenges relative to their peers such as limited access to information about how to choose a college, lack of knowledge with regards to navigating the college environment, its academic expectations, lack of adequate academic preparation, and lack of family support (McDonough, 1997; Thayer, 2000; Pascarella et al., 2004). In summary, students whose parents have no education beyond high school are significantly less likely to attend and graduate from college than their peers whose parents have at least a bachelor's degree (Astin & Oseguera, 2005; Pascarella et al., 2004).

### **Summary of Key Findings**

The findings of this study reinforce the perspective by Bean & Metzner (1985) which identify environmental variables as an important persistence consideration for nontraditional students. Of the academic environmental variables examined in this study, meeting often with an advisor, meeting with faculty outside the classroom, and baccalaureate aspirations were the strongest predictors of student completion. Of the non-academic environmental variables examined in this study, hours of employment (part-time) were also found to be predictive of baccalaureate completion, a finding consistent with Bean & Metzner's (1985) model.

The results of this study also support Bean & Metzner's findings that a student's academic performance is influenced by his or her study habits, program of study, academic advising, and external (nonacademic) influences. External influences that impact academic

performance include hours of employment while enrolled, family responsibilities, opportunity to transfer, study habits, academic advising, and satisfaction with major.

### **Study Limitations**

The findings of this study identified a statistically significant relationship between several factors that support community college transfer student baccalaureate completion over six years. The results of this research only indicate if a relationship *exists* between specific factors and the outcome of interest and should be used only to form hypothesis for future research. The primary limitation of this study is that its findings are based on the analysis and interpretation of secondary data. There are many things to consider when utilizing secondary data analysis instead of primary data analysis. In contrast to secondary data analysis, primary data analysis consists of data analysis in which the same individual team of researchers designs, collects, and analyzes the data (Boslaugh, 2007; Thomas & Heck, 2001; and Vartanian, 2010). Secondary data analysis is “in the broadest sense, analysis of data collected by someone else” (Boslaugh, 2007). Analysis of secondary data can also include “any data that are examined to answer a research question other than the question(s) for which the data were initially collected” (Vartanian, 2010). Secondary data comes for many sources including large government-funded data sets, university/college records, statewide or district-level K-12 school records, or author’s websites. Advantages of using secondary data are that the studies are often funded by the government and generally provide larger samples that are more representative of the target population. Accessing secondary data also saves the researcher the time and considerable cost involved in design and data collection. In addition, the data sets often contain considerable breadth and include a wide range of variables. Disadvantages of secondary analysis are that the required expertise of specific survey statistics/methods used in the analysis of the secondary data was not included in the basic

graduate statistics courses completed by the researcher. Constructs may be operationally defined by a single survey item or a subset of test items which can lead to reliability and validity concerns. In some cases, information regarding study design and data collection procedures may be scarce.

### **Implications for Practice**

The student population entering postsecondary education through the community college continues to grow and diversify. This study's findings point to several important implications for postsecondary educational policy and practice. One of the strongest correlations between community college transfer students and baccalaureate completion over six years identified in this research was student *intent* to transfer to a 4-year institution from the community college, leading to the conclusion that baccalaureate aspirants' motivational characteristics may strongly influence their completion (Wang, 2009). Equally important are the findings that educational aspirations affect community college transfer students' educational outcomes.

It has been well documented that community college students face a variety of educational barriers unique to the adult student; being older, working part or full-time while enrolled, having dependents, being married, and other numerous time constraints and responsibilities that may hinder or limit their time-to-completion trajectory. With the competing demands of college, work, and family responsibilities the opportunity to participate in activities such as meeting with faculty outside of the classroom may not be feasible for many baccalaureate aspirants. Institutions could consider exploring the development of faculty mentors who are assigned to a small group of transfer students based on students intended major – aligning mentees with faculty who teach and/or research in the same discipline. Ensuring that course offerings are flexible enough to allow working students adequate course selections may

also increase the transfer student's ability to successfully transfer within a reasonable timeframe. It is also important to acknowledge that the transfer process is different for every student and that the administrative hurdles involved in the process itself may discourage some from completing it. Colleges and Universities should collaborate and develop streamlined processes for these students through the development of transfer partnerships and articulation policies.

Increasingly, community college transfer student persistence and completion must be an institutional specific undertaking which considers not only the organizational context, but the student peer environment. In order to effect persistence and completion, institutions must not only know who their students are, but must also know what their educational goals are, what barriers they face in reaching those goals, and use institutional policies and practice as levers for creating a *culture of completion*.

### **Recommendations for Future Research**

The results of this study suggest that baccalaureate completion among community college transfer students is ultimately a distinct process subject to different combinations of influencers. In other words, individual context matters. Community colleges need to continue to reach out to transfer students by promoting opportunities to interact with faculty in their chosen field, establishing transfer partnerships and designated pathways to ensure a seamless transition to the 4-year institution. Community college transfer students are poised to significantly help redefine and expand the missions of four-year colleges and universities. In the past decade, four-year institutions have engaged in a modest, but increasing effort to address the unique needs of community college transfer students. This study contributes to the current discussion of this growing support of community college transfer students by identifying a number of factors associated with their educational outcomes at four-year institutions, such as baccalaureate

aspirations, contact with faculty, and early transfer plans. The findings of this study should be of interest to policymakers at the state and national levels in expanding the support and collaboration among all institutions of higher education as they seek to continue facilitating the transfer process and promote long-term educational success for community college transfer student baccalaureate aspirants. Increasingly, community college transfer student persistence and completion must be an institutional specific undertaking which considers not only the organizational context, but the student peer environment. In order to effect persistence and completion, institutions must not only know who their students are, but must also know what their educational goals are, what barriers they face in reaching those goals, and use institutional policies and practice as levers for creating a *culture of completion*. The results of this study suggest that baccalaureate completion among community college transfer students is ultimately a distinct process subject to different combinations of influencers that are not easily addressed with generalized structural changes. In other words, institutional and individual student context both matter.

## References

- Adelman, C. (2004). *Principal indicators of student academic histories in postsecondary education, 1972-2000*. Washington, D.C.: Institute of Education Sciences.
- American Association of Community Colleges (2012). *Reclaiming the American Dream: Community Colleges and the Nations' Future*.
- Anderson, G., M., Alfonso, M. & Sun, J. C. (2006). Rethinking cooling out at public community colleges: An examination of fiscal and demographic trends in higher education and the rise of statewide articulation agreements. *Teachers College Record*, 108(3), 422-451.
- Arnold, J. (2006). Changing the measure of success. *Inside Higher Education*, 12(1).
- Astin, A. W. (1984). Student Involvement: A developmental theory for higher education. *Journal of College Student Personnel*, 25, 297-308.  
doi:10.1111/j.2150-1092.1984.tb01445.x
- Astin, A. W. (1993). *What matters in college: Four critical years revisited*. San Francisco, CA: Jossey-Bass.
- Astin, A. W. & Antonio, A. L. (2012). *Assessment for Excellence: The Philosophy and Practice Assessment and Evaluation in Higher Education*. (2<sup>nd</sup> ed.). New York, NY: Rowman & Littlefield.
- Astin, A. W., & Oseguera, L. (2005). Pre-college and institutional influences on degree attainment. In A. Seidman (Ed.), *College student retention: Formula for student success* (245-276). Westport, CT: ACE/Praeger.
- Banta, T. W., Busby, A. K., Kahn, S, Black, K. E., & Johnson, J. N. (2007) Responding to a fiscal crisis.: A data driven approach. *Assessment & Evaluation in Higher Education*, 32(2), 183-194.

- Bean, J. (1980). Dropouts and Turnover: The synthesis and test of a causal model of student attrition. *Research in Higher Education, 12*(2), 155-187. doi:10.1007/bf00976194
- Bean, J. P., & Metzner, B. S. (1985). A conceptual model of nontraditional undergraduate student attrition. *Review of Educational Research, 55*(4), 485-540.  
doi:10.3102/00346543055004485
- Berger, J. B., Ramirez, G. B., & Lyons, S. (2012). Past to present: A historical look at retention. In A. Seidman (Ed.), *College student retention* (pp. 7-34). Lanham: Rowman & Littlefield Publishers, Inc.
- Bers, T. H., & Smith, K. E. (1991). Persistence of community college students: the influence of student intent and academic social integration. *Research in Higher Education, 32*(5), 539-556.
- Bettinger, E. P., & Long, B. T. (2005). Remediation at the community college: Student participation and outcomes. *New Directions for Community Colleges, March* (129), 17-26.
- Blecher, L., Michael, W. B., & Hagedorn, L. S. (2002). Factors related to the "system" persistence of students seeking the bachelor's degree at four-year institutions. Presentation at the 2002 American Educational Research Association Annual Conference, New Orleans, LA.
- Boslaugh, S. (2007). *Secondary data sources for public health: A practical guide*. New York, NY: Cambridge.
- Boylan, Bonham, & Bliss (1994). Who are the developmental students. *Research in Developmental Education, 11*(2).

- Braxton, J. M. (Ed). (2000). *Reworking the student departure puzzle*. Nashville, TN: Vanderbilt University Press.
- Braxton, J. M., Sullivan, A. S., & Johnson, R. (1997). Appraising Tinto's theory of college student departure. In J. Smart (Ed.), *Higher Education: Handbook of Theory and Research*, 12, 107-164. New York, NY: Agathon.
- Bredo, E., & Feinsberg, W. (Eds.). (1982). *Knowledge and values in social and educational research*. Philadelphia, PA: Temple University Press.
- Cabrera, A. F., Castaneda, M. B., Nora, A., & Hengstler, D. (1992). The convergence between two theories of college persistence. *Journal of Higher Education*, 63(2), 143-164.  
doi:10.2307/1982157
- Cataldi, E. F., Green, C., Henke, R., Lew, T., Woo, J., Shepherd, B., & Siegel, P. (2011). *2008-2009 Baccalaureate and beyond longitudinal study (BB:08/09): First look (NCES 2011-236)*. U.S. Department of Education. Washington, DC: National Center for Education Statistics.
- Choy, S. P., & Berker, A. M. (2003). How families of low-and middle-income undergraduates pay for college. U.S. Department of Education, National Center for Education Statistics. Washing, D.C.
- Cohen, A. and Brawer, F. (2009). *The American community college* (5<sup>th</sup> ed.). San Francisco, CA: Jossey-Bass.
- Cominole, M., Wheelless, S., Dudley, K., Franklin, J., & Wine, J. (2007). 2004/06 Beginning Postsecondary Students Longitudinal Study (BPS:04/06) Methodology Report (NCES 2008-184). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC.

- Creswell, J. W. (2012). *Educational research: Planning, conducting, and evaluating quantitative and qualitative research* (2nd ed.). Upper Saddle River: Pearson Education, Inc.
- Crisp, G., & Nora, A. (2010). Hispanic student success: Factors influencing the persistence and transfer decisions of Latino community college students enrolled in developmental education. *Research in Higher Education, 51*, 175-194. doi:10.1007/s11162-009-9151-x
- Denzin, N.K., & Lincoln, Y.S.(2005). Introduction: The discipline and practice of qualitative research. In N.K. Denzin & Y.S. Lincoln (Eds.), *The sage handbook of qualitative research (2<sup>nd</sup> ed.)*. Thousand Oaks, CA: Sage Publications.
- Dougherty, K. J., & Kienzl, G. (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*(3), 452-487. doi:10.1111/j.1467-9620.2006.00658.x
- Dowd, A., C. (2007). Community colleges as gateways and gatekeepers: Moving beyond the access "Saga" toward outcome equity. *Harvard Educational Review, 77*(4), 407-419.
- Doyle, W. R. (2006). Community college transfers and college graduation: Whose choices matter most? *Change, 38*(3), 56-58.
- Durkheim, E. (1961). *Suicide: A study in sociology*. (Translated by George Simpson and John Spaulding). New York, NY: The Free Press.
- Eaton, S. B., & Bean, J. P. (1995). An approach/avoidance behavioral model of college student attrition. *Research in Higher Education, 36*(6), 617-645.
- Ericsson K. A. & Simon H. A. (1993). *Protocol Analysis: Verbal Reports as Data*. Cambridge, MA: MIT Press

- Geiger, R. G., & Heller, D. E (2011). Financial trends in higher education: The United States. *Peking University Education Review*, 9(11), 15-32.
- Habley, W.(1981). Academic Advising: Critical link in student retention. *NASPA Journal*, 28(4),45-50.
- Hills, J. R. (1965). Transfer shock: The academic performance of the junior college transfer. *Journal of Experimental Education*, 33, 201-215. doi:10.1080/00220973.1965.11010875
- Hosmer, D. W., & Lemeshow, S. (2000). *Applied logistic regression* (2<sup>nd</sup> ed.). New York, NY: A Wiley-Interscience Publication, John Wiley & Sons, Inc.
- Ishitanti, T. T. (2003). A longitudinal approach to assessing attrition behavior among first-generation students: Time-varying effects of pre-college characteristics. *Research in Higher Education*, 44(4), 433-449. doi:10.1353/jhe.2006.0042
- Kilbride, M. S. (1997). *Toward understanding uniqueness and common ground: Persistence and attrition among non-traditional students in the community college*. Boston, MA: Boston University.
- Kirk-Kuwaye, C., & Kirk-Kuwaye, M. (2007). A study of engagement patterns of lateral and vertical transfer during their first semester at a public research university. *Journal of the First-Year Experience & Student Transitions*, 19(2), 9-27.
- Kleinbaum, D. G., Kupper, L. L., Nizam, A. & Muller, K. E. (2008). *Applied Regression Analysis and Other Multivariable Methods* (4<sup>th</sup> ed.). Belmont, CA: Thomson Higher Education.
- Laanan, F. S. (2001). Transfer student adjustment. *New Directions for Community Colleges*, 114(12), 5-13. doi:/10.1002/cc.16
- Leader, C. (2010). The good business of transfer: Why improving college transfer

- pathways makes good sense for New England. *New England Board of Higher Education*, 18-19.
- Levine, A., & Cureton, J. S. (1998). *When hope and fear collide: A portrait of today's college student*. San Francisco, CA: Jossey-Bass Publishers.
- McCabe, R. (2000). *No One to Waste*. Washington, D.C.: Community College Press.
- McPhail, C. (2011). *The Completion Agenda: A Call to Action*. AACC, Washington, DC.
- Reclaiming the American Dream: Community Colleges and the Nation's Future* (21<sup>st</sup> Century Report). AACC - Washington, DC.
- Mulligan, S.C., & Hennessy, J. J. (1990). Persistence in a community college: Testing attrition models. Paper presented at the annual meeting of the American Educational Research Association, Boston, MA.
- Mutter, P. (1992). Tinto's theory of institutional departure. *Journal of College Student Development*, 33(4), 310-318.
- National Center for Education Statistics (2008a). Home Page. Retrieved February 24, 2015 from <http://nces.ed.gov/about/>
- National Center for Education Statistics (2008b). PowerStats. Home Page. Retrieved March 22, 2015 from [http://nces.ed.gov/datalab/powerstats/pdf/bps2009\\_subject.pdf](http://nces.ed.gov/datalab/powerstats/pdf/bps2009_subject.pdf)
- National Center for Education Statistics (2008c). National Postsecondary Student Aid Study (NPSAS). Home page. Retrieved March 22, 2015 from <http://nces.ed.gov/surveys/npsas>
- National Center for Education Statistics (2008d). Integrated Postsecondary Education Data System (IPEDS). Home page. Retrieved March 22, 2015 from [http://nces.ed.gov/IPEDS/about/ipeds\\_history.asp](http://nces.ed.gov/IPEDS/about/ipeds_history.asp)

National Center for Public Policy and Higher Education (2011). *Affordability and Transfer: Critical to Increasing Baccalaureate Degree Completion*.

<http://affordabilityandtransfer2011.highereducation.org>

Obama, B. (2009, July). *Remarks by the President on the American Graduation Initiative in Warren, MI | The White House*. Retrieved from: <http://www.whitehouse.gov/the-press-office/remarks-president-american-graduation-initiative-warren-mi>.

Pallant, J. (2005). *SPSS survival manual: A step by step guide to data analysis using SPSS*. New York, NY: Open University Press.

Pampel F. C. (2000) *Logistic regression: A primer*. Sage University Papers Series on Quantitative Applications in the Social Sciences, 107-132. Thousand Oaks, CA: Sage Publications

Pascarella, E. T., & Terenzini, P. T. (1979). Interactive influences in Spady's and Tinto's conceptual models of college dropout. *Sociology of Education*, 52, 197-210.  
doi:10.2307/2112401

Pascarella, E.T., & Terenzini, P.T. (1998). Studying college students in the 21<sup>st</sup> century: Meeting new challenges. *Review of Higher Education*, 21, 151-165.

Pascarella, E. T., Pierson, C. T., Wolniak, G. C., & Terenzini, P. T. (2004). First-generation college students: Additional evidence on college experiences and outcomes. *Journal of Higher Education*, 75(3), 249-284.

Pascarella, E. T., & Terenzini, P.T. (2005). *How college affects students* (Vol. 2). San Francisco, CA: Jossey-Bass.

- Pascarella, E. T., Duby, P. B., and Iverson, B. K. (1983). A test and reconceptualization of a theoretical model of college withdrawal in a commuter institution setting. *Sociology of Education*, 56,88-100.
- Peng, S. S. & Fetters, W. B. (1978). Variables involved in withdrawal during the first two years of college: Preliminary findings from the national longitudinal study of the high school class of 1972. *American Research Journal*, 15(3), 361–372.
- Peterson, M., Wagner, J. A., & Lamb, C. W. (2001). The role of advising in non-returning students' perceptions of their university. *Journal of Marketing for Higher Education*, 10(3), 45-59.
- Phillips, D. C. & Burbules, N. C. (2000). *Postpositivism and educational research*. New York, NY: Rowman & Littlefield.
- Price, J. L. (1977). *The study of turnover*. Ames, IA: Iowa State University Press.
- Radford, A.W., Berkner, L., Wheelless, S.C., and Shepherd, B. (2010). Persistence and attainment of 2003–04 Beginning Postsecondary Students: After 6Year. U.S. Department of Education. Washington, DC: National Center for Education Statistics.  
Retrieved <http://nces.ed.gov/pubsearch>
- Reason, R. D. (2009). Student variables that predict retention: Recent research and new developments. *NASPA Journal*, 46(3), 482-501. doi:10.2202/1949-6605.5022
- Renn, K. A., & Reason, R. D. (2013). *College students in the United States: Characteristics, experiences, and outcomes*. San Francisco, CA: Wiley.
- Rouche, J. E., & Rouche, S. (1999). *High stakes, high performance: Making remedial education work*. Washington, D.C.: Community College Press.

- Schmid, C., & Abell, P. (2003). Demographic risk factors, study patterns, and campus involvement as related to student success among Guilford Technical Community College students. *Community College Review*, 31(1), 1-16.
- Seidman, A. (2012). *College student retention: Formula for student success* 2<sup>nd</sup> ed.). Lanham, MD: Rowman & Linfield Publishers, Inc.
- Shapiro, D., Dundar, A., Chen, J., Ziskin, M., Park, E., Torres, V., & Chiang, Y. C. (2012). *National Student Clearinghouse Research Center Signature Report: Completing College: A state-level view of student attainment rates*. Retrieved at <http://www.studentclearinghouse.info/signature/4state/>
- Snyder, D. A. (2008). *The new traditionals: Adult learners and higher ed marketing*. Aspen, Colorado: July Press.
- Spady, W. (1970). Dropouts from higher education: An interdisciplinary review and synthesis. *Interchange*, 1, 64-85. doi:10.1007/bf02214313
- Spellman, N. (2007). Enrollment and retention barriers adult students encounter. *The Community College Enterprise*, 63-79.
- Summers, M. D. (2003). Attrition research at community colleges. *Community College Review*, 30(4), 64-84. doi:10.1177/009155210303000404
- Swail, W. S. (2002, July/August). Higher education and the new demographics: Questions for policy. *Change*, 34(4), 15-23. doi:10.1080/00091380209604731
- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. Boston, MA: Pearson/Allyn & Bacon
- Tate, R. (1995). *Modeling outcomes in the behavioral and social science*. Tallahassee, FL: Target.

- Terenzini, P. T., Springer, L., Yaeger, P., Pascarella, E. T. & Nora, A. (1996). First generation college students: Characteristics, experiences, and cognitive development. *Research in Higher Education*, 37, 1-22. doi:10.1007/bf01680039
- Thelin, J. R. (2004). *A history of American higher education*. Baltimore, MD: The John Hopkins Press.
- Thomas, S. L., & Heck, R. H. (2001). Analysis of large-scale secondary data in higher education research: Potential perils associated with complex sampling designs. *Research in Higher Education*, 42, 517-540. doi:10.1023/a:1011098109834
- Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, 45, 89-125. doi:10.1007/978-90-481-8598-6\_2
- Tinto, V. (2006). Research and practice of student retention: What next? *College Student Retention*, 8(1), 1-19. doi:10.2190/c0c4-eft9-eg7w-pwp4
- Townsend, B. K., & Wilson, K. (2006). "A hand hold for a little bit": Factors facilitating the success of community college transfer students to a large research university. *Journal of College Student Development*, 47(4), 439-456. doi:10.1353/csd.2006.0052
- Trochim, W. (2006). Positivism and post-positivism. *Research methods knowledge base*  
Retrieved February 3, 2014 from <http://www.socialresearchmethods.net/kb/positvsm.php>
- U.S. Department of Education (2005). The road less traveled? Students who enroll in multiple institutions. (NCES 2005-157). Washington, DC.
- Vartanian, T. P. (2011). *Secondary data analysis*. New York, NY: Oxford.
- Velez, W. & Javalgi, R. G. (1987). Two-year to four-year college: The likelihood of transfer. *American Journal of Education*, 96(1), 81-94. doi:10.1086/443882
- Vogt, W. (2007). *Quantitative research methods for professionals*. Boston, MA: Pearson

Education.

- Volkwein, J., King, M. C., & Terenzini, P. T. (1986). Student-faculty relationships and intellectual growth among transfer students. *Journal of Higher Education*, 57, 413-430.
- Voorhees, R. A. (1987). Toward building models of community college persistence: A logit analysis. *Research in Higher Education*, 26(2), 115-129. doi:10.1007/bf00992024
- Wang, X. (2009). Baccalaureate attainment and persistence of community college transfer students at four-year institutions. *Research in Higher Education*, 50(6), 570-588. doi:10.1007/s11162-009-9133-z
- Wang, X. (2012). Factors contributing to the upward transfer of baccalaureate aspirants beginning at community colleges. *Research in Higher Education*, 83(6), 851-875.
- Wine, J., Cominole, M., & Caves, L. (2009). 2004/09 *Beginning Postsecondary Students Longitudinal Study (BPS:04/09) Field Test* (NCES 2009-01). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC
- Wood, J. L. & Turner, C. S. V. (2010). Black males and the community college: Student perspectives on faculty and academic success. *Community College Journal of Research & Practice*, 35, 1-17. doi:10.1080/10668926.2010.526052
- Wood, J. L., Nevarez, C., and Hilton, A.A. (2012). Determinants of Transfer among community college students. *News Forum Press*, 12(2), 1-6. doi:10.1080/10668926.2012.637870

Wyatt, L. W. (2011). Nontraditional student engagement: Increasing adult student success and retention. *The Journal of Continuing Higher Education*, 59(11), 10-20.

doi:10.1080/07377363.2011.544977

Yang, P. (2008). Transfer performance of community college students: Impacts of costs and institution. *The Journal of Applied Research in the Community College*, 129(2), 147-159.

Zhan, M. (2014). The impact of youth debt on college graduation. *The Journal of Sociology & Social Welfare*, 41(3), 133-156.

## **Appendices**

## APPENDIX A: DESCRIPTION OF VARIABLES

Table A-1  
*Filter Variable*

Variable	Description	BPS Identifier
First institution level 2003-04	Indicates the level of the first institution attended during the 2003-2004 academic year. Source: BPS:04/06 student interview, IPEDS:03	FLEVEL

Table A-2

*Dependent Variable*

Variable	Description	BPS Identifier
Highest degree attained anywhere through 2009	Indicates the highest degree attained at any institution through June 2009. Source: BPS:04/06/09 student interview.	ATHTY6Y

Table A-3

*Independent Variables*

Variable	Description	BPS Identifier
Gender	Indicates the respondent's gender. Source: NPSAS:04 student interview.	GENDER
Race	Student's race/ethnicity with Hispanic/Latino as a separate category. Source: NPSAS:04 student interview	RACE
Parent's Education	Indicates the highest level of education of either parent of the respondent during the 2003-2004 academic year. Source: NPSAS:04 student interview.	PAREduc
High School GPA	Indicates the high school grade point average on the standardized test date, according to self-report on test	HCGPAREP

	questionnaire. Source: College Board, ACT.	
Income	Indicates the total 2002 income as a percentage of the federal poverty level thresholds for 2002. Source: NPSAS:04 student interview. NOTE: Based on family size, total income, and dependency. Refers to the family size and income of the parents of dependent students, or the respondent's own family if independent. Derived from variables total income (CINCOME) and household size (HSIZE). A value of 100 or less means that the respondent's family is at or below the federal poverty level threshold for that family size.	PCTPOV
Plans to transfer	Indicates whether the respondent planned to transfer to a 4-year institution as of 2003-2004. Source: NPSAS:04 student interview.	TR4PLNY1
Job while enrolled: Afford school without working	Indicates whether the respondent could have afforded to attend school without working. Source: BPS:04/06 student interview	AFFORD06
Dependent Children	Indicates whether the respondent had dependent children in 2006. Source: BPS:04/06 student interview.	DEPANY06
Marital Status	Indicates the respondent's marital status as of 2006: Source: BPS:04/06 student interview.	SMAR06
Undergraduate education worth the cost	Indicates whether the respondent considered undergraduate education worth the cost. Source: BPS:04/09 student interview.	UGEWC09
Help from parents 2004	Indicates whether the respondent's parents/guardians helped the respondent pay for living expenses other than	PARHELPC

	housing (such as food and transportation) during the 2003-2004 academic year.	
Academic advising	Indicates whether the respondent met with an advisor concerning academic plans during the 2003-2004 academic year. Source: NPSAS:04 student interview.	FREQ04C
Faculty informal meeting	Indicates whether the respondent had informal or social contacts with faculty members outside of the classroom when last enrolled. Source: BPS:04/06 student interview.	FREQ06A
Satisfaction with choice of major	Indicates whether the respondent is satisfied with choice of undergraduate major or course of study. Source: BPS:04/09 student interview.	SATMAJ09
Participation in study groups	Indicates whether the respondent attended study groups outside of the classroom. Source: BPS:04/06 student interview.	FREQ06G
Degree aspirations	Indicates the highest level of education the respondent expected to ever complete. Source: BPS:04/06 student interview.	DGEVR06
Enrollment pattern	Indicates the respondent's enrollment pattern during the 2003-2004 academic year. Source: NPSAS:04 student interview, BPS:04/06 student interview.	ENRSTAT
College GPA	Indicates respondent's estimated college grade point average. Source: BPS:04/09 student interview.	GPA09

Source: Data derived from U.S. Department of Education, National Center for Education Statistics, 2003-2004 Beginning Postsecondary Student Longitudinal Study, Second Follow-up (BPS:04/09). Computations by NCES PowerStats July 23, 2015.

## APPENDIX B: CODING SCHEME

Table B-1  
*Coding Scheme for Filter, Dependent (Outcome), and Independent (Predictor) Variables.*

BPS Variable	Description	Code/Values	Name
<i>Filter</i>			
LEVEL	First Institution Type	0=4-year 1=2-year	FIRSTINSTTYPE
<i>Dependent</i>			
ATHTY6Y	Highest degree attained anywhere through 2009	0=Less than a bachelor's degree 1=Bachelor's degree	ATTAINED
<i>Independent</i>			
GENDER	Gender; Male/Female	0=Male 1=Female	GENDER
RACE	Race/Ethnicity	0=Other 1=White	WHITE
RACE	Race/Ethnicity	0=Other 1=Black	BLACK
RACE	Race/Ethnicity	0=Other 1=Hispanic	HISPANIC
ASIAN	Race/Ethnicity	0=Other 1=Asian	ASIAN
PAREduc	Parents education	0=Other than a Bachelor's 1=Bachelor's degree or higher	PAREduc
HCGPAREP	GPA/A- to A	0=Other 1=A- to A	GPA/A- to A
HCGPAREP	GPA/B to A-	0=Other 1=B to A-	GPA/B to A-
HCGPAREP	GPA/B- to B	0=Other 1=B- to B	GPA/B- to B
HCGPAREP	GPA/C to B-	0=Other 1=C to B-	GPA/C to B-

HCGPAREP	GPA/C to D-	0=Other 1=C to D-	GPA/C to D-
PCTPOV	Income as a percentage of the federal poverty level	Continuous	PCTPOV
TR4PLNY1	Plans to transfer to a 4-year institution	0=No 1=Yes	TR4PLNY1
AFFORD06	Job while enrolled: Afford school without working	0=No 1=Yes	AFFORD06
DEPANY06	Dependent children	0=No 1=Yes	DEPANY06
SMAR06	Marital Status	0=Other 1=Married	SMAR06
UGEWC09	Consider undergraduate education worth the cost	0=No 1=Yes	UGEWC09
PARHELPC	Received help with living expenses from parents/guardians	0=No 1=Yes	PARHELPC
FREQ04C	Academic Advising	0=No 1=Yes	FREQ04C
FREQ06A	Faculty contact outside of classroom	0=No 1=Yes	FREQ04C
SATMAJ09	Satisfaction with choice of major	0=No 1=Yes	SATMAJ09
FREQ06G	Participate in study groups	0=No 1=Yes	FREQ06G
<hr/>			
DGEVR06		0=No 1=Yes	DGEVR06

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	Education goal: Bachelor's degree or higher		
ENRSTAT	Enrollment pattern/full- time	0=No 1=Yes	ENRSTAT
GPA09	College GPA/2.25 or higher	0=No 1=Yes	GPA09

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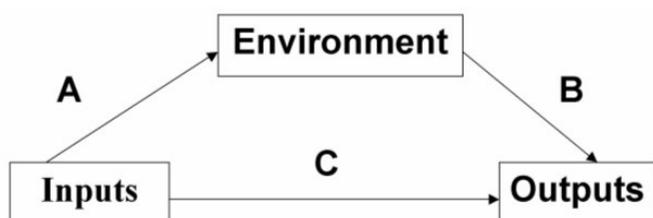
Source: Data derived from U.S. Department of Education, National Center for Education Statistics, 2003-2004 Beginning Postsecondary Students Longitudinal Study, Second Follow-Up (BPS:04/09). Computation by NCES PowerStats on 7/23/2015.

## APPENDIX C: COPYRIGHT PERMISSION

On Jul 20, 2015, at 10:45 AM, "Bowen, Kristie Jean" <[bowenkr@onid.oregonstate.edu](mailto:bowenkr@onid.oregonstate.edu)> wrote:

> Good morning Dr. Astin,

Please allow me to introduce myself: My name is Kristie Bowen and I am a PhD. candidate from Oregon State University, College of Education located in Corvallis, Oregon. My research is focused on baccalaureate completion for community college transfer students. I am using your I+E=O model as part of my theoretical framework for my study and will be applying a logistic regression analysis to a public data set, the BPS:04/09. My first question is for to permission for use of the visual representation of your model listed below:



Warm regards,

Kristie J. Bowen  
 Doctoral Candidate  
 Oregon State University  
 College of Education  
[bowenkr@onid.orst.edu](mailto:bowenkr@onid.orst.edu)

Dear Ms. Bowen, Feel free to use the diagram.

I would suggest that you use a blocked stepwise approach, where you first control the I variables in the initial block, and then allow the E variables to compete with each other for the next entry. The one that enters first may wipe out the other, or both may enter (or neither). Let the data decide this, unless you have a good theoretical reason to enter one of the E variables before the other.

Good luck in your research!

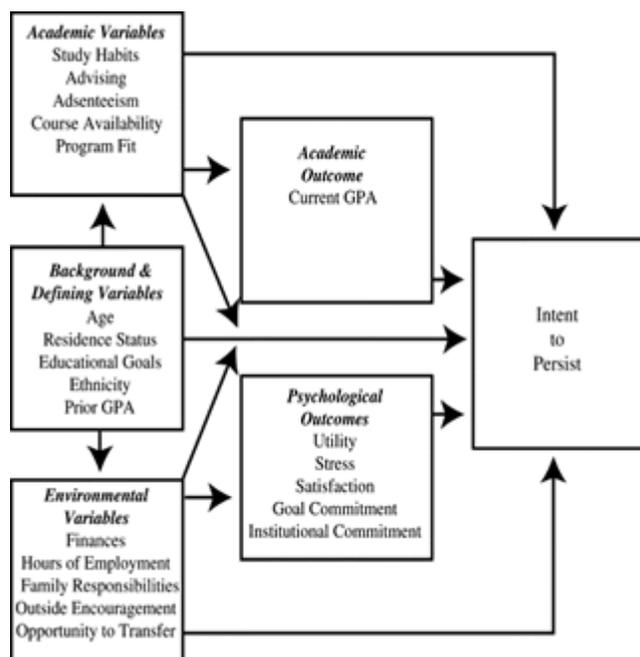
Alexander W. Astin  
 Allan M. Cartter Professor Emeritus &  
 Founding Director  
 Higher Education Research Institute  
 University of California, Los Angeles  
[aastin@gseis.ucla.edu](mailto:aastin@gseis.ucla.edu)

## APPENDIX D: COPYRIGHT PERMISSION

**From:** Bowen, Kristie Jean <[bowenkr@onid.oregonstate.edu](mailto:bowenkr@onid.oregonstate.edu)>  
**Sent:** Monday, July 20, 2015 2:10 PM  
**To:** Bean, John P.; Metzner, Barbara S.  
**Subject:** Permission to use visual of Undergraduate Attrition Model

Good morning Drs. Bean and Metzner,

Please allow me to introduce myself: My name is Kristie Bowen and I am a PhD. candidate from Oregon State University, College of Education located in Corvallis, Oregon. My research is focused on baccalaureate completion for community college transfer students. I am using your Model of Nontraditional Undergraduate Student Attrition model as part of my theoretical framework for my study. I would like permission to use the visual representation of your model shown below in my dissertation:



Your research is most fascinating, and I am so honored to be using your model in my study – as a first-generation community college graduate myself, I never imagined in my wildest dreams that I would be doing doctoral research someday. Thank you again for your consideration, I look forward to hearing from you.

Kristie J. Bowen  
 Doctoral Candidate  
 Oregon State University  
 College of Education  
[bowenkr@onid.orst.edu](mailto:bowenkr@onid.orst.edu)

Bean, John P.

Jul 20 (6 days ago)

to me, Barbara

Kristie, with this email I give you permission to use the attrition model you refer to below.

Barbara might want to write you herself, but I'm sure she'd agree. Nice to see our heavy thinking still in use. Best of luck with your research.

John P. Bean

Assoc. Prof. Emeritus

Indiana University

Metzner, Barbara S.

Jul 23 (3 days ago)

to me

Kristie: I am pleased to give you permission to use the visual representation of the Model of Nontraditional Undergraduate Student Attrition, pictured below in your email, for use in your doctoral research. Best wishes for success with your study. It involves a most interesting topic!

Barbara Metzner