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entitled

A National Longitudinal Study of the Influence of Federal Student Aid on Time to Associate-Degree Attainment

by

Ann Hartle Proudfit

Submitted to the Graduate Faculty as partial fulfillment of the requirements for the

Doctor of Philosophy Degree in Higher Education

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An Abstract of

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Community colleges now serve more than 13 million students annually, nearly half of all American undergraduates. Because of their open access mission, community colleges are a primary point of entry for many students, particularly underserved populations. Timely degree completion for associate-degree seeking students is important for promoting social equality and economic development. This dissertation examined what influence if any input and environmental variables, specifically the amount and type of federal financial aid received have on a community college student's time to associate degree attainment. Data from the Beginning Postsecondary Students (BPS) 2004-2009 dataset were used to conduct a multiple regression analysis using a weighted total of 288,436 graduates. The final model identified 124 variables that were significantly related to months enrolled prior to associate degree attainment, and explained 42.3% of variance. Initial and ongoing goals and commitments emerged as the strongest predictors of time to associate degree attainment, followed by financial aid variables. This study supports Vincent Tinto's student departure model; it provides a foundation for future research, and can inform theory, policy and practice.

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Table of Contents

List of Tables

List of Figures

Chapter One

Introduction

Community colleges in the United States serve more than 13 million students annually, or about 45% of all American undergraduates, and compared to four-year public and private colleges, community colleges serve more low-income and first-generation college students (American Association of Community Colleges, 2012b, 2013; Mellow & Heelan, 2008). However, low degree completion rates are problematic for community college students who need degrees to qualify for jobs, and for employers who need educated workers (American Association of Community Colleges, 2012a; Carnevale & Rose, 2011; Carnevale & Smith, 2013; Carnevale, Smith, & Strohl, 2010; Lumina Foundation, 2012; Schneider & Yin, 2012). Guided by student departure theory (Tinto, 1993) and human capital theory (G. S. Becker, 1993), this exploratory study uses linear regression analysis to examine the influence of students' pre-entry attributes, goals and commitment levels, institutional experiences as well as academic, social and financial integration levels on time to associate-degree attainment.

Problem Statement

Historically, community colleges have increased access to higher education for underserved populations; however, low rates of timely associate-degree attainment threaten achievement of the community-college mission, and lead to negative outcomes for students and society (American Association of Community Colleges, 2012a; Complete College America, 2011; Ford, 2010; Eric Kelderman, 2012, August 9; National Center for Higher Education Management Systems, 2009; Tinto, 1993). The

purpose of this study is to identify what influence, if any, input and environmental variables, in particular the type and amount of federal financial aid received, have on a community college student's time to associate-degree attainment.

Significance of the Problem

About 70% of Americans attend college within two years of earning a high school diploma; however, less than 30% of students earn a two-year degree within three years (National Center for Higher Education Management Systems, 2009). In the 2007-08 academic-year, 47% of all U.S. undergraduate students received some form of federal financial aid (Wei et al., 2009), and in 2011-12, more than $173.7 billion was spent on all forms of federal student aid, an increase of 140% in 2011 dollars since 2001-02 (College Board, 2012). According to the College Board (2012), 34% of Pell grants, 16% of Federal work study, 11% of subsidized Stafford loans and 9% of unsubsidized Stafford loans went to public community college students. Unfortunately, despite a significant investment of federal funds, many community college students do not complete the degrees they need to secure livable-wage jobs, gain career mobility, and contribute to society through taxes.

Between 2001-02 and 2011-12 academic years, inflation-adjusted estimates indicate that federal grants have increased by 185% and federal loans have increased by 120%; however, the amount invested in federal-work study has decreased by 24% (College Board, 2012). Since 1995, there has been a steady increase in the number of student-loan recipients (Wei, Berkner, & Carroll, 2008). The increase in student-loan borrowers has been linked to the inability of grant funds to keep up with inflation and rising college costs (College Board, 2012). Whether the increase in student loans is

temporary or long-term, financing higher education can be a source of significant debt, with few benefits for loan recipients who do not attain degrees.

Funding educational access that does not lead to degree attainment is a problem for our nation, our communities, and individuals in terms of lost time, lack of personal development, and financial loss. Students who do not complete college degrees are less likely to be civically engaged in the democratic process; they earn less in the workforce, and pay fewer taxes over their lifetimes, resulting in fewer dollars available to support the public-good (American Association of Community Colleges, 2012a; Schneider & Yin, 2012; Wei & Horn, 2013, April). For example, Schneider and Yin (2012) examined the impact of not completing a two-year degree for the 2006 cohort of first-time, full-time community college students, and estimated that the lost wages and lost taxes for 161,470 students was $36 billion in present value lifetime earnings and taxes. As students delay their entry to the workforce, wage increases often are delayed. For students who do not graduate, these losses are compounded, and include decreased lifetime-earning potential, and, in many cases, significant educational debt that may end in loan default.

The importance of education to the current and emerging economy is well documented (American Association of Community Colleges, 2012a; Carnevale et al., 2010; Complete College America, 2011; Lumina Foundation, 2012). According to Georgetown University's Center on Education and the Workforce, 63% of all jobs in the United States will require a college education by 2018 (Carnevale et al., 2010). In an address to the Joint Session of Congress on February 24, 2009, President Barack Obama stated that by 2020, America will once again have the highest proportion of college graduates in the world. Based on educational attainment levels in the U.S. during 2009,

this presidential statement demands eight million more U.S. college graduates by 2020 – a clear call for action to institutions of higher education, particularly community colleges that serve as a primary entry point to higher education. The American Association of Community Colleges estimates that community colleges must produce five million more degrees by 2020 if America is to achieve this educational goal (2012a).

Many studies have examined the effects of financial aid on a student's choice of college, access to college, persistence, and success (Alon, 2007; Chen, 2007; Chen & DesJardins, 2010; Gillen, 2009; Northern, O'Brien, & Goetz, 2010; Rubin, 2011; Singell, 2004; Singell & Stater, 2007; St. John, 1990a, 1990b; St. John, Andrieu, Oescher, & Starkey, 1994; Stratton, O'Toole, & Wetzel, 2004; Titus, 2006b; Zhan & Sherraden, 2011). In addition, financial aid trend analyses have been conducted to track the distribution of aid over time and the characteristics of student-aid recipients (College Board, 2012, 2013; U.S. Department of Education, National Center for Education Statistics, 2011b; Wei et al., 2008). This research indicates that financial resources help to determine college selection, and also influence student persistence and outcomes in four-year colleges.

Most of the research that is available on financial aid and community college students is limited to trend reports produced by the federal government (U.S. Department of Education, National Center for Education Statistics, 2011a, 2011d, 2012b). Data from the National Center for Education Statistics and other sources (American Association of Community Colleges, 2012b; Dougherty & Kienzl, 2006; Giegerich, 2005, Fall) indicate that community college students are more likely than their four-year college peers to be low-income, to work while attending college, to attend college part-time, to be first-

generation college students, to be members of minority races/ethnicities, and to be less well-prepared than their four-year counterparts. These studies have found that student characteristics affect the likelihood that community college students will persist in college and attain degrees. For example, many low-income students must work while attending college, and time spent working has been shown to increase a student's stress level and to decrease the time available for study, as well as for interaction with other students and with faculty (Bilkic, Gries, & Pilichowski, 2012; Northern et al., 2010; Stratton et al., 2004). Student-to-student and student-to-faculty interaction are involvement factors which have been linked to student persistence and degree attainment (Astin, 1975, 1999; Complete College America, 2011; O'Toole, Stratton, & Wetzel, 2003; Patel, Brinkman, & Coughlan, 2012; Paulsen & St. John, 2002; Riggert, Boyle, Petrosko, Ash, & Rude-Parkins, 2006; Roksa, 2010; Stratton, O'Toole, & Wetzel, 2008).

To date, very little research has been conducted to identify how financial aid influences community college student outcomes, and how student-aid could be used more effectively to support associate-degree attainment. Using the Beginning Postsecondary Students (BPS) longitudinal dataset 90/94, Dowd and Coury (2006) found that student loans had a negative impact on community-college student persistence, but loans were not significantly related to degree completion. They also found that some community-college students may be less likely to take on student-loan debt, due to negative views of indebtedness, or a greater uncertainty about their ability to complete a degree.

Differences in student outcomes attainment have been theoretically and empirically linked to a variety of factors, including student characteristics, self-perception, student-institutional fit, student behavior, and rational choices (Astin, 1993,

1999; G. S. Becker, 1993; Beekhoven, De Jong, & Van Hout, 2002; Brock, 2010; Cabrera, Stampen, & Hansen, 1990; DesJardins, Ahlburg, & McCall, 2002; St. John, Cabrera, Nora, & Asker, 2000; St. John, Hu, & Fisher, 2011; Tinto, 1993). The proposed study seeks to extend current knowledge by applying human capital (G. S. Becker, 1993), and student departure (Tinto, 1993) theories. This exploratory study uses a national longitudinal data set to examine what influence, if any, the type and amount of federal financial aid received, student input characteristics and college environmental variables have on time to associate-degree attainment for community college students.

Theoretical Framework

Two theoretical frameworks drive this study: Vincent Tinto's student departure theory (1993) and Gary Becker's human capital theory (1993). Tinto's theory postulates that student integration in academic and social activities enhance the overall college experience for students, causing them to be more connected with the institution and less likely to depart. Tinto's theory considers what the student brings to the institution (inputs), as well as what the institution brings to the student (environment) in shaping student outcomes, and it considers the institution's role in student retention. Tinto's theory suggests that students who receive federal loans and work study awards should have a stronger connection to college compared to self-pay students, since these students not only apply for federal loans and work study, but also must commit personal funds and work to support their education.

Becker's theory proposes that human capital investments, such as participation in higher education, result from rational cost versus benefit analyses that consider whether the costs are appropriate, given the probable returns on investment. Becker notes that

cost-benefit analyses may reflect culturally-based value judgments. Becker's theory suggests that students who take on student loans see value in higher education and also believe in their ability to graduate and repay their accumulated debt, perhaps more so than students who do not have to make these value judgments. However Becker's theory also suggests that when the amount of debt rises, students may make choices that are in conflict with earning a degree, such as stopping out to get a job, or attending school part-time to minimize debt levels through part- or full-time employment.

Drawing on both student departure theory and human capital theory, this study expands the dimension of integration to include financial integration of students within the community-college setting, by examining the influence of type and amount of federal financial aid received on time to associate degree attainment. These theories were selected for several reasons. Both theories have existed for more than 30 years, and have stood the test of time. These theories complement each other: student departure theory considers the impact of student integration in college relative to the financial aid system (Tinto, 1993), while human capital theory considers students' perception of higher education costs versus benefits (G. S. Becker, 1993), as key determinants of student persistence. Using both theories enables the researcher to consider the influence of student and environmental characteristics including student goals, commitments, integration and choices as well as the financial aid system, on time-to-degree completion for community college students.

Research Questions

The following research questions are examined in this study:

1. What influence, if any, do a student's pre-entry attributes (excluding the type and the amount of federal financial aid received), such as student race, gender, age and high school grade point average, have on a community college student's time to associate-degree attainment (the criterion variable)?
2. What influence, if any, do a student's initial goals and commitments have on the criterion variable?
3. What influence, if any, do a student's institutional experiences have on the criterion variable?
4. What influence, if any, do academic integration variables have on the criterion variable?
5. What influence, if any, do social integration variables have on the criterion variable?
6. What influence, if any, do a student's ongoing goals and commitments have on the criterion variable?
7. What influence, if any, does the type of federal financial aid received have on the criterion variable?
8. What influence, if any, does the amount of federal-financial aid received have on the criterion variable?

Methodological Approach

A quantitative, non-experimental research design with a theoretical-control prediction purpose is used in this study. The researcher did not manipulate the independent variables, but rather focused on predicting student outcomes based on the type and amount of federal financial aid received, while controlling for student pre-entry attributes (such as age, race, gender, family income level, and high school grade point

average), students institutional experiences (such as institutional size, term-to-term persistence, ratio of credits earned to credits attempted, and college grade point average), student academic and social integration variables (including time spent interacting with peers and faculty, as well as time spent working off-campus), and student commitment to the institution (initial and ongoing, including self-efficacy and satisfaction). Multiple regression analysis was used to examine the research questions, using a blocked form. This statistical test is appropriate because all research questions have a single continuous dependent variable measuring the number of months enrolled at any institution before attaining the first associate degree, as of June 2009, and multiple independent variables (Hinkle, Wiersma, & Jurs, 2003).

The National Center for Education Statistics Beginning Postsecondary Students survey (BPS) 2004-09 dataset was used in this study. This dataset includes approximately 16,700 students' responses from first-time college students at the end of their first year of college (2003-04), and then three (2005-06) and six years (2008-09) after these students began postsecondary education. The survey was used to collect data about student persistence in college and completion of degrees, as well as student characteristics and changes over time in income and debt, student goals, and characteristics such as marital status and employment status (National Center for Education Statistics, 2013). The BPS includes data on both full-time and part-time students. Having data on part-time students is important when examining community college student outcomes, since 59% of community college students attend school part-time (American Association of Community Colleges, 2013).

This study examines 43.1% of the BPS 2004-09 cohort respondents who began their postsecondary studies in a community college in 2003-04 (variable CCSTAT6Y≠0) and who attained their first associate degree by June 2009 (PROUT6=2). In addition to a vast array of financial aid variables, the BPS survey includes variables that measure institutional and student characteristics, as well as educational experience variables that examine student integration based on peer and faculty interactions. The BPS dataset is longitudinal, and its original cohort is drawn from a large, nationally representative sample from the National Postsecondary Student Aid Study (NPSAS). Because the data are longitudinal, they permit study of the impact that the type and amount of federal financial aid received has on student outcomes over time.

Definition of Terms

- Human capital – the value of personal skills, abilities, and credentials in society and the workforce
- Continuous enrollment – uninterrupted enrollment in all non-summer terms until degree completion
- Stop-out – an enrollment pattern where students leave and return to college intermittently prior to either earning a degree or dropping out permanently
- Drop-out – leaving college permanently prior to earning a degree
- Voluntary departure – student in good financial, academic and behavioral standing chooses to leave college; may be stop-out or drop-out
- Non-voluntary departure – student is permanently or temporarily removed from college due to poor academic progress, inability to pay tuition and fees, or misconduct.

- Associate degree – two-year college degree offered by community colleges, as well as some four-year colleges and universities. Associate degrees typically prepare students for direct workforce entry or provide the first two-years of a four-year degree program.
- Community colleges – two-year higher education institutions that offer associate-degrees and certificates as well as courses for general interest and personal development.
- Financial aid – financial support provided to college students to facilitate access, persistence, and degree completion.

Delimitations

This study examines data from associate-degree graduates to determine how the amount and type of federal financial aid received, specifically grants, loans, and work study, influence time to associate-degree attainment. This study does not examine the role of other federal programs that support student success, such as Federal TRIO programs or Federal tax credits. This study does not consider the influence of financial aid on certificate attainment or other post-associate-degree attainment (e.g. four-year or advanced degrees). This study focuses on aid received rather than aid awarded because many students choose not to accept their full federal financial aid award package.

Limitations

The 2004-09 Beginning Postsecondary Students restricted use data set is used in this study. Although the BPS 2004/09 dataset is the most current and comprehensive national longitudinal dataset currently available, the cohort tracked in this study began college in 2004, approximately ten years ago as of this writing, and is limited to first-time

college students. As a secondary data source, the researcher is limited to using the data that were collected. The researcher must rely on existing variables and missing data must be examined to ensure that it is missing at random.

Summary

The findings from this exploratory study can be used to advance practice, theory and policy development in the area of associate-degree attainment. Specifically, the study examines what influence, if any, do student pre-entry attributes, initial and ongoing commitment, student integration and institutional experiences, including type and amount of federal financial aid received, have on a community college student's time to associate-degree attainment. Tinto's student departure theory (1993) and Becker's human capital theory (1993) provide the theoretical frameworks for this quantitative research study. These theories were selected because they help the researcher focus on what influence, if any, a student's perceived value of higher education (cost v. benefit), and a student's attributes, goals, commitments and integration in college, have on time to associate-degree attainment.

This research is important because community colleges now serve more than 13-million students, and are a primary entry point to college for many historically-underserved populations who receive federal financial aid (American Association of Community Colleges, 2012a, 2013). Understanding how financial aid influences time to associate-degree attainment for community college students is essential for policy development that maximizes degree completion. In addition, this study provides useful information to advance practice; for example, legislators and college administrators can use the findings from this study as they consider how supplemental student aid from

state, local, and institutional sources could be applied most effectively. Students and parents can also benefit from the results of this study as they consider whether to apply for and accept financial aid awards. By understanding how federal financial aid influences associate-degree-attainment, students and their parents will be able to more easily identify an appropriate financial-aid package. The findings from this exploratory study also can be used as a basis for the development of more refined models aimed at identifying how to maximize financial aid in support of timely associate degree completion.

Chapter Two

Literature Review

Introduction

This study examines the influence of federal student aid on time to associate-degree completion for community college students. The literature review begins with a brief history of community colleges in America, followed by a discussion of the role and evolution of federal financial aid for college students. The concepts of college student access and success are then discussed in relation to community colleges and federal financial aid.

A review of current scholarly literature and research findings on factors that influence persistence and associate-degree completion, specifically student pre-entry attributes, initial and ongoing commitments, integration and institutional experiences, including type and amount of federal financial aid received, is provided. The two theories that frame this study, Vincent Tinto's student departure theory (1993) and Gary Becker's human capital theory (1993), are then described. The relationship of these theories to each other and to the research questions under study is discussed, followed by a critical analysis of the extant literature. Finally, a summary of the variables in relation to the two theories is presented, along with a description of the proposed study in relation to history, current literature and theory.

Community Colleges in America

Since the first two-year college opened in Joliet, Illinois in 1901, community colleges have grown in number and in importance throughout the United States. American history and political movements including two world wars, the civil rights

movement, the women's movement, and the war in Vietnam resulted in expanded access to higher education participation. Higher education, once accessible only to a select few, became a tool for economic growth and personal development. As veterans returned from World War II and a post-war baby boom followed, the changed perception of post-secondary education led to a growing demand for higher education. In response to the increased demand for higher education, more than 900 community colleges were created between 1950 and 2006, and substantial enrollment growth by women, minorities, immigrants, and veterans occurred in community colleges during the 1970s and 1980s. (Mellow & Heelan, 2008).

Today, approximately 1,200 community colleges serve more than 13 million students in America (American Association of Community Colleges, 2013). The growth in community colleges across America has helped to equalize the opportunity for participation in higher education; however, financial support and academic ability are still necessary for successful and timely degree completion. The following sections describe the role of community colleges and the challenges faced by community college students.

Community college role. The American Association of Community Colleges (2012a, 2013) identifies the role of community colleges as providing access, affordability and career preparation. Community colleges provide courses and degrees that serve multiple purposes. For example, community college students may take courses to fulfill certificate and degree requirements, or they may take courses for personal and professional enrichment outside of a degree-track. Associate degree graduates may enter the workforce directly, or they may transfer college credits earned at a community college to count toward a bachelor's degree at a four-year college or university (Mullin,

2012; Wang, 2012a). Diverse community college course offerings appeal to a broad range of students, and as a result community college students vary in terms of their educational goals and personal characteristics (American Association of Community Colleges, 2013; Mellow & Heelan, 2008).

The access mission embraced by community colleges necessitates unique student support systems (Lumina Foundation, 2012; Mellow & Heelan, 2008). Community colleges typically offer a broad array of support services, including developmental education, tutoring, and mentoring programs to support student success. These supports are designed to help students who are not prepared for the rigors of college to become college-ready, to persist in their studies, and to accomplish their educational goals.

Challenges for community college students. Community college students are diverse. The lower-cost, open-access opportunity to participate in higher education provided by community colleges, compared to four-year colleges and universities, attracts students with lower levels of academic preparation and income (American Association of Community Colleges, 2013; Paulson, 2012). In addition, many community college students do not have clear educational goals or career plans (Wood, 2012). These factors create barriers for student persistence and degree completion.

Academically underprepared students must become college ready by participating in developmental education courses. Developmental courses are sub-college level, and do not count toward degrees. The need for developmental education courses adds to the time and cost of earning a degree, while delaying workforce entry and advancement, and each of these factors has been found to reduce student persistence and to lower graduation rates (Maue, 2012).

For low-income students, college costs can curtail continuous enrollment leading to stop-out and drop-out behaviors. For example, low-income college students often attend college part-time while working full- or part-time jobs, and working while in college has been linked to both positive (Breier, 2010; Chen & DesJardins, 2008; Metz, 2001; Reome, 2012) and negative (Breier, 2010; Roksa, 2011; Yates, 2004) outcomes, depending on the type of work and the number of hours worked each week. However, students who have fewer financial resources are more sensitive to financial stress (Chen, 2007, 2008; Chen & DesJardins, 2008, 2010; Leslie & Brinkman, 1987; Nora, 1990; Nora & Horvath, 1989; Paulsen & St. John, 2002; St. John, 1990a; St. John et al., 2000). As a result of financial stressors, such as illness, childcare issues, transportation costs and tuition increases, many students stop-out or drop-out of college. Stopping-out of community college lengthens time-to-degree attainment, and increases the likelihood that students will drop out permanently without earning a degree (Cohodes & Goodman, 2012; Complete College America, 2011; Schneider & Yin, 2012).

The multifaceted goals and diverse blend of community college students make it difficult for faculty and administrators at community colleges to identify degree-seeking students. Without a clear understanding of student needs, community college support systems can easily become misaligned. Three such misalignments that create barriers to timely degree completion for students are discussed below: a lack of clear educational goals, selection of majors without intentionality, and selection of courses that do not align with major field requirements. Each of these misalignments can increase time-to-degree completion and decrease the likelihood of degree completion for students.

All students who apply for federal financial aid must complete the Free Application for Federal Student Aid (FAFSA). However, in order to receive federal student aid, students must be seeking a degree or certificate (Federal Student Aid, 2010). Therefore, even students who do not fully understand degree options and who are not fully informed about degree requirements, must declare majors and indicate that they are degree- or certificate-seeking, in order to qualify for federal financial aid. Students who select majors without adequate academic advising are more likely to change majors and to take courses that do not align with their majors, while students who work with academic advisors to select majors and course schedules are more likely to persist and graduate (Davila, 2011; Saltiel, 2011; Thomas, 2003). A lack of intentionality in declaring majors and selecting courses often delays time-to-degree completion for community college students (Complete College America, 2011; Wood, 2012). When time-to-degree completion is extended, substandard outcomes including drop-out, unrealized future income potential, and student loan default, often result (Complete College America, 2011; National Association of Student Financial Aid Administrators, 2013b).

Financial Aid for Education in America

The federal government's role in providing financial aid in the U.S. has evolved. Currently higher education costs are being shifted toward students in the form of college loans, while government grant support for students is shrinking. Students are taking on more debt than ever before, in the face of rising college costs and declining government aid (Archibald & Feldman, 2011; Chopra, 2012; College Board, 2012; St. John, Paulsen, & Carter, 2005; The Institute for College Access and Success, 2013, February). The

cost-shift from tax-based support toward individual-based support for higher education, particularly when coupled with increased time-to-degree completion, translates into rising costs for students and for society (Giegerich, 2005, Fall; Romano, Losinger, & Millard, 2011; Schneider & Yin, 2012; Volkwein & Lorang, 1996).

To understand the current state of financial aid, it is important to consider its historic evolution. The following sections trace the history and evolution of federal financial aid since 1965. Three main types of federal student aid are described, and the relationship between federal financial aid and student access and success is discussed.

History of federal student aid since 1965. American culture and politics impact the amount and type of federal financial aid that is available to support college students. The Higher Education Act of 1965 (HEA) initiated federal aid for college students in America. HEA was designed to strengthen higher education institutions while providing financial support for students to improve access to higher education. For more than 40 years HEA has evolved into a comprehensive support system, though many scholars and policy advocates have observed that its evolution has been far from strategic (Hearn & Holdsworth, 2005; Parsons, 2005; St. John, 2006; St. John, Daun-Barnett, & Moronski-Chapman, 2013; St. John et al., 2011; St. John & Parsons, 2005; Thelin, 2005).

When President Lyndon B. Johnson signed the HEA bill into law on November 8, 1965 the goal was to remove cost barriers for college students, based on the belief that college was no longer a luxury, but a necessity. This legislation followed a period of racial desegregation, and highlighted the role of education in transforming individuals and society through economic growth and development. Title IV of the HEA promised educational opportunity beyond high school as a means of advancing social justice and

enhancing economic prosperity; it connected human capital investments to economic outcomes within society. Prior to Title IV, higher education funding for students was limited to select disciplines, such as math and science, through the National Defense in Education Act, and to specific student groups, such as veterans, through the GI Bill (TG Research and Analytical Services, 2005, November). Subsequent HEA reauthorizations have resulted in changes based on cultural and political pressures.

The 1968 HEA reauthorization increased the availability of guaranteed student loans through private lending options. The Basic Education Opportunity Grant, known as the Pell Grant, was created by the 1972 HEA reauthorization. Pell grants provide need-based aid in an effort to decrease educational costs for low-income students, potentially eliminating their need for student loans. Policy changes and rising median income levels in the 1970s led to a decrease in eligibility for subsidized loans. The 1976 HEA reauthorization increased the maximum Pell Grant award, and relaxed the income eligibility requirements for this support, leading to increased student participation and increased program costs. Then, in 1978, the Middle Income Student Assistance Act (MISSA) made guaranteed subsidized student loans available to all, regardless of income. These policy changes increased the federal role in funding student aid, and as federal student aid expanded beyond need-based aid, the cost to taxpayers also grew.

By the 1980s, public pressure to reduce the federal budget and to reduce taxes led to increases in loan interest rates and to the creation of the parent PLUS loan in the 1980 HEA reauthorization. The 1981 Omnibus Budget Reconciliation reinstated income eligibility for guaranteed student loans, and expanded unsubsidized loan programs. This shift away from need-based aid and toward loans, has resulted in decreased higher

education opportunities for lower- and middle-class students, a trend that has escalated in the 1990s through today (St. John et al., 2013). Figure 1 below shows the increase in federal student aid during the last five years, and illustrates the larger portion of loans compared to grants and work study.

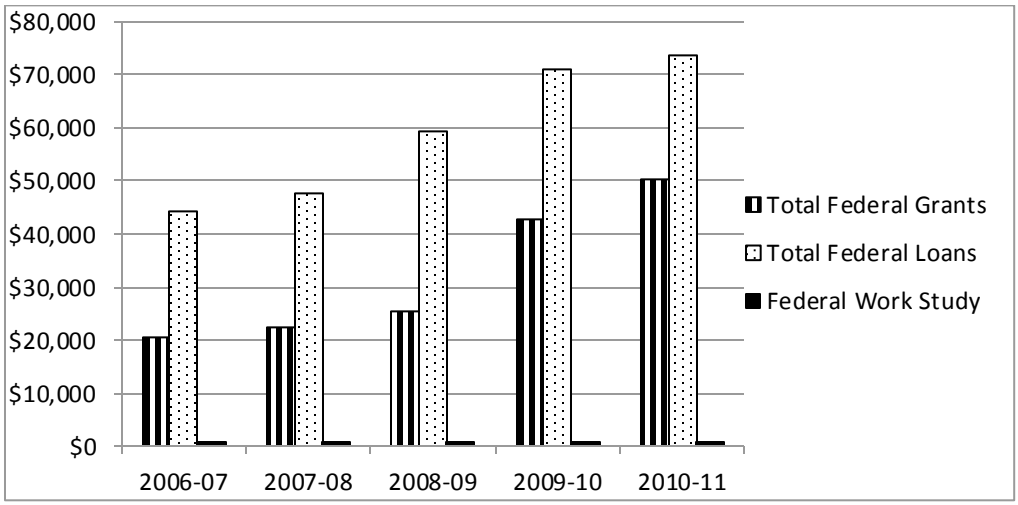

Figure 1. Federal Financial Aid to Undergraduates 2006-07 to 2010-11 (in 2011 dollars, in millions). Adapted from "Trends in student aid," by College Board, 2012, p. 12, College Board Advocacy and Policy Center.

Shifting political winds have resulted in a system of federal student aid that has evolved in response to pressure from advocacy groups and political agendas, rather than reliance on data and research (Burd et al., 2013, January; Thelin, 2005). In addition, political polarization since the 1980's has resulted in educational funding policies that are less supportive of individual development, and more supportive of societal demands, as identified by politicians, businesses and advocacy groups (St. John & Parsons, 2005). The change in political and public opinion regarding the value of higher education has resulted in decreased federal grant and subsidized loan support for higher education and increased individual financial support for higher education through educational loans and direct payments.

The federal financial aid system in place today, was neither strategically-planned, nor the result of a continuous quality improvement process. Rather, it has evolved over time in an era of decreasing commonality of thought regarding the role of higher education in economic, personal and societal development. It is critical, therefore, to understand the types of federal financial aid and the effects this aid has on degree completion, in order to align the student aid system to improve student outcomes.

Types of federal financial aid for American college students. Three types of federal financial aid for college students are considered in this study: Pell grants, guaranteed student loans (including subsidized, unsubsidized, Perkins and PLUS loans), and federal work study. These aid types are available to all income-eligible undergraduate students, regardless of field of study or degree-type; however, award amounts for each type of aid vary based on college costs, expected family contributions, and student enrollment intensity. The requirements for federal aid recipients also vary based on the type of aid received. For example, grants do not require repayment as long as satisfactory academic progress is made, but student loans require repayment during college or upon graduation, and work study awards require work hours from students while they are attending college.

The federal government defines annual and lifetime student financial aid funding limits. The federal government also determines the number of semesters that a student is eligible to receive aid. The following sections provide details on distribution methods and the required qualifications for aid recipients for the three types of federal student aid that are included in this analysis: federal Pell grants, student loans, and work study.

Federal Pell grants. Educational grants from the federal government provide college students with funds that do not require repayment. Students who receive Pell grants must be low-income, undergraduate students who have not attained their first bachelor's degree, however, in some cases, students in select post-baccalaureate programs and students in teacher-training programs may be eligible for Pell. Pell grants, previously known as Basic Educational Opportunity Grants are made to students for use at participating institutions of higher education. Funds may be paid to the student, or credited to the student's school account. Maximum Pell grant award amounts are set annually, and these amounts are based on a student's enrollment intensity, college cost, and expected family contribution (Federal Student Aid, 2011).

Research has shown that grants decrease barriers to educational access for low-income students and positively influence student persistence and degree completion (Chen & DesJardins, 2008; Mendoza, Mendez, & Malcolm, 2009; Turley, 2005; Wine, 2011). For community college students who tend to have lower income levels than their four-year college counterparts, Pell grants provide increased access and financial support, without the added burden of repayment. Two other options for students who require financial assistance, loans and work study, are described below.

Guaranteed student loans. Unlike grants which do not require repayment, student loans must be repaid, and depending on the type of loan, interest rates and accrual vary. Guaranteed student loans are administered through the federal government, making them readily available to students who may not be able to secure a private loan due to unemployment, low income levels, or poor credit history. Federal student loans typically have lower interest rates and more flexible repayment options than do private loans. In

addition to Perkins Loans that are provided to higher education institutions for students with exceptional financial need, there are three primary types of guaranteed federal loans available to students: subsidized, unsubsidized, and PLUS.

Subsidized student loans are made to students who demonstrate financial need based on college costs and expected family contribution. Subsidized loans accrue no interest while students remain in college and have a lower interest rate compared to other loans. In contrast, unsubsidized student loans are available to undergraduate, graduate and professional students who do not have a demonstrated financial need. Unsubsidized loans begin accruing interest immediately. Finally, PLUS loans are available to parents of dependent undergraduate students, as well as to graduate and professional students, to supplement other types of loans. PLUS loans are available regardless of financial need, and begin accruing interest immediately (Federal Student Aid, 2012).

Work study. Federal work study is paid directly to higher education institutions for distribution to undergraduate and graduate students with financial need. Work study funds are distributed on a first-come, first-served basis, and provide part-time employment opportunities on- or off-campus to help students pay for their education (http://studentaid.ed.gov/types/work-study). Students who participate in federal work study are paid federal minimum wage or above, depending upon the work assignment. Work study jobs typically provide community service or are related to a student's program of study. On-campus work study jobs provide opportunities for students to work for their school, while off-campus work study jobs typically support public interest through nonprofits or public agencies. Higher education institutions sometimes partner

with private for-profit employers to provide students with relevant work experiences that are related to the student's major field of study (College Board, 2012).

Federal student aid provides an opportunity for students to participate in higher education, regardless of their income levels. However, this access has not always resulted in strong retention and degree completion for students (Cohodes & Goodman, 2012; Complete College America, 2011; Reome, 2012; Roksa, 2011). The following section discusses access and success for college students in relation to federal student aid and community colleges.

Access and success for college students in America. Both community colleges and federal student aid have increased access to higher education in America, particularly since 1960 (Mellow & Heelan, 2008; TG Research and Analytical Services, 2005, November). However, community college student success, measured in terms of persistence and graduation, is a topic of concern (Complete College America, 2011; Giegerich, 2005, Fall; Lumina Foundation, 2012; Reome, 2012; Roksa, 2010). Low graduation rates and protracted time-to-degree completion for community college students create a negative image for community colleges (American Association of Community Colleges, 2012a; Complete College America, 2011; U.S. Department of Education, National Center for Education Statistics, 2011a).

Two issues emerge from a review of current scholarly literature and popular media: the need to improve understanding of the unique role of open-access community colleges within the higher education spectrum, and the need to reduce the time community college students spend earning associate degrees. Both of these issues, if left unaddressed, will result in negative perceptions of the effectiveness and value of

community colleges within the American educational infrastructure, while also yielding negative outcomes for students served by community colleges. These issues and their relationship to institutional funding are discussed below.

Degree completion and the open-access mission. Many studies of community college student persistence and degree-completion use timeframes that limit the potential to adequately track progress for part-time and academically underprepared students. The government standard used to track and report degree completion metrics is 150% of time-to-degree completion for full-time, first-time students. For two-year, degree-seeking students, 150% time equals three years of study, a timeframe that is most appropriate for studying full-time students who are beginning their college studies in college-level courses. For students with strong academic records and ability, three years provides a sufficient timespan to account for delays in degree completion that may result from illness or other life circumstances. However, for students who attend classes part-time and who require additional preparatory course-work prior to beginning college-level courses, three years is rarely enough time to complete degree requirements (Metz, 2001; Zomer, 2009), even if no delays result from life issues. Thus, outcome metrics based on three-year timeframes do not provide a sufficient timeframe for examining success for part-time, academically-underprepared community college students, yet many community college degree completion studies use a three-year time period (Martin-Osorio, 2009; Schneider & Yin, 2012).

Negative perceptions about community colleges result from low graduation and transfer rates, as well as prolonged time-to-degree completion for students. For example, some research describes community colleges as deterrents to four-year degree

completion, when bachelor-degree seeking students enter community colleges with plans to complete associate degrees and to transfer to four-year colleges, and then do not successfully transfer (Dougherty & Kienzl, 2006; Wang, 2008, 2012a, 2012b). These studies do not consider the open-access mission of community colleges and whether students who begin at community colleges would be able to participate in any other form of higher education without the open-access community colleges provide. The community college reputation is further diminished when their graduation rates are compared to graduation rates of selective colleges (Cohodes & Goodman, 2012) despite research that demonstrates positive outcomes are possible without admissions selectivity (Yeado, July 2013).

Another challenge in community college outcomes studies is a limited time-span of observation. Studies of community college students frequently track semester-to-semester and year-to-year persistence (Lee, 2009; Neel, 2004), rather than longer-term persistence and degree completion. Degree-completion studies tend to examine whether students did or did not graduate, without considering the time it takes for students to earn associate degrees (Dowd & Coury, 2006; Ford, 2010; Metz, 2001; Reome, 2012; Roksa, 2011). No studies examining time to associate-degree completion as an outcome of interest have been identified.

Funding policy. Funding policy dictates financial support for higher education at the state and national levels. Demands by popular media, advocacy groups and the general public for improved degree-completion rates (American Association of Community Colleges, 2012a, 2012b; Carnevale & Smith, 2013; Complete College America, 2011; González, 2012, July 30) have led many states to shift from enrollment-

based funding to outcomes-based funding. Outcomes-based funding models create urgency for colleges to improve student outcomes, or to suffer funding reductions for institutional operations. Recent studies of outcomes-based funding models have found them to be ineffective at best, and potentially damaging to overall educational attainment goals (Polatajko, 2011; Titus, 2006a). Policy decisions that focus on outcomes without considering access have the potential of limiting achievement of the community college mission.

In addition to potential funding losses at the institutional level, a decrease in the volume and value of need-based grants has resulted in an increase in student loans and part-time employment to finance higher education in America (College Board, 2012). This movement has shifted the burden of college costs from grants, funded by taxpayers, to loans, funded by students and their families, and to student employment. For low-income students who do not have a robust financial support system, even relatively low college costs may present a barrier (Cabrera et al., 1990; Chen, 2007, 2008; Chen & DesJardins, 2008, 2010; St. John, 1989; Stampen & Cabrera, 1988). Rather than choosing between a private or public college, or between a four-year or two-year college, low-income students faced with college costs and no financial support may choose to forego or delay college, to take on student loan debt, or to attend part-time while working.

Access and success – contradictory objectives? Many issues complicate degree completion for community college students. From an institutional perspective, community colleges serve the majority of first-generation to college, low-income and academically underprepared students (American Association of Community Colleges,

2012a, 2013); however community colleges receive fewer government resources per dollar spent when compared to four-year colleges and universities (American Association of Community Colleges, 2013). From a student perspective, decreasing grant funding availability, coupled with a decline in the value of grants relative to rising college costs, creates a need to work or to take on loans to fund educational costs.

Students who work while attending college have less time for studying and for social interaction, both factors that are positively associated with persistence and completion (Astin, 1993; Wang, 2008). Students who take on debt may be influenced by their cultural background or debt aversion to be less likely to begin, continue and complete degrees (Chen & DesJardins, 2008; Perna, 2008; Reome, 2012), and students who attend college part-time and who stop-out are less likely to complete college degrees (Complete College America, 2011; Lee, 2009). Unfortunately, student loan debt must be repaid, and loan repayment can be difficult for students who stop-out or drop-out prior to earning a degree (Complete College America, 2011).

A clear understanding of the factors that influence the time-to-degree completion is needed to facilitate alignment of financial aid policy with student needs in order to support degree completion. Without policy alignment, the open-access mission of community colleges may be curtailed through rising student costs and declining institutional, state and federal funding support. The following sections describe the outcomes of recent scholarly research on student persistence leading to degree completion. Specifically student pre-entry attributes, initial and ongoing commitments, integration and institutional experiences, including type and amount of federal financial

aid received, found to influence student persistence and associate-degree completion are discussed.

Literature on Degree Completion

Community colleges now educate nearly half of all college students, and serve as an entry point for many students who otherwise would not attend college due to lack of academic preparation or lack of financial resources (American Association of Community Colleges, 2012a, 2012b, 2013). Research on degree completion in the 21st century points out the need for more advanced degrees in America so that the United States is able to remain competitive in the global economy (Carnevale & Rose, 2011; Carnevale et al., 2010; Domestic Policy Council, 2011; National Commission on Higher Education Attainment, 2013; The White House, 2013, February 13). The emphasis on increasing the number of college-educated Americans by 2020 makes understanding the factors that influence degree completion for community college students critical. If community college students are not graduating, the national goal for additional college graduates will not be achieved.

Research suggests that the speed at which a student progresses toward degree completion impacts the cost, the perceived quality and the value of the degree, as well as the likelihood of completing the degree (Cohodes & Goodman, 2012; Complete College America, 2011). Despite a great deal of attention on graduation rates and loan default rates in the popular media (Eric Kelderman, 2012, August 9; Eric Kelderman, 2012, August 9; Lewin, 2012, November 11; Redden, 2011, August 22; Troop, 2013, January 16), little scholarly research has been conducted to inform practice on improving degree completion at the community college level. Scholarly research aimed at helping students

and their families understand the steps to take to improve the likelihood of degree completion also is scant.

To assist students and their families in the college decision-making-process, the federal government, policy groups, and the popular media have begun to report student outcomes, particularly college graduation rates and costs (Duncan, 2012, July 24; Troop, 2013, January 16). However, the influence of financial aid on the time-to-degree attainment has not been the subject of rigorous examination. Rather trend reports showing increasing college costs and rising student loan debt along-side low graduation rates are creating an image of community colleges as inefficient, ineffective and costly in terms of time and financial investment that does not result in a diploma (Butler, 2012; National Association of Student Financial Aid Administrators, 2013a, 2013b; Wei et al., 2008; Wei & Horn, 2013, April).

A shift in how individuals view, participate in and financially support higher education is taking place. Higher education, once a tool for enlightening the human mind and an institution for the financially well-to-do, has become more affordable and accessible to the general population. The open access and affordability provided by community colleges have democratized higher education in terms of access. Unfortunately, not all community college students are equally successful in achieving a degree, and this achievement gap appears to be non-random (Kim & Sherraden, 2011; Mbadugha, 2000; Reome, 2012; Roksa, 2011).

Higher education is an economic driver when it prepares graduates who possess the skills and abilities needed for workforce entry. However, the economy suffers when college students are delayed in earning their degrees, or when they drop-out prior to

earning degrees. Investments of time and talent as well as financial aid funds on college coursework that does not quickly and efficiently lead to degree completion results in losses for individuals, society and the economy (National Commission on Higher Education Attainment, 2013).

The shift in the perceived value and purpose of higher education, from enhancing social good at the level of the individual and the community, toward driving the economy at the state, national and international levels, is important to consider (Pryor et al., 2012; Titus, 2006b; U.S. Department of Education, National Center for Education Statistics, 2011d, 2012b). The locus of value for higher education influences the amount of time and money individuals, legislators and taxpayers are willing to invest in higher education, and this amount appears related to the perceived economic and social benefits of higher education. The dynamic interplay between higher education costs, coupled with the short- and long-term benefits of a college degree, impact how the total cost of higher education, including tuition, fees, time-to-market and anticipated wages, is tolerated by students, governments and the public. The economic value of higher education, as well as who should pay for higher education has been the subject of considerable debate (Cabrera et al., 1990; Leslie & Brinkman, 1987, 1988; Perna, 2008; St. John et al., 2000)

Shift from access to outcomes. Associate-degree completion, although important to the economy and to individual development, has not been the topic of much scholarly research. Over the past decade, trend analyses have tracked associate-degree completion as an outcome, but scholarly research has focused primarily on intermediate student outcomes such as semester-to-semester persistence, year-to-year persistence and course completion (Lee, 2009; Neel, 2004). Since the mid 2000's, pressure from

government, society and advocacy groups has resulted in a focus on accountability within higher education.

This shift toward accountability for student success, often defined as graduation within 150% time to degree completion for full-time students, or three years for a two-year degree, gives rise to a focus on degree completion as an outcome of interest. To date, many research studies that examine degree completion focus on four-year degrees, rather than two-year degrees (Alon, 2007; DesJardins et al., 2002; Northern et al., 2010; Singell, 2004; Singell & Stater, 2007; Titus, 2006a, 2006b; Volkwein & Lorang, 1996; Zomer, 2009). Many studies that have been undertaken at the community college level have been single-institution studies, often doctoral dissertations (Butler, 2012; Saltiel, 2011; Seifert, 2011; Wine, 2011). In addition, most degree-completion studies have looked at whether the degree was completed by a certain point in time, rather than examining the time elapsed from beginning studies until degree completion in a longitudinal analysis (Davila, 2011; Dowd & Coury, 2006; Reome, 2012; Stuart, 2009; Titus, 2006b; U.S. Department of Education, National Center for Education Statistics, 2012b; Yousif, 2009). The outcomes of these studies, therefore, lack the depth of understanding that is possible with longitudinal data, since the total time invested in degree completion has not been the subject of study.

Factors that influence associate-degree completion. Research to date has identified numerous variables that influence academic progress leading to degree completion. These variables include factors that students bring with them to higher education (pre-entry attributes, initial goals and commitments) as well as factors that occur during college (institutional experiences, financial aid, integration, ongoing goals

and commitments). Recent research findings relating these variables to persistence and associate-degree completion are discussed below. These findings provide a foundation for the research model used in this exploratory study.

Students' pre-entry attributes. Pre-entry attributes are characteristics that students possess prior to enrolling in college. Some of these attributes may change over time, like family income and parent's education level, but others remain static, such as prior academic experiences, gender and race. Pre-entry attributes have been found to influence college choice, as well as subsequent persistence and degree completion. Race, age, sex, financial background, student beliefs and perceptions, as well as prior learning, are variables that have been linked to persistence and associate-degree completion outcomes. The following sections highlight recent research findings related to these variables. Researchers have found that students who attend community colleges have many characteristics that differ from students who enter four-year colleges or universities (Chen & DesJardins, 2008; Doyle, 2009; Reome, 2012; Wang, 2008, 2012a, 2012b). Additionally, community college student background characteristics have been associated with future educational attainment as demonstrated by the examples noted below.

Parents' educational levels (Stratton et al., 2008) and being white (Calcagno, Bailey, Jenkins, Kienzl, & Leinbach, 2008; Dougherty & Kienzl, 2006; Lee, 2009) have been positively linked to student persistence. African American and minority students were found to be less likely than whites to complete degrees, despite higher educational aspirations among African American students (Dougherty & Kienzl, 2006). Researchers have found a student's age to be negatively (Dougherty & Kienzl, 2006; Lee, 2009; Stratton et al., 2008) and positively (Paulson, 2012) related to student outcomes,

including stop-out, drop-out, persistence, and transfer. However, Stratton et al. (2008) found age to significantly affect stop-out and drop-out behavior in males only. Several other studies found females to be more likely to persist in community colleges than males (Cooper, 2009; Lee, 2009; Paulson, 2012), regardless of age.

High school preparation, including earning a high school diploma and participating in college-preparatory curricula, has been found to be positively related to persistence and completion, compared to a general equivalency diploma (GED) (Cooper, 2009; Dougherty & Kienzl, 2006). High school grade point average (GPA) and high school class rank have been found to be positively related to associate-degree persistence and completion (Clark, 2003; Moore, 2006; Wang, 2008; Yousif, 2009), while participation in developmental or remedial coursework in college has been negatively associated with persistence and degree-completion outcomes (Cooper, 2009; Fike & Fike, 2008; French Graybeal, 2007; Metz, 2001; Moore, 2006; Paulson, 2012).

Students' goals and commitments. A student's skills, abilities, attitudes, beliefs and values have all been linked to the formation of a student's initial goal and level of institutional and external commitment. Students' goals and commitments lead to institutional experiences including student integration, on-going goals and commitments and ultimately to degree completion outcomes. The following paragraphs identify variables that influence students' goals and commitment levels.

Psychological attributes, including a student's intent, perception of college value, personal self-concept, personal locus-of-control, have been identified as positive predictors of degree-completion outcomes (Astin, 1993; Bean & Eaton, 2000; Bers & Smith, 1991; Eads, 1989; Maldonado, Rhoads, & Buenavista, 2005; Maue, 2012; Okun,

Ruehlman, & Karoly, 1991; Wang, 2008). Students who understand the current and future value of earning a college degree, who believe they are able to earn a degree, and who believe that they are able to influence their outcomes through personal action, such as studying and attending class, are more likely to earn degrees than students who do not. Students who are committed to college and to their degree goals are less likely to change majors, a factor that has been associated to lack of persistence and completion (Wood, 2012). Committed students also tend to have higher levels of college satisfaction, a factor associated with persistence and degree completion (Astin, 1993; Metzner & Bean, 1987; Okun et al., 1991)

Many students who attend community colleges have lower levels of academic-preparation and income, compared to their four-year counterparts (U.S. Department of Education, National Center for Education Statistics, 2012b). As a result, these students make choices based on their personal characteristics, often using a cost-versus-benefit approach. For example, academically-underprepared students and students with low income levels may choose to attend college part-time, despite research that has found enrollment intensity to be positively related to student integration, persistence and degree completion (Lee, 2009; Paulson, 2012).

External commitment variables include factors that occur outside of the college campus, but that influence student choices and outcomes. These variables such as marital status, number of dependent children, and employment status may support or deter college persistence and degree completion. Research has linked family support and college services to positive student outcomes (McKinney & Roberts, 2012; Radovcic, 2010; Reome, 2012; Yates, 2004). However, marital status (Burt, 1998; Clark, 2003;

Eads, 1989; Maue, 2012; Moore, 2006) and having dependent children (Brock, 2010; Burt, 1998; Dougherty & Kienzl, 2006; Futris, Nielsen, & Olmstead, 2009; Schmidt, 2004) have been linked to both positive and negative outcomes for student persistence and degree completion. In contrast, the number of hours that a student is employed off-campus has been linked to negative outcomes that worsen as the number of hours worked increases, and if the employment is not related to college goals (Roksa, 2011; U.S. Department of Education, National Center for Education Statistics, 2011d; Yates, 2004).

In addition to pre-entry attributes, goals and commitment levels, institutional experiences have been found to influence degree-completion outcomes for students (Ashar & Skenes, 1993; Astin, 1993; Bean & Metzner, 1985; Freeman, 2003; Maue, 2012; Pascarella, Smart, & Ethington, 1986; Tomas, 1998). A student's institutional experiences can create barriers or provide support. The following section highlights recent outcomes in scholarly research related to the impact of institutional experience variables, including academic and social integration on persistence and associate-degree completion.

Institutional experiences. Institutional experience variables are forces within the college environment that influence student persistence and success. Institutional experiences have been found to influence student persistence and degree completion with mixed effects. Recent research regarding the influence of institutional experience variables on student persistence and associate degree completion is discussed below.

Institutional experience variables influence student integration and outcomes. Institutional variables including a large college size, a large part-time to full-time faculty ratio, and a racial/ethnic composition that has more minority students, all have been

linked to negative student outcomes (Calcagno et al., 2008). However, other institutional variables, including high levels of participation in new student orientation and high levels of informal contact between students and faculty, have been found to positively influence student persistence and degree completion (Braxton & Lien, 2000; De La Rosa, 2006; DuBois, 2008; Moore, 2006; Walker Marsh, 2000).

Student integration has been found to influence the likelihood of degree completion (Clark, 2003; Lee, 2009; O' Toole, Stratton, & Wetzel, 2003; Padilla, 2007; Paulson, 2012; Stratton et al., 2004; Wood, 2012); however, for community college students, social integration has been less impactful than academic integration (Bean & Metzner, 1985; Bers & Smith, 1991; Pascarella & Chapman, 1983; Pascarella et al., 1986). Research suggests that a lack of on-campus living decreases the effect of social integration on student outcomes for two-year college students compared to their four-year counterparts (Bean & Metzner, 1985; Bers & Smith, 1991; Pascarella & Chapman, 1983; Pascarella et al., 1986).

Nevertheless, social integration appears to positively influence degree completion for community college students who participate in clubs and activities (Orefice, 2007; Salas, 2003) and who are enrolled in courses with low student-to-faculty ratios. Students who participate in learning communities and student success courses that provide opportunities for peer interaction also have been found to be more likely to persist in college (Ashar & Skenes, 1993; Moore, 2006; Saltiel, 2011; Thomas, 2003). Attending college part-time rather than full-time results in less social integration with the college campus for the student; however, smaller class sizes have been found to increase social integration for nontraditional students (Ashar & Skenes, 1993). Decreased integration, as

Tinto has theorized (1993) and research findings have supported (Beekhoven et al., 2002; Clark, 2003; Freeman, 2003; Hirschy, Bremer, & Castellano, 2011; Lee, 2009; Maldonado et al., 2005; Moore, 2006; Wood, 2012), has been linked to a lack of ongoing student commitment and to dropout.

Students' costs and financial aid. Cost variables are likely to change over time and to vary between students and between institutions. College costs are determined by tuition, fees and educational expenses charged minus the total of aid received by college students. The type and amount of aid awarded and accepted has been shown to influence college choice and likelihood of degree completion (Mbadugha, 2000; Metz, 2001; Paulsen & St. John, 2002; St. John, 1990a, 1990b, 2000; St. John, Kirshstein, & Noell, 1991; St. John & Noell, 1989; St. John et al., 2005; Wine, 2011). A review of recent research finding related to the effect of cost variables on associate degree completion is presented below.

Not all students apply for or accept their full federal aid award. The College Board estimates that only 58% of Pell eligible students at community colleges applied for aid in 2007-2008 academic year (2010). Research indicates that students and families lack information regarding how the financial aid system works, leading to a decreased likelihood of applying for federal aid and to accepting aid (College Board, 2010; Executive Office of the President, 2009, September). Other studies identify racial and cultural debt aversion as barriers to aid application and acceptance (Chen, 2007; Chen & DesJardins, 2010; Titus, 2006b). Still other studies have linked receipt of financial aid to a student's aspirations, self-efficacy, attendance patterns, retention and completion (Downing, 2008; Grasgreen, 2013, January 24; Hendel, Shapiro, & Willen, 2005; Long,

2006, December 5; Noonan, 2001; Orefice, 2007; Paulsen & St. John, 2002; St. John et al., 2005; Stratton et al., 2008), while students with unmet financial need have been found less likely to persist and complete degrees (Titus, 2006b).

Poorly informed students may make choices that are not economically sound or in their long-term best interest. For example, using credit cards with high interest rates to pay for books and educational expenses may cost more than low-interest student loans, however debt-averse students may decline loans in favor of other high-interest credit options (Long, 2006, December 5). Similarly, students who choose the least expensive college option rather than selecting a college that fits their personal preferences may be less likely to complete a degree than students who select a college that meets their individual needs and preferences (Fornash, 1988; Okun et al., 1991; Rogers, 2005; Romano, 2011; Stuart, 2009; Wilt, 2010). This research suggests that students who forego four-year colleges to begin their studies at community colleges to save on cost often do not complete their educational goals. However, Mullin (2012) found that students who successfully transfer from two-year colleges into four-year colleges are just as likely to graduate as are students who began their coursework at four-year colleges.

As noted above, many students attend college part-time while working off-campus to avoid college debt; these working students are more likely to stop out as they progress toward degree completion and many never complete degrees (Complete College America, 2011). In contrast, students who are employed on-campus and in jobs that are related to their college goals have been shown to have increased integration on campus and improved persistence and completion outcomes (Chen & DesJardins, 2008; Reome, 2012; U.S. Department of Education, National Center for Education Statistics, 2011d).

College costs have been empirically linked to access, persistence and degree completion. Extant research suggests that college costs influence student choices and outcomes, and that college costs are affected by student aid (Archibald & Feldman, 2011; Chen & DesJardins, 2008; Mbadugha, 2000; Paulsen & St. John, 2002; St. John, 1990a; St. John et al., 2005). Research on the impact of student aid on degree attainment outcomes has mixed results. Some studies call for a simplification of the federal aid process to encourage participation in higher education (College Board, 2010; Executive Office of the President, 2009, September; Long, 2006, December 5; U.S. Department of Education, 2009); other studies suggest that the amount of financial assistance available to students must be altered to incentivize participation and completion (Chen & DesJardins, 2010; Dannenberg & Voight, 2013, February), thus pointing toward the need for policy change. Still other studies cite factors, including part-time attendance, lack of adequate academic preparation and long work-hours, for creating conditions where students are less likely to succeed (Cooper, 2009; Fike & Fike, 2008; French Graybeal, 2007; Noonan, 2001; O' Toole et al., 2003; Zomer, 2009), thus indicating the need for changes in student behavior. In addition, scholarly research focused on rising student loan debt and low graduation rates, has provided recommendations on reducing loan indebtedness and increasing understanding and accountability to improve outcomes for students and society (Butler, 2012; Complete College America, 2011; Dannenberg & Voight, 2013, February; González, 2012, July 30; National Association of Student Financial Aid Administrators, 2013b; Schneider & Yin, 2012; The Institute for College Access and Success, 2013, February).

The existing research provides a foundation for the current exploratory study. The two theories that guide this study are described below. Then a brief critical analysis of the current state of the literature on associate degree completion is provided.

Theoretical Framework

Two theories frame the current study and organize thinking around the research questions. A brief description of each theory is presented below, followed by a discussion of how these theories complement each other and provide a framework for examining the proposed study's research questions. Finally, the variables identified above from recent scholarly research are presented in relation to the elements of the two theoretical frameworks that guide this study: Tinto's (1993) student departure theory and Becker's (1993) human capital theory.

Student departure theory. Vincent Tinto's student departure theory seeks to explain how a student's characteristics and the college environment influence academic and social integration, leading to student retention or departure (Tinto, 1993). Tinto's theory has received widespread use since it was first conceived in 1975, and it has been tested repeatedly using data from different higher education institutions and student subsets (Braxton & Hirschy, 2005). Tinto points out that the issue of drop-out is not well defined, and as a result research into student departure yields mixed findings (Tinto, 1975). Tinto's theory has evolved based on empirical testing and critical feedback.

According to Tinto's theory, a student enters college with a level of commitment to a degree path and to the higher education institution. The level of student commitment is based upon internal and external factors, forces, and experiences. A student's background characteristics and initial commitment levels then combine with college

environmental factors, including faculty and peer interaction. Together these factors influence student integration and result in ongoing commitment levels that lead to student retention or departure (Tinto, 1975, 1993).

If student and institutional goals are well aligned, integration is likely. Integration, in turn promotes student retention, progression, ongoing commitment and completion. For example, students who believe in the value of a college education, who are academically well-prepared for college, who devote time to college activities where interaction with faculty and peers occurs, and who have adequate social and financial support, are more likely to earn degrees than are students who do not possess these characteristics, interactions and resources (St. John et al., 2013; St. John et al., 2011).

Student departure theory does not imply that degree attainment is always achieved when a student persists. Rather, the theory suggests that when a student departs permanently from higher education (drop-out) the student is unable to complete a degree, but when a student persists, a degree may or may not be attained, and the timeframe for earning a degree varies from student to student. Tinto's theory is a logical frame for considering how a student progresses toward a degree over time, since not all students who complete degrees do so in a time-efficient manner. Student departure theory considers voluntary and non-voluntary student separation from college, and also considers the duration of the separation: stop-out (temporary leave or institutional transfer) versus drop-out (permanent departure from high education), and various intermittent enrollment patterns (Tinto, 1975; Tinto & Pusser, 2006). Figure 2 depicts Tinto's theory of student departure.

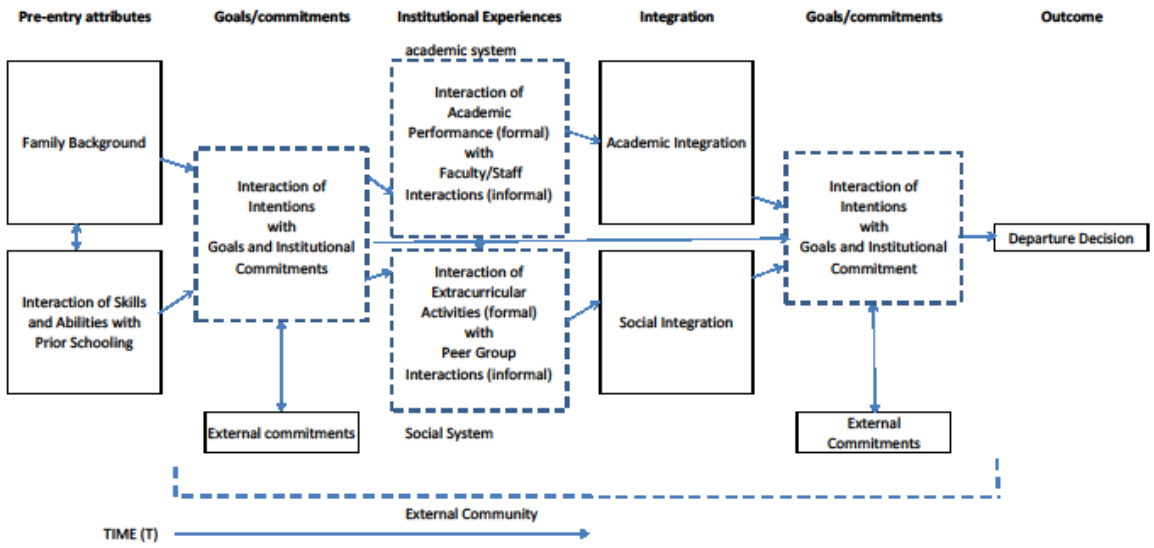

Figure 2. Vincent Tinto's Longitudinal Model of Student Departure. Adapted from "Leaving college: Rethinking the causes and cures of student attrition," by V. Tinto, 1993, p. 114. Copyright 1993 by The University of Chicago Press.

Human capital theory. Gary Becker's human capital theory examines the impact of human development investment on current and future economic outcomes (1993). According to Becker's theory, investments in people, including educational spending, contribute to human capital growth. Human capital growth occurs when increased educational levels lead to new skills that result in higher wages, as well as social and psychological growth that lead to personal and societal well-being. Higher education is a long-term investment of time and tuition by individuals, their families and the public that results in economic outcomes and societal benefits (G. S. Becker, 1993).

When considered through the lens of human capital theory, higher education is an investment in intellectual capital that has an economic impact on both individuals and society. Human capital theory considers the link between the cost of developing the mental abilities of individuals and the resulting personal, societal and economic outcomes. In doing so, Becker's theory offers a logical rationale for financial

investments in higher education participation from students as well as from other beneficiaries, including society-at-large and employers.

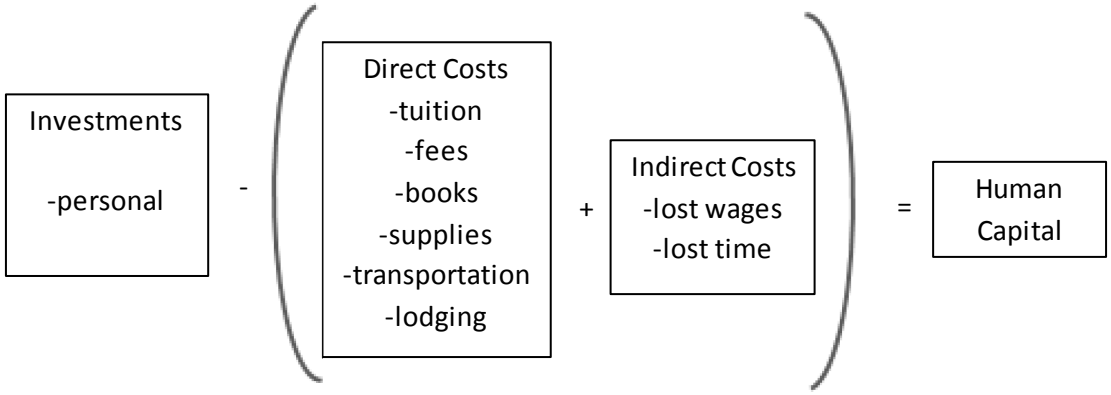

Figure 3. Human Capital Development Model. Adapted from "Human capital: A theoretical and empirical analysis with special reference to education," by G.S. Becker, 1993, The University of Chicago Press.

Relationship between theories and to the issue under study. Input, environmental and cost variables contribute to student outcomes in slightly different ways according to student departure theory and human capital theory. According to Tinto's student departure theory, input variables lead to initial commitment levels and these factors combine with environmental variables, influencing integration. Integration then influences ongoing student commitment, as well as the likelihood of associate-degree attainment. According to Becker's human capital theory, student choices are based on value judgments that consider the costs and the benefits of various decisions and behaviors. These value judgments are influenced by a student's cultural background and aspirations, resulting in student behaviors, including college selection and attendance, financial aid application and acceptance, as well as persistence and college completion or departure.

Becker's human capital theory is an economic theory, while Tinto's student departure theory is an interactionalist theory rooted in sociological thought. Both

theories help to explain how and why individuals may choose to participate in or to depart from higher education. Together these theories can help to explain how government support for students can influence outcomes. By using human capital theory and student departure theory, both individual and social elements are considered when examining the influence of federal financial aid on time to associate degree attainment.

From an economic perspective the increased earning power resulting from a college degree benefits the recipient, as well as society, because personal financial gains can be taxed and redistributed in the form of social services. From an interactionalist perspective, the integration between a student and the educational environment leads a student to persist or to depart. Because a student's decision to persist in college or to depart may contain both economic and social determinants across the continuum of time-to-degree, it is important to consider both human capital and student departure theories when studying degree attainment.

Human capital theory, when used to frame student behavior in college, considers how educational costs and benefits are analyzed by a student, who must then decide to persist to earn a degree, or to depart from the institution without a degree. This theory considers how students make decisions to persist or depart based on current value of their investment (time, effort, tuition, and current/forfeited wages) balanced against the probability of future gains (intellectual/personal development, degree attainment, and future wages). The price-response behaviors of students may reflect self-efficacy, as well as cultural and social norms, rather than a strict cost-benefit analysis (St. John et al., 2000). Institutional and social constructs, as well as individual and societal values interact, resulting in choices and outcomes (Parsons, 2005).

For example, the amount a student is willing to pay or borrow to attend college has been shown to be influenced by self-efficacy, as well as a student's cultural perspective regarding the long-term versus short-term benefits of a college degree on life-long earning potential (St. John, 2006; St. John et al., 2013; St. John et al., 2011; Wang, 2008). A low-income student who receives a federal student aid award may still be less likely to apply, enroll, and persist in higher education when immediate loss of wages are considered, compared to a high-income student who receives little or no federal student aid (Chen, 2008; Chen & DesJardins, 2008). A student from a more affluent background, who has a positive perception of the long-term benefits of higher education, may be more likely to persist, regardless of financial incentives.

Thus, student departure from higher education can occur independently from a pure cost-benefit analysis. For example, social isolation or not fitting in with the college environment has been shown to lead to student departure, regardless of the potential long-term benefits of a college degree (Astin, 1999; Tinto, 1993). By applying both human capital and student departure theories to the research questions, this study considers how input, environmental and cost factors influence time-to-degree associate-degree attainment for community college students. This dual-theory approach has been recommended as a means of accounting for college student retention (Beekhoven et al., 2002; Chen, 2008).

Table 1

Variables Found to Influence Student Persistence and Degree Completion Relative to Elements in Student Departure Theory and Human Capital Theory

Theory elements			
Student Departure	**Human Capital**	**Variables**	**Influence**
Pre-entry attributes	Investments (prior to entry)	Academic preparation	+
		Age	+/-
		Family income	+
		GED	-
		High school class rank	+
		High school diploma	+
		High school GPA	+
		Parent education level	+
		Race (white)	+
		Sex (female)	+
Goals and commitments (Initial)	Investments (initial)	Student has degree goal	+
		Student has locus of control	+
		Student studies	+
		Student values college	+
External commitments (initial)	Investments (initial)	Employment (full-time)	-
		Employment (part-time)	+/-
		Family support	+
		Marital status	+/-
		Student has children	+/-

Institutional experiences	(does not apply)	Attendance (part-time)	-
		Attendance (full-time)	+
		Class size	-
		Institution size	-
		More minority students	-
		More part-time faculty	-
		Participation in orientation	+
		Student satisfaction	+
		Took remedial courses	-
		Took student success course	+
		Used college services	+
Integration (academic)	Indirect costs	Attends classes	+
		Clubs/activities member	+
		Interaction with faculty	+
		Learning community member	+
Integration (social)	Indirect costs	Interaction with peers	+
		Social isolation	-
Goals and commitments (ongoing)	Investments (ongoing)	Aspirations	+
		Changed major	-
		Good fit with institution	+
		Info to make financial choices	+
		Self-efficacy	+
		Stopped out	-

External commitments (ongoing)	Investments (ongoing)	Employment (on-campus)	+
		Employment (off-campus)	-
		Marital status	+/-
		Student has children	+/-
Financial Aid	Direct costs	Grants	+
		Has unmet financial need	-
		Loans	-
		Loan debt	+/-
		Received financial aid	+

This literature review has identified historic and philosophical shifts in how higher education is perceived, in who has access to and who participates in higher education, and in the purpose of higher education for individuals and for society. In addition, the two theoretical frameworks that guide this study have been identified and described. The following section highlights the gaps in current research and establishes the need for this study.

Critical Analysis

As noted above, a shift toward increasing access to higher education has led to dramatic growth in community colleges during the 1950s and to dramatic increases in the number of students participating in higher education during the following decades. Over the years there has been a continuous need to balance access with quality standards leading to outcomes.

The shift from low levels of college access at selective colleges to open access at community colleges has necessitated the development of academic and financial support systems for students. These support systems are critical for community college students

who often lack adequate academic preparation, income, and expectations to facilitate success. This, in turn, has led to an increased demand for federal student aid. However, enrollment growth and increasing college costs have surpassed funding availability, causing a shift from grants for students funded by the government to loans funded by students and their families.

This shift in educational funding highlights a dichotomy of purpose and perhaps a shift in perception regarding the purpose of higher education as a public good or a private good, as a tool for social justice in helping to equalize workforce opportunities for graduates, or as an economic driver for corporate America. In addition, although federal financial aid decreases immediate economic barriers that often limit access to higher education, a shift toward loans has been found to deter some students from accessing higher education. Therefore, despite the existence of federal student aid, without sufficient support and guidance, the pre-entry attributes of many community college students limit their potential for success.

The multifaceted community college mission has resulted in a wide variety of student goals that have diminished degree completion outcomes. Popular media and recent research highlight the need to regain focus within community colleges to improve outcomes and to decrease the time to degree completion for students. However, research to date has focused primarily on short-term persistence and degree-completion as outcomes rather than examining factors that influence the time to associate degree completion, even though students who take longer in their studies have been found to be less likely to complete degrees. Most studies of completion have focused on four-year rather than two-year institutions, even though nearly half of all college students begin

their studies at community colleges. In fact, no empirical research studies focused on the influence of federal student aid on time to associate degree attainment have been identified. This exploratory study examines how input, environmental and financial factors together influence time-to-degree attainment for community college students, with a goal to advance understanding and improve student outcomes.

Summary

Political and historic shifts, particularly since the 1960's, have resulted in an evolving role for higher education. Postsecondary education is now critical to supporting economic growth and development in the United States, and community colleges are a primary point of entry for nearly half of all college students in America. Once a luxury available to only a select few, open-access community colleges have made higher education readily available to all. The lower-cost, two-year associate-degree offered by community colleges has increased access to higher education by reducing the amount of time and money needed to earn a degree.

At the same time, the creation of federal student aid for the general population in the 1960s, and its expansion in the 1970s, has expanded access to higher education for many individuals who would not otherwise have been financially able or willing to participate in postsecondary education. Since the 1980s, however, political and ideological shifts have occurred that have resulted in an increased emphasis on the personal benefits of postsecondary degrees, while the societal and economic benefits of college degrees have been minimized. This shift has led to decreasing government support for student grants, and increasing emphasis on personal funding of higher education through loans. This, in turn, has led to demands from students, families, mass

media and lawmakers for increased accountability from colleges and universities in terms of quality, outcomes and cost. No longer is student access enough; now, retention and degree completion are expected.

Student departure theory and human capital theory provide two vantage points to frame these historic shifts in how higher education operates (from access to progress to success), how financial aid for education is changing (from need-based grants to loans). Together these shifts are resulting in conditions that favor students who are academically well prepared, able to pay for college, or be willing to take on debt to finance a college education (Chen, 2007; Chen & DesJardins, 2008; Reome, 2012; St. John et al., 2011). Student departure theory illuminates the role of student commitment to and integration with higher education. Human capital theory highlights the role of the economy and culture in shaping student decisions. When taken together, these theories help to explain how student choices resulting from the interaction and influence of a student's background, the environment on- and off-campus, and college cost factors influence degree completion.

The shift from access to outcomes in community colleges has not received much attention from scholarly researchers. The lack of strategic design in the growth and evolution of federal student aid calls for research to ensure that the current system serves our nation and our students in ways that are fiscally sound, socially just, and that lead to efficient degree completion. However, few studies have examined the influence of student financial aid on postsecondary degree completion, particularly at the associate-degree level.

This study examines how the type and amount of federal financial aid to students influences the time-to-associate-degree attainment. Student departure theory and human capital theory are used as a basis for considering the personal and economic factors that influence time-to-associate-degree attainment. This study extends current research related to associate-degree attainment by incorporating the element of time-to-degree completion into the equation as the dependent variable. The amount of time needed to earn a degree has been shown to influence student outcomes and to have long-term economic impacts for students and society. Chapter three discusses the proposed methodology of this study including the theoretical framework, the research questions, the population and variables to be examined, the data analysis procedures, limitations, and delimitations. Chapter four presents the research findings, and chapter five discusses the research findings and presents recommendations for policy and practice.

Chapter Three

Methodology

Introduction

This chapter describes the methods that are used to examine the influence that the amount and type of federal student aid have on time to associate degree attainment for students who began their postsecondary education in public two year colleges, known as community colleges. The theoretical framework and data analysis model that are used in this exploratory study are described, followed by a description of the National Center for Educational Statistics (NCES) Beginning Postsecondary Students (BPS) 2004-09 longitudinal dataset that is used in this analysis. Next, the population and sample used in this study are defined and the variable selection is discussed. Finally, data analysis procedures as well as limitations and threats to the validity of this study are described.

Research Design

As noted above, a quantitative, non-experimental research design with a theoretical-control prediction purpose was used in this exploratory study. The researcher identified a model to predict the time to associate degree completion based on the type and amount of federal financial aid received, while controlling for student input variables, college-environmental characteristics, integration variables, and intermediate educational outcomes. SPSS software was used to run a blocked form of stepwise, linear multiple regression analysis to examine the research questions. This statistical test is appropriate because all research questions have a single continuous dependent variable, and multiple independent variables (Hinkle et al., 2003). In addition, because the BPS survey data were collected using a complex, two-stage sampling design regression analysis using

SPSS Complex Samples module also was conducted to incorporate the complex sample weights. Because the Complex Samples software does not permit a block-form design, the outcomes from the block-form analyses are discussed in depth, and the Complex Samples output are considered as a means of validating the explained variance of the block-form model.

Theoretical framework. As described above, two theoretical frameworks were used in this study: Vincent Tinto's student departure theory (1993) and Gary Becker's human capital theory (1993). Both theories consider outcomes as resulting from student pre-entry attributes, goals and commitment levels. However each theory has limitations that can be overcome by using the theories together. Human capital theory considers students' perception of higher education costs versus benefits, but does not consider a student's institutional experiences (G. S. Becker, 1993). While student departure theory considers the impact of a student's institutional experiences, including integration in college, but does not consider the how financial factors influence student retention and departure (Tinto, 1993). This study expands the dimension of integration to include financial integration of students within the community-college setting. In doing so, a student's time to associate degree attainment is examined as an outcome that is rooted in both student integration and student choice.

Data analysis model. Vincent Tinto's longitudinal model of institutional departure provides the data analysis model for this study. This model is depicted above in chapter two, and the variables from the BPS dataset that were used to test the influence of the amount and type of federal student aid on the time to associate degree completion for students within the population under study are outlined in Appendix D. When indexed

variables comprised of multiple variable factors exist, both the indices as well as the factors were tested for best fit within the model. The following variable clusters were examined in the analysis using separate blocks within a stepwise multiple regression analysis:

- Pre-entry attribute variables (family background, skills, abilities and prior schooling)
- Initial goals and commitments (student intentions, student commitment to the institution, institutional goals, institutional commitment to the student, student external commitments, institutional external commitments)
- Institutional experiences
- Integration (financial, academic, and social)
- Ongoing goals and commitments (ongoing student intentions, student commitment to the institution, institutional goals, institutional commitment to the student, student external commitments, institutional external commitments)

The Survey Instrument

The Beginning Postsecondary Students (BPS) survey 2004-09 restricted use dataset compiled by the National Center for Education Statistics was used in this study. This dataset is the third BPS cohort, and it is a subset of students from the National Postsecondary Student Aid Study (NPSAS). NPSAS is a large nationally-representative sample of postsecondary first-time beginning students who attended any postsecondary institution in the United States or Puerto Rico (U.S. Department of Education, 2012).

The 2004-09 BPS is comprised of data on education and employment for students during the first six years since they first enrolled in postsecondary education. The final

BPS 2004-09 dataset includes 16,680 student respondents who provided sufficient responses during interviews at the end of their first year of college (2003-04) and during follow-up surveys at three years (2005-06) and six years (2008-09) after they began postsecondary education. All eligible respondents had to be alive during all data collection periods and must have had valid data to permit record construction of their enrollment history (U.S. Department of Education, 2012).

Background of the instrument. BPS includes data on postsecondary student persistence and completion, as well as on transition from college to the workforce. The BPS longitudinal design permits study of changes over time for variables including student goals and personal characteristics, such as income and marital status (National Center for Education Statistics, 2013). The BPS dataset includes data on full- and part-time students, an important factor since 59% of community college students attend school part-time (American Association of Community Colleges, 2013). BPS also includes educational experience variables that measure student integration, making it an ideal dataset for exploring student persistence and drop-out over time.

Reliability of the data collection process. Data entry key-rekey procedures, inter-rater reliability checks, and the use of trained expert coders enhanced the reliability of the data collection process. Throughout the data-entry process, random samples of data were reviewed for data-entry accuracy and coders were continuously monitored and provided with feedback to ensure the quality and consistency of their work. Statistical tests were used to compare original and re-keyed data and these tests confirmed the reliability of the data at acceptable levels and in many instances near perfect (U.S. Department of Education, 2012).

Data Collection Procedures

In order to access the BPS:04/09 restricted-use dataset, the researcher first contacted the National Center for Education Statistics (NCES) per the process outlined on the website http://nces.ed.gov/pubsearch/licenses.asp and in the Restricted-Use Data Procedures Manual (U.S. Department of Education, National Center for Education Statistics, 2011c). Online and hard copy request documents were submitted per the NCES process including a license agreement, a security plan form and affidavits of non-disclosure for each individual who will have access to the data. The request was approved by the Dean of the College and the University of Toledo's sponsored research office, with the principal project officer (PPO), Dr. Ronald Opp, assuming responsibility for maintaining the confidentiality of the data. Once all forms were submitted and approved, NCES mailed the data to the PPO at the University of Toledo for computer installation and use.

The BPS:04/09 dataset was compiled using a complex two-stage sampling design. First, contact information was located for students in the sample, and a mailing was sent to students and their parents in order to update student information. Members of the sample were then contacted by mail, and received informed consent information and a request to participate in the study. Data collection then began with financial incentives provided to student participants in three phases of data collection.

Ninety-one percent of the original sample (n=16,920) were located. Interviews were completed by 15,160 students for an 82% response rate for all eligible sample members, for a 90% response rate among the sample members who were located. Online

interviews were completed by 9,630 students, with the remaining interviews being conducted in the field or via telephone.

Each interview lasted approximately 20 minutes. Warnings were embedded in the survey to warn the respondents when their responses were outside a range of likely responses. Help text built into the interview instrument and interviewer training was used to improve the quality of the data. Other data quality-control measures included monitoring of telephone interviews, tracking help-desk calls and frequent debriefing sessions with interviewers, which were used to improve each phase of the data collection process (U.S. Department of Education, 2012).

Transcript data requests for the BPS were sent to 3,030 eligible postsecondary institutions, and these requests were combined with the Baccalaureate and Beyond Longitudinal Study to ease the burden on institutions. Transcripts could be provided via fax, FedEx or electronic transfer. Eighty-seven percent (n=2,620) of eligible institutions provided transcript data for sample members. Trained coders keyed transcript data into the dataset for 16,960 students (92% of the original sample) including information from 25,120 transcripts. Reliability of the data was ensured through training of data entry personnel, and through key-rekey data comparisons and statistical tests of inter-rater reliability (U.S. Department of Education, 2012).

A total student sample of 16,680 was identified. This sample resulted from removing 110 deceased students from the original sample and further limiting the sample to students with sufficient enrollment history data via interviews (n=15,160) or other data sources (n=1,520). Institutional and student sampling procedures are described below.

Population and Sample

The BPS:04 cohort includes all students who were first-time beginners in postsecondary education during academic year 2003-04, in any postsecondary institution in the United States or Puerto Rico that was eligible to receive federal aid authorized under Title IV of the Higher Education Act. Eligible institutions offered programs for people who completed high school, and these institutions offered at least one academic, occupational or vocational program lasting at least three months or 300 clock hours, with courses open to people other than employees of the institution. U.S. service academies were not included in the study.

Unlike previous NPSAS studies, the BPS:04/09 population included students who were taking only correspondence courses. Students who were eligible for inclusion in the study must have been enrolled in an academic program, or at least one credit-bearing course that could count toward degree requirements for an academic degree or the students must have been participating in an occupational or vocational program that required 300 clock hours or 3 months of instruction. Students who were concurrently or solely enrolled in high school, a General Educational Development (GED) program, or another type of high school completion program were not included in this study (U.S. Department of Education, 2012).

A two-stage sample design was used for the BPS:04/09 to first select eligible institutions, and then to select eligible students using the NPSAS:04 sampling frame. Subsampling procedures were used for the first and second follow-ups. The sample and subsample parameters are described below. This study looked at 43.1% of the BPS:04/09 cohort respondents who began their studies in a community college in 2003-04 (variable

CCSTAT6Y≠0), and further focused on community college students within this sample who earned an associate degree by June 2009 (PROUT6=2). In doing so, the researcher sought to understand the influence of input and environmental variables, including the amount and type of federal student aid on time to associate degree attainment.

Institutional sample. Institutions included in the BPS:04/09 study were from the NPSAS:04 sample. The institutional sampling frame for NPSAS:04 was constructed from the Integrated Postsecondary Education Data System (IPEDS) Institutional Characteristics files and header files as well as the 2000 and 2001 Fall Enrollment files, and institutions that were newly formed were added to the sample using the 2002-03 IPEDS data of NPSAS-eligible institutions.

Data were then cleaned to eliminate institutions with missing enrollment data or out-of-range enrollment data that were unusually small or large to avoid inappropriate selection probabilities and sample allocations. From this sampling frame, a direct, unclustered sample of institutions was selected for NPSAS:04; however 12 states[1] that expressed interest in supporting and encouraging NPSAS by their institutions were selected for oversampling of public two-year, public four-year and private nonprofit four-year institution types.

Original student sample and follow-up subsamples. Students included in the BPS:04/09 study were selected from the NPSAS:04 student sample. While NPSAS:04 included all types of undergraduate students, the BPS sample included only first time beginner (FTB) undergraduate students. Potential FTB students were classified as both

[1] California, Connecticut, Delaware, Georgia, Illinois, Indiana, Minnesota, Nebraska, New York, Oregon, Tennessee, and Texas

pure (enrolled in postsecondary education for their first time in 2003-04 after completing high school requirements) and effective (enrolled for at least one postsecondary course before 2003-04 but never completed the course). The sample of NPSAS:04 students was selected using a fixed-type sampling rate, rather than a fixed number, in order to keep selection probability equal across student type within the institution type. Hence the BPS:04-09 samples included 44,670 eligible potential FTB students from the NPSAS:04, 23,090 in the first BPS follow-up (BPS:04/06), and 18,640 students in the second follow-up (BPS:04/09). As noted above, eligible students for the final BPS:04/09 dataset must have been alive at the time of the BPS:04/09 data collection, and with valid data to permit enrollment history to be constructed. A total student sample of 16,680 was identified.

Variable Selection

The following sections identify the dependent variable and the independent variable blocks that are used in this study. Each variable was identified based on the theoretical models and findings from previous research studies identified in the literature review, chapter two. Detailed variable names and descriptions for all independent variables used in this study are provided in Appendix D.

Dependent variable. The dependent variable used in this study was time to associate degree attainment as measured by months enrolled at any institution before attaining first associate's degree as of June 2009 (ATAAEN6Y) (U.S. Department of Education, National Center for Education Statistics, 2012a).

Independent variables. All independent variables were entered into the regression analysis using the following blocks:

1. Pre-entry attribute variables

2. Initial goals and commitments
3. Institutional experiences
4. Academic integration
5. Social integration
6. Ongoing goals and commitments
7. Financial aid

Data Analysis Procedures

The following sections describe the data analysis procedures that were used in this study. A discussion of steps taken to clean and prepare the data is provided, followed by a description of the assumptions and the statistical methods that were used in this study.

Data preparation. The BPS:04/09 dataset was sent to the PPO cleaned and ready for analysis. The dataset was delivered in a secured and zipped format to ensure confidentiality of the data. The PPO contacted NCES after the data file was received to retrieve the password needed to unlock the data and install it onto the non-networked computer. After the dataset was installed on the computer, a review of variables was conducted to ensure readability. All scaled variables in the dataset were already labeled and coded for regression analysis, with the smallest numerical option used for the most negative responses and the largest numerical option used for the most positive responses. When necessary, categorical variables used in the regression analysis were dummy-coded by the researcher into dichotomous variables for ease of interpretation in the regression analysis.

Extensive data cleaning was conducted by the NCES prior to the release of data to identify valid responses and imputation was used when possible to replace missing data with valid response data. Any remaining missing data values were handled using listwise

deletion, which deletes the entire record if any data element is missing. This conservative method is the default way to handle missing data in SPSS.

Assumptions. Two statistical assumptions were tested for prior to full-scale data analysis: lack of multicollinearity of variables, and a linear relationship between the independent variables and the dependent variable. In cases where these assumptions were not validated, the variables in the model were adjusted to ensure that the data analysis model would yield valid results. Both assumptions are described below and the results of the statistical tests of these assumptions are described in chapter four.

In order to have valid results in a multiple regression analysis, it is imperative that a linear relationship exists between the independent variables and the dependent variable. In this analysis Pearson correlation coefficients were examined to ensure that predictive independent variables were correlated with the dependent variable. All independent variables not significantly correlated with the dependent variable were eliminated from the equation.

Another concern in multiple regression analysis is having redundant independent variables. In this research, variables with Pearson bivariate correlations of .90 or higher were examined and all but one of the collinear variables was eliminated from the model to avoid issues with multicollinearity. In this way the model was limited to include the fewest number of meaningful independent variables.

In addition, two theoretical assumptions also were made in this analysis: that the data contained in the BPS:04/09 dataset represent the population of interest, and that the data are valid and reliable. The BPS data focus on first-time beginning students, which may not fully represent the community college student population; however this dataset

provides the most comprehensive longitudinal data available to examine the type of questions posed by the researcher. BPS data include information from student interviews, and students may provide false responses or omit responses. However, steps were taken by the National Center for Education Statistics to identify out-of-range responses and to train interviewers to avoid unintentional misrepresentation. In addition, student-record data were collected and were used to validate student responses when possible (U.S. Department of Education, 2012).

Statistical analysis. SPSS was used to run a multiple regression model following the preliminary steps noted above to clean, prepare and test the data. Blocked stepwise regression with forward entry and backward removal of variables was used to identify the model with the best fit. This method was selected over other methods including hierarchical linear modeling (HLM) as both ordinary least squares (OLS) regression and HLM have been found to yield similar results (Astin & Denson, 2009). However causal analytical modeling via blocked multiple regression analysis (CAMBRA) enables the researcher to account for correlation among variables while observing direct and indirect effects as variables enter the model, thus providing a more robust model of analysis (Astin, 2005; Astin & Denson, 2009; Astin & Dey, 1996; Korn, 1999).

In the present analysis, each data block contains similar variables, with each block representing elements in Tinto's student departure model (Tinto, 1993), as noted above. In this way, the blocked regression permitted the researcher to examine the change in significance of independent variables entered in each block in predicting the change in the dependent variable. As each new block of variables enters the regression, the researcher observed the significance of individual independent variables as well as the

overall explained variance to better understand how individual independent variables and groups of independent variables affect the dependent variable.

By examining the change in beta coefficients the researcher is able understand how the independent variables interact with each other and how they influence the dependent variable. The blocked form of multiple regression analysis enables the researcher to observe changes in explained variance as variables enter into the regression. Indirect effects are detected when variance of one independent variable is diminished as another independent variable enters into the equation. In contrast, variables that enter the regression as significant and remain significant throughout the steps have direct effects on the dependent variables. By using blocked form of stepwise multiple regression, the influence of independent variables on each other in each block of the model as well as on the dependent variable of interest, time to associate degree attainment was assessed. In this way direct and indirect relationships between the variables was identified (Astin, 1999, 2005; Astin & Denson, 2009; Detwiler, 2011; Hinkle et al., 2003).

As described by Sax, Astin and Avalos (1999, pp. 192-193):

> CAMBRA also allows the investigator to conduct a series of path analyses by observing how the coefficients for variables already entered are changed when later variables are entered. When an entering variable significantly diminishes the coefficient for an earlier variable, an "indirect" path has been identified. When an earlier variable's coefficient remains significant through the final step, a "direct" path has been identified. The unique situation that occurs when an entering variable *strengthens* the coefficient for an earlier variable (a condition not covered in most writings on path analysis) is called a "suppressor effect" (i.e., the entering variable has been "suppressing" the observed effect of the earlier variable on the dependent variable) (Astin, 1991; Astin & Dey, 1996).

The regression results are presented in Chapter Four.

Limitations of the Study

All studies have limitations and the following sections identify several validity threats and limitations of this study.

Threats to internal validity. Internal validity refers to the ability to determine cause and effect relationships within a research study. A non-experimental research design was used in this study. As a result, causation was difficult to determine because independent variables could not be randomly assigned. Because a blocked form of multiple regression was used, the researcher selected variables and placed them into blocks based on groupings that were intended to reflect a temporal sequence similar to Tinto's student departure model (Tinto, 1993). However, research findings could be due to other factors including reverse causation, circular causation, or from the effects of other variables not considered within the model. For example, historic events may have influenced student responses to the interviews over the course of the study, maturation of students throughout the study period could lead to changes in responses over time, irrespective of the factors under study, and mortality within the cohort may have resulted in certain types of students dropping out of the sample (Trochim, 2006).

Threats to external validity. External validity refers to the generalizability of the research findings to other populations, in other settings and over time (Trochim, 2006). One of the best ways to ensure external validity is to draw a representative sample using random selection and achieving high response rates. A large, nationally representative sample was used in this study, and as described above response rates were sufficient to high. Thus, the ability to generalize findings from the study is increased. However, because a secondary dataset was used, the researcher did not have control over

the types of questions that were asked, nor the type of data that were collected. The limitations of using a secondary data source are described below.

Secondary data limitations. The proposed study used a robust secondary dataset that is both national and longitudinal. The dataset was designed specifically to examine the type of questions posed by the researcher. The data were collected using well-trained professionals and quality control measures were used to ensure that the data were accurately recorded.

Despite these advantages, the dataset has some limitations: The timespan of the survey is now several years old; however, it is the most current dataset available. Survey respondents were asked to provide information using an interview format that can result in errors from faulty memory and from omission; however, prompts were built into the survey to check when out-of-range responses were recorded. In addition, student record information was collected to augment the survey data. Finally, only first-time beginner (FTB) students were included in the dataset (U.S. Department of Education, 2012), yet many community college students are returning adult students who may not be first-time beginners. Although the dataset has limitations, it is still the best data source available for conducting the proposed study.

Summary

Chapter three reviewed the purpose of the proposed study and the methods that were used to explore the research questions. The research design, survey instrument, data collection procedures were described in detail. The population and sample that were used in this exploratory study were identified. The variable selection method that was used was described and the dependent and independent variable blocks were identified.

Finally, data analysis procedures and limitations were discussed. The data analysis results are presented in chapter four.

Chapter Four

Results

Introduction

Previous research has examined the influence of student characteristics, institutional experiences and financial aid on whether a student completes a degree. Much of the existing research focuses on bachelor degree completion. This is the first known study that considers time to associate-degree completion as a dependent variable of interest. This chapter describes the statistical analyses performed to identify what influence, if any, the amount and type of federal aid received have on time to associate-degree attainment, after controlling for student characteristics, commitments and institutional experiences.

Using the methods described in chapter three, a stepwise regression analysis was performed using SPSS software. The following seven blocks were used to enter independent variables into the regression: 1) pre-entry attributes, 2) initial goals and commitments, 3) institutional experiences, 4) academic integration, 5) social integration, 6) ongoing goals and commitments, and 7) financial aid. To incorporate the complex sample design weights, the complex samples module in SPSS also was used to verify and compare outcomes from this analysis. Descriptive statistics are first presented, followed by regression analyses results for the significant predictors of time to associate-degree attainment for first-time beginner community college students.

Characteristics of the Sample and the Population of the Study

As described in chapter three, this study used data from the Beginning Postsecondary Students (BPS) longitudinal dataset compiled by the National Center for

Educational Statistics. The initial data were collected in 2003-04 and first-time beginner students attending any postsecondary institution that was eligible to receive federal aid authorized by Title IV of the Higher Education Act in the United States or Puerto Rico were eligible to participate. Follow-up data were collected in 2005-06 and 2008-09, and the final BPS 2004-09 dataset includes 16,680 student respondents who provided sufficient responses at all three data points (U.S. Department of Education, 2012).

Several types of weights were included in the BPS 2004-09 dataset. The panel weights (WTB) were used in this analysis. Use of the panel weights ensures that student responses were collected at each data point. This is the most conservative approach and the approach recommended by the NCES (S. Crissey, personal communication, November 8, 2013). When the panel weights were applied to the BPS 2004-09 dataset, a weighted total of 3,746,294 first-time beginning students was generated with an unweighted count of 16,120.

Students were included in the population for this study if they began their education at a public community college (CCSTAT6Y≠0) and attained their first associate degree within six years (PROUT6=2). This approach was recommended by NCES personnel (M. Soldner, personal communication, November 15, 2013) and within the BPS 2004/09 codebook as a way to include degree attainment for students who begin at public community colleges regardless of where they complete their associate degrees (U.S. Department of Education, National Center for Education Statistics, 2012a). Based on the population selection criteria, a total of 1,170 associate degree graduates were included in this study. When the panel weights were applied to the population of associate degree graduates used in this study, a total of 288,436 graduates with an

unweighted count of 1,170 was generated. Select characteristics of the overall sample and population under study are displayed in Table 2 and are summarized below.

Table 2

Characteristics of the BPS 2004-09 Sample and the Population Under Study

	Overall dataset n = 3,746,294	%	Population under study n = 288,436	%
Gender				
Female	2,152,319	57.5%	178,106	61.7%
Male	1,593,975	42.5%	110,330	38.3%
Race				
Asian	218,141	5.8%	16,941	5.9%
Black or African American	589,142	15.7%	31,220	10.8%
American Indian or Alaska Native	79,889	2.1%	4,502	1.6%
Native Hawaiian or other Pacific Islander	33,209	0.9%	1,615	0.6%
White	2,576,653	68.8%	213,448	74.0%
Hispanic or Latino origin	559,783	14.9%	39,230	13.6%
Other	372,108	9.9%	28,007	9.7%
High school GPA was 2.5 or more	2,273,153	60.7%	171,808	59.6%
Has high school diploma	3,304,827	88.2%	257,588	89.3%
Father had college degree	1,219,302	32.5%	72,235	25.0%
Mother had college degree	1,284,666	34.3%	83,166	28.8%

Year 1 degree goal: associate or bachelor degree	3,175,965	84.8%	279,673	97.0%
Attendance intensity pattern was full-time through 2009	1,867,534	49.9%	213,862	74.1%
Kept same major as of 2009	543,171	14.5%	42,803	14.8%
Applied for any aid in 2003-04	3,156,672	84.3%	222,417	77.1%

The population under study had an average age of 21.94 years at first enrollment, while the overall sample had a slightly higher average age at first enrollment of 22.05. The number of months enrolled at any institution until attainment of first associate degree as of June 2009 ranged between 10 and 72 months, with an average of 31.48 months for the overall sample. The same range of 10 to 72 months of enrollment until attainment of first associate degree was also present for the population under study, however students who began their postsecondary education at community colleges had a mean time to associate degree attainment of 32.54 months, an enrollment duration that is slightly higher than the overall sample mean.

As shown above the population under study is nearly 62% female, and 74% white, both higher than the overall sample percentages. Although more community college graduates had earned a high school diploma (89.3% versus 88.2%), fewer had a grade point average above 2.5 (59.6% versus 60.7%) compared to the overall survey sample. In contrast, a lower percentage of students who began their studies at community colleges and completed degrees within six years, compared to the overall sample, had fathers who completed degrees (25.0% versus 32.5%) or mothers who completed degrees (28.8% versus 34.3%). A larger percentage of students in the population under study indicated having a degree goal in year one (97.0% versus 84.8%) compared to the overall sample population. More community college graduates had an attendance intensity

pattern of full-time (74.1% versus 49.9%), however only slightly more community college graduates kept the same the major through 2009 (14.8% versus 14.5%) when compared to the overall sample. A lower percentage of community college graduates applied for any financial aid (77.1% versus 84.3%) compared to the overall sample. In summary, the average community college graduate included in this analysis is about 22 years old, is enrolled for 32.5 months prior to earning a first associate degree, is White, is female, has a high school GPA of 2.5 or more, has earned a high school diploma, has parents without college degrees, has a year one degree goal of earning an associate or bachelor degree, and has a full-time enrollment intensity as of 2009.

Review of the Research Questions

Eight research questions were asked to address first-time community college student's time to associate-degree attainment (the criterion variable) for students who completed an associate degree by 2009. For the purposes of this study, time to associate-degree attainment was measured as total months enrolled at any institution through 2009, and the research questions were:

1. What influence, if any, do a student's pre-entry attributes (excluding the type and the amount of federal financial aid received), such as student race, gender, age and high school grade point average, have on the criterion variable?
2. What influence, if any, do a student's initial goals and commitments have on the criterion variable?
3. What influence, if any, do a student's institutional experiences have on the criterion variable?

4. What influence, if any, do academic integration variables have on the criterion variable?
5. What influence, if any, do social integration variables have on the criterion variable?
6. What influence, if any, do a student's ongoing goals and commitments have on the criterion variable?
7. What influence, if any, does the type of federal financial aid received have on the criterion variable?
8. What influence, if any, does the amount of federal-financial aid received have on the criterion variable?

Statistical Procedures

Chapter three outlined the data analysis plan used in this study. The following sections identify how the analysis plan was implemented using BPS 2004-09 data to analyze the research questions above. Following an initial review of all variables available in the dataset, a list of nearly 250 variables was compiled based on the literature review outlined in chapter two. The variables of interest were tested for multicollinearity and all variables that were correlated at .90 or greater were examined and redundant variables were removed from the list. Based on feedback from NCES, additional variables were removed if they were not included in the 2009 final derived BPS dataset (M. Soldner, personal communication, November 7, 2012). Finally, all categorical variables were converted to dummy variables in preparation for the regression analysis.

Block form stepwise regression. A total of 142 variables were entered into a block form, stepwise regression using SPSS software. Predictor variables entered the

equation if they were significant at the $p<.05$ and they remained in the equation as long as their p values remained at $p<.10$. A total of 136 models were generated. Ten variables were excluded from all models due to non-significance, two variables entered into an initial model but were removed by the final model due to non-significance, and six variables were non-significant in the final model. In the final model, 124 variables emerged as significant predictors of time to associate degree attainment.

The findings are presented in table form in Table 3. Table 3 includes the following columns of information: variable name, the step that the variable was entered into the regression, the correlation between each independent variable and dependent variable (Zero r), the step beta (β) weight for the model when each independent variable entered into the regression, the final beta (β) weight for each independent variable that was significant in the final model, and the *F* value is listed for each independent variable.

The overall explained variance of the final model (adjusted R^2) was .423. This means that 42.3% of the variability in time to associate degree attainment first-time beginner community college students, as measured in months enrolled, was explained by the 124 independent variables that were significant in the final model. A description of the findings ordered by the blocks used in the analysis follows the data table.

Table 3

Significant Predictors of Time to Associate Degree Attainment for Students Who Began at Community Colleges

					Final Step			
	Block	Zero r		Step β	β		F	
Age first year enrolled	1	0.12	***	0.12	***	0.13	***	4430.19	***
Is Female	1	0.07	***	0.06	***	-0.02	***	2002.00	***
HS GPA of 2.5 or more	1	-0.11	***	-0.07	***	-0.01	**	2295.02	***
Has HS diploma	1	-0.04	***	0.01	***	-0.04	***	835.95	***
Dad has a college degree	1	0.03	***	0.06	***	0.02	***	1842.85	***
Mom has a college degree	1	0.01	***	0.01	***	-0.03	***	904.09	***
Race: Asian	1	0.02	***	0.03	***	-0.01	***	1304.53	***
Race: Black or African American	1	0.05	***	0.04	***	0.05	***	1626.60	***
Race: American Indian or Alaska Native	1	-0.04	***	-0.04	***	0.02	***	1454.67	***
Race: Other	1	0.02	***	0.03	***	-0.08	***	983.84	***
Race: White	1	-0.04	***	0.06	***	0.03	***	1193.05	***
Race/ethnicity: Hispanic or Latino origin	1	0.07	***	0.07	***	0.10	***	2858.91	***
First choice school accepted 2004	2	0.00	**	-0.01	***	0.02	***	929.25	***
Enrolled in 2004 to complete an associate degree	2	-0.01	***	-0.01	***	0.02	***	889.46	***

Dependents: Total number 2003-04	2	0.12	***	0.07	***	-0.02	***	1122.15	***
Year 1 degree plan: associate or bachelor degree	2	-0.05	***	-0.03	***	-0.02	***	971.44	***
Job 2004: Hours worked per week (incl work study)	2	0.11	***	0.13	***	0.09	***	1124.33	***
No help from parents in 2006	2	-0.05	***	0.07	***	0.05	***	1115.08	***
Single parent status in 2003-04	2	0.06	***	0.04	***	0.02	***	1012.25	***
Married - 2003-04	2	0.13	***	0.06	***	0.05	***	1089.23	***
Has goal of earning a degree in 2003-04	2	-0.06	***	-0.06	***	-0.05	***	1123.66	***
Attended exclusively FT 2003-04	3	-0.17	***	0.03	***	-0.01	*	2190.89	***
Attended FT last month enrolled through 2006	3	-0.18	***	-0.07	***	-0.04	***	2462.16	***
Attendance intensity pattern is FT last month enrolled through 2006	3	-0.23	***	-0.03	***	0.01	**	2252.62	***
Attendance intensity pattern FT through 2009	3	-0.25	***	-0.15	***	-0.07	***	2372.66	***
Grade point average 2003-04	3	-0.15	***	-0.18	***	-0.14	***	2121.30	***

Percent minority enrollment 2003-04	3	0.13	***	0.01	***	0.16	***	2070.67	***
Percent enrolled: Black, non Hispanic 2003-04	3	0.09	***	0.07	***	-0.07	***	2428.16	***
Percent enrolled: Hispanic 2003-04	3	0.05	***	-0.10	***	-0.12	***	2024.10	***
Degree goal of associate or higher when last enrolled in 2006	3	-0.04	***	-0.01	***	-0.02	***	2129.22	***
Degree goal of associate or higher when last enrolled in 2009	3	0.28	***	0.27	***	0.27	***	1775.23	***
Remedial course 2004: Any taken	3	0.12	***	0.12	***	0.07	***	2487.62	***
Community college track was strongly directed toward a degree	3	-0.07	***	-0.03	***	-0.07	***	2320.35	***
Academic integration index 2004	4	-0.05	***	-0.04	***	-0.09	***	1955.93	***
Had informal faculty meetings in 2004	4	-0.01	***	0.08	***	0.08	***	1953.86	***
Had faculty talk outside class in 2004	4	-0.07	***	0.04	***	0.02	***	1814.36	***
Met with faculty advisor 2004	4	-0.04	***	0.03	***	0.02	***	1847.82	***
Participated in study groups 2004	4	0.01	***	0.04	***	0.05	***	1884.35	***

Had informal faculty meetings in 2006	4	-0.12	***	-0.01	***	-0.02	***	1775.76	***
Met with faculty advisor 2006	4	-0.06	***	-0.01	***	-0.07	***	1738.59	***
Participated in study groups 2006	4	0.03	***	0.05	***	0.01	***	1991.45	***
Participated in fine arts activity 2004	5	-0.05	***	-0.03	***	-0.12	***	1742.14	***
Participated in school clubs 2004	5	-0.06	***	-0.02	***	-0.09	***	1711.27	***
Participated in school sports 2004	5	-0.12	***	-0.07	***	-0.12	***	1789.82	***
Participated in fine arts activity 2006	5	-0.04	***	0.02	***	-0.02	***	1642.31	***
Participated in school clubs 2006	5	-0.12	***	-0.04	***	-0.05	***	1767.64	***
Participated in school sports 2006	5	-0.12	***	-0.10	***	-0.07	***	1781.59	***
Social integration index 2004	5	-0.09	***	0.18	***	0.16	***	1703.15	***
Social integration index 2006	5	-0.14	***	-0.01	**	0.03	***	1671.85	***
Dependent children: Number 2009	6	0.10	***	0.09	***	0.06	***	2323.14	***
Associate or higher degree expected 2006	6	0.01	***	-0.03	***	-0.02	***	2221.14	***
Associate or higher degree expected 2009	6	0.08	***	0.04	***	0.05	***	2266.18	***

Job 2006: Hours worked weekly	6	-0.23	***	-0.10	***	-0.09	***	2230.04	***
Job 2009: Hours worked weekly	6	-0.17	***	-0.10	***	-0.09	***	2322.34	***
Job on campus 2006	6	-0.04	***	-0.01	***	-0.03	***	2138.26	***
Job on campus 2009	6	-0.07	***	-0.06	***	-0.04	***	2326.16	***
Kept same major as of 2006	6	0.05	***	0.05	***	0.02	***	2283.54	***
Kept same major as of 2009	6	0.19	***	0.12	***	0.12	***	2134.58	***
Satisfaction with choice of major or course of study	6	0.14	***	0.10	***	0.08	***	2190.33	***
Satisfaction with quality of undergraduate education	6	0.10	***	0.05	***	0.08	***	2311.17	***
Married as of 2006	6	0.08	***	-0.06	***	-0.04	***	2246.31	***
Married as of 2009	6	0.05	***	0.00	*	0.02	***	1953.34	***
Stopout (first): Anywhere months duration 2009	6	-0.12	***	-0.24	***	-0.18	***	2031.21	***
Stopouts number at first institution through 2006	6	0.01	***	0.02	***	0.10	***	2166.26	***
Stopouts number anywhere through 2009	6	-0.07	***	-0.13	***	-0.22	***	2285.70	***
Did not stop out anywhere in 2004-05	6	0.07	***	-0.01	***	0.02	***	2003.20	***

Did not stop out anywhere in 2006-07	6	0.05	***	-0.01	**	-0.02	***	1977.98	***
Did not stop out anywhere in 2008-09	6	0.03	***	-0.06	***	-0.05	***	2298.66	***
Did not stop out at first institution during 2003-04	6	0.05	***	0.01	***	-0.01	***	2110.00	***
Did not stop out at first institution during 2004-05	6	-0.01	***	0.02	***	0.05	***	2028.94	***
Did not stop out at first institution during 2005-06	6	-0.04	***	-0.01	**	-0.02	***	2082.09	***
Did not stop out at first institution during 2006-07	6	-0.07	***	-0.07	***	-0.08	***	2328.10	***
Enrolled in STEM major when last enrolled in 2009	6	-0.03	***	-0.02	***	-0.01	***	2194.87	***
Applied for any aid 2003-04	7	-0.12	***	-0.03	***	-0.04	***	1835.70	***
Federal campus based aid 2003-04	7	-0.05	***	0.05	***	0.05	***	1849.43	***
Cumulative total student loan amount borrowed through 2006	7	-0.02	***	0.05	***	0.08	***	2102.55	***
Monthly student loan payment as percent of monthly income 2009	7	-0.06	***	0.01	***	0.01	***	1703.17	***
Worked more hours due to loan debt	7	0.00		0.03	***	0.04	***	2084.03	***

Applied for federal aid 2003-04	7	-0.04	***	0.04	***	0.03	***	1823.08	***
Received federal aid other than only Pell Grants in 2003-04	7	-0.06	***	-0.04	***	-0.06	***	2041.28	***
Ratio of federal aid to total aid 2003-04	7	0.03	***	0.05	***	0.18	***	2068.71	***
Only received federal grants in 2003-04	7	0.07	***	0.06	***	-0.03	***	2149.03	***
Received federal and other grants in 2003-04	7	-0.04	***	-0.06	***	-0.07	***	2055.69	***
Received only non-federal grants in 2003-04	7	-0.18	***	-0.12	***	-0.11	***	2036.69	***
Ratio of grant aid to student budget 2003-04	7	-0.08	***	-0.02	***	-0.02	***	1627.33	***
Ratio of grants to total aid 2003-04	7	-0.11	***	-0.04	***	-0.04	***	1690.27	***
Ratio of grant aid to tuition 2003-04	7	-0.05	***	-0.06	***	-0.08	***	2151.60	***
Loan debt was worthwhile investment 2009	7	-0.05	***	-0.03	***	-0.04	***	1900.16	***
Loan debt caused me to postpone enrollment	7	0.00		0.05	***	0.05	***	2148.44	***
Federal loans paid in full/cancelled in 2006	7	0.01	**	-0.06	***	-0.10	***	2138.41	***

Federal loans in repayment in 2006	7	-0.06	***	-0.05	***	-0.08	***	2113.77	***
Federal loans in default in 2006	7	-0.01	***	-0.01	***	-0.01	***	1728.97	***
Federal loans not in repayment in 2006	7	-0.05	***	-0.05	***	-0.08	***	2098.12	***
Federal loans paid in full in 2009	7	-0.07	***	0.01	***	0.01	***	1677.51	***
Federal loans in repayment in 2009	7	-0.07	***	0.04	***	0.04	***	1888.12	***
Federal loans deferred/forebearance in 2009	7	0.03	***	0.05	***	0.07	***	2119.60	***
Federal loans in default in 2009	7	-0.02	***	-0.03	***	-0.02	***	2013.11	***
Federal loans not in repayment in 2009	7	0.05	***	-0.01	*	-0.01	*	1603.00	***
Total need based grant aid 2003-04	7	-0.04	***	-0.10	***	-0.13	***	1944.01	***
Credit cards: Use to pay tuition 2003-04	7	-0.03	***	-0.01	***	-0.01	***	1664.78	***
Monthly student loan repayments 2009	7	-0.08	***	0.03	***	0.05	***	1862.96	***
Currently repaying student loans 2009	7	-0.10	***	-0.03	***	-0.02	***	1809.70	***
Spouse has student loan 2009	7	-0.01	***	-0.01	***	-0.01	***	1639.68	***
Grants: Total state grants in 2003-04	7	-0.06	***	0.04	***	0.05	***	2111.67	***

Cumulative Stafford subsidized loans and Perkins 2006	7	-0.04	***	0.06	***	0.16	***	2027.71	***
Cumulative Stafford subsidized loans and Perkins 2009	7	-0.03	***	-0.10	***	-0.16	***	1922.52	***
Cumulative federal student loan amount owed as of 2006	7	-0.05	***	-0.14	***	-0.25	***	1998.31	***
Total federal loans (excludes PLUS) 2003-04	7	-0.02	***	0.01	**	0.02	***	1615.03	***
Total federal loans (includes PLUS) 2003-04	7	-0.03	***	0.05	***	0.04	***	1755.19	***
Total grants 2003-04	7	-0.09	***	0.04	***	0.18	***	1952.93	***
Institutional aid total 2003-04	7	-0.10	***	0.02	***	0.01	***	1652.22	***
Cumulative Stafford, Perkins, PLUS 2006	7	-0.03	***	-0.07	***	-0.25	***	1968.40	***
Cumulative Stafford, Perkins, PLUS 2009	7	-0.01	***	0.10	***	0.19	***	1742.11	***
Stafford, Perkins, and PLUS loans amount during 2005-06	7	-0.05	***	0.10	***	0.27	***	2143.99	***
Stafford, Perkins, and PLUS loans amount during 2006-07	7	-0.06	***	-0.02	**	-0.03	***	1602.91	***

Stafford, Perkins, and PLUS loans amount during 2007-08	7	0.01	***	-0.06	***	-0.20	***	1876.19	***
Stafford, Perkins, PLUS: Amount owed as of 2009	7	0.01	***	0.04	***	0.12	***	1929.46	***
Stafford and Perkins loans amount during 2004-05	7	0.05	***	0.07	***	0.18	***	2134.12	***
Stafford and Perkins loans amount during 2005-06	7	-0.10	***	-0.10	***	-0.15	***	2077.80	***
Stafford and Perkins loans amount during 2006-07	7	-0.07	***	-0.06	***	-0.12	***	2125.26	***
Stafford and Perkins loans amount during 2007-08	7	0.01	***	0.06	***	0.13	***	1796.00	***
Federal Work study 2003-04	7	-0.08	***	-0.03	***	-0.08	***	1983.57	***
Total nonfederal aid 2003-04	7	-0.15	***	-0.03	***	-0.04	***	1768.52	***
Total work study 2003-04	7	-0.08	***	0.02	***	0.02	***	1782.18	***

Note. n=1,170 with a panel weighted total of 288,436, R^2=.423, Adjusted R^2=.423. *p<.05, **p<.01, ***p<.001.

Block one - Pre-entry attributes. The first research question asked what influence, if any does a student's pre-entry attributes have on time to associate degree attainment. Twelve predictors emerged as significant in block one of the final model.

Being female (β=-.02, p<.001), having a high school GPA of 2.5 or more (β=-.01, p<.01), having a high school diploma (β=-.04, p<.001), having a mother with a college degree (β=-.03, p<.001), being Asian (β=-.01, p<.001) and having a race categorized as other (β=-.08, p<.01) were negative predictors of time to associate degree attainment. This means that as these characteristics were present or increasing the time to associate degree attainment decreased. Age (β=.13, p<.001), having a father with a college degree (β=.02, p<.001), being Black or African American (β=.05, p<.001), being American Indian or Alaska Native (β=.02, p<.001), being White (β=.03, p<.001) or having Hispanic or Latino Origin (β=.10, p<.001) were positive predictors of time to associate degree completion. This means that as these characteristics were present or increasing, time to associate degree attainment also increased.

Block two - Initial goals and commitments. The second research question asked, what influence, if any, do a student's initial goals and commitments have on time to associate degree completion. Nine variables emerged as significant in block two in the final model. Three negative predictors emerged: total number of dependents in 2003-04 (β=-.02, p<.001), having a year one degree plan of an associate's or bachelor's degree (β=-.02, p<.001), and having a goal or earning a degree in 2003-04 (β=-.05, p<.001). Six positive predictors emerged: Accepted to first choice school 2004 (β=.02, p<.001), enrolled in 2004 to complete an associate degree (β=.02, p<.001), hours worked per week in 2004 (β=.09, p<.001), no help from parents in 2006 (β=.05, p<.001), single parent status in 2003-04 (β=.02, p<.001), and married in 2003-04 (β=.05, p<.001). As previously noted, as positive predictors are present or increase, time to associate degree completion also increases, however time to associate degree completion decreases as

negative predictors are present or increase. For example based on the outcomes above, community college students who have a degree plan in year one or a degree goal in 2003-04 tend to be enrolled fewer months prior to earning their first associate degree compared to students who did not have a degree plan or degree goal. Conversely, students who were married in 2003-04 tend to be enrolled more months prior to earning their first associate degree compared to students who were not married.

Block three - Institutional experiences. The third research question asked what if any influence do institutional experiences have on time to associate degree attainment. Twelve variables from block three were significant predictors of time to associate degree attainment. In the final model, full-time attendance intensity pattern through the last month enrolled in 2006 (β=.01, $p<.01$), percent minority enrollment in 2003-04 (β=.16, $p<.001$), having a degree goal of associate degree or higher when last enrolled in 2009 (β=.27, $p<.001$), and taking a remedial course in 2004 (β=.07, $p<.001$) increased time to associate degree attainment. Whereas the time to associate degree attainment decreased as the following variables were present or increasing: attending exclusively full-time in 2003-04 (β=.-01, $p<.05$), attending full time through the last month enrolled as of 2006 (β=.-04, $p<.001$), having full-time intensity pattern through 2009 (β=.-08, $p<.001$), grade point average in 2003-04 (β=.-14, $p<.001$), Black, non-Hispanic enrollment 2003-04 (β=.-07, $p<.001$), Hispanic enrollment 2003-04 (β=.-12, $p<.001$), having a degree goal of associate or higher when last enrolled in 2006 (β=.-02, $p<.001$), and having a community college track strongly directed toward a degree (β=.-07, $p<.001$).

Block four - Academic integration. The fourth research question asked what, if any influence does academic integration have on time to associate degree attainment.

Eight variables emerged in block four as significant predictors of time to associate degree attainment for students who begin their postsecondary education in community colleges. Having informal faculty meetings in 2004 (β=.09, p<.001), talking with faculty outside of class in 2004 (β=.02, p<.001), meeting with a faculty advisor in 2004 (β=.02, p<.001), and participating in study groups in 2004 (β=.05, p<.001) and in 2006 (β=.01, p<.001) were positive predictors which, when present or increasing, increased time to associate degree attainment. Negative predictors, which when present or increasing decreased time to associate degree attainment included the following variables: academic integration index 2004 (β=.-09, p<.001), had informal faculty meetings in 2006 (β=.-02, p<.001), met with faculty advisor in 2006 (β=.-07, p<.001).

Block five - Social integration. The fifth research question asked what, if any influence does social integration have on time to associate degree attainment. Eight social integration variables emerged as significant predictors of time to associate degree attainment, six were negative predictors and two were positive predictors: participating in a fine arts activity 2004 (β=.-12, p<.001) and 2006 (β=.-02, p<.001), participating in school clubs 2004 (β=.-09, p<.001) and 2006 (β=.-05, p<.001), and participating in school sports 2004 (β=.-12, p<.001) and 2006 (β=.-07, p<.001) were negative; social integration index in 2004 (β=.16, p<.001) and 2006 (β=.03, p<.001) were positive.

Block six - Ongoing goals and commitments. The sixth research question asked what, if any influence do a student's ongoing goals and commitments have on time to associate degree attainment for first-time beginner students at public two-year colleges. Twenty-four variables in block six emerged as significant predictors of time to associate degree attainment in the final model, ten were positive and fourteen were negative

predictors. Positive predictors increase time to degree completion when present or increasing: dependent children, number in 2009 (β=.06, p<.001), associate degree or higher expected 2009 (β=.05, p<.001), kept same major as of 2006 (β=.02, p<.001) and 2009 (β=.12, p<.001), satisfaction with choice of major or course of study (β=.08, p<.001), satisfaction with quality of undergraduate education (β=.08, p<.001), married as of 2009 (β=.02 p<.001), stop outs number at first institution through 2006 (β=.10, p<.001), did not stop out at first institution (β=.05, p<.001) or anywhere (β=.02, p<.001) in 2004-05. Negative predictors decrease time to degree completion when present or increasing: associate degree or higher degree expected in 2006 (β=-.02, p<.001), hours worked weekly in 2006 (β=-.10, p<.001) and 2009 (β=-.10, p<.001), having a job on campus in 2006 (β=-.03, p<.001) and 2009 (β=-.04, p<.001), being married as of 2006 (β=-.04, p<.001), stop out (first): Anywhere months duration 2009 (β=-.18, p<.001), stop outs anywhere through 2009 (β=-.22, p<.001), did not stop out anywhere in 2006-07 (β=-.02, p<.001) or 2008-09 (β=-.05, p<.001), did not stop out at first institution during 2005-06 (β=-.02, p<.001) or 2006-07 (β=-.08, p<.001), and enrolled in STEM major when last enrolled in 2009 (β=-.02, p<.001).

Block seven - Financial aid. The final two research questions examined what influence if any the type of federal financial aid received and the amount of federal financial aid received have on time to associate degree completion for community college students. A total of 58 independent variables were entered into block seven of the stepwise regression analysis and 51 of these variables emerged as significant in the final block.

Positive predictors, which when present or increasing led to an increase in the number of months enrolled at any institution prior to attaining a first associate degree, included the following: amount of federal campus-based aid received in academic year 2003-04 (β=.05, p<.001), cumulative total student loan amount borrowed through 2006 (β=.08, p<.001), monthly student loan payment as percent of monthly income as of 2009 (β=.01, p<.001), worked more hours due to loan debt (β=.04, p<.001), applied for federal aid in 2003-04 (β=.03, p<.001), ratio of federal aid to total aid 2003-04 (β=.18, p<.001), loan debt caused student to postpone enrollment (β=.05, p<.001), federal loans paid in full (β=.01, p<.001), in repayment in (β=.04, p<.001) or deferred (β=.07, p<.001) in 2009, monthly student loan repayments 2009 (β=.05, p<.001), total state grants in 2003-04 (β=.05, p<.001), cumulative Stafford subsidized loans and Perkins 2006 (β=.16, p<.001), total federal loans excluding PLUS (β=.02, p<.001) and including PLUS (β=.04, p<.001) in 2003-04, total grants (β=.18, p<.001) and total institutional aid (β=.01, p<.001) in 2003-04, cumulative Stafford, Perkins and PLUS loans as of 2009 (β=.19, p<.001), Stafford, Perkins, and PLUS loans amount during 2005-06 (β=.27, p<.001), Stafford, Perkins, PLUS amount owed as of 2009 (β=.12, p<.001), Stafford and Perkins loans amount during 2004-05 (β=.18, p<.001) and 2007-08 (β=.13, p<.001), and total work study 2003-04 (β=.02, p<.001).

Negative predictors, which when present or increasing led to a decrease in the number of months enrolled at any institution prior to attaining a first associate degree, included the following: applied for any aid 2003-04 (β=-.04, p<.001), received federal aid other than only Pell grants in 2003-04 (β=-.06, p<.001), only received federal grants in 2003-04 (β=-.03, p<.001), received federal and other grants in 2003-04 (β=-.07, p<.001),

received only non-federal grants in 2003-04 (β=-.11, p<.001), ratio of grant aid to student budget 2003-04 (β=-.02, p<.001), ratio of grants to total aid 2003-04 (β=-.04, p<.001), ratio of grant aid to tuition 2003-04 (β=-.08, p<.001), loan debt was worthwhile investment 2009 (β=-.04, p<.001), federal loans paid in full/cancelled (β=-.10, p<.001), in repayment (β=-.08, p<.001), in default (β=-.02, p<.001), not in repayment (β=-.08, p<.001) in 2006, federal loans in default (β=-.02, p<.001) or not in repayment (β=-.01, p<.001) in 2009, total need based grant aid in 2003-04 (β=-.13, p<.001), credit cards used to pay tuition 2003-04 (β=-.01, p<.001), currently repaying student loans 2009 (β=-.03, p<.001), spouse has student loan 2009 (β=-.01, p<.001), cumulative Stafford subsidized loans and Perkins 2009 (β=-.17, p<.001), cumulative federal student loan amount owed as of 2006 (β=-.25, p<.001), cumulative Stafford, Perkins, PLUS 2006 (β=-.25, p<.001), Stafford, Perkins, and PLUS loans amount during 2006-07 (β=-.03, p<.001) and 2007-08 (β=-.20, p<.001), Stafford and Perkins loans amount during 2005-06 (β=-.15, p<.001) and 2006-07 (β=-.12, p<.001), federal work study 2003-04 (β=-.08, p<.001), and total non-federal aid 2003-04 (β=-.04, p<.001).

Use of SPSS complex samples module. In addition to using basic SPSS with the panel weight (WTB000), complex samples add-on module was used to run frequencies and a regression model with the additional strata (BPS09STR) and cluster (BPS09PSU) weights. Frequencies and descriptive statistics were identical for both the SPSS basic and complex samples runs. The overall explained variance for the regression was identical for both SPSS basic and complex samples add-on (R2 and adjusted R2=.423), however using a block form model is not an option when using the complex samples module.

Summary

This chapter described the outcomes of the data analyses that were conducted. A total of 142 variables were entered into a stepwise, block form, multiple regression analysis, 136 models were generated and 124 variables emerged as significant in the final model. A total of 42.3% of the overall variance in time to associate degree attainment by first-time beginner community college students was explained.

Table four displays significant predictors of time to associate degree in final step beta-weight order for variables that increase time to associate degree attainment for first time beginner community college students. These 56 independent variables have a positive linear relationship with the dependent variable, and therefore when these variables are present or increasing, they are associated with an increase in months enrolled prior to earning an associate degree. The absence of these variables or a decrease in their value is likewise associated with a decrease in time to associate degree attainment. For example, as the amount of Stafford, Perkins, and PLUS loans during 2005-06 increased, the months enrolled prior to earning an associate degree also increased for students who began their studies at community colleges, while a decrease in loan amounts was associated with a decrease in the months enrolled prior to attaining an associate degree. The final step beta-weight strengths provide a standardized ranking of the relationship between each independent variable and the dependent variable, thus permitting a comparison of independent variables within the model.

Table 4

Significant Predictors that Increase Time to Associate Degree Attainment for Students Who Began at Community Colleges in Order of Final Step Beta-Weight Strength

		Final Step	
	Block	β	
Stafford, Perkins, and PLUS loans amount during 2005-06	Block 7: Financial aid	0.27	***
Degree goal of associate or higher when last enrolled in 2009	Block 3: Institutional experiences	0.27	***
Cumulative Stafford, Perkins, PLUS 2009	Block 7: Financial aid	0.19	***
Total grants 2003-04	Block 7: Financial aid	0.18	***
Stafford and Perkins loans amount during 2004-05	Block 7: Financial aid	0.18	***
Ratio of federal aid to total aid 2003-04	Block 7: Financial aid	0.18	***
Cumulative Stafford subsidized loans and Perkins 2006	Block 7: Financial aid	0.16	***
Percent minority enrollment 2003-04	Block 3: Institutional experiences	0.16	***
Social integration index 2004	Block 5: Social integration	0.16	***
Stafford and Perkins loans amount during 2007-08	Block 7: Financial aid	0.13	***
Age first year enrolled	Block 1: Pre-entry attributes	0.13	***
Kept same major as of 2009	Block 6: Ongoing goals and commitments	0.12	***
Stafford, Perkins, PLUS: Amount owed as of 2009	Block 7: Financial aid	0.12	***
Race/ethnicity: Hispanic or Latino origin	Block 1: Pre-entry attributes	0.10	***

Stopouts number at first institution through 2006	Block 6: Ongoing goals and commitments	0.10	***
Job 2004: Hours worked per week (incl work study)	Block 2: Initial goals and commitments	0.09	***
Had informal faculty meetings in 2004	Block 4: Academic integration	0.08	***
Cumulative total student loan amount borrowed through 2006	Block 7: Financial aid	0.08	***
Satisfaction with quality of undergraduate education	Block 6: Ongoing goals and commitments	0.08	***
Satisfaction with choice of major or course of study	Block 6: Ongoing goals and commitments	0.08	***
Remedial course 2004: Any taken	Block 3: Institutional experiences	0.07	***
Federal loans deferred/forbearance in 2009	Block 7: Financial aid	0.07	***
Dependent children: Number 2009	Block 6: Ongoing goals and commitments	0.06	***
Participated in study groups 2004	Block 4: Academic integration	0.05	***
No help from parents in 2006	Block 2: Initial goals and commitments	0.05	***
Associate or higher degree expected 2009	Block 6: Ongoing goals and commitments	0.05	***
Federal campus based aid 2003-04	Block 7: Financial aid	0.05	***
Married - 2003-04	Block 2: Initial goals and commitments	0.05	***
Race: Black or African American	Block 1: Pre-entry attributes	0.05	***
Loan debt caused me to postpone enrollment	Block 7: Financial aid	0.05	***
Grants: Total state grants in 2003-04	Block 7: Financial aid	0.05	***

Monthly student loan repayments 2009	Block 7: Financial aid	0.05	***
Did not stop out at first institution during 2004-05	Block 6: Ongoing goals and commitments	0.05	***
Federal loans in repayment in 2009	Block 7: Financial aid	0.04	***
Total federal loans (includes PLUS) 2003-04	Block 7: Financial aid	0.04	***
Worked more hours due to loan debt	Block 7: Financial aid	0.04	***
Applied for federal aid 2003-04	Block 7: Financial aid	0.03	***
Social integration index 2006	Block 5: Social integration	0.03	***
Race: White	Block 1: Pre-entry attributes	0.03	***
Kept same major as of 2006	Block 6: Ongoing goals and commitments	0.02	***
Had faculty talk outside class in 2004	Block 4: Academic integration	0.02	***
Did not stop out anywhere in 2004-05	Block 6: Ongoing goals and commitments	0.02	***
Married as of 2009	Block 6: Ongoing goals and commitments	0.02	***
Total work study 2003-04	Block 7: Financial aid	0.02	***
Met with faculty advisor 2004	Block 4: Academic integration	0.02	***
Total federal loans (excludes PLUS) 2003-04	Block 7: Financial aid	0.02	***
Single parent status in 2003-04	Block 2: Initial goals and commitments	0.02	***
Enrolled in 2004 to complete an associate degree	Block 2: Initial goals and commitments	0.02	***

Race: American Indian or Alaska Native	Block 1: Pre-entry attributes	0.02	***
Dad has a college degree	Block 1: Pre-entry attributes	0.02	***
First choice school accepted 2004	Block 2: Initial goals and commitments	0.02	***
Institutional aid total 2003-04	Block 7: Financial aid	0.01	***
Monthly student loan payment as percent of monthly income 2009	Block 7: Financial aid	0.01	***
Participated in study groups 2006	Block 4: Academic integration	0.01	***
Federal loans paid in full in 2009	Block 7: Financial aid	0.01	***
Attendance intensity pattern is FT last month enrolled through 2006	Block 3: Institutional experiences	0.01	**

Note. n=1,170 with a panel weighted total of 288,436, R^2=.423, Adjusted R^2=.423. *p<.05, **p<.01, ***p<.001.

Table five includes significant predictors of time to associate degree attainment in final step beta-weight order for variables that decrease time to associate degree attainment for first-time beginner community college students. These 68 independent variables have an inverse relationship with the dependent variable: when these variables are present or increasing, they are associated with a decrease in months enrolled prior to earning an associate degree. Likewise, when these variables are not present or are decreasing, they are associated with an increase in months enrolled prior to earning an associate degree. For example, as the cumulative federal student loan amount owed as of 2006 increased, the number of months enrolled prior to earning an associate degree decreased for students who began their studies at community colleges. Conversely, a

decrease in the cumulative federal student loan amounts owed in 2006 was associated with an increase in the months enrolled prior to attaining an associate degree.

Table 5

Significant Predictors that Decrease Time to Associate Degree Attainment for Students Who Began at Community Colleges in Order of Final Step Beta-Weight Strength

		Final Step	
	Block	β	
Cumulative federal student loan amount owed as of 2006	Block 7: Financial aid	-0.25	***
Cumulative Stafford, Perkins, PLUS 2006	Block 7: Financial aid	-0.25	***
Stopouts number anywhere through 2009	Block 6: Ongoing goals and commitments	-0.22	***
Stafford, Perkins, and PLUS loans amount during 2007-08	Block 7: Financial aid	-0.20	***
Stopout (first): Anywhere months duration 2009	Block 6: Ongoing goals and commitments	-0.18	***
Cumulative Stafford subsidized loans and Perkins 2009	Block 7: Financial aid	-0.16	***
Stafford and Perkins loans amount during 2005-06	Block 7: Financial aid	-0.15	***
Grade point average 2003-04	Block 3: Institutional experiences	-0.14	***
Total need based grant aid 2003-04	Block 7: Financial aid	-0.13	***
Percent enrolled: Hispanic 2003-04	Block 3: Institutional experiences	-0.12	***

Stafford and Perkins loans amount during 2006-07	Block 7: Financial aid	-0.12	***
Participated in school sports 2004	Block 5: Social integration	-0.12	***
Participated in fine arts activity 2004	Block 5: Social integration	-0.12	***
Received only non-federal grants in 2003-04	Block 7: Financial aid	-0.11	***
Federal loans paid in full/cancelled in 2006	Block 7: Financial aid	-0.10	***
Job 2006: Hours worked weekly	Block 6: Ongoing goals and commitments	-0.09	***
Job 2009: Hours worked weekly	Block 6: Ongoing goals and commitments	-0.09	***
Academic integration index 2004	Block 4: Academic integration	-0.09	***
Participated in school clubs 2004	Block 5: Social integration	-0.09	***
Federal loans not in repayment in 2006	Block 7: Financial aid	-0.08	***
Federal loans in repayment in 2006	Block 7: Financial aid	-0.08	***
Federal Work study 2003-04	Block 7: Financial aid	-0.08	***
Did not stop out at first institution during 2006-07	Block 6: Ongoing goals and commitments	-0.08	***
Ratio of grant aid to tuition 2003-04	Block 7: Financial aid	-0.08	***

Race: Other	Block 1: Pre-entry attributes	-0.08	***
Attendance intensity pattern FT through 2009	Block 3: Institutional experiences	-0.07	***
Received federal and other grants in 2003-04	Block 7: Financial aid	-0.07	***
Met with faculty advisor 2006	Block 4: Academic integration	-0.07	***
Participated in school sports 2006	Block 5: Social integration	-0.07	***
Community college track was strongly directed toward a degree	Block 3: Institutional experiences	-0.07	***
Percent enrolled: Black, non-Hispanic 2003-04	Block 3: Institutional experiences	-0.07	***
Received federal aid other than only Pell Grants in 2003-04	Block 7: Financial aid	-0.06	***
Has goal of earning a degree in 2003-04	Block 2: Initial goals and commitments	-0.05	***
Participated in school clubs 2006	Block 5: Social integration	-0.05	***
Did not stop out anywhere in 2008-09	Block 6: Ongoing goals and commitments	-0.05	***
Applied for any aid 2003-04	Block 7: Financial aid	-0.04	***
Has HS diploma	Block 1: Pre-entry attributes	-0.04	***
Total non federal aid 2003-04	Block 7: Financial aid	-0.04	***

Ratio of grants to total aid 2003-04	Block 7: Financial aid	-0.04	***
Job on campus 2009	Block 6: Ongoing goals and commitments	-0.04	***
Attended FT last month enrolled through 2006	Block 3: Institutional experiences	-0.04	***
Married as of 2006	Block 6: Ongoing goals and commitments	-0.04	***
Loan debt was worthwhile investment 2009	Block 7: Financial aid	-0.04	***
Mom has a college degree	Block 1: Pre-entry attributes	-0.03	***
Only received federal grants in 2003-04	Block 7: Financial aid	-0.03	***
Job on campus 2006	Block 6: Ongoing goals and commitments	-0.03	***
Stafford, Perkins, and PLUS loans amount during 2006-07	Block 7: Financial aid	-0.03	***
Currently repaying student loans 2009	Block 7: Financial aid	-0.02	***
Is Female	Block 1: Pre-entry attributes	-0.02	***
Had informal faculty meetings in 2006	Block 4: Academic integration	-0.02	***
Federal loans in default in 2009	Block 7: Financial aid	-0.02	***
Year 1 degree plan: associate or bachelor degree	Block 2: Initial goals and commitments	-0.02	***

Degree goal of associate or higher when last enrolled in 2006	Block 3: Institutional experiences	-0.02	***
Dependents: Total number 2003-04	Block 2: Initial goals and commitments	-0.02	***
Associate or higher degree expected 2006	Block 6: Ongoing goals and commitments	-0.02	***
Participated in fine arts activity 2006	Block 5: Social integration	-0.02	***
Ratio of grant aid to student budget 2003-04	Block 7: Financial aid	-0.02	***
Did not stop out at first institution during 2005-06	Block 6: Ongoing goals and commitments	-0.02	***
Did not stop out anywhere in 2006-07	Block 6: Ongoing goals and commitments	-0.02	***
Enrolled in STEM major when last enrolled in 2009	Block 6: Ongoing goals and commitments	-0.01	***
Federal loans in default in 2006	Block 7: Financial aid	-0.01	***
Did not stop out at first institution during 2003-04	Block 6: Ongoing goals and commitments	-0.01	***
Race: Asian	Block 1: Pre-entry attributes	-0.01	***
Credit cards: Use to pay tuition 2003-04	Block 7: Financial aid	-0.01	***
Spouse has student loan 2009	Block 7: Financial aid	-0.01	***
Federal loans not in repayment in 2009	Block 7: Financial aid	-0.01	*

HS GPA of 2.5 or more	Block 1: Pre-entry attributes	-0.01	**
Attended exclusively FT 2003-04	Block 3: Institutional experiences	-0.01	*

Note. n=1,170 with a panel weighted total of 288,436, R^2=.423, Adjusted R^2=.423. *p<.05, **p<.01, ***p<.001.

Seven of the top ten independent variables as ranked by their final-step beta weight strength were financial aid variables. Stafford, Perkins and PLUS loans amount during 2005-06 (β=.27, p<.001) and having a degree goal of associate or higher when last enrolled in 2009 (β=.27, p<.001) were the two strongest predictors of time to associate degree attainment, and having a high school GPA of 2.5 or more (β=-.01, p<.01) and attending exclusively full-time in 2003-04 (β=-.01, p<.05) were the two weakest predictors. As shown in table six below, the block form regression results indicate that most variance can be explained by initial (11.9%) and ongoing (11.3%) commitments of students, followed by financial aid factors (7.2%). Input block variables added 3.6% to the explained variance with institutional experiences adding 5.1% and academic and social integration adding 1.5% and 1.7% respectively.

Table 6

Variance Explained by Block for Predictors of Time to Associate Degree Attainment for Students Who Began at Community Colleges

Block number and description	Variance explained
Block 1: pre-entry attributes	3.6%
Block 2: initial goals and commitments	11.9%
Block 3: institutional experiences	5.1%
Block 4: academic integration	1.5%
Block 5: social integration	1.7%
Block 6: ongoing goals and commitments	11.3%
Block 7: financial aid	7.2%
Total explained variance	42.3%

Chapter Five provides a more detailed consideration of these findings. Implications for policy and practice are discussed, and the relationship of this study's outcomes to theory is described. Ideas for future research are presented, along with concluding thoughts and an overall project summary.

Chapter Five

Discussion, Recommendations and Conclusions

Introduction

The research findings from a block-form multiple regression analysis presented in Chapter Four were intended to answer the eight research questions posed in this exploratory study. Rather than looking at whether community college students persisted or graduated, this study used time to degree attainment, defined as months enrolled prior to earning first associate degree, as the dependent variable. This study is fundamentally different than research focused on degree attainment and persistence. Instead of looking at all degree-seeking community college students to determine if they were retained through degree completion, this exploratory study examined graduates who began their studies at public two-year colleges to determine how quickly they attained their associate degrees. The temporal focus of this study was recommended by DesJardins et al. (2002) who saw time as an important element in departure models. The current study also builds upon research that has examined educational persistence and completion as a function of choice based upon prior educational access and social equity (Mbadugha, 2000; Paulsen & St. John, 2002; St. John, 2006; St. John et al., 2005).

The current study examined the statistical relationship between 142 independent variables and time to associate degree completion. Significant associations were found between 124 independent variables and the dependent variable. This is the first known study to assess time to completion as a dependent variable of interest. Therefore, this exploratory study was conducted to provide a more complete understanding of factors that increase and decrease time to degree completion. Because of the new perspective

illuminated by this study, it can inform current practice while also providing a foundation for further research through subsequent model development.

The current model examines a group of college graduates who began their studies at public community colleges in order to see what factors increase or decrease their time to completion. Looking at the demographic characteristics of all college-going students from the overall BPS 2004-09 sample (n=3,746,294) in comparison to the subset of community college graduates (n=288,436), the two groups differ in characteristics that may reflect social inequity. For example, fewer community college graduates compared to the overall college-going sample were Black or African American and more were White, fewer had parents with a college degree, and fewer applied for any financial aid when they entered college. Conversely, more community college graduates had degree goals at college entry and more had a full-time attendance intensity pattern through 2009 compared to the overall dataset. In a statistical analysis of time to associate degree attainment many of these patterns emerge as statistically significant factors that influence time to associate degree completion.

By focusing exclusively on community college graduates the continuous choices that students make along with educational pathway emerge as determinants of how quickly they graduate, even beyond their initial choice of whether and which college to attend. Whether and how much a student works, whether a student attends full-time or part-time, whether a student attends continuously or stops-out, whether a student receives aid, as well as the amount and timing of aid together help to determine how long it takes the student to graduate. This study suggests that students who graduate from college not only make a choice at entry that determines persistence and completion, but they make

choices throughout their matriculation which accelerate or decelerate their time to completion. Further, in examining the statistically significant variables in this study, it appears that many significant variables are finance-related and rooted in past opportunity and preparation. These variables help to form student perceptions, goals and commitments, and they are directly related to social equity.

Chapter five provides a brief review of the purpose of this study, the methodology used, and the population under study. Results from each block of the regression are discussed in detail in relation to the eight research questions. Implications for practice, policy, theory and future research are then considered. The chapter concludes with a final summary.

Purpose of the Dissertation

This dissertation examines what influence, if any, the amount and type of federal financial aid received have on time to associate degree completion after considering the effects of pre-entry attributes, initial goals and commitments, college experiences, academic and social integration and ongoing goals and commitments. This dissertation uses Vincent Tinto's model of student departure (1993) and expands it to include financial integration as guided by Gary Becker's human capital theory (1993). Because time to associate degree completion has not been the subject of rigorous research to date, the findings of this exploratory study provide valuable information to practitioners and researchers. The large number of variables that have been found to influence time to associate degree attainment can be used by researchers to create more refined statistical models, while practitioners can use the findings to more effectively support student success.

The student departure theory framework was used to categorize the blocks of variables that were examined in the multiple regression analysis. The population under study included a weighted total of 288,436 students who began their postsecondary education at community colleges, and who completed an associate degree within six years. The dependent variable was months of enrollment prior to earning the first associate degree.

One-hundred and forty-two variables were entered into the multiple regression analysis, using seven blocks. In the final model, a total of 124 variables were found to be significant predictors of time to associate degree attainment for the population under study. The use of large-scale multiple regression analysis is not typical in contemporary studies of retention and completion. Other smaller-scale models including hierarchical models, event history models and structural equation models focused and well-aligned with theory are the contemporary norm. However, due to this study's unique focus on time to degree completion, the researcher used previous literature to identify all variables within the dataset with potential to influence time to degree completion. The researcher then removed highly correlated variables to avoid issues with multicollinearity and blocked the remaining variables using Tinto's model of student departure. The researcher included financial aid variables in the final block of the model to assess their impact after considering all other variables, however many finance-related variables are present within other blocks of the model. The results of this analysis are described in detail below.

Discussion of the Findings

A total of 124 variables were found to be significant predictors of time to associate degree attainment for students who first began their post-secondary education at community colleges. Based on the seven variable blocks entered into the multiple regression analysis, initial and ongoing commitment by students (blocks two and six) were the number one and number two predictors of time to associate degree attainment, accounting for 11.9% and 11.3% overall explained variance respectively. These blocks were followed by financial factors (block seven) which accounted for 7.2% of the overall explained variance. Institutional experiences (block three), pre-entry attributes (block one), social integration (block five) and academic integration (block four) accounted for the remaining 11.9% of overall variance in the model (5.1%, 3.6%, 1.7% and 1.5% respectively).

Twelve pre-entry attributes emerged as significant predictors of time to associate degree attainment for students who begin their postsecondary education at community colleges. Six pre-entry attributes increased time to associate degree attainment while six decreased time to associate degree attainment. Nine variables in block two, representing initial goals and commitments were significant predictors: six increased time to completion while three decreased time to completion. Block three included institutional experiences variables, with 12 significant variables in the final step, four that increased time to completion and eight that decreased time to completion. Eight academic integration variables were significant in the final step of block four, three decreased time and five increased time to degree completion. Eight social integration variables in block five were significant in the final step, six decreased time to degree completion while two

increased it. Block six included variables representing ongoing goals and commitments. Twenty-four variables remained significant in the final step, 10 increased time to completion and 14 decreased time to completion. In the seventh and final block which contained financial aid variables, fifty one variables were significant in the final step. Twenty-eight variables decreased time to completion while 23 increased time to completion.

Because this study is exploratory, it is also important to consider all finance-related variables that interact with the variables in block seven. By looking across the blocks of this analysis and identifying all finance-related variables the influence of financial aid across a graduate's matriculation can be considered. Numerous finance-related variables interact with the variables in block seven and with other variables related to socioeconomic status throughout the model. Although not identified within the financial aid block, these finance-related variables occur in each of the other data blocks within the model and account for a substantial amount of the overall explained variance. These finance-related variables and variables that are influenced by socioeconomic status are defined in more detail below in the block by block analysis. Positive and negative relationships between the dependent variable and independent variables are noted, and suppressor effects are identified. A discussion of how the findings of this study compare to prior research also is included.

Block one - Pre-entry attributes. The first research question asked, what influence, if any, do a student's pre-entry attributes (excluding the type and the amount of federal financial aid received) have on a community college student's time to associate-degree attainment. Six positive and six negative predictors within block one were

significant in the final step of the multiple regression analysis, and accounted for 3.6% of the overall explained variance. Age at first year of enrollment, having Hispanic or Latino origin, being Black or African American, White, or American Indian or Alaska Native, and having a dad with a college degree increased time to degree completion. Conversely, having a race of other or Asian, having a high school diploma, having a high school grade point average of 2.5 or more, being female, and having a mom with a college degree decreased time to degree completion.

Comparing these findings to the scholarly literature reviewed in Chapter Two, several variables merit further discussion. In the current study, students with race of Asian or other were likely to complete degrees in shorter time periods than Whites and non-Asian minority students. Chen (2007) found that the effects of financial aid on student outcomes varied by race and socioeconomic status, and this also may account for the variance noted here in time to degree completion for Asians and other minority students. Further, Heller (1999) found Asians to be price sensitive upon enrollment, so given current findings, perhaps this price sensitivity carries throughout all decision making leading up to degree completion. Another plausible reason for the variance of time to degree completion for Asian students compared to other races would be their broad ethnic background which can encompass first generation low-income students to third generation students with higher SES, all of which are grouped together into one Asian racial category (Heller, 1999).

Similar to other studies (Dougherty & Kienzl, 2006; Lee, 2009; Stratton et al., 2008) that identified age as a variable that influences persistence and completion, this study found age increased time to degree completion. This observation appears to

reinforce Paulson's (2012) finding that age was positively related to student stop-out and drop-out. However depending upon their enrollment intensity when enrolled, students who stop out and then attend full-time may take less time to graduate, in terms of month enrolled, than students who attend continuously but at a part-time intensity.

Stratton, O'Toole and Wetzel (2008) found that parents' educational levels increased likelihood of student persistence, but the current study found that having a father with a college degree increased time to degree completion, while having a mother with a college degree decreased time to degree completion. This finding suggests a difference in values in households where mothers had earned a college degree, perhaps a belief that earning a postsecondary degree is possible and worthwhile, that in turn, decreases time to degree completion. An alternative interpretation of this finding would be that households where mothers have earned a college degree are more likely to have higher socioeconomic levels (W. E. Becker, 2003; Heller, 2003) and therefore should be better able to contribute financially and emotionally to support college degree attainment for their children.

Previous research found females were more likely to persist in (Lee, 2009; Paulson, 2012) and to graduate from (Cooper, 2009) college than males. The current study found being female also decreased time to degree completion for students who began their studies at community colleges. This study also parallels finding from prior research that found having a high school diploma (Cooper, 2009; Dougherty & Kienzl, 2006) and a higher high school GPA (Clark, 2003; Moore, 2006; Wang, 2008; Yousif, 2009) improved outcomes for students, relative to persistence and completion, by

demonstrating that these factors also decrease time to associate degree completion for students who began their studies in public community colleges.

Six of the 12 significant variables in the final step of the regression model had shifted their effect on time to degree attainment between entry and the final step. These directional shifts suggest that other variables in the model are interacting with these variables and possibly suppressing their effects. One variable shifted from decreasing to increasing time to degree completion (race: American Indian or Alaska Native), while five variables shifted from increasing to decreasing time to degree completion between their entry step and the final step in the model (is female, has high school diploma, mom has a college degree, race: Asian and race: other). Given the large number of variables included in this model, interaction effects are likely despite removal of variables from the model when high correlation was detected. For example, being female could be interacting with the number of dependents and marital status leading to changes in direction as these variables enter the model. More detailed analysis should be conducted in the future to identify more specific reasons for these directional shifts, and to more fully understand the effects that these independent variables have on the dependent variable.

Block two - Initial goals and commitments. The second research question asked, what influence, if any, do a student's initial goals and commitments have on a community college student's time to associate-degree attainment? Within block two, six positive and three negative predictors were significant in the final step of the multiple regression analysis; these variables accounted for 11.9% of the total explained variance. Being accepted into the first choice school in 2004, being enrolled in 2004 to complete an

associate degree, hours worked per week in 2004, including work study, being a single parent in 2003-04, being married in 2003-04 and having no help from parents in 2006 increased time to degree completion. However, total number of dependents in 2003-04, having an associate or bachelor degree plan in year one, and having a goal of earning a degree in 2003-04 decreased time to degree completion.

As noted above, having a degree goal in 2003-04 and having a degree plan in year one were found to decrease time to completion, while having an associate degree goal in 2003-04 was found to increase time to completion. These seemingly contradictory findings about degree goals and plans influencing time to degree completion seem to parallel research that indicates that a student's self-concept and intentions influence degree-completion outcomes (Astin, 1993; Wang, 2008). Alternatively, having a degree plan in year one could reflect a student's family of origin and socioeconomic status (St. John, 2006; St. John et al., 2013; St. John et al., 2011). Pre-conditioning from college-educated parents and success in high school can influence a student's plans and aspirations or lack thereof (Paulsen & St. John, 2002; Tinto & Pusser, 2006). The present study suggests that students who have firm goals and plans for degrees, and students with degree goals that are not limited to earning an associate degree, complete associate degrees more quickly than students who do not have a plan in their first year and who specifically seek to earn an associate degree.

This study found that as the number of dependents in 2003-04 went up, time to associate degree attainment went down. This finding differs from prior research that found being childless at college entry improved educational outcomes for students who began at community colleges and successfully transferred to four-year colleges

(Dougherty & Kienzl, 2006). This difference in outcomes reflects the fact that the current study outcome, time to associate degree attainment is fundamentally different than prior study outcomes that focused upon persistence and completion.

Three factors in this study were found to increase time to degree completion, hours worked, lack of family support and being a single parent. All of these variables also were found to negatively influence persistence and completion (Dougherty & Kienzl, 2006; Roksa, 2011; U.S. Department of Education, National Center for Education Statistics, 2011d; Yates, 2004). It should be noted that all three of these variables are finance-related and reflect socioeconomic status. Previous research has indicated that failure to account for these types of variables when considering student outcomes leads to faulty models (W. E. Becker, 2003; Heller, 2003). Since these were not direct sources of financial aid they were not included in block seven of this model, however their inclusion is important and their relationships with time to degree are significant. However, interpretation of these variables without considering their relationship with student finances and socioeconomic levels should be avoided.

One curious outcome is that students who begin in community colleges as their first choice tend to take longer to graduate. This variable may be influenced by a suppressor effect since it was a factor that reduced time to completion on its entry step, but increased time to completion by the final step. Perhaps this variable reflects the many factors that may cause students to opt for a community college, including lower income, and external commitments which may lengthen the time to completion, such as family obligations and employment (Paulsen & St. John, 2002). Lack of academic capital

formation and limited financial support for education also could influence student choices that in turn lengthen time to degree (St. John et al., 2011).

Three of the nine significant variables in the final step of the regression model had effects that shifted between the first and final step, suggesting a suppressor effect. These variables should be researched further to identify the specific cause for the changes in direction of their effects. Two variables changed from decreasing to increasing time to degree completion (First choice school accepted 2004 and Enrolled in 2004 to complete an associate degree), while one variable moved from increasing to decreasing time to degree completion by the final step in the model (Dependents: Total number 2003-04). As noted previously, many variables within the model are finance-related and many reflect socioeconomic status. While Tinto's student departure model makes the case for inserting these variables into blocks that occur along a student's matriculation through college, a more thorough understanding of the effects of these variables across the blocks used in this model and in relation to students' choices throughout their college matriculation is desirable. By considering finance-related variables across the model and over the time continuum, it is possible to better understand variance in time to degree completion.

Block three - Institutional experiences. The third research question asked, what influence, if any, do a student's institutional experiences have on a community college student's time to associate-degree attainment? The third block had 12 significant predictors in the final step: four were positive and eight were negative. Together variables in block three explained 5.1% of the overall explained variance. Taking any remedial course in 2004, attending full-time through last month enrolled in 2006, percent

minority enrollment, and degree goal of associate or higher when last enrolled in 2009, all increased time to degree completion. However, the following variables decreased time to degree completion when they were present or increasing: attended exclusively full-time in 2003-04, grade point average in 2003-04, percent of Black, non-Hispanic or Hispanic students enrolled in 2003-04, attending full-time during the last month enrolled through 2006, having a full-time attendance intensity pattern through 2009, having a degree goal of associate or higher when last enrolled in 2006, and having a community college track that was strongly directed toward a degree.

The block three findings related to minority enrollment were mixed: Having a high percent of minority enrollment in 2003-04 was found to increase time to degree completion, while the percent Black, non-Hispanic enrollment in 2003-04 and percent Hispanic enrollment 2003-04 both were found to decrease time to degree completion. While Colcagno et al. (2008) found minority enrollment to have a negative effect on student outcomes, the positive effect of Black and Hispanic student enrollment was not identified. Freeman (2003) did find a difference in Black and White student persistence among community college students. The difference in effect for Black and Hispanic student outcomes may indicate a protective effect for students in select minority groups who are enrolled in colleges with high percentages of similar race students. For example, students enrolled in historically black colleges and universities and Hispanic students may benefit from targeted interventions and affinity group support. This finding could benefit from further review.

The finding that full-time attendance and GPA decrease time to degree completion is not surprising, since successful course completion within degree paths

accelerates degree completion, and high GPAs indicate successful course completion. Prior research has found both GPA (Lee, 2009; Moore, 2006; Wood, 2012) and full-time attendance to increase persistence and completion (Clark, 2003; Lee, 2009; O'Toole et al., 2003; Paulson, 2012). Full-time attendance also facilitates student integration in college, another factor found to increase degree completion that is discussed below.

Both having a degree goal of an associate degree or higher in 2006 and having a community college track strongly directed toward a degree decreased time to completion. These variables, as noted above indicate a commitment on the part of a student to attain a degree while influencing the overall college experience for a student. Students who are degree-focused spend less time experimenting in classes that are outside of their major course of study, and as a result, are able to complete a degree more quickly than students who lack focused degree goals and paths. Interestingly, students who had a degree goal of an associate degree or higher when last enrolled in 2009 took longer to graduate, perhaps as a result of still being enrolled in 2009 to report this goal, and also due to lack of goals and focus at college entry. Finally, remedial coursework was found to increase time to completion, which is not surprising since developmental coursework is outside of basic degree requirements, thus adding more courses to a student's schedule. This is also consistent with previous research on the negative effect of developmental education on degree completion outcomes (French Graybeal, 2007).

Three of the 12 significant variables from block three changed direction of effect between their entry into the model and the final step of the model. This change signifies a relationship between these variables and other variables contained in the model. These

directional changes and possible causes are described below, and the relationship of these variables with time to degree completion merits further research.

One variable changed from decreasing to increasing time to degree completion (Attendance intensity pattern is full-time last month enrolled through 2006). This finding may relate to why students enroll full-time. For students who are degree seeking and who follow their degree plan, successfully completing courses, full-time enrollment will lead to degree completion. However, for students who enroll full-time without a degree plan, or with no intent to complete a degree, full-time attendance may provide a source of income that leads to student retention without timely completion. Attendance intensity also may interact with the number of hours a student works, and the number of hours a student works may be based on their real or perceived ability to pay. In this case students who work full-time and attend school full-time may take longer to graduate due to poor grades requiring a student to repeat courses, or these students may intersperse periods of part-time enrollment or stop-out with periods of full-time enrollment to accommodate work schedules and to avoid loans (Cabrera et al., 1990; Paulsen & St. John, 2002).

Two variables shifted from increasing to decreasing time to degree completion between entry step and final step (Attended exclusively full-time 2003-04 and Percent enrolled: Black, non-Hispanic 2003-04). Perhaps students who attended full-time in 2003-04 had other characteristics that accelerated their progress toward degree completion. For example, maybe something changed their perception of their ability to pay for college, such as a change in marital status or increased financial aid award amounts, and this in turn decreased their time to degree completion. This conclusion regarding the effect of a student's perceived ability to pay, on the outcome of time to

degree completion, aligns with St. John, Cabrera, Nora and Asker (2000) findings on the impact of ability to pay on improvements in persistence. In consideration of the impact of Black non-Hispanic students' race, perhaps academic and social integration for these students is interacting with race, leading to a decrease in time to associate degree attainment. Further research can help to disentangle these interrelated variables' effects.

Block four - Academic integration. The fourth research question asked, what influence, if any, do academic integration variables have on a community college student's time to associate-degree attainment? Block four had eight significant predictors in the final step: five were positive and three were negative. Block four variables explained 1.5% of the overall variance in the model. Having informal faculty meetings, talking with faculty outside class, meeting with a faculty advisor, and participating in study groups in 2004, as well as participating in study groups in 2006 all increased time to degree completion. Time to degree completion was decreased when the following variables were present or increasing: Academic integration index 2004, as well as having an informal faculty meeting and having a meeting with a faculty advisor in 2006.

Overall the academic integration index in 2004 decreased time to associate degree completion for community college students, a finding that is similar to previous research and theory on persistence and attainment (Tinto, 1993; Wood, 2012). This study found specific academic integration factors more likely to increase time to degree completion than to decrease time to completion, with five factors increasing time to completion and only two factors decreasing time to completion. The secondary dataset does not permit the researcher to know who initiated the academic interaction or what the purpose of the interaction was as measured by the variables. Therefore, the faculty meetings and talks in

2004 which increased time to completion may have resulted from poor student performance in the early enrollment years, and perhaps were initiated by students who understood the need to improve or from faculty trying to help students through early intervention. Both informal faculty meetings and meeting with a faculty advisor in 2006 decreased time to degree completion, perhaps suggesting a more collegial discussion or verification of being on the path toward a degree. Interestingly, participating in a study group in 2006 emerged as factor that increased time to degree completion, perhaps reflecting the academic performance of students who participate in study groups as they move through their degree programs.

No suppressor effects were noted in block four. This suggests that all effects were direct effects that were not impacted by other variables entering and exiting the model. In a review of the correlation matrix, none of these variables were found to have very strong correlations with other variables in the model. The strongest correlations were found between the individual types of academic integration and the overall academic integration index ($r<0.6$), and between the academic integration variables and social integration variables ($r<0.4$). Correlations between the academic integration variables with all other independent variables in the model were weak ($r<0.3$).

Block five - Social integration. The fifth research question asked, what influence, if any, do social integration variables have on a community college student's time to associate-degree attainment? Eight significant predictors emerged in the final step of block five: two were positive and six were negative. Block five accounted for 1.7% of the overall explained variance in the regression model. As the social integration index increased in 2004 and in 2006, the time to degree completion also increased.

However, all other social integration variables were found to decrease time to degree completion when they were present or increasing: participating in a fine arts activity in 2004 and 2006, participating in school clubs in 2004 and 2006, and participating in school sports in 2004 and 2006.

The findings within block five were contradictory in that both the 2004 and 2006 social integration index variables increased time to degree completion, while the six individual social integration factors that were significant in the final block all were found to decrease time to degree completion. This finding suggests that too much social integration increases time to degree completion, while general participation in fine arts, school clubs and sports all tend to decrease time to associate degree completion, when considered individually and over time between 2004 and 2006. Prior research found social integration factors have positive effects on persistence and completion (Orefice, 2007; Salas, 2003), but did not indicate a change in effect as the intensity of social integration increased.

In block five, two of the eight significant variables changed direction of effect between entry step and final step of the model. Social integration index 2006 changed from decreasing to increasing time to degree completion, while participating in a fine arts activity 2006 changed from increasing to decreasing time to degree completion between entry step and final step. A suppressor effect likely caused these shifts, and therefore the following variables should be researched further. However, plausible causes for these changes could include an interaction with finance-related variables that enter into the model after these integration variables. For example, the effect of the number of hours worked and a student's decision to stop-out both could interact with their ability to

integrate socially leading to changes in time to degree completion based on Tinto's student departure theory.

Block six - Ongoing goals and commitments. The sixth research question asked, what influence, if any, do a student's ongoing goals and commitments have on a community college student's time to associate-degree attainment? In the final step, 24 significant variables remained in block six. Ten were positive, increasing time to associate degree completion, while 14 were negative and decreasing time to associate degree completion. Block six variables contributed 11.3% to the overall explained variance.

As the following variables increased, the time to degree completion also increased: did not stop out anywhere or at first institution in 2004-05, number of stop-outs at first institution through 2006, keeping the same major as of 2006 and 2009, number of dependent children in 2009, expecting an associate degree or higher in 2009, being married as of 2009, satisfaction with choice of major or course of study, and satisfaction with quality of undergraduate education. In contrast, when the following variables were present or increasing time to degree completion decreased: Did not stop out at first institution during 2003-04, 2005-06, or 2006-07, Expecting an associate degree or higher in 2006, being married as of 2006, number of hours worked weekly in 2006 and 2009, having a job on campus in 2006 and 2009, duration in months of first stop-out anywhere in 2009, number of stop-outs anywhere through 2009, did not stop out anywhere in 2006-07 and 2008-09, and enrolled in STEM major when last enrolled in 2009.

Block six findings illustrate how the effects of some variables on degree completion shift over time. For example, expecting an associate degree or higher in 2006 decreased time to degree completion, however expecting an associate degree or higher in 2009 increased time to degree completion. This finding may reflect greater levels of satisfaction and self-efficacy for students who had degree expectations at the earlier point in time, however they may signify a recursive effect since students with a degree goal in 2009 would not yet have attained a degree. Nonetheless, degree expectations have been identified as increasing student persistence and completion (Astin, 1993; Okun et al., 1991), a finding that seems to be in concert with these factors decreasing time to associate degree attainment. This study found satisfaction with choice of major and quality of undergraduate education increased time to completion. This finding suggests that students who are satisfied may be more likely to persist, but may lack urgency around degree completion.

The decrease in time to completion when students increased their work hours differs from prior research that associates working increased hours with negative persistence and completion outcomes (Bers & Smith, 1991; Eads, 1989). However, Bers and Smith (1991) found that community college students who worked part-time were retained at greater rate than students who did not work. The finding that hours worked weekly and on campus decreased time to degree completion for community college students may reflect increased integration for students who work on campus or a stronger personal financial commitment to degree completion.

The effects of stop-out on time to degree completion were mixed. Ten variables related to stop-out behavior were significant in the final model, with three increasing time

to completion, and seven decreasing time to completion. Since time to completion was measured as months enrolled prior to earning a degree, it is not surprising that stopping out would decrease months enrolled, while not stopping out could increase the number of months enrolled prior to completion, particularly for student enrolled part-time. Based on the findings, not stopping out during 2004-05 lengthened the time to completion, while not stopping out in subsequent years decreased time to completion. This finding suggests that as a student's tenure within the institution increases, persistence without stop-out accelerates progress toward degree completion. There is likely an interaction with the intensity of enrollment that would lead to accelerated completion when occurring without stop-out.

Having a STEM major was found to decrease time to completion. This could reflect the focus of STEM degree pathways, as well as the perceived value of STEM degree outcomes in the workforce relative to other college majors. Contrary to previous research that indicates declaring a major and taking fewer excess credit hours improves completion outcomes (Complete College America, 2011; Wood, 2012), this study found that keeping the same major increased time to degree completion. This finding may reflect other factors that increase time to completion, such as the need to repeat courses to attain passing grades or wait lists in high-demand fields of study that may cause students to take longer to graduate despite having the same major. This in turn could reflect pre-college preparation which is influenced by socioeconomic status, educational access and opportunities at the K-12 levels (St. John, 2006; St. John et al., 2011).

It is important to remember that the dependent variable being used in the current study is time to degree associate degree attainment. Time to attainment is not the same as

persistence, nor is it equivalent to degree attainment. Rather than comparing students who persist to students who drop out, or comparing students who complete degrees to students who do not graduate, the current study explores how independent variables influence time to degree completion for a group of students who graduated within six years of beginning their associate degree studies. To consider the findings of previous studies alongside the current study, one must think about the positive and negative relationships to the dependent variables under study, and how these relationships differ from, or are similar to, each other.

Equating previous studies of persistence and completion to the current study would be inappropriate because the dependent variables are fundamentally different. For example, when using time to degree attainment as the dependent variable, part-time students will take longer to graduate compared to full-time students because part-time attendance increases overall time to completion when measured in months of enrollment. However, full-time students may drop out between periods of enrollment. Student stop-out does not increase months of enrollment, however student stop-out is likely to impact student persistence outcomes particularly if the stop-out period is longer than one semester.

Three of the 24 significant variables in block six changed direction of effect between entry-step and final step within the model. Both did not stop out anywhere in 2004-05 and married as of 2009 moved from decreasing time to degree completion to increasing time. Conversely, did not stop out at first institution during 2003-04 changed from increasing to decreasing time to degree completion by the final step. The relationship between these independent variables and other independent variables related

to financial aid is likely responsible for the change in direction of effect. Not stopping out would result in additional semesters of enrollment if the student is only enrolled part time. Enrollment patterns and enrollment intensity (full-time versus part-time) could also change based on marital status and available funding. Additional research could help to clarify the effects.

Block seven - Financial aid. The seventh and final block included variables designed to answer the final two research questions:

1. What influence, if any, does the type of federal financial aid received have on a community college student's time to associate-degree attainment?
2. What influence, if any, does the amount of federal-financial aid received have on a community college student's time to associate-degree attainment?

These two questions were the primary focus of the current study and they were therefore placed in the final block of the regression model. By placing the financial aid variables in the final block, the researcher was able to examine the relationship between independent variables and the dependent variables throughout the model. As new variables entered into the model the researcher could observe changes in direction of effect and changes in significance for all other variables before considering the impact of financial aid variables on students' time to degree completion.

Block seven had 51 significant variables in the final step, and contributed 7.2% to the overall explained variance. As noted previously, many other finance-related variables are present throughout the model. These finance-related variables, when considered together with the financial aid variables contained in block seven, account for the

majority of overall variance explained by this model. Perhaps the most interesting observation and outcome of this exploratory study is the impact that financial aid and finance-related variables have on the dependent variable in this study seem to be related to timing of aid and the time that a student spends in college prior to earning a degree. In reviewing the effects of the independent variables on time to degree completion, the temporal sequence and duration of matriculation demand additional attention.

Current logic models of persistence and completion do not adequately account for the temporal nature of student outcomes nor the ongoing choices that are influenced by finance-related factors throughout the matriculation process. This exploratory study provides an opportunity to consider how numerous independent variables, many of which are measured at multiple points in time, change over time and interact with each other to influence time to associate degree attainment for community college students. Clearly the number of variables included in this model makes interpretation of outcomes challenging. However, by thinking about the variables that are statistically associated with time to associate degree attainment, and by reflecting on reasons that these relationships exist, better understanding of time to degree completion can be achieved. Variables that could benefit from further research can be identified and alternative logic models that may better explain the variance in time to degree completion can be conceived.

The following 23 variables were found to increase time to associate degree completion: applied for federal aid 2003-04, institutional aid total 2003-04, total grants 2003-04, total state grants in 2003-04, receiving federal campus-based aid 2003-04, ratio of federal aid to total aid 2003-04, total work study 2003-04, total federal loans

(excluding and including PLUS) 2003-04, Stafford and Perkins loans amount during 2004-05, Stafford, Perkins, and PLUS loans amount during 2005-06, cumulative total student loan amount borrowed through 2006, cumulative Stafford subsidized loans and Perkins 2006, Stafford and Perkins loans amount during 2007-08, cumulative Stafford, Perkins, PLUS 2009, Stafford, Perkins, PLUS: amount owed as of 2009, monthly student loan payment as percent of monthly income 2009, federal loans paid in full, in repayment or deferred/forbearance 2009, monthly student loan repayment 2009, loan debt postponed enrollment, and worked more hours due to loan debt.

The following 28 variables were found to decrease time to associate degree completion when they were present and/or increasing: applied for any aid 2003-04, received federal aid other than only Pell grants in 2003-04, only received federal grants in 2003-04, received federal and other grants or only non-federal grants in 2003-04, ratio of grant aid to student budget 2003-04, ratio of grants to total aid 2003-04, ratio of grant aid to tuition 2003-04, total need based grant aid 2003-04, credit cards used to pay tuition 2003-04, federal work study 2003-04, total non-federal aid 2003-04, Stafford and Perkins loans amount during 2005-06, cumulative federal student loan amount owed as of 2006, cumulative Stafford, Perkins, PLUS 2006, Stafford, Perkins and PLUS loans amount during 2006-07, Stafford and Perkins loans amount during 2006-07, federal loans paid in full/cancelled, in repayment, in default, or not in repayment in 2006, Stafford, Perkins and PLUS loans amount during 2007-08, federal loans in default or not in repayment in 2009, currently repaying student loans 2009, cumulative Stafford subsidized loans and Perkins 2009, spouse has student loan 2009, and loan debt was worthwhile investment 2009.

In a review of these factors several patterns emerge. Significant relationships between independent variables and time to degree completion were found in each of the time periods within the survey, however no variables within block seven that occurred during the 2004-05 time-period were found to significantly decrease time to associate degree completion. Loans were found to increase time to degree completion within each time period surveyed, and many of the variables that increased time to degree completion appear to reflect financial need including applying only for federal financial aid, and receiving subsidized loans and Perkins loans. Grant aid was prevalent among variables that were found to decrease time to degree completion, as were need-based loans including subsidized Stafford and Perkins loans.

Several findings within block seven bear further discussion. First, while applying for any aid in 2003-04 decreased time to completion, applying for federal aid and the ratio of federal aid to total aid received in 2003-04 increased time to completion. This finding may reflect self-efficacy or higher levels of achievement among students who apply for more than federal aid, as well as the added potential for financial resources to support their persistence and completion. It also may reflect student's socioeconomic status and pre-college preparation as applying for non-federal aid may signify higher levels of student achievement necessary to qualify for state and/or institutional aid. In addition, students who only receive federal aid may be more likely to work and to take on loans in order to finance their participation in higher education.

Second the effect of loans on time to degree completion appears related to timing along the degree pathway. For example while cumulative Stafford, Perkins, PLUS loans in 2006 decreased time to completion, in 2009 this same variable increased time to

completion. Similarly Stafford and Perkins loans as well as Stafford, Perkins, PLUS amount owed during beginning and ending timeframes (during 2004-05 and 2007-08, and as of 2005-06 and 2009 respectively) all increased time to completion, while amounts in the middle timeframes decreased time to completion (2005-06 and 2006-07 and 2006-07, 2007-08 respectively). This finding suggests that the timing of loans to students may be an important factor in reducing time to completion. Loans provided during the mid-years versus at the very beginning or end of a student's educational path appear to reduce time to completion. This may reflect the importance of initial grant aid or it may indicate that personal funding from students prior to securing loans is the best method to ensure timely completion.

Applying for aid early and receiving aid in addition to Pell grants, having a spouse who also took out loans, and believing that loans are worthwhile were associated with decreased time to degree completion. Having loans that are paid, in default or in repayment during 2006 or in default in 2009 are all associated with a decrease in time to completion. This finding is not surprising, since loans are payable upon completion, therefore repayment, default, payment in full or forbearance are the only options. On the contrary, having loans paid in full, in repayment, or deferred in 2009, as well as the amount of monthly student loan repayment in 2009 all increased time to degree completion. These findings indicate that students may be working more hours to repay loans or that they may need to delay their education due to other circumstances that qualify for loan deferment. These finding also suggest that the higher the accumulated debt, the longer a student may remain enrolled, possibly to avoid repayment, at least until viable employment is secured.

As the ratio of grants to total aid, to student budget, and to tuition in 2003-04 increased, time to degree completion decreased. Receiving only federal grants and only non-federal grants decreased time to degree completion, while the total grants, total state grants and the institutional aid total all increased time to completion. These finding suggest that grants are an important way to decrease time to completion when awarded during the entry year; however there appears to be a diminishing return as the additional grant types are added and overall grant amounts increase. Perhaps large grant amounts originating from state and institutional sources entice new students to select an institution of higher education that is not a good fit, or to feel less pressure to perform since the grant support may decrease a student's personal financial commitment. This finding could benefit from additional research to identify what the optimum grant amount is for supporting timely degree completion.

Both federal and non-federal work study in 2003-04 were found to decrease time to completion; however total work study in 2003-04 increased time to completion. The influence of work hours on student outcomes is aligned with prior research. Just as persistence and completion studies have found increased work hours decrease persistence and completion outcomes (Bers & Smith, 1991; St. John, 2003; St. John, 2006; St. John et al., 2011), this study found time to completion increased as work hours increased.

By the final block of the analysis, after considering all other variables, only one variable changed direction of effect from increasing to decreasing time to degree completion: only received federal grants in 2003-04. An interaction effect due to other variables in the model likely caused this shift. An interaction with prior education and socioeconomic status and receipt of only federal grants in 2003-04 is plausible if the

students who only received federal grants were less well-prepared to compete for other types of grants, or if they were not aware of the process for securing alternatively funded grant dollars. Additional research is needed to examine the effect of this variable on time to associate degree attainment for students who begin postsecondary education in community colleges.

Overall the findings in block seven indicate that financial aid influences time to degree completion. Due to the large number of variables in this block and in the overall model however, multiple interaction effects make interpretation of the results difficult. It appears that financial aid influences the time it takes for a student to earn an associate degree, but that a student's socioeconomic status, preparation and perceptions of need interact with these variables. In addition, temporal changes in how aid is applied also appear to influence the effectiveness of the aid in reducing the number of months enrolled prior to degree completion. Recursive effects also are at play, since students who complete degrees sooner will have less opportunity to continue to receive financial aid. The temporal dimension of degree completion is an area that deserves attention in future research and theory development. Understanding how aid influences time to degree attainment can help policy-makers and administrators equalize opportunities for access, while also improving student outcomes by decreasing time to degree completion.

Implications for Practice and Policy

This exploratory study was designed to identify what influence, if any, the amount and type of federal financial aid have on time to associate degree attainment for community college students after controlling for the effects of pre-entry attributes, initial and ongoing commitment, institutional experiences, and academic and social integration.

One outcome of this research has been the identification of time to associate degree as an important dependent variable worthy of further study. This study found numerous independent variables that were significantly related to the time it takes a student to complete a degree. By identifying variables that increase and decrease time to associate degree completion, this exploratory study provides a foundation on which to consider new logic models for enhancing student outcomes and for increasing return on investment for federal aid.

At least two of the variables that emerged as significant factors that decreased time to completion seemed to be counterintuitive: Participating in school sports during 2003-04 and stopouts anywhere through 2009 both decreased time to completion. A brief summary of the findings are provided below. Each of these variables could benefit from further review.

A stopout was defined as a break in enrollment of five or more consecutive months, and for the population under study the range was zero to 20 months of stopout prior to degree completion. Nearly 56% had no stopout, while 34% stopped out for five months, and the remaining 10 percent stopped out for 10 to 20 months prior to completing a degree. As the duration of stopout increased, the number of students completing degrees decreased, yet these students still were able to complete degrees. A closer examination of stopout patterns could help illuminate any difference in time to degree completion based upon the timing of the stopout period. An examination of the characteristics of students who stopped out also could be undertaken.

The variable "participated in school sports 2003-04" indicated whether or not the respondent participated in varsity, intramural, or club sports during the 2003-2004

academic year. Because all types and levels sports were included in this variable it is hard to say whether organized sports influenced time to degree completion or if the outcome was influenced by time spent with peers. Further, it is impossible to tell how much time was devoted to game time versus practice time. Of the population under study slightly more than nine percent participated in some sports in 2003-04, however it is impossible to tell what type of sports, or the intensity of time spent on practice versus play. Future research could focus on how the type, level and intensity of collegiate sports participation influences time to degree completion.

The findings of this study provide valuable information for college administrators who seek to increase degree completion rates, as well as students who seek to decrease time spent earning a degree. The findings also provide a starting point for future research aimed at improving educational outcomes and the financial aid system. The following sections identify some implications of this study.

Implications for college administrators. Based on this study's findings, college administrators can select variables that decrease time to degree completion that are within their control in order to devise strategy to maximize student outcomes. For example, college administrators may choose to work with feeder high schools to improve student outcomes, including high school GPA and graduation rates, as both are shown to decrease time to completion. Educational administrators also may encourage students to attend college immediately upon high school graduation, as age is shown to increase time to completion.

Further, college administrators may consider ways to increase the number of students who have degree plans and goals upon college entry, as both of these factors

decrease time to associate degree attainment. Full-time attendance and higher college GPAs also decreased time to completion, so college administrators could consider these factors in prioritizing the use of institutional resources. Similarly, providing financial support that enables students to work less and attend classes full-time may result in higher grades that could improve outcomes.

Structuring integration to help students engage academically and socially based on the findings of this study is yet another area of consideration for helping students to complete degrees more quickly. Intentional interactions that do not become too demanding of students' time may prove most helpful. Minimizing stop-out behavior, providing on-campus work for students, but limiting the amount of hours worked, as well as helping students to form expectations of earning a degree also can decrease time to associate degree completion. Finally providing financial support that is appropriate and enables students to also have a financial stake in their education can decrease time to completion.

Implications for college students. Similar to college administrators, college students and prospective college students can benefit from the results of this study by adapting their behavior in order to decrease time to degree completion. For example, by doing well in high school so that they are prepared at college entry, students can avoid the need for developmental education. Developmental education is a factor shown to increase time to completion. Students can consider how the type and intensity of employment, preferably limited hours of work study, may help them to avoid or minimize loan debt, while also helping them to decrease time to degree completion. Finally, students can select a college of best-fit where they can commit to earning a

degree, and then formulate a degree plan early in their collegiate career to minimize the amount of time needed to complete a degree.

Implications for financial aid policy. Policy-makers can benefit from the findings of this study because it provides valuable information about factors that increase and decrease time to associate-degree attainment for students who begin their postsecondary education at community colleges. Of the top ten significant predictors of time to associate degree completion, seven were financial aid variables: four that increased time to completion and three that decreased time to completion. The financial aid variables that increased time to completion include unsubsidized and PLUS loans as well as total grants 2003-04, and all suggest substantial financial need and unmet need in the case of PLUS loans.

Among the top ten significant factors that increased time to degree completion were seven financial aid variables. The findings of this exploratory study suggest that receiving aid early and receiving subsidized loans increase time to associate degree completion. In contrast, six of the top ten variables that decreased time to associate degree attainment were financial aid variables. Based on these findings, students who took out loans prior to 2005-06 and who received larger amounts of need based grants in 2003-04 completed more quickly. Future research could examine how the amount, timing and packaging of student aid influences time to degree, in an effort to improve student outcomes.

This study helps to illuminate the effects of grants and loans on student outcomes. The timing, amounts and types of aid can be studied more specifically in order to decrease time to degree completion. Based on this exploratory study, it appears that

packaging student aid based on timing, amount and mix of aid types can facilitate students' financial stake in their own outcomes, yielding benefits for students and taxpayers alike. Additional research is needed to more fully understand how the timing and packaging financial aid influences time to degree completion and how these effects vary by income levels.

Contributions to Literature and Theory

This study is unique in considering time to associate degree attainment, rather than other student outcomes that have been studied in the past, such as semester to semester persistence, year to year persistence, and degree completion. Because of the focus on graduates' time to degree, it is possible to look at choices students make over their enrollment period and how these choices influence the number of months they are enrolled prior to earning a degree. This study was able to identify many variables that were significantly related to the time it took students to attain an associate degree in an effort to advance research, theory and practice. Understanding the variables that influence time to degree completion, provides valuable information for researchers, policy makers, college administrators and students who seek to minimize time to degree completion.

Contemporary theory on student departure (Astin, 1975, 1999; Tinto, 1975, 1993) as well as literature related to student perceptions of ability to pay and the direct effects of aid on student outcomes (Cabrera et al., 1990; Nora, 1990; St. John, 1989, 1990b; St. John et al., 2000; St. John et al., 1991) have provided a vibrant backdrop and foundation for this exploratory study. DesJardins et al. (2002) identified time as an important factor to consider in future research and theory development, however the influence of time on

degree completion has not been the subject of rigorous scholarly review. Recent concerns with the lack of timely degree completion (Complete College America, 2011; U.S. Department of Education, National Center for Education Statistics, 2012b) reinforce the need to examine time and its impact on degree attainment. Economic models and institutional-fit models have been used in the past to explain why students persist and drop-out of college. The current study illuminates the importance of student choices and finance-related variables over the course of a student's matriculation as important factors that affect the time it takes a student to earn a degree.

Time influences student decision-making beyond existing economic (G. S. Becker, 1993), psychological (Bean & Eaton, 2000), environmental (Astin, 1993), and social-interaction (Tinto, 1975, 1993) models. Time changes student perceptions of ability to pay. Time also influences the perception of the direct effects of student aid including public and individual rates of return on investment and economic and social benefits for individuals and for society. Despite the importance of temporal effects, a lack of research in this area limits information available to students, administrators and policy makers when determining appropriate investments of resources to support degree attainment, particularly the use of federal financial aid. The current study helps to fill the gap in research about how quickly students complete degrees over time, and can support improved policy development, decision-making and new theory development.

Based on the findings of this study, the researcher has identified the need for a new logic model. This new model must identify time to degree completion, rather than departure, as the dependent variable of interest, thus moving from a model of student departure to a model of student completion. This new model of student completion

should be driven by ongoing student choices based on student perceptions built upon many finance-related variables that occur throughout the model. Pre-entry attributes, goals and commitments, and integration can be elements in the model, but rather than being sequential blocks on a path, these elements should be located on an upward spiral. Based on this new logic model and similar to prior research (Paulsen & St. John, 2002; St. John et al., 2005), students with unmet financial needs will make different choices than students without unmet financial needs, unless some external stimulus intervenes to change a student's perceptions. As students continue on their educational journey their perceptions of need and self-efficacy evolve, and as new choices emerge students may react differently at different points in time. For example, students who work full-time at college entry may determine that part-time work and a loan are preferable later in their educational journey. The temporal sequence and intensity of student choices, experiences and interventions shape new student perceptions that together determine time to degree completion.

This study is an important first step in recognizing the importance of time as a factor that influences student degree completions outcomes, and specifically the attainment of an associate degree. The factors that have been identified in this study's seven-block regression analysis model not only vary in their influence upon time to associate degree completion, but also are altered by each student's experience. Not all students spend the same amount of time earning a degree, and this creates variance in their opportunity to experience each of the variables over time.

Just as a student's family of origin creates a set of expectations for that student, including the student's perceived value of higher education and the student's personal

self-efficacy relative to academic ability, so also do life experiences, social exposure and higher education alter a student's reality throughout life. It is the interaction of a student's temporal reality, based on past experiences, in conjunction with current institutional experiences and anticipated long-term outcomes that interact to form student choices. These choices in turn lead to outcomes that create a new reality with experiences that lead to further choices until the student completes a degree.

Along the degree pathway, students makes many decisions. Decisions to stop-out, to work more hours while attending college, and to attend college part-time often lengthen time to degree and ultimately influence long-term outcomes including financial, personal and social gains. Therefore understanding how time influences a student's decision making is critical for policy makers and college administrators who seek to improve degree-completion outcomes. The current study adds to the literature by providing a baseline for the exploration of time as an important factor in determining degree-completion outcomes and for inclusion in the development of new theories of student completion.

Recommendations for Future Research

This experimental study was conducted using a method employed by Alexander Astin (1975) in his landmark work on preventing student dropout that included a large number of variables in the model to identify potential associations in advance of theory development. By including all variables identified as having potential relevance based on extant theory and literature in the regression model, the researcher identified 124 variables that have a significant relationship with time to associate degree completion for students who begin their studies in a public community college. While somewhat

daunting, these findings provide a rich source of information for practitioners, and also provide a foundation for further research. The following sections identify some additional areas of study that could be undertaken in the future to improve community college student outcomes.

Additional models. The present study used a block form of multiple regression analysis to examine eight research questions related to factors that influence time to associate degree attainment. Additional research could be conducted to drill-down into the findings from this study by exploring relationships between specific variables of interest. For example, hierarchical linear modeling (HLM), as well as survival and event history analysis could be used to study select factors found to be significant in this model. These approaches have been used successfully in the past in studies of retention (Chen, 2007; Chen & DesJardins, 2008, 2010; Chen & St. John, 2011). Rather than controlling for the effects of various independent variables as done in this study, these methods could provide a more in-depth examination of how various factors of interest influence student outcomes. For example, HLM could be used to compare the effect of financial aid received on students of different races or different age groups over time. Survival and event history analysis could be used to predict time to completion based on the initial findings of this research. Finally, reduced regression models that focus on specific factors from blocks in this study, such as entry point engagement or aid at entry also could be conducted to reduce interaction effects related to multiple points in time observations.

The dependent variable also could be adjusted to examine months elapsed rather than months enrolled, to better understand how stop-out behavior impacts time to degree

completion. In addition, the population selection could be limited to students who complete degrees at their first institution, to better understand the potential benefits of remaining at a single institution on overall student outcomes.

Future BPS cohorts and other data sources. Future cohorts of Beginning Postsecondary Students could be used to replicate the current study in order to explore the generational changes that may influence time to degree completion. State and local datasets could also be used to replicate this study in order to determine the influence of state and local funding on degree completion outcomes.

Conclusions

The current study examined the influence that the amount and type of federal financial aid received have on time to associate degree attainment for students who begin their postsecondary education at community colleges. This is the first known study to examine time to degree attainment for community college students as an outcome of interest. Time to degree completion is fundamentally different from persistence and completion variables that have been considered in the past. As a result of these findings, an enhanced logic model that accounts for temporal changes in explaining increases and decreases in time to degree attainment is recommended.

The findings of this dissertation contribute to the body of literature by identifying how financial aid influences time to degree completion after considering other factors, including pre-entry attributes, student goals and commitments, institutional experiences, and integration. The findings of this study can inform college officials and financial aid administrators, as well as students and their families in the areas of policy, practice and choice. This study provides future researchers and policy-makers with a long list of

factors that influence time to associate degree completion that can be used to guide future inquiry. These factors should be examined in more detail using alternate and refined statistical models.

Finally, this study highlights the influence that a variety of variables have on time to associate degree completion. In so doing, this study suggests that a new logic model that incorporates temporal sequence into degree completion framework could be valuable in helping to explain variance in time to degree completion for students based on input, integration and environmental characteristics. By focusing on time to degree completion rather than other outcomes such as persistence and completion, this study illuminates a variety of factors worthy of further examination based on their relationship to the time it takes a student to complete an associate degree.

President Obama's call to increase the number of college-educated Americans coupled with the growing cost of post-secondary education make timely degree completion more important than ever before. In order to improve outcomes, stakeholders must understand the many factors that influence time to associate degree attainment. This exploratory study provides an initial examination into a topic that will likely gain interest as higher education costs rise and shift toward consumers, while outcomes become more widely known and scrutinized.

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Appendix A

NCES Restricted Use Data License Approval

From: "IESData.Security@ed.gov" <IESData.Security@ed.gov>

Date: Thursday, July 18, 2013 10:55 AM

To: "Opp Ronald D." <ron.opp@utoledo.edu>

Cc: Marilyn Seastrom <marilyn.seastrom@ed.gov>, Jason Browning <jbrowning@sanametrix.com>, Jesse Rine <jesse.rine@ed.gov>, Rafic Jouejati <rafic.jouejati@ed.gov>

Subject: Approved- #13030012

License number: 13030012

Dear Ronald Opp,

We have completed our review of your application. Your application has been approved. Keep a copy of this License approval email in your License file. Please reference your License number in any future correspondence. We will be mailing the data and a copy of your License paperwork to you in the next few business days. Please retain the documents in your License file.

Once you receive the data, please contact the IES Data Security Office for the password that you will need to unencrypt the data. You must secure this password from unauthorized access. You are licensed for the data you requested in your Formal Request. The data you will receive are on loan for the time period specified in your Formal Request commencing with the date of the NCES Commissioner 's signature on the signed License document. Once your License expires, please send the data back to IES and close the License or submit an amendment to renew the License.

Please read and have other project staff read the ES I Restricted -use Data Procedures Manual at:

http:/nces.ed.gov/statprog/rudman/toc.asp . Violations of any of the License or security requirements by any project staff could result in License cancellation. If during the course of your research you need to add project staff, take staff off of the project, need additional restricted –use data, extend the time period of your License, or need to close your License, please read how to do any of these at:

http:/nces.ed.gov/statprog/instructmod.asp

Any draft reports or other pre-publication documents that use or contain IES restricted-use data must be reviewed by the IES Data Security office prior to their dissemination outside the licensed project staff. Please send these reports to the email address below.

If you have any questions, please contact us.

IES Data Security Office
Department of Education/CEINS/
1990 K. Street, NW, Room 9060
Washington, DC 20006
202-502-7307
IES Data Security Office

Appendix B

University of Toledo Institutional Review Board Approval

THE UNIVERSITY OF TOLEDO
1872

The University of Toledo
Department for Human Research Protections
Social, Behavioral & Educational Institutional Review Board
Office of Research, Rm. 2300, University Hall
2801 West Bancroft Street, Mail Stop 944
Toledo, Ohio 43606-3390
Phone: 419-530-2844 Fax: 419-530-2841
(FWA00010686)

To: Ronald Opp Ph.D. and Ann Proudfit
Department of School Psychology, Legal Specialties and Counselor Education

From: Barbara K. Chesney, Ph.D., Chair
Mary Ellen Edwards, Ph.D., Vice Chair
Walter Edinger, Ph.D., Chair Designee
Lee Ann Pizzimenti, J.D.

Signed: B.K. Chesney **Date:** 10/25/13

Subject: IRB #108505
Title: *A National Longitudinal Study of the Influence of Federal Student Aid on Time to Associate-Degree Attainment*

On 10/25/13, the above research was reviewed and approved as Exempt (category #4) by the Chair and Chair Designee of the University of Toledo (UT) **Social Behavioral & Educational** Institutional Review Board (IRB). The requirement to obtain a signed consent form has been waived as this research is determined to be minimal risk and a signed consent document would be the only record linking the subject to the data. It was determined that this waiver for signed consent will not adversely affect the rights and welfare of the participants. This action will be reported to the committee at its next scheduled meeting.

Please Note: A consent form is not required for this study. However an Information Sheet regarding the study should be distributed to potential participants. This Information Sheet should include the name and telephone number of a contact person in case the subjects need additional information. It is also strongly encouraged that the study be explained verbally to potential subjects.

Items Reviewed:
- IRB Application Requesting Exempt Review

Designated as EXEMPT RESEARCH on: 10/25/13

Please read the following attachment detailing Principal Investigator responsibilities.

Appendix C

NCES Approval for Release of Findings to Non-licensed Individuals

-----Original Message-----
From: IESDataSecurity [mailto:IESData.Security@ed.gov]
Sent: Tuesday, February 25, 2014 3:11 PM
To: Proudfit, Ann
Cc: ron.opp@utoledo.edu
Subject: RE: Request for review of document prior to sharing...license #13030012

Hello Dr. Opp,

You are cleared to disseminate the dissertation titled "A National Longitudinal Study of the Influence of Federal Student Aid on Time to Associate-Degree Attainment" by Proudfit, to non-licensed persons.

Thanks,

Jesse Rine
IES Data Security Office
U.S. Department of Education
1990 K Street, NW, Room 9060
Washington, DC 20006
(202) 502-7307

-----Original Message-----
From: Proudfit, Ann [mailto:Ann.Proudfit@tri-c.edu]
Sent: Saturday, February 22, 2014 4:42 PM
To: IESDataSecurity
Cc: ron.opp@utoledo.edu
Subject: RE: Request for review of document prior to sharing...license #13030012

Dear IES Data Security Officer: Thank you for your review of the original documents referenced below. Attached please find the updated documents for final approval based on your comments.

Appendix D

Variables Used in Block Order

Block 1: Pre-entry Attributes

Variable Code	Variable Description	Recoded Variable Code
AGE	Age first year enrolled.	
GENDER	Respondent's gender is female.	DUMMY_FEMALE
HCGPAREP	High school grade point average (GPA) is 2.5 or more.	D_HSGPAGT25
HSDEG	Indicates that the respondent has earned a high school diploma.	D_HSDIPL
PDADED	Respondent's father earned a college degree as of 2003-04.	D_DADDEG
PMOMED	Respondent's mother earned a college degree as of 2003-04.	D_MOMDEG
HISPANIC	Indicates whether the respondent is Hispanic.	
RAASIAN	Indicates whether the respondent is Asian.	
RABLACK	Indicates whether the respondent is Black.	
RAINDIAN	Indicates whether the respondent is American Indian or Alaska Native.	
RAINDTRB	Indicates whether the respondent is part of a state or federally recognized tribe.	
RAISLAND	Indicates whether the respondent is Native Hawaiian or other Pacific Islander.	

RAOTHER	Indicates whether the respondent is a race other than those listed.
RAWHITE	Indicates whether the respondent is White.

Block 2: Initial Goals and Commitments

Variable Code	Variable Description	Recoded Variable Code
ACPTF04	Indicates the number of respondents who were accepted to their first choice of schools. Includes those who applied to only one school.	
ATTENDA	Reason enrolled 2004: Complete associate's degree.	D_ATTENDA
DEPNUM	Indicates the number of respondent's dependent children and others in 2003-04.	
DGOALY1	Respondent's degree goal in 2003-04 was an associate or bachelor degree.	D_DGOALY1
DGPLNY1	Respondent's degree plan in 2003-04 was an associate or bachelor degree.	D_DPLNY1
JOBHOUR2	Indicates the average hours the respondent worked per week during the 2003-2004 academic year (includes work study).	
PARSP06E	Respondent received no financial assistance from his/her parents when last enrolled 2006.	D_PARSP06E
SINGLPAR	Identifies independent students who were single parents during the 2003-2004 academic year.	
SMARITAL	Respondent was married during the 2003-2004 academic year.	D_MARRIED
UGDEG	Enrolled in an associate degree program during 2003-04 academic year.	D_UGDEG

Block 3: Institutional Experiences

Variable Code	Variable Description	Recoded Variable Code
ATTNPTRN	Respondent's attendance intensity at all institutions attended in the 2003-2004 academic year, for all months enrolled from July 2003 through June 2004 was always full-time.	D_ATTINTEFT
ENINLM3Y	Enrollment intensity during the last month enrolled through June 2006 was full-time.	D_ATTINT06
ENINLM6Y	Enrollment intensity during the last month enrolled through June 2009 was full-time.	D_ATTINT09
ENINPT3Y	Enrollment intensity for all months enrolled through June 2006 was part-time.	D_ATTINTP06
ENINPT6Y	Enrollment intensity for all months enrolled through June 2009 was part-time.	D_ATTINTP09
GPA	Indicates the respondent's cumulative Grade Point Average (GPA) for the 2003-2004 academic year.	
GPA06	Indicates the respondent's grade point average (4 point scale) when last enrolled as of 2006.	
PCT_MIN	Indicates the percent of total undergraduate enrollment at the institution that were minority students during the 2003-2004 academic year. Minority students include those who are Black, non-Hispanic, Hispanic, Asian/Pacific Islander, or American Indian/Alaskan Native.	

PCTMIN1	Indicates the percent of the institution's student body that was Black, non-Hispanic during the 2003-2004 academic year.	
PCTMIN3	Indicates the percent of the institution's student body that was Asian/Pacific Islander during the 2003-2004 academic year.	
PCTMIN4	Indicates the percent of the institution's student body that was Hispanic during the 2003-2004 academic year.	
REMETOOK	Indicates whether the respondent took any remedial or developmental courses during the 2003-2004 academic year.	
UGDEG06	Degree goal associate degree or higher when last enrolled in 2006.	D_UGDEG06
UGDEG09	Degree goal associate degree or higher when last enrolled in 2009.	D_UGDEG09
CCTRACK	Community college track strongly directed toward a degree.	D_CCTRACK

Block 4: Academic Integration

Variable Code	Variable Description	Recoded Variable Code
ACAINX04	This variable indexes the overall level of academic integration the respondent experienced at the first institution he/she attended during the 2003-2004 academic year.	
ACAINX06	This variable indexes the overall level of academic integration the respondent experienced at the most recent institution attended as of 2006.	
FREQ04A	Respondent had informal or social contacts with faculty members during the 2003-2004 academic year.	D_FREQ04A
FREQ04B	Respondent talked with faculty about academic matters outside of class time (including e-mail) during the 2003-2004 academic year.	D_FREQ04B
FREQ04C	Respondent met with an advisor concerning academic plans during the 2003-2004 academic year.	D_FREQ04C
FREQ04G	Respondent attended study groups outside of the classroom during the 2003-2004 academic year.	D_FREQ04G
FREQ06A	Respondent had informal or social contacts with faculty members outside of classrooms and offices when last enrolled as of 2006.	D_FREQ06A
FREQ06B	Respondent talked with faculty about academic matters, outside of class time (including e-mail) when last enrolled as of 2006.	D_FREQ06B
FREQ06C	Respondent met with advisor concerning academic plans when last enrolled as of 2006.	D_FREQ06C

FREQ06G	Respondent attended study groups outside of the classroom when last enrolled as of 2006.	D_FREQ06G

Block 5: Social Integration

Variable Code	Variable Description	Recoded Variable Code
FREQ04D	Respondent attended music, choir, drama or other fine arts activities during the 2003-2004 academic year.	D_FREQ04D
FREQ04E	Respondent participated in school clubs during the 2003-2004 academic year.	D_FREQ04E
FREQ04F	Respondent participated in varsity, intramural, or club sports during the 2003-2004 academic year.	D_FREQ04F
FREQ06D	Respondent attended music, choir, drama, or other fine arts activities when last enrolled as of 2006.	D_FREQ06D
FREQ06E	Respondent participated in school clubs when last enrolled as of 2006.	D_FREQ06E
FREQ06F	Respondent participated in varsity, intramural, or club sports when last enrolled as of 2006.	D_FREQ06F
SOCINX04	This variable indexes the overall level of social integration the respondent experienced at the NPSAS institution during the 2003-2004 academic year.	
SOCINX06	This variable indexes the overall level of social integration the respondent experienced at the most recent institution attended as of 2006.	

Block 6: Ongoing Goals and Commitments

Variable Code	Variable Description	Recoded Variable Code
DEPNUM09	Indicates the number of children under the age of 25 the respondent supports financially.	
DGEVR06	Highest degree ever expected 2006 was associate degree or higher.	D_DGVRE06
DGEVR09	Highest degree ever expected 2009 was associate degree or higher.	D_DGVRE09
JOBHRS06	Indicates the average hours the respondent worked per week as of 2006.	
JOBHRS09	Average hours the respondent worked per week at current job in 2009.	
LOCJOB06	Indicates the location of the job the respondent had worked the most hours was primarily on campus in 2006.	D_LOCJOB06
LOCJOB09	Indicates the location of the job the respondent had worked the most hours was primarily on campus in 2009.	D_LOCJOB09
MAJ06CHG	Respondent never formally changed majors at the most recent school attended as of 2006.	D_NOCHGMAJ06
MAJ09CHG	Respondent never formally changed majors at the most recent school attended as of 2009.	D_NOCHGMAJ09
SATMAJ09	Indicates the respondent is satisfied with choice of undergraduate major or course of study in 2009.	

SATUG09	Indicates the respondent was satisfied with the quality of undergraduate education received.	
SMAR06	Respondent was married as of 2006.	D_MAR06
SMAR09	Respondent was married as of 2009.	D_MAR09
STMN3Y	Number of months elapsed during the first stopout period (enrollment break of 5 or more months). This is also the number of months between the first and second enrollment spells.	
STMN6Y	Number of months elapsed during the first stopout period (enrollment break of 5 or more months).	
STNUFI3Y	Number of stopouts at the first institution attended through June 2006.	
STNUM3Y	Number of stopouts at all institutions attended, through June 2006.	
STNUM6Y	Number of stopouts at all institutions attended, as of June 2009.	
STSTA2	Respondent did not stop-out during academic year 2004-2005 at any institutions.	D_NOSTOP05
STSTA3	Respondent did not stop-out during academic year 2005-2006 at any institutions.	D_NOSTOP06
STSTA4	Respondent did not stop-out during academic year 2006-2007 at any institutions.	D_NOSTOP07

STSTA6	Respondent did not stop-out during academic year 2008-2009 at any institutions.	D_NOSTOP09
STSTAFI1	Respondent did not stop-out during academic year 2003-2004 at the first institution attended.	D_NOSTOPFI04
STSTAFI2	Respondent did not stop-out during academic year 2004-2005 at the first institution attended.	D_NOSTOPFI05
STSTAFI3	Respondent did not stop-out during academic year 2005-2006 at the first institution attended.	D_NOSTOPFI06
STSTAFI4	Respondent did not stop-out during academic year 2006-2007 at the first institution attended.	D_NOSTOPFI07
MAJ09A	Enrolled in STEM major when last enrolled 2009.	D_STEMMAJ09

Block 7: Financial Aid

Variable Code	Variable Description	Recoded Variable Code
AIDAPP	Indicates whether the respondent applied for financial aid for the 2003-2004 academic year.	
AIDCST	Indicates total aid received as a percentage of the total student budget. Excludes respondents who attend more than one institution.	
CAMPAMT	Indicates the total amount of federal aid that is campus-based (allocated by the institution's financial aid office) received by respondent during the 2003-2004 academic year.	
CUMULN06	The cumulative amount of student loans borrowed for undergraduate education as of 2006. Excludes PLUS undergraduate loans.	
CUMULN09	The cumulative amount of respondent's undergraduate loans borrowed for undergraduate education as of 2009.	
EDPCT09	The percentage of monthly income which goes to monthly student loan payments.	
EMPL09A	The respondent had to work more hours because undergraduate education loan debt had influenced the respondent's employment plans and decisions.	D_EMPL09A
FEDAPP	Indicates whether the respondent applied for federal financial aid for the 2003-2004 academic year.	

FEDPACK	Indicates the federal aid package by type of aid received during the 2003-2004 academic year: Two dummy variables created for Pell Only or Other Federal Aid. Reference category is No Federal Aid Received	D_OTHERFED04
FEDPCT	Ratio of total federal aid to total aid the respondent received during the 2003-2004 academic year.	
GRNTSRC	For respondents with any grant, indicates the combination of federal grants, state grants, institutional grants, and other sources of grants received during the 2003-2004 academic year. Three dummy variables created for Only Federal Grants, Federal and Other Grants and Only Non-Federal Grants. Reference category is No Grants Received.	D_FEDONLYGRANT04 D_FEDANDOTHERGRANT04 D_NONFEDGRANT04
GRTCST	Indicates the total grants received as a percentage of the total student budget.	
GRTPCT	Indicates the ratio of total grants to total aid received during the 2003-2004 academic year.	
GRTPCTTN	Indicates the total grants received as a percentage of tuition and fees at NPSAS.	
LNDWI09	Respondent considered the undergraduate student loan debt to be a worthwhile investment for the future.	D_LNDWI09
LNIN09E	Respondent postponed enrollment because the undergraduate student loan debt had influenced his/her enrollment plans and decisions.	D_LNIN09E

LOANST06	Indicates the repayment status of federal Stafford and Perkins loans in the last quarter of 2006 as reported in NSLDS. Five dummy variables were created Loans Paid in Full by 2006, Loans in Repayment by 2006, Loans Deferred/Forebearance by 2006, Loans in Default by 2006, Loans Not in Repayment by 2006. Reference is No Federal Loans.	D_PDINFULL06 D_REPAYMENT06 D_DEFAULT06 D_NOREPAY06
LOANST09	Indicates the repayment status of federal Stafford and Perkins undergraduate loans in the last quarter of 2009 as reported in NSLDS. Five dummy variables were created Loans Paid in Full by 2009, Loans in Repayment by 2009, Loans Deferred/Forebearance by 2009, Loans in Default by 2009, Loans Not in Repayment by 2009. Reference is No Federal Loans.	D_PDINFULL09 D_REPAYMENT09 D_DEFERRED09 D_DEFAULT09 D_NOREPAY09
NEEDAID	Indicates the total amount of need-based grants the respondent received during 2003-2004 academic year.	
PAYTUIT	Indicates whether the respondent used a credit card to pay tuition for the 2003-2004 academic year.	
RPYAMT09	The monthly payment for respondent's undergraduate loans.	
RPYSL09	Respondent is currently repaying undergraduate loans.	D_RPYSL09
SPSLNR09	Spouse's student loans are in repayment.	D_SPSLN09

STGTAMT	Indicates the total amount of state grants, scholarships, and fellowships the respondent received during the 2003-2004 academic year.
SUBCUM06	Cumulative Stafford subsidized loan and Perkins loan amounts the respondent borrowed through 2006
SUBCUM09	Cumulative Stafford subsidized loan and Perkins loan amounts the respondent borrowed through 2009
T4XOWE06	Indicates the total undergraduate Stafford, Perkins, and Consolidated loan amounts outstanding in 2006, as reported in NSLDS.
TFEDLN	Indicates the total amount of all federal loans (excluding PLUS undergraduate loans) the respondent received during the 2003-2004 academic year.
TFEDLN2	Indicates the total amount of federal loans including PLUS undergraduate loans the respondent received during the 2003-2004 academic year.
TITIVAMT	Indicates the total amount of federal Title IV financial aid awards the respondent received during the 2003-2004 academic year.
TOTGRT	Indicates the total amount of all grants and scholarships the respondent received during the 2003-2004 academic year.
INSTAMT	Indicates the total amount of institutional aid the respondent received during the 2003-2004 academic year.

T4TCUM06	Indicates the cumulative Stafford, Perkins, and PLUS undergraduate loan amount the respondent borrowed through 2006.
T4TCUM09	Cumulative Stafford, Perkins, and PLUS undergraduate loan amounts borrowed through 2009.
T4TLN06	Indicates the total amount of Stafford, Perkins, and PLUS undergraduate loans borrowed during 2005-06.
T4TLN07	Indicates the total amount of Stafford, Perkins, and PLUS undergraduate loans borrowed during 2006-07.
T4TLN08	Indicates the total amount of Stafford, Perkins, and PLUS undergraduate loans borrowed during 2007-08.
T4TOWE06	Indicates the total Stafford, Perkins, and PLUS undergraduate loan amount owed as of 2006.
T4TOWE09	Indicates the total Stafford, Perkins, and PLUS undergraduate loan amount owed as of 2009.
T4XCUM09	Indicates the cumulative Stafford and Perkins undergraduate loan amounts borrowed through 2009.
T4XLN05	Indicates the total amount of Stafford and Perkins loans borrowed during 2004-05.
T4XLN06	Indicates the total amount of Stafford and Perkins loans borrowed during 2005-06.
T4XLN07	Indicates the total amount of Stafford and Perkins undergraduate loans borrowed during 2006-07.

T4XLN08	Indicates the total amount of Stafford and Perkins undergraduate loans borrowed during 2007-08.
TFEDWRK	Indicates the total amount of federal work-study the respondent received during the 2003-2004 academic year. Includes the institutional matching funds which are awarded on the basis of need.
TNFEDAID	Indicates the total amount of non-federal financial aid received during the 2003-2004 academic year.
TNFEDGRT	Indicates the total amount of non-federal grants the respondent received during the 2003-2004 academic year.
TOTLOAN	Indicates the total amount of loans (excluding federal PLUS undergraduate loans) the respondent received during the 2003-2004 academic year.
TOTWKST	Indicates the total amount of all work-study awards the respondent received during the 2003-2004 academic year.