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An Examination of the Relationship Between Institutional Financial Aid Programs and Four-Year Graduation Rates

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AN EXAMINATION OF THE RELATIONSHIP BETWEEN INSTITUTIONAL FINANCIAL AID PROGRAMS AND FOUR-YEAR GRADUATION RATES

by

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ABSTRACT

Institutions are increasingly searching for strategies for using institutional financial aid awards to improve graduation in four years. The purpose of this study was to examine the relationship between institutional award programs with graduation in four years. Furthermore, there was investigation into any interaction that existed between ethnicity, Expected Family Contribution (EFC), and the type of award on graduation in four years. Covariates were tested from a theoretical framework that included elements from sociological and economic theories, academic components, and the concept of liquidity constraints. Data was queried from the student information system at the selected site for students who were first-time in college, full-time students for summer 2015 or fall 2015, who enrolled full-time in fall 2015, were classified as in-state for tuition purposes, and filed the 2015-2016 FAFSA. A random sample yielded 490 student records for analysis. Logistic regression was used to test for relationships. When considering all covariates, the type of institutional award program showed no statistical significance in relation to four-year graduation rates. There was no evidence that ethnicity and/or EFC had a moderating effect on type of award for graduation in four years.

Keywords: institutional aid, financial aid, four-year graduation, retention

This dissertation is dedicated to Mom.
You taught us the value of education and character. As a nontraditional student you showed us and the world your strength and tenacity to overcome obstacles to earn your bachelor's and master's degree. As the first woman in the family to earn a master's degree, you single-handedly inspired your daughters and granddaughters to make higher education a critical component of their lives. We turned out pretty good - not in spite of you, but because of you.
I wish you had been able to finish this journey with me.
P.S. Looks like my graduation is on your birthday, so Happy birthday in heaven!

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE: INTRODUCTION

Background

It is widely agreed upon that financial aid promotes student success, but researchers struggle to show direct relationships between the two (Goldrick-Rab et al., 2009). The lack of evidence about *how* financial aid influences student success stimulates doubts for policymakers regarding increased investment in financial aid programs (St. John, 2000; Castleman & Long, 2016). A crucial challenge facing researchers is that the circumstances that make students eligible for need-based aid cannot be detached from the influence that need-based aid exerts (Goldrick-Rab et al., 2009).

Financial aid is not awarded randomly to students and the factors that lead to the awarding of aid can lead to a selection-bias that can cause overvaluing or undervaluing the direct effects of financial aid (Castleman & Long, 2016). For example, a student's motivation can influence the seeking out of financial aid sources and re-enrollment decisions individually. It is not possible to separate the unobserved influence of the student's motivation from the influence of a financial aid program. It is also very difficult to specify *how* financial aid influences student success (Goldrick-Rab et al., 2009). For example, there is little research that evaluates how limits on timeframe on eligibility (maximum 8 terms of eligibility versus 150% of the credit hours it takes to earn a degree) may influence students to graduate in four years.

Research on the effects of financial aid have shown positive effects on initial enrollment decisions, but there is little evidence that financial aid has a direct positive influence on student success (Castleman & Long, 2016). There is an abundance of observed and unobserved factors

that contribute to lack of evidence. Students may choose to enroll in an institution based on many factors among which may include a financial aid offer but may remain committed to persisting at the institution regardless of future eligibility. Additionally, low-income students who are offered substantially generous need-based financial aid packages may be academically underprepared for college level work which may lead to dropping out, in which case the aid may have a negative influence on student success.

There has been an increased investment in need-based aid for the purposes of opening access for a larger population including low-income and underserved students including African Americans/Blacks, Hispanics, and American Indians/Alaska Natives. However, there remains a significant gap between college access and college completion particularly among those groups (Goldrick-Rab et al., 2009; Castleman & Long, 2016). While private institutions graduate about 90 percent of the students who begin at their institutions, public institutions graduate less than 30 percent of the students who begin at their institutions (Tinto, 2012). Although the access gap between low-income students and high-income students has narrowed, high-income students are still three times more likely to earn a bachelor's degree than low-income students.

The history of financial aid illustrates the purpose of financial aid, which primarily has focused on increasing access to higher education for students. Over the past several decades, there has been a shift from providing need-based aid to increase access for less affluent students toward recruiting highly talented students by providing merit-based aid to students who most likely would have attended and completed college without financial aid. Furthermore, there has been a shift of the primary funding source of financial aid programs over the past decade.

Evolution of Financial Aid

Financial aid in the U.S. first appeared in 1643, when Lady Anne Radcliff Mowlson's financial contribution to Harvard University became the first endowed scholarship specifically earmarked to fund education for poor students (Fuller, 2014). The University of Virginia was the first example of a genuine public university (Heller, 2002). Founded in 1819 by Thomas Jefferson, the University of Virginia had a board appointed by the state, was financially supported by the state for its establishment and continuing operations, was not affiliated with a particular religion, and provided free tuition for low-income students in the state of Virginia. State support of private institutions was also very common during this time.

The Morrill Act of 1862 was a major catalyst for expanding state support of public institutions (Heller, 2002). To raise funds for the establishment of land-grant institutions, the federal government gave land to the states to sell. Between 1869 and 1939, the number of higher education institutions tripled and enrollment in higher education expanded by 30 times.

The Serviceman's Readjustment Act of 1944 established federal veteran's benefits including financial assistance for college education, home loan guarantees, and unemployment assistance and was the first major action taken by the federal government to provide aid to students resulting in the expansion of access to veterans returning from war (Fuller, 2014). The Serviceman's Readjustment Act of 1944 was nicknamed as the G.I. Bill of Rights because servicemembers were commonly referred to as G.I.'s based on the military phrase government issued.

The impetus for the development of the G.I. Bill occurred in 1932, when World War I veterans who had been issued interest-bearing certificates after the war that would mature in 1945 marched on Washington, D.C., in the Bonus March, trying to persuade Congress to cash out the certificates early due to the Great Depression (Ortiz, 2009; Heller, 2002). President Herbert Hoover had protesters forced out resulting in the deaths of two. As the U.S. joined World War II, the age to be drafted was reduced to 18 years old, and Congressional leaders in conjunction with President Franklin D. Roosevelt recognized the need to avoid another Bonus March at the end of World War II. The Serviceman's Readjustment Act of 1944 was established to make higher education accessible to veterans returning from war so they would be able to transition back into civilian life and find adequate employment.

Even with the implementation of the G.I. Bill, states continued to provide the largest portion of financial support to public institutions (Heller, 2002). Students benefited the most from large state subsidies that were intended to keep tuition low regardless of their ability to pay. This meant that students from affluent families paid the same low rates as students from low-income families. Even in 1947, concerns over rising cost of education and the cost-sharing for students were significant (Zook, 1947). However, the G.I. Bill shifted a large portion of the cost-share to the federal government and away from students and institutions (Heller, 2002).

The National Defense Act of 1958 (NDEA) was the first federal commitment to provide aid to students in the form of low-interest loans for the purpose of improving access to higher education for lower-income students (NDEA, 1958). Although President Harry Truman's commission had highlighted the need to expand access in 1947, President Truman was unsuccessful in enacting legislation at that time (Maher, 2016). After the Soviet Union

successfully launched Sputnik during the race to space and the arms race, savvy legislators recognized that the only way to get federal financial aid legislation passed was to embed it into a defense bill. Hence, the NDEA was signed into law.

The Higher Education Act (HEA) of 1965 was signed into law by President Lyndon B. Johnson on November 8, 1965 (Dynarski & Scott-Clayton, 2013). The HEA was an omnibus bill that contained multiple programs including the Title IV section which authorized federal financial aid to students attending higher education (HEA, 1965). This legislation has been reauthorized and revised continuously over the years, but is still the law that governs federal financial aid policy (Capt, 2013). The HEA established need-based grants including Pell grant, federal work-study, and loans guaranteed by the federal government. The primary objective was to expand access for low-income students to higher education, with revisions made later to expand access for middle-income students.

Many states created state sponsored scholarship programs by the end of the 1960s (Heller, 2002). The HEA reauthorization in 1972 created a federal fund to match funding dollar-for-dollar in states that provided need-based grants to students, which promoted the development of need-based state funded grants.

Tuition costs continued to rise about 4.5 percent every year between 1964 and 1972, while family incomes were relatively stationary (Heller, 2002). Families increasingly bore the heavier cost-share of tuition as costs rose and state appropriations for higher education increasingly fluctuated. In the 1980s, need-based and merit-based award programs funded by the states were roughly growing at the same rates. However, in the 1990s states began to create large

merit-based scholarship programs, upending the delicate balance between need-based and merit-based programs. Georgia started the trend with the lottery funded HOPE (Helping Outstanding Pupils Excel) Scholarship, inspiring the establishment of Florida's Bright Futures Scholarship. Georgia's HOPE Scholarship originally required a need-based component in addition to its merit-based criteria, but the need-based requirement was eventually eliminated. This marked the beginning of the policy shift from focusing on need-based aid to increase access to all students to merit-based award programs that heavily favored the more academically prepared, higher-income families.

Financial aid can be funded through federal, state, private, and institutional funding as described in this section (Heller, 2002). However, there is little published about how institutional funding is allocated at public institutions to students, in part because much of those funds are used to attract the most competitive students to help shape the profile of the incoming freshman class. Institutions, especially public four-year universities, are increasingly competing for students and scarce state resources, which makes institutional aid a strategic tool in recruitment, retention, and student success strategies.

Among the four sources of funding – federal, state, private, and institutional – there are several types of programs. Grants are typically need-based free money programs that do not have to be repaid to the source. Scholarships can be merit-based, need-based, or a hybrid of the two, and do not require repayment to the source. Self-help programs include work-study programs for which students earn wages by working and loans that students may take out but are required to repay to the lender. This study focuses on institutional sources for grants and scholarships (excluding athletic scholarships).

Between 1989-1990 and 1995-1996, institutional award funding for undergraduate students grew 140.1 percent (Heller, 2002). In 2018-2019, institutional awards nationwide represented 48 percent of all free money aid at approximately $65 billion (College Board, 2019a). Federal grants comprised 30 percent of all free money aid at $40.7 billion. State grants made up 8 percent and private sources made up 13 percent. The importance of leveraging institutional funding for awards is immense given that it is currently the largest investment in grant funding to students in higher education across the country. Institutions must develop strategies on how to ensure that funding is effectively used to maintain access, recruit students, and enhance student success.

Problem Statement

Pressure to address low graduation rates has been mounting from state and federal legislatures, accrediting agencies, and national ranking systems (DeAngelo, Franke, Hurtado, Pryor, & Tran, 2011). The three main areas under scrutiny include improving degree completion rates, achieving equity in degree completion between groups, and reducing the time it takes to earn a degree. One major strategy in pursuing these goals is to leverage institutional financial aid programs, currently the largest source of grant and scholarship funding, yet there are very few clear paths on how to do so. While most major metrics and federal reporting requirements evaluate six-year graduation rates, some states such as Florida have modified its graduation rate metric to a four-year graduation rate (Florida Board of Governors, 2018).

Integration of competing priorities in developing institutional financial aid policy poses a challenge for administrators. Rutherford (2016) studied how goal complexity was related to

financial aid policy. She suggested that institutions that experienced higher goal complexity, or higher numbers of competing goals, were more likely to choose which goals to support, leaving other goals on the backburner. She found that goal complexity in financial aid policy has been especially intensified in part by "outcomes-based funding" (p. 6). She found that at four-year institutions, the funding of institutional financial aid decreased as goal complexity increased, suggesting that institutional funds may be redirected away from financial aid programs to support other programs.

In summary, the problem that the results of this research sought to address is that institutions need to make data-driven policy decisions when shaping institutional grant and scholarship programs that will increase rates of graduation in four years, but there is little research that can be leveraged to provide insight on what strategies produce significant results. The murkiness created by goal complexity along with challenges in assessing effectiveness of financial aid programs produces an environment where institutions are developing award packaging philosophies without clear evidence-based strategies. Kalsbeek (2013) aptly described "…persistent cries at the institutional level about the scarcity of usable and actionable knowledge, understanding, or insight" (p. 5).

Purpose Statement

The purpose of this study was to examine the relationships, if any, between institutional award programs and graduation in four years. The research included covariates such as ethnicity, the sum of federal grant aid, transfer credit at admit, Expected Family Contribution (EFC), parents' highest education level, college entrance exam scores, and high school GPA. A

secondary purpose was to explore if there were any interactions between ethnicity, EFC, and the type of institutional award program.

Significance of the Study

According to Schneider (2010), the United States spends more on higher education than any other nation in the world, yet it has fallen behind on retention and graduation measures. At public four-year institutions in the U.S., 80.8 percent of all students receive some type of financial aid and 67.5 percent of all students receive grant aid (National Center for Educational Statistics, 2018). The sizeable investment that institutions are making to promote student success have grown larger than federal investment in grant aid (College Board, 2019a). It is critical to examine relationships between institutional aid programs and measures of student success.

Of particular concern for this study, how institutional need-based grant and merit-based scholarship programs can help reduce time to degree to four years or less has not been widely explored. In looking at the relationship between institutional financial aid and on-time graduation in four years, this research begins an exploration of institutional award strategies that promote student success.

Financial aid strategies that promote retention and degree completion can also reduce costs of attrition to institutions. Institutional costs for attrition include the institutional dollars spent not only on recruitment, costs related to providing services and courses, but also the cost of providing institutional aid programs to students who fail to persist and complete a degree. There are also costs of attrition to the state and federal governments. Schneider (2010) estimated that from 2003 to 2007, states across the U.S. spent $6.2 billion in state appropriations, and $1.4

billion in state aid programs on students who failed to return to college. Federal grants to students who dropped out came to $1.5 billion for the same time period. Since the share of grant funds are now greater from the institutions than the federal or state government, institutional aid lost to attrition is of major concern.

Definition of Terms

To ensure a clear understanding of certain terms, this section provides definitions and common acronyms that appear in this study.

Expected Family Contribution (EFC) – the eligibility index that results from completing the Free Application for Federal Student Aid. It is calculated based on household size information, income, and assets.

First-Time in College (FTIC) – the students who are admitted to an institution in summer or fall immediately following high school graduation.

Free Application for Federal Student Aid (FAFSA) – the federal application that students must complete to be considered for federal aid. Some state and institutional award programs may also be dependent on the FAFSA.

Renewable award – an award that is designated as renewable at the time that initial eligibility is determined. Renewal criteria are typically published and sent to students before receiving the award.

Renewal eligibility – the criteria evaluated at the end of the award period for renewable awards to determine eligibility for the upcoming year.

Stop-out period – a period in time in which a student stops attending school (DesJardins & McCall, 2010).

Theoretical Framework

There are five main theories that guide research on financial aid and student success: psychological, sociological, organizational, economic, and interactionalist. Chapter two describes each of these theories in detail and provides additional components such as liquidity constraints. For this study, sociological and economic theories and academic factors were combined. Liquidity constraints were also explored in terms of interactions between ethnicity, EFC, and the type of institutional award received.

Research Question

The research question that guided this study was: What is the relationship between institutional financial aid programs and graduation in four years?

Hypothesis #1: Students who receive either a merit-based institutional aid only or a merit-based and need-based institutional aid will be more likely to graduate in four years compared to those who only receive need-based institutional aid when accounting for student-level characteristics (gender, ethnicity, EFC, sum of federal grants, SAT scores, high school GPA, transfer credit at admit, and parents' highest education level).

Hypothesis #2: Ethnicity and EFC will moderate the relationship between institutional aid and graduation in four years when accounting for student-level characteristics

(gender, ethnicity, EFC, sum of federal grants, SAT scores, high school GPA, transfer credit at admit, and parents' highest education level).

Organization of the Study

This study is organized into five chapters. Chapter one provides the background, problem statement, purpose statement, significance of the study, definitions of terms, an introduction to the theoretical framework, and the research questions. Chapter two furnishes a review of the literature on retention, persistence and graduation, research related to how financial aid influences student success, and the theoretical framework. Chapter three illustrates the methodology that was used including the selection of participants, measurements, procedures, and design and analysis. Chapter four presents the results from testing the assumptions for logistic regression and testing the hypotheses for the research question. Chapter five concludes the study with a discussion of the findings, the implications for practice, limitations and delimitations, and recommendations for further research.

CHAPTER TWO: LITERATURE REVIEW

Introduction

Researchers have been seeking to explain retention and student success for decades but have not produced much in way of evidence-based strategies for higher education institutions (DeAngelo, Franke, Hurtado, Pryor, & Tran, 2011). Furthermore, it is the strong opinion of many researchers that financial aid has a positive effect on student success, but there are infinite confounding variables that prevent researchers from proving causality between financial aid and student success (Goldrick-Rab, Harris, & Trostel, 2009). The remainder of this chapter reviews the research on degree attainment, retention and persistence, time to degree completion, and the influence of financial aid on student success. The chapter concludes with a review of theories used to study retention and graduation.

Degree Attainment, Retention, and Persistence

Access to higher education increased two-fold between 1980 and 2011, yet graduation rates remained relatively consistent over time (Tinto, 2012). The increasing gap between students entering college and completing a degree has triggered pressure from state legislatures, accrediting agencies, college ranking systems, and the federal government to improve degree completion rates, reduce the achievement gaps in underserved groups, and reduce the length of time it takes to earn a degree (DeAngelo, Franke, Hurtado, Pryor, & Tran, 2011).

Although research on retention and graduation rates has accumulated over decades, there has not been substantial progress in increasing college completion rates (DeAngelo, Franke, Hurtado, Pryor, & Tran, 2011). The research has provided insight to retention but has failed to

provide evidence-based strategies for institutions (Kalsbeek & Hossler, 2010). There is an abundance of theories and conceptual frameworks that enhances understanding of all of the factors that influence retention, but institutions are left to determine which factors to focus on rather than focusing on student progress. At the same time, retention and graduation rates are measures in which higher education institutions are judged, motivating institutions to seek out strategies to improve student success.

Degree Attainment

In 2009, President Barack Obama established an ambitious goal to increase degree attainment to 60 percent for persons ages 25 to 34 by the year 2020 (Nettles, 2017). In the same year, the Lumina foundation established a goal to increase degree completion for persons ages 25 through 64 by year 2025. The significance of the establishment of these goals in 2009 is that it was the last year of the Great Recession and both the U.S. government and the Lumina Foundation predicted growth in the economy that would demand a more educated workforce.

Nettles (2017) argued that a broad overall goal of reaching 60 percent by 2020 or 2025 was oversimplistic. He pointed to the goals not targeting specific degree programs to promote degree attainment in the fastest growing fields and highlighted the gaps that endure in major inequities in three underserved populations: African Americans, American Indian/Alaskan Natives, and Hispanics. Table 1 was adapted from Nettles (2017) and illustrates the attainment gap among ethnicities. Asians have exceeded the 60 percent goal for both age groups, while White women were projected to be on target for the goal dates in 2020 and 2025. Serious gaps were evident for African Americans, American Indian/Alaskan Natives, and Hispanics, which make about a third of the U.S. population and growing at rates that outpace Whites.

Table 1 Degree Attainment in 2014 by Population and Age

Group	Degree attainment in 2014 Ages 25 to 34	Degree attainment in 2014 Ages 25 to 64
U.S. Population	42.3%	40.4%
African American	29.0%	29.3%
American Indian/Alaska Native	21.0%	23.6%
Asian	68.4%	60.8%
Hispanic	21.9%	21.1%
White	49.6%	45.7%

Note: Adapted from Nettles (2017) (Table 1, page 3)

Nettles (2017) projected the overall U.S. population to reach 60 percent degree attainment by 2041, with the entire White population hitting its mark in 2027, White males in 2038, and African American women in 2058. African American men, American Indian/Alaskan Natives, and Hispanics, male and female, were not expected to reach 60 percent even by 2060.

Figure 1 illustrates the disparities in graduation rates within 150 percent of the timeframe required to earn a degree. For 2018-2019, IPEDs data continues to confirm that Asian and White students have much higher graduation rates than Blacks/African Americans, Hispanics, and American Indian/Alaskan Natives, and women in all categories outpaced men.

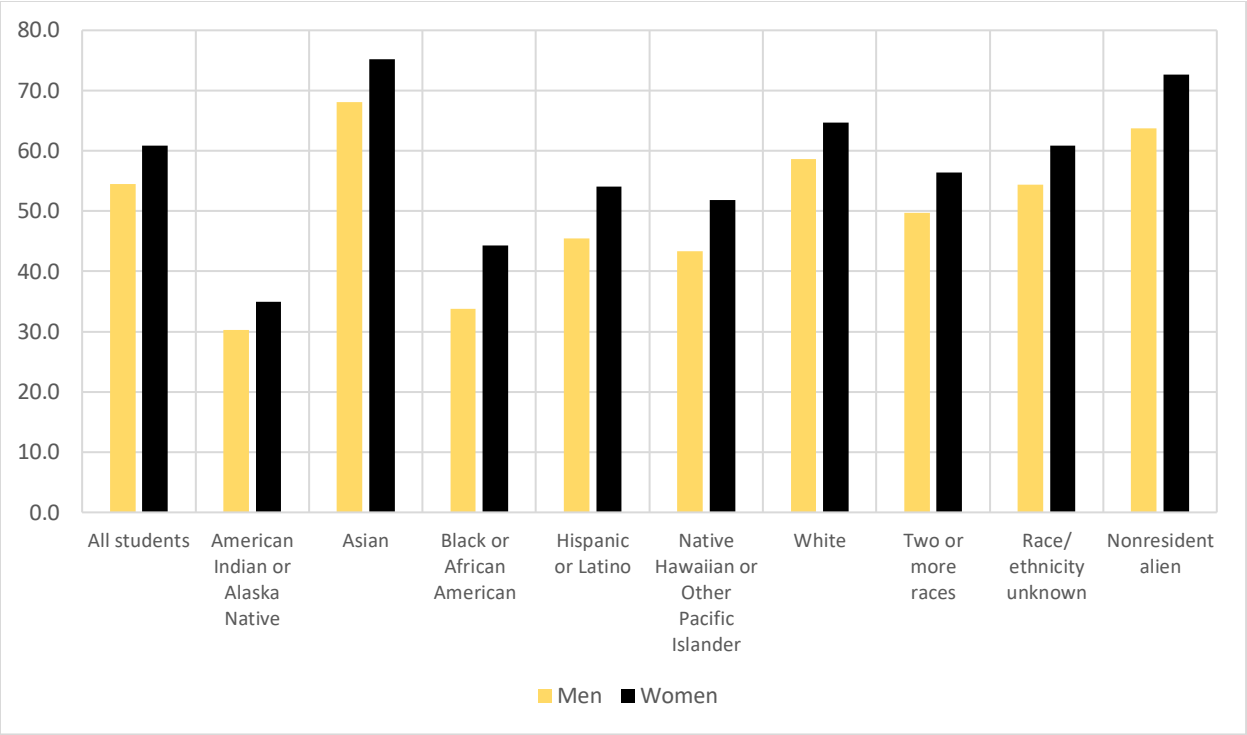

Figure 1 Public Institutions Graduation Rates within 150 percent Timeframe

Source: U.S. Department of Education, National Center for Education Statistics, IPEDS, Winter 2019–20, Graduation Rates component (provisional data).

DeAngelo, Franke, Hurtado, Pryor, and Tran (2011) studied the first-time in college (FTIC) freshman from cohort year of 2004 for four-, five-, and six-year graduation rates. They found that only 38.9 percent of entering students graduated in four years or less, only 56.4 percent graduated in five years, and only 61.2 percent graduated within six years. Private institutions demonstrated the highest four-year completion rate at 64 percent, while public institutions had the lowest completion rate at 23.5 percent.

Bound, Lovenheim, and Turner (2009) found that four-year public institutions in lower ranked public institutions had the lowest completion rates compared to top 50 ranked institutions.

They suggested that entering students who were less academically prepared were increasingly enrolling and then dropping out. The most significant population driving the gap in completion in their study was found to be men. Bailey and Dynarski (2011) stated that differences between men and women in degree completion were absent three decades ago, but results in 2011 were markedly different, with women earning degrees at much higher rates than men regardless of socioeconomic status. Black women completed degrees at a higher rate than White women between 1915 and around 1970, at which point White women experienced a slight increase over Black women.

Research has found a relationship between degree attainment and family income (Bailey & Dynarski, 2011). Students from high-income families experienced higher rates of college enrollment, persistence, and degree completion, while students from low-income families were much less likely to persist and complete. Bailey and Dynarski (2011) studied two cohorts of high school graduates in two ranges of dates: high school graduates between 1979 and 1992 and high school graduates between 1997 and 2000. They examined the inequity between college entry and college completion between the highest income quartile and the lowest income quartile. The later cohort group from the highest income quartile experienced a 22 percent increase compared to the earlier cohort group for entry into college. The lowest income quartile only increased by 10 percent compared to the earlier cohort. The data illustrated how access increased differently among socioeconomic status. Their findings on degree completion also demonstrated a dramatic difference between income groups. Students from the highest income quartile earning a degree grew 18 percent compared to the earlier cohort, while the lowest income quartile earning a degree only increased by 4 percent compared to the earlier cohort. Another finding from this

study indicated that women from the highest income quartile were driving the rising gap in degree attainment by completing degrees at far higher rates than women from the lowest-income quartile and all men.

Retention and Persistence

Retention is a cornerstone to understanding and influencing graduation rates. Tinto (2012) distinguished between the terms retention and persistence based on the perspective of the assessment. Retention is the institution's perspective of keeping a student in its institution from one year to the next, while persistence is the student's perspective on continuing to enroll and making progress toward completion. First-year retention is a common measure of success and typically assesses the rate of full-time, first-time in college students who return to enroll for the second year. This is the period of time in which students are most vulnerable to attrition, and the causes for attrition are plentiful.

Of those students who will leave higher education before degree completion, 38 percent will leave during their first year and 29 percent will leave during their second year (Tinto, 2012). About 63 percent will ultimately graduate with a four-year degree. Forty-two percent of students whose families have high incomes earn bachelor's degrees, while only 19 percent of low-income students will graduate from a four-year institution. First generation students fail to attain a degree at much higher rates than students who come from college educated families.

There are three main components that influence retention: Institutional factors, student attributes, and financial situations (Millea, Will, Elder, & Molina, 2018). Institutional factors include the efforts that institutions take to influence students such as class size, student residence

and life programs, academic support programs, and how institutional funding is spent. Student attributes include aspects that are unique to the student and can include socioeconomic status, ethnicity, first generation status, college entrance test scores, high school GPA, and much more.

Kuh, Kinzie, Cruce, Shoup, and Gonyea (2007) suggested that most models used to frame student success include five distinct categories of variables. The first set of variables include the demographics and background of the student including academic preparedness. The second set includes qualities of the institution including its mission, size, and how selective its admission process is. The third set of variables includes the exchanges that the student has with faculty, staff, and fellow students that lead to social integration. The fourth set of variables take into account how the student experiences the atmosphere of learning. The fifth set of variables reflects the level of energy that the student exerts toward educational pursuits. The complex layers of factors that impact student retention and student success adds to the difficulty researchers experience in developing evidence-based models to improve retention and graduation.

Millea et al. (2018) conducted a study on 2004 graduates to estimate probability of second-year retention. Elements that were found to have a positive influence on retention include high school GPA, test scores, age, receipt of grants and scholarships, and higher grades in general education courses (Millea, Will, Elder, & Molina, 2018). Large class size has been found to have a negative influence on retention. Aspects that were found to have no influence included comparing White to non-White students, gender, being in-state for tuition purposes, chronic absenteeism, and living on campus. Dynamics that had a positive influence on graduating in six years or less included test scores, end of freshman year GPA, small class size, receipt of merit

scholarship, and receipt of grants. Circumstances having a negative influence on graduation in six years included age and taking out student loans. Elements that showed no influence on graduation in six years included in-state residency, chronic absenteeism, living on campus, and receipt of athletic scholarship.

Time to Degree Completion

According to Bound, Lovenheim, and Turner (2007) the length of time it takes to earn a degree results from the decisions a student makes about the vigor at which the student takes courses, the institution's ability to provide the needed courses, and the cost of those courses. There are a multitude of reasons students may take longer than four years to earn a degree. For instance, many students, particularly those who are academically underprepared, must take remedial coursework before taking college level courses. Other students may have to reduce their course load to part-time to financially afford the cost of education. Some degree programs now require more than 120 credit hours to graduate, which may lead to longer time to completion.

DesJardins and McCall (2010) identified stop-out behavior as a key concern for college completion. They studied a sample of 12,648 FTIC students from fall terms in 1984, 1986, and 1991. Tracking the students over 19 semesters, where an academic year contains fall, spring, and summer semesters, 12 semesters would demonstrate completion in four years. They found that 71 percent of students had at least one stop-out period, 53 percent of which never returned to the institution. Of the 47 percent that did return, 70 percent had a second stop-out period. Of those who had a second stop-out, only 43 percent returned. Of those that returned from a second stop-out, 65 percent had a third stop-out, 40 percent of which returned. Out of the sample of 12,648

students, 4,490 graduated which represented only 35 percent of those who began enrollment. Of those 4,490 students, 76 percent graduated with no stop-out periods at all. The results compellingly suggest that stop-out behavior has strong negative effect on students' likelihood of earning a degree.

About 55 percent of students who earn a bachelor's degree graduate from the institution in which they began (Tinto, 2012). Of those students, only 33 percent graduate in four years or less. The residual percentage of students graduate in 6 years or less. In 2004, only 38.9 percent of students graduated in four years or less (DeAngelo et al., 2011). By the fifth year, 56.4 percent graduated and by the sixth year, 61.2 percent graduated. Over the course of a decade from 1994 to 2004 four-year graduation rates increased only 2.6 percent while six-year graduation rates rose 3.6 percent. In comparing four-year institutions on six-year graduation rates, students in private schools (64 percent) perform far better than students in public schools (23.5 percent). The disparity is likely to be due to the higher levels of academic preparation for college among private school students compared to public school students.

In 1994, about 32.6 percent of men graduated in four years (DeAngelo et al., 2011). By 2004, that rate held relatively steady at 32.9 percent. In contrast, 39.7 percent of women in 1994 graduated in four years and 43.8 percent in 2004. First generation students are more difficult to graduate than students who come from college educated families in any time period. The four-year graduation rate for first generation students was 27.4 percent in 2004 and rose to 50.2 percent at the six-year graduation mark.

Bound, Lovenheim, and Turner (2007) compared time to degree completion of high school graduates entering college in 1972 and in 1992. Their findings corroborated that time to degree has increased over the past several decades. From the high school graduates in 1972, 56.8 percent earned their four-year degree in four years or less. From the high school graduates in 1992, the percentage of students completing in four years fell to 43.6 percent. Their findings did indicate that students at private four-year institutions fared much better than public four-year institutions, and again confirmed that lower ranking institutions have longer times to degree than top 50 institutions.

A study conducted by Qin and Phillips (2019) explored student characteristics that contributed to graduation in three years. They found that the number of credit hours enrolled for the first term, total transfer credits, high school GPA, and EFC status (to represent socioeconomic status) were statistically significant predictors of graduating in three years. They also found that the EFC status (dichotomous classification of zero or non-zero) moderated the relationship between transfer credit hours and graduation in three years. Students with zero EFC were nearly half as likely to graduate in three years compared to non-zero EFC students.

Financial Aid Effects on Retention, Graduation, and Time to Degree

Researchers in higher education have found that financial aid positively influences initial college enrollment and believe it contributes to persistence and graduation (Castleman & Long, 2013). The intricacies of the relationship between financial aid and countless confounding variables make it extremely difficult for researchers to show direct influence of financial aid over retention or graduation.

Goldrick-Rab, Harris, and Trostel (2009) raised the question about how even with increasing investment in need-based aid, there continues to be a 40 percent gap in bachelor's degree attainment between students from low-income families and high-income families. They argue that while financial aid is believed to promote success, the research does not yet corroborate this narrative. Cabrera (1992) stated that despite decades of research, there has been little discovered about how financial aid effects student success.

Financial aid is an economic intervention and has often been studied under economic theories including human capital theory and net-price theory that have serious limitations when it comes to students and financial aid (Goldrick, Harris, and Trostel, 2009). Human capital theory assumes that people are educated about their choices and make rational decisions, which is often not the case especially for underserved populations. Net-price theory assumes that the cost of education is the same for all students. However, the cost to low-income students can be substantially different from the cost to a student from an affluent family, and the cost of education is not all monetary. There are psychological costs associated with education, especially for underprepared students who have to exert more effort to be successful.

Goldrick-Rab et al. (2009) noted that a major problem plaguing research on effects of financial aid is the omitted variable bias. It is nearly impossible to control for all possible variables that can influence the effect of financial aid on enrollment and student success. Examples of typically omitted variables include the multifaceted effects of education prior to college, how students tend to focus on long-term goals versus short-term goals, employment effects, study and time management skills, aversion to risk, and aversion to uncertainty. Reigg (2008) argued that omitted variable bias interferes with establishing causality when it comes to

financial aid effects on student success. However, in the face of this researchers continue to attempt to bolster knowledge of relationships both direct and indirect between financial aid and student success.

According to Cabrera's (1992) structural model, financial aid is both influenced by and influences financial attitudes and academic preparation before college. He conducted a study to examine direct and indirect effects of financial aid on persistence. Feelings of being satisfied with financial support was related to academic and intellectual development, but the actual receipt of financial aid did not have a relationship with academic and intellectual development. Financial aid had a "significant direct effect on GPA" (p. 20) and on social integration. Financial aid had an indirect effect on commitment to the institution by way of social integration.

Kuh et al. (2007) studied the relationships between specific student behaviors and institutional contributors to student success. They found that students who were awarded a merit-based aid award by the institution had increases in first-year GPA of about .09 points. Students from families who earned $30,000 or less earned first-year GPAs about .10 points less than their peers whose families earned $80,000 or more.

Students from wealthier families are more likely to earn a bachelor's degree than lower income students who have similar academic credentials (Ma, Pender, & Welch, 2019). Students from wealthy families experience enhanced opportunity on admission into college, persisting from year to year, and earning a bachelor's degree (Bailey & Dynarski, 2011). Although access for low-income students has been increased, the gap in persistence between the top and bottom income quartile is stark, which exasperates the overall gap in degree completion.

Research on federal and state aid programs is abundant, but there are fewer studies published on institutional aid programs. Ye (2019) examined how institutional grants affected six-year graduation rates at four-year institutions including public, private for-profit, and private non-for-profit. Using aggregated institutional-level data from IPEDs he found that institutional grants have a positive effect on six-year graduation rates after controlling for other aid programs. He also noted that this effect was largest at public four-year institutions. An increase of $1,000 of institutional aid was related to a 1.24 percent increase in graduation rates. This study did not differentiate between merit-based or need-based institutional aid or examine if institutional awards promoted on-time graduation.

Gross, Berry, and Reynolds (2015) examined effects of financial aid on degree completion using IPEDs data and data from the state of Indiana's student information system. They found that women were more likely to complete a degree than men and that students who received need-based awards were less likely to complete a degree than students who did not receive a need-based award. More specifically, an $1,000 increase in federal grants led to a 12 percent reduction in likelihood of degree completion in women, while the same increase in state grants increased completion by 9 percent. They did not find that institutional aid had any effect on completion.

DesJardins and McCall (2010) found that an increase of $1,000 in merit-based aid reduced stop-out spells by 35.2 percent, while the same increase in need-based grants reduced stop-out spells by 32.9 percent. They suggested that merit-based aid has more influence in the beginning of an academic career, while need-based grants have more influence around the tenth semester of a career, when counting three semesters per year.

Price and Davis (2006) conducted a study to find relationships between institutional need-based awards and non-need-based awards provided in the first year of college with six-year graduation rates. They found that institutionally funded merit-based aid programs had flourished between 1990 and 2004 by increasing 171 percent, while institutionally funded need-based aid had increased only 37 percent over the same time period. Findings indicated that at public four-year institutions, institutional need-based grants covered about 28 percent of tuition and fees, while merit-based programs covered only 23 percent. Hispanic and upper-income families were more likely than African Americans to receive institutional award funds. The receipt of institutional award programs was a positive predictor of graduating in six years. The study found that increasing the ratio of need-based grants to cover more than half of tuition and fees would increase the probability of graduating in six years by 14 percent, while doing the same increase for merit-based aid would increase six-year graduation by 22 percent.

A study that compared retention based on the receipt of a renewable merit-based scholarship versus a single-year scholarship indicated that the renewable four-year scholarship resulted in better retention rates than the single-year scholarship (Woodward, 1988). It is likely that there are several reasons for this finding. First, receiving a four-year renewable scholarship tends to be seen as a high achievement and may instill a commitment to the institution as a result of the honor that comes with the scholarship. Furthermore, financial uncertainty over the academic career may be reduced leading to better persistence. There is also an argument that students who receive these renewable four-year scholarships tend to come from higher-income families and probably would have persisted without the scholarship.

Theoretical Framework

Research on financial aid and graduation primarily reference theories of retention and student attrition, which is guided by five key groups of theories: psychological, organizational, sociological, interactionalist, and economic (Braxton & Hirschy, 2005).

Psychological Theory

Psychological theories frame attrition and persistence as being a result of psychological processes that occur as the student interacts with the environment (Bean & Eaton, 2000). Bean and Eaton (2000) integrated four psychological theories to explain student attrition and persistence: attitude-behavior theory, coping-behavioral theory, self-efficacy theory, and attribution theory.

Attitude-behavior theory informs on how beliefs lead to attitudes and then attitudes lead to behaviors. Coping-behavioral theory explains how a student adjusts to an environment that he believes that he fits into, while those who do not feel like they fit in may attempt to adapt to their circumstances to succeed. The student may experience stress from perceived hazards from within the environment, therefore the goal is to develop coping mechanisms to mitigate stress. Social integration can be assessed in terms of social approach or social avoidance behaviors. Social approach behaviors can include the practice of participating in clubs and student government or attending social events. Social avoidant activities may include working off campus or returning home frequently.

Self-efficacy theory examines the student's perceptions of his ability to be successful in a given activity. As self-efficacy improves, the student will become more motivated and behave in

more ambitious ways. Attribution theory, as applied in the Bean and Eaton (2000) model, primarily emphasized internal and external locus of control. Students with higher levels of internal locus of control are more inclined to be aware of how their own abilities and behaviors determine their success. Those with external locus of control tend to believe that outside forces are the cause of success or failure.

Altogether, the four theories explain that there is a complex combination of "psychological processes" that occur as successful students participate in higher education that promote "self-efficacy, reduced stress, increased efficacy, and internal locus of control" (Bean & Eaton, 2000, p. 58).

Organizational Theory

Organizational theories frame student attrition and persistence as being similar to employee turnover in the work environment (Chen, 2008). Organizational factors that influence student attrition and persistence include size, structure, faculty to student ratios, and institutional resources. Student decisions to reenroll or leave college are influenced by satisfaction with institutional attributes (Bean & Eaton, 2000).

Sociological Theory

Sociological theories view student attrition and persistence as a product of social characteristics of individuals and organizations (Chen, 2008). Berger (2000) suggested that social reproduction theory has significant relevance in examining student persistence. There are two major components that comprise capital: cultural capital and economic capital. Cultural capital typically results from socialization with the family, peers, and early educational

experiences. Economic capital is represented by the financial resources of the family. Characteristics most commonly associated with the sociological lens include socioeconomic status, race and ethnicity (Chen, 2008), income, and parental educational levels (Berger, 2000).

Social reproduction theory posits that students with the highest levels of a combination of capital assets are considered upper class and use their capital to maintain or improve their social status. Individuals with like backgrounds and comparable capital resources unconsciously share a collective ideology that establish class-based norms. Organizations, including higher education institutions, also seek to capitalize on their cultural and economic capital by projecting an image that is attractive to the most desirable students.

Institutions tend to have majority populations with capital resources that align with the image they project to secure the most desirable students (Berger, 2000). As a result, students who are members of the majority tend to have less trouble adjusting to the institution, while those in the minority are likely to wrestle with questions related to drop out and persistence.

Social attainment theory suggests that parental income levels and career status guide the educational and career status of future generations, referred to as cross-generational uplift (St. John, 2003). Cross-generational uplift holds that each generation will seek to remain in the same socioeconomic status as the previous generation or improve compared to the previous generation.

Interactionalist Theory

Interactionalist theory combines the psychological, organizational, and sociological perspectives (Chen, 2008). As the student interacts with the organization the complex processes

that guide psychological and social integration within the organization influence the student's decisions to leave or reenroll.

Economic Theory

Human capital theory and rational choice theory propose that students make college choice and persistence decisions based on a cost and benefits analysis (St. John, 2003; Yang & Venezia, 2020; Beekhoven, De Jong, & Van Hout, 2002). Students consider the direct costs of attending college which include tuition and fees, books, cost of living, and potential wages that are sacrificed to pursue higher education (St. John, 2003; Chen, 2008; Yang & Venezia, 2020). The costs are weighed against the benefits that the student expects to gain in increased earning potential and improved quality of living. As students compare the cost and benefits in making persistence decisions, the effect of financial aid may weaken over the students' academic career as the investment accrues and remaining cost diminishes (Mabel, 2020).

Beekhoven, De Jong, and Van Hout (2002) suggested that there are three areas in which social and economic class can affect the cost and benefits analysis of students. First, the rational choice theory assumes that all families have sufficient financial resources to support students in their pursuit of higher education, but that does not reflect the reality for many students. Students from higher income families have the resources to continue education, while low-income students may have to drop out due to financial constraints. Second, the costs of not completing a degree may include a descent of social mobility, which higher income families with highly educated parents may be more inclined to evade, consistent with social attainment theory. Third, students' confidence in their abilities to successfully earn a degree can have an impact on the cost and benefits analysis.

As evidenced by the evolution of financial aid in the U.S., human capital theory is the justification of the establishment and continued investment in federal and state financial aid systems (St. John, 2003).

Integrated Theoretical Framework

In some research the term integration is used to describe social and academic integration within the institution. However, much of the research done on the effects of financial aid on student success uses the term integrated to describe the way in which two or more theories are combined into one theoretical framework. Beekhoven, De Jong, and Van Hout (2002) combine integration-based theory for social and academic integration with rational choice theory for a longitudinal study to describe the variation in student success. They analyzed data based on each of the two theories individually and then in a third model that combined the two theories. They found that each theory showed comparable effects on student success for most background variables. The level of parental education had an effect for rational choice theory, but not for the integration-based model. Combining the theories explained more variance than either model alone.

Dowd and Coury (2006) referenced Beekhoven, De Jong, and Van Hout's (2002) theoretical framework in their study on the effects of financial aid on persistence and associate degree attainment. Dowd and Coury (2006) specifically cited integrating the interactionalist model and rational choice theory to take into consideration cognitive and affective elements that contribute to the student's ability to commit to engaging in the college environment and integrating both socially and academically. Under this framework, they found that loans had a negative effect on persistence and no specific type of aid had an effect on earning an associate

degree. They were particularly surprised at the finding that grants did not significantly affect persistence or degree attainment based on rational choice theory.

Dowd (2004) also relied on Beekhoven, De Jong, and Van Hout's (2002) model to study timely bachelor's degree completion within five years. Using the same combination of interactionalist and rational choice theory as Dowd and Coury (2006), Dowd (2004) found that for dependent students, family income does not have an effect on persistence into the second year but does have a significant effect on completing a bachelor's degree. She found that second year persistence was positively affected by state grants and subsidized loans but found no effect for any form of aid on degree attainment. She suggested that grants clearly reduce the student's costs associated with college and should theoretically be found to positively effect persistence and graduation, but it could be that the effect is less direct and it is difficult to control for all possible variables.

Another study on timely degree completion was based on a theoretical framework that combined the integration-based model of social and academic integration with price response theories (DesJardins, Ahlburg, & McCall, 2002). Price response theory suggests that a student's response to changes in cost evolve over time and that decisions to persist are made frequently until the student decides to drop out or graduates. They studied how those decisions were influenced over time by several variables. They found that students who entered college with previous college credit were more likely to earn their degrees in four years than those who had no credit upon entry. In looking at ethnicity, they found that Latino students tend to take longer to earn a degree than White students. No significant effect was found between any type of

financial aid and graduation, but they argue that aid does reduce stop-out behavior which indirectly influences timely graduation.

St. John, Cabrera, Nora, and Asker (2000) developed a financial nexus model also referred to as college-choice persistence nexus model. They suggested that students make persistence decisions based on cognitive, affective, and financial factors. Blending economic theories including price response theory and theories of targeted subsidies with integration-based models of academic and social integration provides a stronger framework for studying the effects of aid on student success. They found that financial aid had only an indirect effect on persistence but that indirect effect was the third most influential in their model.

Chen and DesJardins (2010) suggested a heterogenous approach that integrated all five areas (psychological, sociological, organizational, economic, and interactionalist) with the concept of liquidity constraints. Liquidity constraints explores how different subgroups of people respond differently to changes in financial aid types and amounts. This model helped to understand how disadvantaged students reacted differently than majority groups in college. They studied how racial/ethnic groups varied in drop out behavior based on this model. Their findings indicated that African American and Hispanic students were more likely to drop out in their first year compared to White and Asian students. Low-income students also had a higher likelihood of dropping out than middle- or high-income students.

A recent innovation that is gaining national attention in higher education is the “15 to Finish” strategy promoted by Complete College America (CCA) (2013, p. 1). The idea behind this strategy is that students who earn 30 credits per year are most likely to be on track to

graduate in four years (CCA, 2014). To make this strategy viable, there are several components that must be in place. First, students must have clearly defined academic plans with intensive academic advisement to ensure that students are taking the right courses at the right time in their programs. Second, institutions must incentivize students to take and successfully complete 30 credit hours each year. Some institutions do that by not charging additional tuition beyond 12 credit hours and others provide institutional financial aid programs to mitigate the extra cost of taking the additional credit hours beyond 12. Complete College America (2014) reported data suggesting that these strategies do work, but there is currently little published research on these programs.

Summary

Research has documented that there are serious gaps between college entry and college completion, and institutions are increasingly being called upon to answer for these gaps. One common strategy is to deploy institutional financial aid to influence graduation in four years. However, there is little known about how financial aid actually influences students to make on-time progress toward degree completion. The heterogenous theoretical framework provides context for research to factor in components of psychological, organizational, sociological, interactionalist, and economic theories while also considering that there are liquidity constraints that influence certain subgroups that create differences in how students respond to persistence decisions. This study used a heterogenous approach that considers the factors from four specific areas: sociological, economic, academic, and the liquidity constraints concept.

CHAPTER THREE: METHODOLOGY

This quantitative study of *ex post* facto student data was analyzed using logistic regression to examine the relationship between institution award programs and graduation in four years. This chapter is organized into eight sections: (a) restatement of the problem, (b) research question and hypotheses, (c) participants, (d) measurements, (e) procedures, (f) design and analysis, and (g) the summary.

Restatement of the Problem

The problem that this research sought to address is that institutions need to make data-driven policy decisions when shaping institutional need-based grant and merit-based scholarship programs to increase graduation in four years, but there is little research that can be leveraged to provide insight on what strategies produce significant results specifically for student outcomes such as on-time graduation in four years.

Research Question and Hypotheses

What is the relationship between institutional financial aid programs and graduation in four years?

Hypothesis #1: Students who receive either a merit-based institutional aid only or a merit-based and need-based institutional aid will be more likely to graduate in four years compared to those who only receive need-based institutional aid when accounting for student-level characteristics (gender, ethnicity, EFC, sum of federal grants, SAT scores, high school GPA, transfer credit at admit, and parents' highest education level).

Hypothesis #2: Ethnicity and EFC will moderate the relationship between institutional aid and graduation in four years.

Participants

The study site was a large four-year public research university in the southeastern United States. The initial data file provided to the researcher contained a random sample of 1,000 students from the FTIC, in-state cohort admitted in Summer 2015 or Fall 2015 who had completed the 2015-2016 FASFA and enrolled full-time in Fall 2015. The researcher parsed the file further to exclude students who did not receive either of the institutional award programs, leaving 490 student records for analysis.

Table 2 shows the distribution of gender by ethnicity for the participants in the study. Females outnumbered males in every ethnic group and constituted 65.5 percent of the participants. The participants in the study represented the diversity of the institution (White 39.6 percent; Asian 9.6 percent; Black 20.6 percent; Hispanic 28 percent).

Table 2 Gender by Ethnicity

Ethnicity	Male	Female	Total
White	76	118	194
Asian	18	29	47
Black	29	72	101
Hispanic	44	93	137
Other	2	9	11
Total	169	321	490

The lowest EFC a student could have for 2015-2016 was $0, which translated to the student being eligible for the maximum amount of Federal Pell grant possible. The mean EFC for

participants was $10,676, with a range from $0 to $393,385. The mode EFC was $0 and the median EFC was $3,244. Sixty-one percent of the participants qualified for Federal Pell grant based on the EFC on record, which means the federal government considered those students to be particularly needy for financial assistance.

Table 3 provides a view of the participants' parents' highest education level attained by ethnicity. Sixty-nine percent of participants came from families in which at least one parent had completed college. The remaining 31 percent were considered first generation students.

Table 3 Parents' Highest Education by Ethnicity

	Parents' Highest Education Level				
Ethnicity	Unknown	Middle School	High School	College	Total
White	0	0	35	159	194
Asian	2	4	19	22	47
Black	3	0	31	67	101
Hispanic	2	3	46	86	137
Other	0	0	7	4	11
Total	7	7	138	338	490

Of the 490 participants, 297 students (approximately 61 percent) also received a Federal Pell grant. For those participants who received a federal grant, the average amount was $4,321, with awards ranging from $626 to $6,975. The average high school GPA for participants was 3.96. Figure 4 demonstrates that the high school GPA for this group was a normal distribution. For the participants in this study, the mean SAT score was 1209, with a range from 920 to 1520.

Of the 490 participants in this study, less than half of the participants (231) had transfer credits matriculated upon admission. Some of these credits were most likely the result of dual enrollment in college level courses during high school.

Measurements

Types of Awards

The merit-based scholarships in this study were awarded to incoming FTIC students who demonstrated high academic performance based on high school credentials and college exam scores. These programs are often referred to as recruitment scholarships and are typically used to attract high quality students to the institution. These merit-based scholarships were renewable at the end of each academic year with a career funding limit of eight semesters.

Need-based grants are awarded to students who demonstrate a significant financial need. The financial need is determined by subtracting the EFC from the school's cost of attendance. Need-based grants are generally intended to increase access to those with limited financial resources. The need-based grant programs in this study were non-renewable, but students may have been found to be eligible in subsequent years but limited to receiving funding up to the point at which they attempted 132 credit hours

The two largest merit-based scholarship programs and the two largest need-based grant programs were selected for this study. These four programs accounted for approximately 41 percent of all institutional award programs at the selected site. Table 4 provides a breakdown of the funding of the programs being studied.

Table 4 Institutional Award Program Disbursed 2015-2016

Institutional Award Program	Disbursed	Unique Student Counts	% of Total Institutional Funding
Need-Based Grant	$10,298,864	8,699	22.24%
Merit-Based Scholarship	$9,023,094	2,789	19.48%
Total	$19,321,958	11,488	41.72%

Gender and Ethnicity

Gender (male or female) and ethnicity (White, Asian, Black, Hispanic, and Other) data was reported by the student on an admission application.

Expected Family Contribution

The EFC is an index number that is utilized to determine eligibility for Federal Pell grant and other aid and is provided to the higher education institutions selected by the student on the FAFSA with the results of the FAFSA. The U. S. Department of Education published the EFC formulas for the aid year along with the formula worksheets and tables (Federal Student Aid, U.S. Department of Education, 2015).

There were three standard formulas and each of the standard formulas had a simplified version as well. Formula A is used to calculate an EFC for dependent students. Formula B calculates the EFC for independent students with no dependents in their household. Formula C is used to calculate the EFC for independent students with dependents in their household. Each formula has a set of tables that are referenced to calculate allowances in the formula such as state and other taxes, social security taxes, and assets protection.

Formula A calculates an expected contribution based on parental information and an expected contribution based on the dependent student's information, which for most high school graduates is negligible. For dependent students, the formula primarily weighs the parental contribution. A flowchart model of the parental contribution calculation of Formula A for a dependent student is presented in Figure 2. It provides a visual representation of the components that were used to calculate the parent contribution for an EFC for 2015-2016 (Federal Student Aid, U.S. Department of Education, 2015).

The parents' total countable income including adjustable income and untaxed income was combined, and then allowances based on the total income were excluded. Some of these allowances included federal, state, and payroll taxes as well as an allowance for cost of living. The formula produced an amount from income that the parents have been expected to have available for educational expenses for a nine-month period. Next, the parents' assets was evaluated. To evaluate parental assets, the formula considered the oldest parent's age to provide an asset protection for retirement purposes – the older the parent, the higher the asset protection allowance. The formula calculated the resources from parents' assets that was considered available for their student's educational expenses for a nine-month period. The contribution from income and the contribution from assets were added together to produce the total parent contribution after accounting for other siblings that are in college.

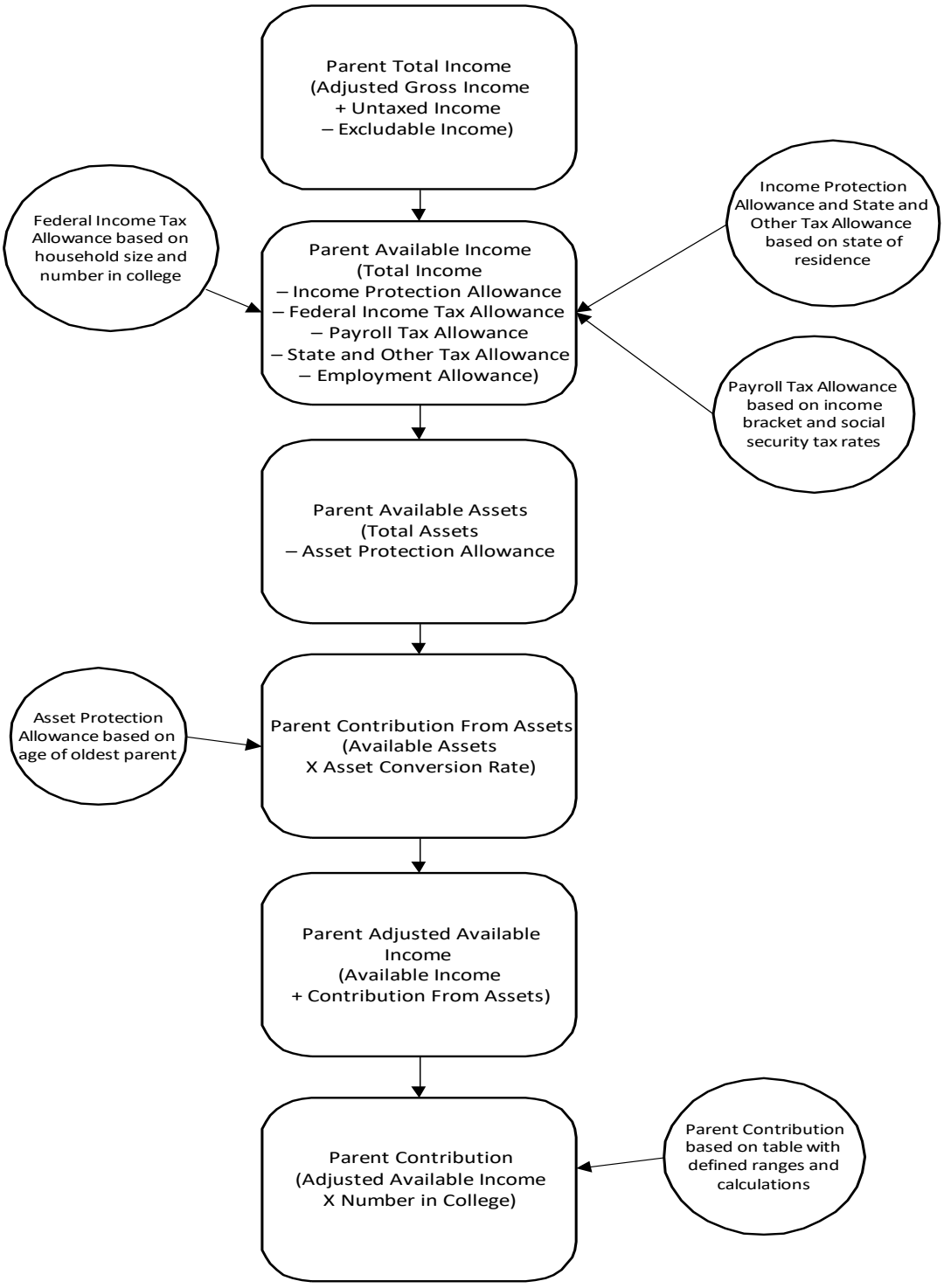

Figure 2 Parent Contribution Calculation for Dependent Student EFC

Source: Federal Student Aid, U.S. Department of Education (2015)

Parents' Highest Education Level

The parents' highest education level was collected from the participants' financial aid record from the 2015-2016 FAFSA. This item was self-reported by students for each parent. The possible answers included Unknown, Middle School, High School, or College.

Sum of Federal Grants in First Year

The sum of federal grants was collected from each participant's financial aid record for 2015-2016 and included disbursed federal grants for Fall 2015 and Spring 2016.

High School GPA

High school GPA was collected from high school transcripts on record at the institution. The high school GPA can range from zero to five, with values over 4 indicating honor courses.

SAT Scores

The SAT is an entrance exam taken by high school students to measure readiness for college. SAT scores are used by many higher education institutions in admission decisions as well as predicting other student outcomes including second-year retention, freshman year GPA, and graduation in four years and six years (Shaw, 2015).

The SAT was redesigned in 2016 resulting in changes to scoring. Therefore, the SAT scores from prior to 2016 were converted to the new scores using the Old SAT Scores to New SAT Scores concordance table (College Board, 2016). Students in the sample who did not have an SAT score, did have an ACT score. The ACT is also an entrance exam used by higher education institutions to predict student readiness for college. The ACT scores for students without SAT scores were converted to new SAT scores using the ACT/SAT Concordance table.

Validity studies for the old SAT demonstrated a strong association between the scores and student outcomes (Shaw, 2015). The corrected (for restriction of range) correlation coefficient for the association between freshman year GPA and SAT was consistently close to 0.55, suggesting good predictive validity. Likewise, higher SAT scores were associated with higher second-year retention. Students with the highest SAT scores were retained about 90 percent of the time while those in the lowest range were retained at about 60 percent. Additionally, 75 percent of students in the highest SAT score range graduated in four years compared to 20 percent of those in the lowest SAT score range.

The first validity study since the redesign found that SAT scores increased predictability of student outcomes by 15 percent compared to predictions using only grades (College Board, 2019b). The correlation coefficient for the relationship between freshman year GPA and SAT scores after correction for restriction of range was 0.51, suggesting that first year GPA and SAT scores are strongly correlated with one another. Students in the highest SAT score range were retained to second year at 92 percent while those in the lowest range retained at only 65 percent.

Transfer Credits at Admit

Transfer credits at admit were collected from the participant's academic records and summed all credits earned prior to admission to the institution.

Procedures

The data were provided to the researcher by the financial aid office at the institution. Only the requested variables for the sample were included in the data file and personally identifiable information was masked prior to the file being provided to the researcher. The data

included demographic information about each student including SAT and ACT scores, high school GPA, transfer credits upon matriculation, gender, ethnicity, 2015-2016 Expected Family Contribution (EFC), parents' highest education level, and 2015-2016 dependency status as determined by the FAFSA.

Design and Analysis

A causal-comparative design was used to examine the relationship between the type of institutional award program and graduation in four years. The purpose was to make inferences on whether certain types of institutional award programs influence students to graduate in four years, and if so, to what degree.

The dependent variable for both hypotheses was graduation in four years. For this sample, a student who completed a bachelor's degree by the end of Summer 2019 would have graduated within four years.

The independent variable of focus for both hypotheses was the type of institutional award received. There were three factor levels: students who received only a need-based grant, only a merit-based scholarship, and both a merit-based scholarship and a need-based grant. This study specifically examined the four largest institutional award programs, two merit-based scholarships and two need-based grants. Students could not receive both of the need-based grants, nor could they receive both of the merit-based scholarships. However, students could receive one of each.

Covariates were selected based on prior research to reflect the four areas of the theoretical framework: sociological, economic, academic, and liquidity constraints. The sociological framework considered theory of social reproduction, social attainment, and cross-

generational uplift. The covariates used for the sociological framework were gender, ethnicity, EFC, and parent's highest education level. The economic framework included the cost-benefits analysis. To reflect economic framework, the researcher included only in-state students to ensure that the students in the sample had like costs and used sum of federal grants as a covariate. The academic framework was represented by the inclusion of high school GPA, SAT scores, and transfer credit at admission as covariates. Liquidity constraints were reflected by examining interactions between ethnicity, EFC, and the type of award received.

Logistic regression in SPSS was employed to analyze data. The researcher entered the variables using a forward hierarchical method and compared the models for best fit (Lomas & Has-Vaughn, 2012). Table 5 summarizes the design and analysis for each hypothesis. For hypothesis one, the model measured the relationship between graduation in four years and the type of award received when accounting for gender, ethnicity, EFC, high school GPA, SAT scores, sum of federal grants, transfer credit at admit, and parents' highest level of education. For hypothesis two, the model tests for all two-way and three-way interactions between ethnicity, EFC, and type of award on graduation in four years.

Table 5 Hypotheses with Variables, Moderators, and Tests

Hypotheses	Dependent Variable	Independent Variables	Moderators	Covariates	Test
Students who receive merit-based institutional aid will be more likely to graduate in four years compared to those who only receive need-based institutional aid when accounting for student-level characteristics	Graduation in four years (Yes, No)	Institutional Award (need-based only, merit-based only, both)	None	Gender, ethnicity, EFC, HS GPA, SAT score, sum of federal grants, transfer credit at admit, parents' highest education level	Logistic Regression
Ethnicity and EFC will have interactional effects on the relationship between institutional aid and graduation in four years when accounting for student-level characteristics	Graduation in four years (Yes, No)	Institutional Award (need-based only, merit-based only, both)	Ethnicity, EFC	HS GPA, transfer credit at admit	Logistic Regression

Summary

The aim of this study using a causal-comparative design was to identify relationships between institutional aid programs and graduation in four years. The data was collected by querying the student information system for specific data elements including the dependent variable (graduation in four years), the independent variable (type of institutional award received), covariates (gender, ethnicity, EFC, high school GPA, SAT/ACT scores, sum of federal

grants for first year, transfer credits earned before admission, and parents' highest education level). Logistic regression was used for the analysis.

CHAPTER FOUR: RESULTS

Introduction

Logistic regression analysis was used to test for relationships between the type of institutional award program and whether students graduated within four years. For hypothesis one, no relationship was found between the type of award program and graduation in four years. For hypothesis two, no 2-way or 3-way interactions were found between EFC, type of award, and graduation within four years.

Testing the Assumptions

To obtain valid results, the following assumptions must be met for a logistic regression: noncollinearity, linearity of relationship between predictor values and the logit of the dependent variable, and the absence of outliers in the residuals. Noncollinearity requires that there is not a strong linear relationship between two or more of the predictor variables. This was measured by analyzing tolerance and Variance Inflation Factors (VIF) from a linear regression using ordinary least squares. According to Lomax and Has-Vaughn (2012), tolerance calculated at less than 0.20 indicates that multicollinearity is present with values of less than 0.10 representing serious violation of the assumption. Additionally, VIF larger than 0.10 indicates that noncollinearity does not exist. Table 6 displays the tolerance and VIF for all the independent variables, covariates, and moderators included in the full models for either hypothesis. A serious violation of noncollinearity was found on parent highest education level for high school and college.

Table 6 Hypothesis One Full Model Collinearity Statistics

	Tolerance	VIF
Merit-based	0.495	2.022
Both	0.862	1.160
Asian	0.780	1.281
Black	0.714	1.400
Hispanic	0.762	1.312
Other	0.940	1.064
HS GPA	0.762	1.312
SAT	0.576	1.736
EFC	0.751	1.331
Sum of Federal Grants 1st Year	0.738	1.356
Transfer Credit at Admit	0.964	1.037
Parent Highest Education Middle School	0.491	2.035
Parent Highest Education High School	0.066	15.219
Parent Highest Education College	0.064	15.711

The final model for the hypotheses did not present with any violations of noncollinearity. Table 7 shows the tolerance and VIF for the final model.

Table 7 Hypothesis One Final Model Collinearity Statistics

	Tolerance	VIF
Merit-based	0.802	1.246
Both	0.951	1.051
HS GPA	0.779	1.284
Transfer Credit at Admit	0.979	1.021

Linearity in logistic regression holds that the continuous predictor variables have a linear relationship with the logit of the dependent variable (Lomax & Hahs-Vaughn, 2012). Continuous variables were tested using the Box-Tidwell transformation (1962), which transforms each continuous variable to its logit, the natural log of the variable multiplied by the variable and

testing for an interaction between the logs and the independent variables. Three continuous variables (EFC, sum of federal grants, and transfer credit at admit) had values that included zero. To prevent undefined results from a natural log of zero, the value of one was added to all existing values of the logits. High school GPA ($p = 0.148$), SAT ($p = 0.148$), sum of federal grants ($p = 0.065$), and transfer credit at admit ($p = 0.121$) demonstrated linear relationships with the logit of the dependent variable.

Cook's distance was used to identify any outliers with undue influence for the full or final model for both hypotheses. A value greater than one indicates extreme outliers (Cook & Weisberg, 1982). For hypothesis one, Cook's distance demonstrated a maximum value of 0.060 for the full model and a maximum value of 0.044 for the final model. For hypothesis two, the Cook's distance for the final model calculated a maximum value of 0.033.

Testing the Hypotheses for the Research Questions

Hypothesis One

A logistic regression was used to determine if students who received merit-based institutional aid would be more likely to graduate in four years compared to those who only received need-based institutional aid when accounting for student-level characteristics (gender, ethnicity, EFC, sum of federal grants, SAT scores, high school GPA, transfer credit at admit, and parent's highest educational level). The model was estimated with a hierarchical forward (likelihood ratio) method. Both the log likelihood ratio test ($\chi^2(4) = 37.359$, $p < .001$) and the Hosmer and Lemeshow goodness of fit ($\chi^2(8) = 3.54$) indicated that the fit of the model was good. The Nagelkerke R^2 assessed that the model explained about 9.8 percent of variance. Only

two of the 15 covariates were found to be statistically significant. Table 7 provides the statistics for the independent variable and the covariates that were included in the final model. The result showed that after accounting for high school GPA and transfer credit at admit, there was not a significant relationship between the type of award and four-year graduation ($\chi^2(2) = 0.601$, $p = 0.740$). The regression equation is:

Predicted logit of (Graduation in 4 years) = -6.249 + (-0.091)(Merit-based) + (0.435)(Both) + (1.557)(High School GPA) + (0.011)(Transfer at admit). (1)

Table 8 Logistic Regression Model

	β	*SE β*	*Wald's* χ^2	*df*	*p*	*OR*
Type of Award			0.601	2	0.740	
Merit-based vs. Need-based	-0.091	0.238	0.147	1	0.701	0.913
Both vs. Need-based	0.435	0.711	0.375	1	0.540	1.546
High School GPA	1.557	0.329	22.444	1	0.000	4.743
Transfer Credit at Admit	0.011	0.006	4.072	1	0.044	1.011

Table 8 displays the tests for the covariates that did not predict four-year graduation. The Lagrange multiplier (*LM*) estimates the improvement in the fit of the model if the variables were included in the model. All omitted variables failed to make statistically significant improvements to the model.

Table 9 Covariates Not Included in the Model

Covariates not included in the model	*LM*	*df*	*p*
SAT	0.163	1	0.686
Ethnicity	1.434	4	0.838
Asian vs. White	0.167	1	0.682
Black vs. White	0.090	1	0.764
Hispanic vs. White	0.434	1	0.510
Other vs. White	0.049	1	0.825
Gender (Male)	1.432	1	0.825
EFC	1.963	1	0.161
Sum of Federal Grants in 1st Year	1.192	1	0.275
Parents' Highest Ed	6.037	3	0.110
Middle School vs. Unknown	0.659	1	0.417
High School vs. Unknown	0.052	1	0.819
College vs. Unknown	0.035	1	0.851

Note: LM = Lagrange multiplier

Hypothesis Two

A second logistic regression was used to determine if ethnicity and EFC had moderating effects on the relationship between institutional aid and graduation in four years after accounting for the two covariates that contributed to the previous model. This model tested all two-way and three-way interactions between type of award, ethnicity, and EFC while controlling for high school GPA and transfer credit at admit. Only students with merit-based institutional awards had a broad range of EFCs ranging from $0 to $393,385. Those with need-based institutional grants had a restricted range of EFCs between $0 and $8,981, as an EFC above $9,000 makes them ineligible for this type of award. Since the type of award was confounded with EFC, only students with EFCs less than or equal to $8,981 were included in the analysis.

There were no statistically significant three- or two-way interactions with type of award. Therefore, neither EFC or ethnicity moderated the relationship between type of award and four-year graduation. Table 9 displays the results of the three-way interactions. Table 10 displays the results of the logistic regression for the two-way interactions.

Table 9 Logistic Regression Testing for Three-Way Interactions

	β	*SE β*	*Wald's* χ^2	*df*	*P*	*OR*
Merit*EFC*Asian	-0.048	28.216	0.000	1	0.999	0.953
Merit*EFC*Black	0.001	0.001	2.495	1	0.114	1.001
Merit*EFC*Hispanic	0.001	0.001	0.859	1	0.354	1.001
Both*EFC*Asian	0.000	27.119	0.000	1	1.000	1.000
Both*EFC*Black	-0.001	47.927	0.000	1	1.000	0.999
Both*EFC*Hispanic	-0.004	284.283	0.000	1	1.000	0.996

Table 10 Logistic Regression Testing for Two-Way Interactions

	β	*SE β*	*Wald's* χ^2	*df*	*P*	*OR*
Merit*EFC	-0.001	.000	2.341	1	0.126	0.999
Merit*Asian	2.084	1.364	2.335	1	0.127	8.034
Merit*Black	0.697	1.029	0.459	1	0.498	2.008
Merit*Hispanic	-1.107	1.303	0.722	1	0.395	0.330
Both*EFC	0.000	0.002	0.000	1	0.995	1.000
Both*Asian	18.942	28276.390	0.000	1	0.999	168375725.1
Both*Black	-22.838	28397.040	0.000	1	0.999	0.000
Both*Hispanic	20.315	23204.695	1.211	1	0.274	1.385

Summary

The research question for this study sought to examine relationships between institutional award programs and graduation in four years. For this sample, there is no evidence that either of the need-based grant awards or the merit-based scholarships had a significant relationship with graduating in four years when controlling for high school GPA and transfer credit at admit. There was no evidence that either EFC or ethnicity moderated the effect of type of institutional award on graduation within four years. The best fitting model is the final model from hypothesis one.

CHAPTER FIVE: DISCUSSION

Discussion of the Findings

For hypothesis one, there was no statistically significant difference between students with need-based awards and students with merit-based awards on graduation in four years when controlling for high school GPA and transfer credits at admit. Additionally, students with a combination of a need-based grant and a merit-based scholarship did not differ from students with only a need-based grant. It is worth noting that none of the need-based grants or merit-based scholarships selected for this study were designed for the purpose of influencing on-time graduation. However, there is often an expectation that these awards would likely exert some influence, even if it is indirect (Goldrick-Rab et al., 2009).

For hypothesis two, neither the EFC nor ethnicity had moderating effects on type of institutional award on graduation in four years for this sample. The results of this study did not support the application of the concept of liquidity constraints on graduation in four year, in which students of underserved populations such as Black/African American and Hispanic students modify persistence decisions based on limited financial resources (Chen & DesJardins, 2010). The restricted selection of students with EFCs of $9,000 or less may have contributed to this finding since high income students were excluded from this analysis.

Chen and DesJardins (2010) suggested that research has contributed to the knowledge of how financial aid affects students by ethnic groups but argued that the research is still lacking. They suggested that the data on this topic is outdated and failed to examine interactional effects between the type of award program and ethnicity. Their study found an interaction between the

Federal Pell grant and ethnicity on drop-out risk using a discrete-time event history model. Their results suggested that for Asian students the larger the Federal Pell grant received there is a smaller chance of drop-out behavior. It may be that the concept of liquidity constraints is best applied to studies investigating persistence decisions over time rather than graduation outcomes.

Implications for Practice

On the findings for hypothesis one, the primary implication for financial aid administrators and their leadership is that award programs designed to increase access and attract students may be successful for the purpose for which it is designed but may not be a useful tool to directly improve time to degree completion. According to St. John (2000), it is important to understand the meaning of the coefficients. A significant and negative coefficient would suggest that the aid is having a negative influence on four-year graduation rates, while a significant and positive coefficient would suggest the opposite. In this case, a non-significant coefficient suggests that the institutional awards are leveling the playing field for students to persist and graduate without doing harm or advancing the probability of graduating in four-years. This makes the non-significant finding for hypothesis one a noteworthy one.

If new programs must be developed to improve student success outcomes, it may force institutions to reappropriate funds that were historically reserved for promoting access and opportunity or recruitment, unless the institution can produce additional funds for the new programs. Research has already shown that programs used for access and opportunity and recruitment have been statistically proven to improve initial enrollment and second year retention. Taking funds away from established, successful programs to create programs for

another purpose could have negative consequences to other important measures by which the institution is accountable.

There is substantial research that indicates that the family financial situation and/or ethnicity does influence student persistence and completion (Nettles, 2017; Bailey & Dynarski, 2011; Millea et al., 2018; Goldrick-Rab et al., 2009; Kuh et al., 2007; Ma et al., 2019). Yet, the findings of hypothesis two suggest otherwise. The institutional award programs in this study functioned similarly across ethnicities and income ranges for students whose EFCs range from $0 to $9,000 in terms of on-time graduation. Since all EFCs could not be included, these findings are limited in application. Also, the concept of liquidity constraints may be more applicable over a longitudinal model as demonstrated by Chen and DesJardins (2010) that examines persistence decisions made over time rather than on the outcome of on-time graduation.

The completion gap between ethnic groups remains stark (Nettles, 2017). While Asians outperform Whites, Blacks/African Americans and Hispanics underperform significantly compared to Whites. This presents another competing goal for institutions – to use institutional aid to promote equity across ethnicities in student outcomes. Equity implies that the goal is to help those with varying levels of socioeconomic status to obtain access to higher education and opportunity to succeed rather than treating all students the same regardless of socioeconomic status as is done under policies focused on equality. Since socioeconomic status involves sociological factors such as race and ethnicity in addition to economic factors, it is possible that only looking at EFC in awarding practices may not be enough. Chen (2008) suggested that higher education needs to use research to determine how to shape award programs to attempt to reduce the completion gap between ethnic groups.

Limitations and Delimitations

Limitations

Goldrick-Rab et al. (2009) and Reigg (2008) cautioned against making causal inferences based on omitted variable bias. Although, this study attempted to account for as much variance as possible, there are far too many unobserved variables that cannot be accounted for. A significant limitation of this research includes not being able to control for factors related to psychological and organizational frameworks. Using only data from the student information system cannot provide data on social interactions within the institution, levels of engagement, self-efficacy, or locus of control – all of which may predict graduation or mediate the relationship between grant receipt and graduation. The violation of the noncollinearity for parents' highest education levels may have presented as a limitation had this covariate not been eliminated from the final model.

Selection-bias is an inherent challenge when studying the influence of financial aid programs (Castleman & Long, 2016). Selection-bias refers to situations where cases are not randomly assigned. While a random sample was generated for this study, the sample was limited to the population of students who had applied for aid and received one or more of the institutional award programs under study. This means that all students were essentially self-selected into the population by virtue of the financial aid application. Additionally, factors that contribute to being eligible for a need-based award or a merit-based award can also lead to a bias. Students awarded an institutional need-based grant tend to have limited family financial resources, which in itself is negatively associated with persistence and degree completion (Bailey

& Dynarski, 2011), and with extended time to degree completion (Bound, Lovenheim, & Turner, 2007).

Another factor leading to eligibility of institutional need-based grants is the behavior associated with submitting a FAFSA. The 2013 Update of the NCES High School Longitudinal Study of 2009 found that about 65 percent of students completed the FAFSA for their first year in college (Bahr, Sparks, Hoyer, ED, & AIR, 2018). Twenty-four percent of students did not file a FAFSA while 3 percent indicated that they were unaware of what the FAFSA was. There are just as many reasons why students do not complete the FAFSA as there are factors that lead a student to complete the FAFSA. It is impossible to separate these factors from other factors that lead to on-time graduation. Timing of when the FAFSA is completed is also critical to qualifying for institutional need-based grants since most schools use a deadline date to distribute the limited funding. Feeney and Heroff (2013) found that students with higher EFCs tend to complete the FAFSA earlier than those with the lowest EFCs (below $2,000).

College readiness and family income can also confound results related to financial aid and student success. Students who are exceptionally well prepared for college tend to be from higher income families and will likely have greater success in college than students who are less academically prepared or underprepared who tend to be from less wealthy family backgrounds. The majority of the sample students who received merit-based scholarships were from higher family income brackets than those who received need-based grants. Of those students in the sample who received a merit-based award, 74.8 percent had EFCs above the Pell eligibility cutoff ($5,198) for 2015-2016 and 74.0 percent had EFCs above $9,000. Need-based grants in

the sample were distributed only to students with EFCs $9,000 and below, with 75.6 percent of need-based grants going to those with EFCs less than $5,199.

A limitation on the analysis of hypothesis two is the fact that the cases selected for analysis had a restricted EFC range of $0 to $9,000. This basically excluded higher income families from the analysis. The moderating effect of EFC on type of award may have been undervalued because of the restricted range.

Delimitations

The researcher used several delimitations in this study. First, the study was limited to one large public university in the southeastern United States. Institutions across the region and the U.S. use a wide array of criteria and rules to manage institutional award programs so the results may not be generalizable to other institutions. However, it can begin a conversation on how specific types of institutional award programs may influence graduation in four years. Another delimiter was that the study was limited to only specific institutional award programs. The influence of most federal, state, and private aid was not being considered as a part of this study. Additionally, the institutional award programs were not created for the purpose of improving graduation in four years. The last delimiter was that the study was limited to only one cohort and therefore may not be useful to generalize to other cohorts.

Recommendations for Further Research

Future research should seek to answer questions on what makes an institutional award program effective on moving students toward on-time graduation in four years. Some institutions and states have created award programs designed for this purpose, but little research has been

published to support the effectiveness or provide details on the mechanisms of the award policy that promote on-time graduation in four years. For a deeper understanding, research should focus not only on what aspects of the policies of an award program does to improve on-time graduation overall but should seek to understand how the policies of an award program affect student success of historically underserved populations as well.

Future research should also consider the contributions of bundled services such as CCA's (2014) guided pathways and enhanced academic advisement in combination with aid. Guided pathways and enhanced academic advisement must be pervasive in the administration of aid to targeted students, as opposed to passive academic advisement in which the student must seek out guidance.

Another key component for researchers to elaborate on is how institutions can incentivize students to stay on track with course selections and take the course load required to graduate in four years. Part of this research should seek to identify which types of students are more likely to be influenced by such incentives as well as what strategies work.

Additional future research should focus on how renewal criteria or award amount affect graduation in four years. Researchers can explore whether renewable awards are more effective than establishing eligibility annually for awards.

Conclusions

University leadership and administrators must balance a host of priorities imposed by the international community, federal government, state governments, local communities, and others. Financial aid is oftentimes one of those areas that many look to as a tool to influence student

behavior. Research has supported the notion that financial aid makes significant contributions to students' decisions to begin attending an institution. Financial aid is also long thought to be influential in encouraging students to persist and graduate. However, very little has been documented on if and how financial aid directly influences student success after initial enrollment.

With institutional aid now the largest portion of student financial aid provided to students, administrators at institutions are seeking ways to leverage institutional aid to improve student success metrics such as graduation in four years. This presents more competing priorities for aid administrators. The challenge for aid administrators is how to leverage aid to achieve enrollment goals, retention goals, and on-time graduation goals without disenfranchising any other groups of students.

Although the institutional award programs under scrutiny in this study were designed to attract students to the institution and reduce cost of attendance, high level administrators expect that those programs also promote retention and graduation. The results of this study indicated that the type of award has no statistically significant relationship with graduation in four years. This study did not attempt to track indirect effects of these programs on graduation in four years, nor did it examine any award programs that were specifically designed to improve graduation in four years. This study also found no moderating effects between EFC or ethnicity and type of institutional award on graduation in four years.

Administrators must not assume that all aid programs should or do promote on-time graduation. To intentionally influence on-time graduation by leveraging institutional financial

aid, institutions need to design award programs explicitly for the purpose of promoting on-time graduation. However, as noted by CCA (2014), such programs may need to include a bundle of strategies that enhance academic advisement and guided pathways in combination with reducing cost of attendance.

APPENDIX
IRB DETERMINATION OF NONHUMAN SUBJECT RESEARCH

UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board
FWA00000351
IRB00001138, IRB00012110
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

NOT HUMAN RESEARCH DETERMINATION

April 30, 2021

Dear Dawn Herrod:

On 4/30/2021, the IRB reviewed the following protocol:

Type of Review:	Initial Study
Title of Study:	An Examination of the Relationship Between Institutional Financial Aid Programs and Four-Year Graduation Rates
Investigator:	Dawn Herrod
IRB ID:	STUDY00003028
Funding:	None
Grant ID:	None
Documents Reviewed:	• Dawn Herrod, Category: Faculty Research Approval; • Dawn Herrod, Category: IRB Protocol;

The IRB determined that the proposed activity is not research involving human subjects as defined by DHHS and FDA regulations.

IRB review and approval by this organization is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are research involving human in which the organization is engaged, please submit a new request to the IRB for a determination. You can create a modification by clicking **Create Modification / CR** within the study.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

Racine Jacques, Ph.D.
Designated Reviewer

REFERENCES

Bailey, M. J., & Dynarski, S. M. (2011). *Gains and gaps: Changing inequality in U.S. college entry and completion*. National Bureau of Economic Research. https://www.nber.org/papers/w17633

Box, G.E. P., & Tidwell, P. W. (1962). Transformation of the independent variables. *Technometrics, 4*(4), 531-550.

Bound, J., Lovenheim, M. F., & Turner, S. (2007). *Understanding the increased time to the baccalaureate degree.* Stanford Institute for Economic Policy Research. https://siepr.stanford.edu/sites/default/files/publications/06-43_0.pdf

Bound, J., Lovenheim, M. F., & Turner, S. (2009). *Why have college completion rates declined? An analysis of changing student preparation and collegiate resources*. National Bureau of Economic Research. https://www.nber.org/papers/w15566.pdf

Cabrera, A. F. (1992, April 20-24). *The Role of Finances in the Persistence Process: A Structural Model*. The Annual Meeting of the American Educational Research Association, San Francisco, CA.

Capt, R. L. (2013). Analysis of the Higher Education Act Reauthorizations: Financial Aid Policy Influencing College Access and Choice. *Administrative Issues Journal: Education, Practice, and Research*, *3*(2), 1-16. doi:10.1037/0278-6133.24.2.225

Castleman, B. L. & Long, B. T. (2016). Looking beyond enrollment: The causal effect of need-based grants on college access, persistence, and graduation. *Journal of Labor Economics, 34*(4), 1023-1073.

College Board (2016). *Concordance tables: Old SAT scores to new SAT scores*. https://collegereadiness.collegeboard.org/educators/higher-ed/scoring/concordance

College Board (2018). *Guide to the 2018 ACT©/SAT© Concordance.* https://collegereadiness.collegeboard.org/pdf/guide-2018-act-sat-concordance.pdf

College Board. (2019a). *Trends in student aid 2019*. https://research.collegeboard.org/pdf/trends-student-aid-2019-full-report.pdf

College Board (2019b). *Validity of the SAT© for predicting first-year grades and retention to the second year.* https://collegereadiness.collegeboard.org/pdf/national-sat-validity-study.pdf

Complete College America (CCA). (2014). *Four-year myth. Make college more affordable. Restore the promise of graduating on time.* Retrieved from https://completecollege.org/wp-content/uploads/2017/05/4-Year-Myth.pdf

Complete College America (CCA). (2013). *The power of 15 credits: Enrollment intensity and postsecondary student achievement.* Retrieved from https://completecollege.org/wp-content/uploads/2017/11/CCA-Intensity-Brief-April3-1.pdf

Cook, R. D., & Weisberg, S. (1982). *Residuals and influence in regression*. Chapman Hill.

DeAngelo, L., Franke, R., Hurtado, S., Pryor, J.H., & Tran, S. (2011). *Completing college: Assessing graduation rates at four-year institutions.* Higher Education Research Institute at UCLA. https://www.heri.ucla.edu/DARCU/CompletingCollege2011.pdf

DesJardins, S. L. & McCall, B. P. (2010). Simulation the effects of financial aid packages on college stopout, reenrollment spells, and graduation chances. *The Review of Higher Education, 33*(4), 513-541.

Dynarski, S. M. (2000). *Hope for whom? Financial aid for the middle class and its impact on college attendance.* National Bureau of Economic Research. https://www.nber.org/papers/w7756

Dynarski, S. & Scott-Clayton, J. (2013) Financial aid policy: Lessons from research. *Future of Children, 23*(1), 67-91.

Feeney, M., & Heroff, J. (2013). Barriers to need-based financial aid: Predictors of timely FAFSA completion among lower-income students. *Journal of Student Financial Aid, 43*(2), 65-85.

Florida Board of Governors. (2018, December). *Performance funding model – Schedule of changes in common metrics [Information Brief]*. Florida Board of Governors. https://www.flbog.edu/wp-content/uploads/BUD-02d-Info-Brief-on-PBF-Metric-Schedule.pdf

Fuller, M. B. (2014). A History of Financial Aid to Students. *Journal of Student Financial Aid, 44*(1), 42-68.

Goldrick-Rab, S., Harris, D. N. & Trostel, P. A. (2009). Why financial aid matters (or does not) for college success: Toward a new interdisciplinary perspective. In J.C. Smart (Ed.), *Higher education: Handbook of theory and research*. Vol. 24, (pp. 1-46). Springer.

Gross, J. P. K., Berry, M., & Reynolds, P. (2015). The differential effects of financial aid on degree completion by gender. *Strategic Enrollment Management Quarterly, 3*(1), 1-19.

Heller, D. E. (2002). The policy shift in state financial aid programs. In J.C. Smart & W.G. Tierney (Ed.), *Higher education: Handbook of theory and research*. Vol. 17, (pp. 221-261). Springer.

Higher Education Act (HEA) of 1965, Pub. L. No. 89-329, 79 Stat. (1965).

Hosmer, D. W. & Lemeshow, S. (2000). *Applied logistic regression (*2nd ed.). John Wiley and Sons, Inc.

Kalsbeek, D. H. & Hossler, D. (2010). Enrollment management: Perspectives on student retention (Part I). *College and University, 85*(3), 2-11.

Kalsbeek, D. H. (2013). Framing Retention for Institutional Improvement: A 4 Ps Framework. *New Directions for Higher Education, 2013*(161), 5–14. https://doi.org/10.1002/he.20041

Kuh, G. D., Kinzie, J., Cruce, T., Shoup, R. & Gonyea, R. M. (2007). *Connecting the dots: Multi-faceted analyses of the relationships between student engagement results from the NSSE, and the institutional practices and conditions that foster student success*. Revised final report prepared for Lumina Foundation for Education. Indiana University Bloomington: Center for Postsecondary Research. http://cms.uhd.edu/qep/QEP_web_page_files/Connecting_the_Dots_Report.pdf

Lomax, R. G. & Hahs-Vaughn, D. L. (2012). *An Introduction to Statistical Concepts* (3rd ed.). Routledge.

Ma, J., Pender, M. & Welch, M. (2019). *Education pays 2019: The benefits of higher education for individuals and society.* College Board. https://research.collegeboard.org/pdf/education-pays-2019-full-report.pdf

Maher, B. D. (2016). Divided by loyalty: The debate regarding loyalty provisions in the National Defense Education Act of 1958. *History of Education Quarterly, 56*(2), 301-330.

Millea, M., Wills, R. Ekder, A., & Molina, D. (2018). What matters in college student success? Determinants of college retention and graduation rates. *Education, 138*(4), 309-322.

National Center for Educational Statistics, IPEDS. (Winter 2019-20). *Graduation rates component.* https://nces.ed.gov/ipeds/Search?query=&query2=&resultType=all&page=1&sortBy=date_desc&overlayTableId=28424

National Center for Educational Statistics. (2018). *2015-2016 National Postsecondary Student Aid Study (NPSAS:16). First Look.* U. S. Department of Education.

National Defense Education Act (NDEA) of 1958, Pub. L. No. 85-864, 72 Stat. (1958). https://catalog.archives.gov/id/299869

Nettles, M. (2017). *Challenges and opportunities in achieving the national postsecondary degree attainment goals.* (Research Report No. RR-17-38). Princeton, NJ: Educational Testing Service. https://doi.org/10.1002/ets2.12141

Ortiz, S. R. (2010). *Beyond the bonus march and GI Bill.* NYU Press.

Price, D. V. & Davis, R. J. (2006). *Institutional Grants and Baccalaureate Degree Attainment*. National Association of Student Financial Aid Administrators.

Reigg, S. K. (2008). Causal inference and omitted variable bias in financial aid research: Assessing solutions. *The Review of Higher Education, 31*(3), 329-354.

Rutherford, A. (2016). Goal complexity in financial aid and the contingency of organizational sector. *Journal of Student Financial Aid, 46*(2), 2-24.

Qin, L., & Phillips, G. A. (2019). The best three years of your life: A prediction of three-year graduation with diagnostic classification model. *International Journal of Higher Education, 8*(6), 231-239.

Schneider, M. (2010). Finishing the first lap: *The cost of first-year student attrition in America's four-year colleges and universities.* The American Institute for Research. https://www.air.org/sites/default/files/AIR_Schneider_Finishing_the_First_Lap_Oct101.pdf

Shaw, E. (2015). *An SAT© validity primer.* College Board. https://files.eric.ed.gov/fulltext/ED558085.pdf

St. John, E. P. (1992). Workable models for institutional research on the impact of student financial aid. *Journal of Student Financial Aid, 22*(3), 13-26.

St. John, E. P. (2000). The Impact of Student Aid on Recruitment and Retention: What the Research Indicates. *New Directions for Student Services, 2000*(89), 61. https://doi.org/10.1002/ss.8905

Tinto, V. (2012). *Completing college: Rethinking institutional action*. The University of Chicago Press.

Woodward, C. (1988). The effects of single-year scholarships versus renewable scholarships on persistence. *College and University, 63*(2), 162-167.

Ye, Y. (2019, August 10-13). *Institutional grants and graduation success: Assessing sector performance among the four-years U.S. college* [Paper presentation]. American Sociological Association 114th Annual Meeting, New York, NY, United States.

Zook, G. F. (1947). *Higher education for democracy: A report of the President's commission on higher education: Establishing the Goals.* (1947). Retrieved from https://archive.org/details/in.ernet.dli.2015.89917