Identity as an Influence on Major Selection for Undeclared Students

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A Dissertation

Presented to

The Faculty of the College of Education

William Paterson University of New Jersey

In Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

February 2024

IDENITY AS AN INFLUENCE ON MAJOR SELCTION FOR UNDECLARED STUDENTS

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Abstract

Undeclared students choose their major while enrolled in college, but major choice can have long-term implications on social mobility, career path, and lifetime earnings. Identity can play a role in the major selected by an undeclared student. This research analyzed the relationship between identity and major selection for undecided students to identify trends of inequity based on 1) gender, 2) race, 3) socioeconomic status, and 4) first-generation college student status. Additionally, this research assessed if any identities predict major selection for undeclared students. This quantitative study used secondary data from a diverse R2 research university in the northeast United States and a sample size of 1,686 students who enrolled in college without a major. Chi-square Tests of Independence were performed to analyze relationships between major and identity, while a Multinomial Logistics Regression was conducted to identify predictors of major selection. Relationships were found between major and 1) gender, 2) race, and 3) socioeconomic status, while major and first-generation status were unrelated. Gender and race were found to predict major choice for undeclared or exploratory students. Women were underrepresented in business majors and more likely to choose majors in education, social sciences, humanities, and psychology. These findings indicate that historically marginalized students may not have access to or feel welcomed in certain majors. Educational leaders should consider evaluating major admissions standards, faculty representation, and intentional advising services for undeclared students in an effort to avoid perpetuating cycles of systemic oppression.

Keywords: undeclared, undecided, college major choice, identity, gender, race, socioeconomic status, first-generation

Dedication

Dedicated to my mother, who did it first,

and to Nick, who does it all.

Acknowledgments

It takes a village to raise a doctoral student. Achieving this goal was no easy feat, and I am eternally grateful for the village that supported me.

I would like to express my deepest gratitude to the members of my dissertation committee. Dr. Daphne Galkin offered invaluable mentorship, subject matter expertise, and access to this unique student population. Dr. Samuel Fancera provided much-needed training to help me gain my footing and confidence as a researcher. Lastly, I could not have asked for a better supervisor than Dr. Robert Seal, whose advice, wisdom, and patience cannot be overstated. The higher education dialogues we shared over the past few years have been some of my most valuable learning experiences. Additionally, the faculty members within the Leadership Ed.D. program have provided enormous guidance, especially Dr. James Alford, who helped me through the early stages of my research.

I had the pleasure of being part of the inaugural cohort in the Leadership Ed.D. program at William Paterson. It is not always easy to be the first group, and I am grateful for the lateral learning and camaraderie that my ten classmates provided.

Next, I'd like to acknowledge the support provided by my family and friends. The Hreskos—Mom, Dad, Laura, Lisa, Poe, and Jay—the Rushes, the Staabs, and my nearest and dearest friends who understood my goals and the sacrifices they required. Thank you for cheering me on while I climbed the mountain.

Last but not least, I'd like to thank my partner, Nick, whose votes of confidence kept me going when my spirits dipped. I am eternally lucky for a partner who not only supported my purpose but stepped into the trenches with me. Thank you for championing my dream. I could not have done this without you.

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Chapter 1: Introduction

Undeclared college students are faced with an important decision during their college career: selecting a major. This decision impacts a large portion of the overall college-going population; 22% to 50% of students enroll in college without a major each year (Gordon & Steele, 2015). College major selection not only impacts the course requirements for graduation, but studies have shown that it can impact a student's future career, salary, and opportunity for social mobility (Carnevale, Rose, et al., 2011; Carnevale, Strohl, et al., 2011; Carnevale et al., 2015; Chetty et al., 2018; Creusere et al., 2019; Niu, 2017; Webber, 2016; Wolniak et al., 2008). In fact, one study found that the highest-earning majors can earn 314% more than the lowest-earning majors (Carnevale, Rose, et al., 2011; Carnevale et al., 2015, Strohl,).

Research also indicated that students within certain identity groups disproportionately selected majors tied to lower earnings, which may perpetuate income disparities on a societal level. For example, White men made up the largest percentage of majors with the most earning potential, creating an ongoing system of social and financial inequality for women and people of color (Gemici & Wiswall, 2014; Speer, 2017). As a result, diverse representations of identities in various industries have become an increasingly important issue (Santamaria & Santamaria, 2016).

To help inform future institutional efforts and decisions dedicated to improving educational access and opportunity for all identities, further research into identity trends is needed. To date, there has been significant research on major selection trends based on identity in broader college populations, but research dedicated to studying identity trends within undeclared student populations remains limited. Further research in this area is important because of the distinct differences in undeclared and declared student populations. Studies show

that, although declared and undeclared students are alike in many areas, there are notable differences in career attitude and identity (Gordon & Steele, 2015; Holland, 1997). Importantly, studies indicate that the decision to be undeclared can also be influenced by gender and culture (Gordon & Steele, 2015).

This study aimed to provide further clarity and understanding of undeclared students and their major decision-making in hopes of improving outcomes for disadvantaged populations. This study established trends around major selection of undeclared students by analyzing social identities, including gender, race, first-generation status, and socioeconomic status. The study analyzed if any identity acts as a predictor of major selection for undeclared students.

Historical Antecedents

American colleges and universities have developed a model of education that requires students to choose a specific path of study or "major" to graduate with a degree. College students complete a curriculum of study while achieving their degree, allowing them to graduate with a credential in their chosen niche area (Guthrie, 2006). Typically, students will also complete a liberal arts or general education curriculum during their college tenure. The combination of a liberal arts curriculum and a major curriculum allows students to graduate with a well-rounded education as they have knowledge both as generalists and specialists.

Major choices range in scope and have evolved since the conception of higher education. Higher education in the United States was born of Western models originating in Europe (Guthrie, 2006). This style of education had college students learning a liberal arts curriculum, which included areas of study such as Greek, ancient history, Latin, and ethics. Students could also pursue more vocational education in areas such as ministry or agriculture. The second half of the 19th century saw a shift in the university curriculum. In 1877, Johns Hopkins University

introduced the term *major*, allowing students to have more focus on their studies (Guthrie, 2006). Most universities grew to include major areas that reflected main academic disciplines, such as mathematics, English, sociology, and education. These majors would be taught by one academic department. However, major offerings grew to become interdisciplinary in the 20th century (Guthrie, 2006). Interdisciplinary majors are administered by more than one academic department. Many interdisciplinary majors have emerged through societal shifts, such as the Civil Rights movement, resulting in majors like Black Studies and Women's Studies (Clifton, 2020). Majors can represent academic disciplines, such as history and physics, or professional fields, such as engineering or film (Guthrie, 2006).

Most colleges and universities offer a range of majors to prospective students, but acceptance requirements vary by department and major in a process independent of university admissions standards. These requirements are typically in the form of minimum grade point averages (GPA) or prerequisite classes. In other cases, like competitive arts majors, students may be required to submit a portfolio, audition, or interview for consideration. Interest in a college major does not guarantee entry into that field of study; a prospective student may meet the university's admissions standards but not the admissions standards for their desired academic program. For example, a student may apply as a biology major; their qualifications allow them admission into the university, but they do not have the required GPA and prerequisite science classes needed to be part of the biology major. Instead, these students may be accepted as undeclared students.

Correlation of Major Selection with Career and Potential Earnings

The choice of college major is correlated to the choice of career (Carnevale, Rose, & Cheah, 2011; Carnevale, Strohl, & Melton, 2011). Georgetown University's Center on Education

and the Workforce found that lifelong earnings and unemployment rates are related to academic major and educational attainment (Carnevale, Rose, et al., 2011; Carnevale, Strohl, et al., 2011). Earning a bachelor's degree can lead to a 20-50% advantage in salary when compared to those without a college degree (Pascarella & Terenzini, 2005; Shatto & Erwin, 2016; Wolniak et al., 2008).

However, not all bachelor's degrees are created equal, as earnings potential varies based on academic major. One study found that the highest-earning majors can earn 314% more than the lowest-earning majors (Carnevale, Rose, et al., 2011; Carnevale, Strohl, et al., 2011; Carnevale et al., 2015). The highest-earning majors are related to academic areas such as engineering, computers and math, and business, and the lowest-earning majors fall under academic areas related to humanities, arts, education, social work, and psychology (Carnevale, Rose, et al., 2011; Carnevale, Strohl, et al., 2011; Carnevale et al., 2015; Wolniak et al, 2008).

The lifelong impacts of major selection have been increasingly acknowledged by the public, such that students and their families have shown an increased desire to choose a major that directly correlates to job success. This has led to a higher demand for students to choose majors with perceived occupational value (Loveland, 2017; Malik & Slaughter, 2016; Spight, 2020).

Existing Identity Trends of Major Selection

Literature on major decision-making trends has varied by identity group, such that some identity groups, like gender or race, have deeper bodies of supporting research compared to others, like first-generation students or socioeconomic status. While certain trends or influences of major selection have been well-established, others have been disputed, especially as intersectionality has been considered. Intersectionality, a term coined by Crenshaw (1989),

asserts the interconnected nature of social categories, which can create interconnected systems of disadvantage. Therefore, it is helpful to understand the historical trends from past research to understand the disparities across identities in college major decision-making.

To start, there have been well-established major selection trends in gender. For example, men have been historically overrepresented in the highest-earning occupations (Patnaik et al., 2022; Speer, 2017; Wolniak et al., 2008). Alternatively, majors in which women are most heavily concentrated are fields of education and health, which have much lower earning potential than male-dominated majors such as engineering and business (Carnevale, Strohl, et al., 2011; Carnevale et al., 2015).

While trends in race vary, research has shown that Black students have the highest represented proportion in academic areas such as counseling, human services, and community organization, which also correlate with lower-paying professions (Carnevale, Strohl, et al., 2011; Carnevale et al., 2015). On the other hand, one study showed that Asian-American students have a higher representation in STEM majors than in non-STEM majors (Niu, 2017).

Major decisions of students based on first-generation and socioeconomic status (SES) were historically less researched and need further study. However, one study has shown that first-generation students are more likely to choose career paths with low unemployment and high average wages (Trejo, 2016). According to the same study, the most preferred majors for first-generation students are computer science, math, engineering, health, psychology, and education; these students are less drawn towards arts, biology, communication, and humanities (Trejo, 2016). SES has been shown to be influential when paired with other factors. One study found that Black students' higher preference for a STEM major over White students intensifies as

family SES increases, as long as family SES is at or above the mean level (Niu, 2017). This is an example of how intersecting identities can play a role in major selection.

Research has suggested that intersectionality can impact major selection and potential earnings. For example, computer science is a major that has shown high post-college earnings potential, but the earnings potential is more limited if a computer science major is a woman (Wolniak et al., 2008). Additionally, median earnings for computer science majors were historically lower for Hispanic and Black students than for White students (Wolniak et al., 2008). The theory of intersectionality is relevant because a computer science major who is a Black woman may still have less opportunity for social mobility than a computer science major who is a White man.

Social Justice Impact: Academic Major's Influence on Social Mobility

Higher education has been widely viewed by society as a pathway to social mobility (Wolniak et al., 2008) and should act as a resource to create a more just and equitable society (Webber, 2016; Wolniak et al., 2008). Enrollment in higher education has been trending upward over the past few decades (NCES, 2020), but that does not necessarily equate to a society that lends itself to upward social mobility, as studies have shown that women and students of color consistently enroll in majors that correlate to lower-paying professions (Carnevale, Strohl, et al., 2011). Students from advantaged groups have historically had more access to education and can leverage this knowledge to access better educational opportunities, exacerbating the stratification of education and reinforcing social inequality (Wolniak et al., 2008). To create more equality within socioeconomic strata, there is a need for more diverse representation within academic majors.

The cultural proficiency framework (Terrell et al., 2018) has recognized that universities may be experiencing "cultural blindness" by not recognizing when these inequities are the results of their policies. However, higher education leaders can analyze factors of inequity to improve upon their practices (Terrell et al., 2018). A better understanding of the dynamics and differences in college major selection can help educational leaders move into cultural precompetence, which is the awareness of an organization's strengths and areas for growth to respond effectively to diverse populations. This understanding lends context to areas of the lifecycle where women and people of color may be deterred from pursuing certain educational and career paths, such as STEM or business (Niu, 2017).

Admissions to Academic Majors

Not all students have access to all majors. Each academic department determines its admissions standards, creating restrictions or requirements that undeclared students must meet before they can declare. The university utilized in this study (henceforth referred to as Study University) has a range of admissions standards for each major, including a GPA requirement, prerequisite coursework, audition, or portfolio review. For example, admission to the computer science major requires students to achieve a 3.0 GPA and complete four computer science and math courses with a B- or higher. As a result, many students interested in this major may not be able to achieve the required standards. Conversely, some majors have no requirements and welcome all undeclared students in good academic standing.

Each major subgroup varies in admissions standards. Table 1 outlines the level of difficulty for an undeclared student to join that major based on restrictions at Study University.

Table 1

Difficulty of Admission's Standards for Entry into Major Subgroups

Major Subgroup	Difficulty of Admissions	Types of Requirements
Arts	Mixed	Many programs require a minimum GPA, audition, or portfolio review
Biology and life sciences	High	Minimum GPA requirement and prerequisite courses
Business	High	Minimum GPA requirement
Communication and Journalism	Low	No requirements
Computers, statistics, and mathematics	High	Minimum GPA requirement and prerequisite courses
Education	High	Minimum GPA requirement and prerequisite courses
Health	Mixed	Some programs have minimum GPA requirements
Humanities and liberal arts	Low	No requirements
Industrial arts, consumer services, and recreation	Mixed	Some programs have minimum GPA requirements
Law and public policy	Mixed	Some programs have minimum GPA requirements
Physical Sciences	Mixed	Some programs have minimum GPA requirements and prerequisite courses
Psychology and social work	Low	No requirements
Social Sciences	Low	No requirements

The Need for Liberal Arts

This study examined the underrepresentation of disadvantaged groups from majors that correlate with high-paying jobs, such STEM and business. However, this does not imply that those academic areas are superior to majors in liberal arts and humanities. It is essential for the health of academia and the workforce that students continue to opt into liberal arts majors,

including but not limited to education, psychology, English, and history (Penprase, 2018). These areas provide the indispensable services of creating well-educated citizens of the world who serve as critical thinkers and leaders in various industries. This study has not suggested that all students should pursue careers in STEM and business but instead has sought to point out a pattern of inequality across the academic areas that lead to the highest-paying careers. A truly equitable society would have diverse representation across all college majors to have meaningful representation in every industry.

Understanding Undeclared Students

Colleges in the United States typically allow students to enroll without a selected major, resulting in a population of students called undeclared or undecided. The reasons a student has chosen to be undeclared can vary; they may not have qualified for admission into their desired program but still want to enroll in a university, or they may have wanted to explore their interests or future career options before selecting a major. Terms like “undecided” or “exploratory” can be used to describe the same population of students. In this study, undeclared students are defined as the population of college students who have not yet declared a major or specific area of academic study.

Between 22% and 50% of students enroll in college without a major each year (Gordon & Steele, 2015), and there has been extensive research dedicated to understanding the traits and needs of undeclared students. Undeclared students encompass a heterogeneous and complex group, and their reasons for choosing to be undeclared vary (Gordon & Steele, 2015), including personal-social concerns that cause internal conflict around major selection (Gordon & Steele, 2015). For example, they may be interested in giving back to a community through a job in social work but also want to ensure a high-paying job. Additionally, students may have interest-

ability conflicts, such as a desire to be a professional dancer but little training in the performing arts.

Undeclared students create a unique challenge for administrators. College administrators have historically identified undeclared students as an at-risk population (Gordon & Steele, 2015), though this assertion is debated in other literature (Bordon & Fu, 2015; Dika et al., 2019; Spright, 2020). Reynolds et al. (2010) found that students need to declare early in their college career to persist to degree completion. However, research on graduation persistence for undeclared students is also disputed. Some research found that students' choice to matriculate into college undeclared was not a predictor of student persistence (Bordon & Fu, 2015; Spright, 2020). Undeclared students can have unique needs that do not apply to declared students. This can be related to circumstances around their informational, developmental, and personal-social concerns (Gordon & Steele, 2015).

Impact on Higher Education Leaders

Higher education leaders should continue to deepen their understanding of undeclared students, specifically their major selection trends, to ensure they can structure academic advising strategies to suit their needs. For example, colleges and universities may need to assist undeclared students in understanding their goals, values, skills, and interests. These students also need advisors to provide them with resources about curricular and major options at the university and a deeper understanding of career options in the career world (Gordon & Steele, 2015; Leach & Patall, 2016). Developmentally, students may need assistance in decision-making skills. Advisors can work to understand the varying types of indecision a student may be facing and guide them in educational decision making, such as taking autonomy over building their own schedule (Ellis, 2014; Leach & Patall, 2016). Improvements to academic advising practices for

professionals who advise undeclared students can improve the student experience, as those who feel academically and emotionally supported by campus administrators are more likely to persist until graduation (Gordon & Steele, 2015).

Student Enrollment and Retention

Maintaining high enrollment is important for leaders in higher education for several reasons. First, having students persevere until graduation creates a more educated society. Education is considered a way to create access to social mobility and contribute to a more socially just society (Pascarella & Terenzini, 2005; Shatto & Erwin, 2016). Second, universities need to maintain healthy enrollment to remain in operation (Barr & McClellan, 2018). Enrollment and retention are important to the operations of a university, as student tuition is a major contributor to college revenue (Barr & McClellan, 2018). Tuition revenue generated from enrollment numbers has become even more important in the wake of the coronavirus pandemic.

COVID-19 Impacts

Universities have faced unforeseen financial pressures since the 2020 coronavirus pandemic, with college enrollment numbers dropping across the country (Kamssu & Kouam, 2021). This has impacted the operating budgets of these schools. College enrollment has dropped even more for certain populations. Indigenous and Native American students saw the most disproportionate drops in enrollment, with a 10.7% decrease in enrollment (Shatto & Erwin, 2016). Black student enrollment decreased by 7.9%, and international student enrollment decreased by 13.7% (Shatto & Erwin, 2016).

Significance

Understanding how social identity may relate to major selection in undeclared students has broad-sweeping implications inside and outside the realm of academia. This study has

research-to-practice relevance to answering retention, graduation rates, and social mobility concerns for students from diverse identity groups. Leaders in higher education should pay special attention to how social identities may impact the major decisions of undeclared students for several reasons. First, having diverse identities represented in each career field is an important goal in creating a more just society (Penprase, 2018; Santamaria & Santamaria, 2016). Major choice impacts social mobility (Wolniak et al., 2008), and students having a greater opportunity for social mobility can lead to a more equitable society. Second, higher education leaders should be aware of the needs of undeclared students to retain them in college and see them persevere to graduation (Gordon & Steele, 2015).

Purpose of the Study

This study aimed to determine if social identities relate to major selection for students who enter college without an academic major. This study examined the following social identities: gender, race, first-generation status, and SES to explore trends around the major selection of undeclared students. The study also examined if any identity predicts major selection for undeclared students.

Research Questions

This study's analysis and findings were based on answering the following set of research questions:

RQ1: Is identity related to choice of college major for undeclared students?

RQ1a: Is there a relationship between gender and major for undeclared students?

RQ1b: Is there a relationship between race and major for undeclared students?

RQ1c: Is there a relationship between SES and major for undeclared students?

RQ1d: Is there a relationship between first-generation status and major for undeclared students?

RQ2: Does identity predict major selection for undeclared students, as measured by gender, race, SES, and first-generation status?

A correlational research design was used to answer these research questions. The strength of relationships was measured by testing the null hypotheses. The following null hypotheses were tested:

H_0: There is no relationship between major and gender.

H_0: There is no relationship between race and gender.

H_0: There is no relationship between socioeconomic status and gender.

H_0: There is no relationship between first-generation status and gender.

Theoretical Framework

This research sought to identify systemic inequities in higher education with the hope that educational leaders can correct them. Therefore, the researcher used both social justice and leadership theories to frame the study.

The theory of cumulative (dis)advantage has stated that advantages for one group or individual over another accumulate over time, resulting in inequality growing over time (DiPrete & Eirich, 2006). “A [cumulative advantage] process is capable of magnifying small differences over time and makes it difficult for an individual or group that is behind at a point in time in educational development, income, or other measures to catch up” (DiPrete & Eirich, 2006, p. 272). Many different types of variables can influence cumulative (dis)advantage, such as growing up in a poor versus rich family, being raised in a single versus two-parent household or being assigned to a low versus high academic track in high school. When exposed over long

durations, these variables result in advantages or disadvantages over an individual's lifetime. For college students, innate advantages or disadvantages are likely to grow over their lifetime; this may impact the college majors that undeclared students ultimately select. Students who have had high school exposure to educational areas that lead to high-paying industries, such as STEM or business, are more likely to choose a major in those areas. However, students from disadvantaged backgrounds may not have the same exposure to resources such as AP courses, well-funded labs or classrooms, or mentorship (DiPrete & Eirich, 2006). Cumulative (dis)advantage theory is exemplified here, as students with limited access to secondary education may continue to have limited knowledge and subsequent access in postsecondary education.

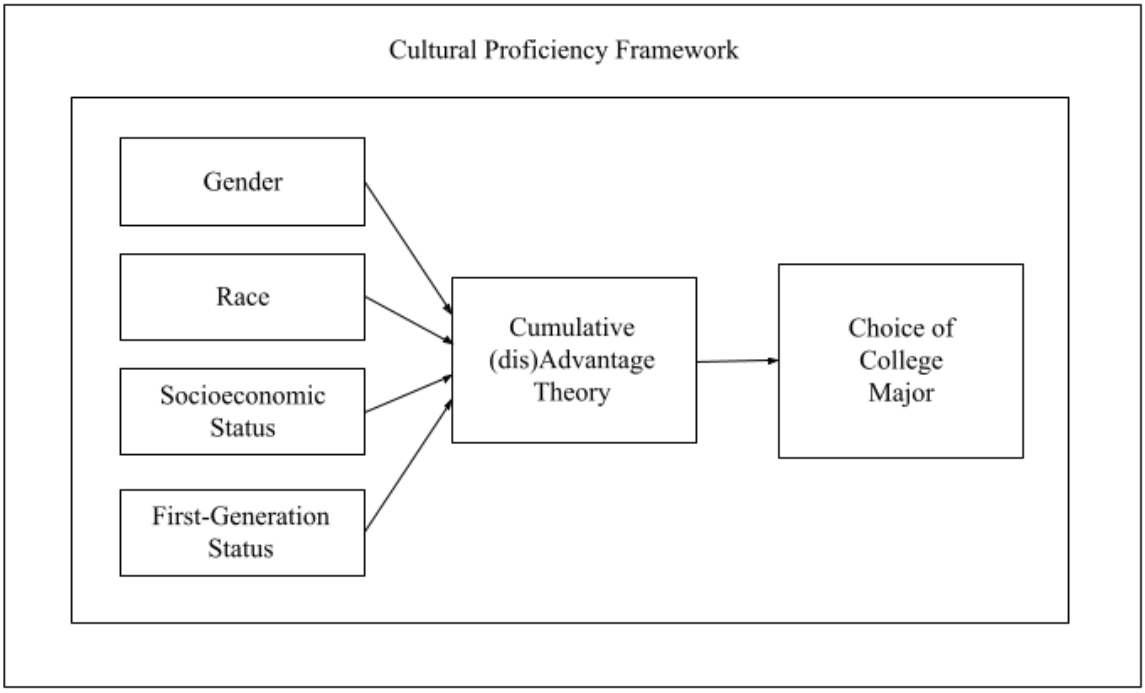
It is important to understand a pattern of systemic inequities faced by students, but it is equally valuable to understand how leaders within higher education can use this research to create a more equitable society. To frame how leaders can interpret this research, this paper utilized the cultural proficiency framework developed by Terrell et al. (2018). This framework provided a lens for examining one's values, policies, practices, and behaviors to help leaders understand how they can best advocate with different populations in their organization and personal lives. Essential to the practice of culturally proficient leadership is assessing culture, valuing diversity, managing the dynamics of difference, adapting to diversity, and institutionalizing cultural knowledge (Terrell et al., 2018). There are six stages in the cultural proficiency continuum: *destruction, incapacity, blindness, precompetence, competence,* and *proficiency* (Terrell et al., 2018). The last three stages on the continuum enable transformation, but leaders should always be moving towards the stage of *cultural proficiency,* where there is lifelong learning about the differences of others and advocacy for each individual's culture.

Also important to the cultural proficiency framework is understanding both principles and barriers. The principles include the insight that culture is a predominant force and that the dominant culture serves each individual in varying degrees (Terrell et al., 2018). Each culture has unique needs and problem-solving should vary based on the diverse thoughts of each culture. Marginalized populations are at least bicultural, meaning they must understand their culture *and* the dominant culture. Achieving cultural proficiency is essential, as the absence of cultural competence anywhere threatens competent services everywhere (Terrell et al., 2018). Terrell et al. (2018) also identified barriers that can prevent culturally proficient leadership, including resistance to change, systemic oppression and privilege, entitlement, and unawareness that there is a need to change.

The theoretical framework shown in Figure 1 represents how the theories influence the study. Undeclared students may experience cumulative advantages or disadvantages based on their identities (gender, race, socioeconomic status, and first-generation status). This may influence their choice of college major. The framework suggests that due to the cumulative (dis)advantage theory, the independent variables may influence or predict the dependent variable. The cultural proficiency framework is used to frame the entire study, as it guides educational leaders to emphasize the value of social justice and creating diverse spaces in education.

Figure 1

Conceptual Framework for Identity as an Influence on Major Selection for Undeclared Students



Definition of Terms

Enrollment: an organizational concept in colleges or universities that refers to the number of students attending a college.

Exploratory student: a student who is enrolled in college and has not yet selected a specified area of academic study; undeclared.

First-generation college student: a term identifying college students whose parents did not obtain a bachelor's degree (Glaessgen et al., 2018; RTI International, 2019).

Generation Z: a term identifying people born between 1995 - 2010.

Identity group: a subsection of people united by some physical, social, or mental characteristic. Examples include race/ethnicity, gender, socioeconomic status, and sexual orientation.

Intersectionality: a term that identifies how different elements of political and social identity discrimination overlaps or intersect. It asserts how systems of power affect a marginalized population within a society (Crenshaw, 1989).

Major: an academic area that provides an in-depth study in one of the fields in which a college or university offers a degree (Guthrie, 2006).

Marginalized population: a term that has origins in critical race theory and indicates a population is considered to be underrepresented regarding their economic, cultural, political, or social life; not part of a mainstream identity group (Teranishi, 2007).

Social mobility: the movement of individuals, households, or families between socioeconomic strata in society.

Undecided student: a student who is enrolled in college and has not yet selected a specified area of academic study; undeclared.

Undeclared student: a student who is enrolled in college and has not yet selected a specified area of academic study; undecided.

Conclusion

The literature in higher education has provided information regarding the experiences of undeclared students, yet there is a gap concerning social identities as an influence on their major selection. Understanding the factors that influence major selection can help create a more diverse representation in each major and lead to a more diverse workforce. This is important information for higher education leaders including academic deans, enrollment officers, and vice presidents of academic affairs. Academic advisors can also benefit from this study, as they can be provided with data to help them think more critically about ways to offer unique advising experiences to each undeclared student.

Chapter 2: Literature Review

A comprehensive review of past literature related to undeclared students and major choice was conducted to 1) understand existing trends, 2) identify research gaps that exist, and 3) contextualize this study's findings. The review was exhaustive of relevant and peer-reviewed research on topics ranging from, but not limited to, definitions and traits of undeclared students to retention trends within this population. This review also included research focused on influences of major selection, including gender, race, socioeconomic status (SES), first-generation status, familial impact, and interests and abilities.

The topics of major selection and undeclared student populations have a rich history of research dedicated to them. However, there is a gap in the literature regarding the study of major selection influences for undeclared students. Research on the influences of major selection has been primarily based on broad college populations, but there is a need to analyze these influences on undeclared students in isolation. While there is a plethora of research dedicated to studying trends in major selection by gender and race, there remains a gap in research on SES and first-generation status. This study aimed to add to the existing literature on major selection trends and contribute to the understanding of the major selection trends within isolated undeclared student populations.

Undeclared Students

Undeclared Student Demographics

Research has shown that undeclared students comprise 22% - 50% of students enrolled in higher education in the United States (Freedman, 2013; Gordon & Steele, 2015). However, outside of a few studies, there is limited current research on the demographic information and identities of this population. One study conducted by Wang and Orr (2019) quantitatively

analyzed the demographics of a large four-year university specializing in STEM programs. The authors compared demographic data between undeclared and declared students. The study showed that undecided students were more diverse in terms of both race and ethnicity. Additionally, 18% of undeclared students were first-generation, while only 14% of declared students were first-generation. Wang and Orr (2019) found that the age of undeclared students was statistically significantly lower than those entering the university with a major. The finding that undecided students skewed younger than their decided peers was also echoed by the National Center for Education Statistics (NCES, 2018). The study by Wang and Orr (2019) contributes to the understanding of the demographics of undeclared students; however, it is limited because it represents only one STEM-focused university.

Regarding college performance, Leppel (2001) found that undeclared students performed at a lower academic rate than students who had declared their major. Additionally, Wang and Orr (2019) found that the high school GPAs, SAT, and ACT scores of undeclared students were statistically significantly lower than those of entering decided students.

Undeclared Student Retention and Graduation Rates

Historically, many college administrators have viewed undeclared students as attrition-prone, but as the literature has evolved, studies have offered a nuanced and, more recently, alternative viewpoint. Many past studies found undeclared students to be at a high risk of dropping out of college without a completed degree (Daubman & Johnson, 1982; Leppel, 2001; Sklar, 2014; Titley & Titley, 1985; Yue & Fu, 2017), while some suggested that students need to declare early in their college career to persist to degree completion (Reynolds et al., 2010). In other words, waiting too long to declare increases the risk of dropping out of college, while declaring early in a college career has shown higher rates of persistence to graduation (Allen &

Robbins, 2010; Reynolds et al., 2010; Sklar, 2014). Also, Sklar (2014) found that the time to degree completion was longer for students who entered college without a major than for those who entered with a major when all other factors were equal.

Several studies attempted to identify factors that contributed to the challenges of degree persistence within undeclared students. Research suggested that declared and undeclared students were alike in many areas but had notable differences in career attitudes and identity (Gordon & Steele, 2015; Holland, 1997). To that end, a seminal study by Tinto (1993) found that a lack of clear educational and career goals could impact students' commitment to graduating from the university where they were enrolled. Reynolds et al. (2010) furthered this research by conducting a mixed-methods study in which undeclared students were enrolled in a course aimed at helping them declare a major. Enrollment in the class had a statistically significant effect on persistence to a degree within four years. It also showed that many students declared their major within the first year (2010). Separately, research from Yue and Fu (2017) found that student persistence to graduation and time to degree completion was most influenced by the choice of major and cumulative credit hours.

Although the aforementioned literature suggests that undeclared students have higher attrition compared to declared students, there is research that debates or conflicts with this position. More recent studies found that the choice to matriculate into college without a major is not a predictor of student persistence (Bordon & Fu, 2015; Dika et al., 2019; Graunke et al., 2006; Spright, 2020). Some researchers stated that claims of undeclared students being attrition-prone were dated (Dika et al., 2019; Spight, 2020). Spight (2020) asserted that major declaration status was not the most specific determinant to analyze when seeking to understand college retention. In his study, Spight (2020) found that demographics, campus engagement, and

environment can serve as more of a predictor of retention. More recently, Spight (2022) used institutional records of 4,489 first-year college students to compare graduation rates for students who enrolled declared and undeclared. The researcher found that being undeclared neither increased nor decreased the likelihood of graduating in four years; however, undeclared students were *more* likely to graduate when looking at six-year rates (Spight, 2022).

Dika et al. (2019) found that specific student attributes were significant predictors of undeclared students' rates of persistence to graduation, such as race, math preparation, and perceived social fit. They claimed that more math preparation and higher levels of perceived social fit were linked to perseverance, while undeclared students of color persist to graduation at higher rates than undeclared White students (Dika et al., 2019).

Cognitive Considerations for Waiting to Declare

Undeclared students have a myriad of different reasons for not declaring their major. Reasons for major indecision vary for each student (Spight, 2020) and can include wanting to explore, feeling overwhelmed, choosing between a small pool of options, or still being unsure if college is the correct path for them (Glaessegen et al., 2018; Gordon & Steele, 2015). In order to form a better understanding of undeclared student decision-making, this literature review highlighted several cognitive theories that posit the possible merits and traits of entering into college undeclared.

Perry’s (1968) theory of moral development supported the idea that waiting to declare your major can be a benefit. Perry pointed out that a student may be in dualistic thinking at 18 years old because they would not yet be cognitively able to synthesize the personal and occupational factors to make the best career decision (Gordon & Steele, 2015). Perry’s theory

supported the belief that enrolling in college undeclared is a net-positive decision, giving students time to explore options and make an informed decision.

Tyler's seminal theory of indecision (1969) pointed out the difference between *indecision* and *indecisiveness.* Indecision was typical for growth and development, while indecisiveness represented bad habits and could signify immaturity. Guay et al. (2006) expanded upon this by distinguishing between *chronic indecision* and *developmental indecision.* Developmental indecision was a normal stage of adolescence; these students were typically able to resolve their own decisions with information-seeking. However, chronically indecisive students displayed lower rates of autonomy and self-efficacy. Students who experienced chronic indecision or indecisiveness were more prone to leave college without a degree, while students who experienced developmental indecision may be more prepared to make well-informed decisions about their college major and were more likely to persevere to graduation (Guay et al., 2006). These theories of indecision could help higher education administrators understand risk factors around the attrition of undeclared students.

Academic Advising for Undeclared Students

Academic advising is essential in supporting undeclared students' success (Leach & Patall, 2016; Wang & Orr, 2019). Leach and Patall (2016) stated that "undecided students who perceive receiving supportive advising that satisfied their needs for autonomy, competence, and relatedness may experience enhanced motivation toward major decision-making over time" (p. 30). The study by Leach and Patall (2016) recommended *need-supportive advising* during advising sessions for enhanced autonomous motivation, engagement, and performance. Leach and Patall (2016) found that need-supportive advising that began at the beginning of the year

predicted independent advisee decision-making at the end of the year, such as more motivation to decide on a major.

Wang and Orr (2019) found that intentional and structured academic advising services geared toward undeclared students could help with graduation time and persistence. The study evaluated one university's major declarations and major changes and found that 71.1% of undecided students remained in the majors they selected. In contrast, 46.4% of declared students stayed in their initial major. Additionally, the study showed that 43.2% of students completed up to 30 credit hours before declaring a major, revealing effective advising services could help students declare a major by the end of their first year.

A recent study evaluated the practices of educational leaders working with Black male students who entered college undeclared at predominantly White institutions (McElderry, 2022). McElderry pointed out the importance of integration into the university as a factor for success. This study posited that administrators work with these students through an anti-deficit lens and should instead use an asset-based frame to highlight the achievements of this population. McElderry (2022) encouraged the use of student resources, early alerts, and additional support that “directly ties the intersection of race with academic success” (p. 42) to support undeclared Black males to persist to graduation.

Research has also found that first-generation students were less likely to find and utilize resources that could lead to college success, such as advising (Glaessegen et al., 2018). Previous literature identified that first-generation undeclared students did not always understand the role of an academic advisor and instead made use of their continuing-generation peers to gather information (Glaessegen et al., 2018). These students could benefit greatly from campus

resources and intervention, as one study found that for every meeting with an advisor, the odds of retaining that student increase by 13% (Swecker et al., 2013).

Major Selection Factors

Major selection is a nuanced decision that can be influenced by a variety of factors. For example, some students consider opinions from families and peers, while others seek insight from professionals, such as high school guidance counselors or college academic advisors (Gordon & Steele, 2015; Workman, 2015). Some research has shown that occupational plans in high school were uniformly the strongest predictors of major selection (Carnevale, Strohl, & Melton, 2011; Carnevale, Rose, & Cheah, 2011; Morgan et al., 2013), while others suggested reflecting on interests, skills, and abilities could also be used to determine major selection. In fact, Allen and Robbins (2010) found that students who spent time analyzing their interests and abilities were more likely to persist to degree completion than those who select a major without intentionality.

Research consistently found that major selection was influenced by identities such as race, income, sex, ability, and parental education (Gordon & Steele, 2015; Trejo, 2016). Further supporting this notion, a study by Murphy and Collins (2015) examined the attributes that college graduates sought in a career field and found results were dependent on identity. In this study, women expressed more of a desire than men to work in an organization that has gender parity in leadership and racial diversity, while men valued salary and responsibility more than women. Black respondents valued organizational diversity, access to mentorship, and training programs more than non-Black respondents (Murphy & Collins, 2015). Therefore, a major that a college student chose was likely to be dependent on values that were developed through their identities. These areas of potential influence are explored in the following sections.

Gender Identity

Gender identity has been proven to be a factor in major decision-making (Barrone, 2011; Carnevale, Strohl, et al., 2011; Dickson, 2010; Gordon & Steele, 2015; Jewett & Chen, 2022; Morgan et al., 2013; Niu, 2017; Speer, 2017; Trejo, 2016; Wiswall & Zafar, 2015). One of the most salient trends is the gender makeup of STEM majors, where men are more likely to choose majors that focus on science, math, and engineering, while women are found more often to select humanities, social science, and education fields (Speer, 2017). These findings have been supported by research from Dickson (2010) and Morgan et al. (2013), who stated that there was a low representation of women, Black students, and Hispanic students in sciences and engineering (Dickson, 2010; Morgan et al., 2013), and, more recently, several other studies that found male students choose STEM majors more frequently than female students (Jewett & Chen, 2022; Niu, 2017). When controlling for other factors, one study found that the odds of a female student choosing a STEM major were 48% lower than a male student (Jewett & Chen, 2022).

Some studies found that women were also underrepresented in business majors (Davis & Geyfman, 2012; Geyfman et al., 2015). One study found that although female college enrollment was trending upward, female enrollment in the studied business programs declined by 3.6% between 2003 and 2011 (Davis & Geyfman, 2012).

Wiswall and Zafar (2015) studied the factors that influence the major selection for men and women. They found that women were more likely to weigh beliefs about their own abilities when choosing a major, whereas men were less likely to consider their own skills when selecting a major. They also found that women were less likely to be overconfident in their abilities than men. Furthermore, Davis and Geyfman (2012) found that female students were less confident in their quantitative abilities than men. The authors posited that this could be the reason for female

underrepresentation in business and STEM. Gemici and Wiswall (2014) found that interest instead of skill differentiated men from women regarding career and major selection.

Though women can declare any major, including STEM, they still face many social barriers that might dissuade them from doing so. A report by the American Association of University Women identified unconscious biases held by women, employers, and educators as creating significant barriers to closing the gender gap in the STEM field (Corbett & Hill, 2015). This gender imbalance impacts many areas of STEM, including academic areas such as pre-med and engineering. When analyzing students interested in pre-medical undergraduate majors, women showed a larger decline in interest than men, independent of ethnicity or race (Barr et al., 2008). Even when women choose to declare into STEM majors, they were more likely to leave the majors than their male counterparts (Dickson, 2010). A 2020 qualitative study researched the experiences of college students in STEM based on gender and race (Dancy et al., 2020). Women of color overwhelmingly reported that their race and gender impacted their experiences within the major, while White men were largely unaware of any impact that gender or race had within their major. Furthermore, women reported bias, intimidation, or feeling out of place within their academic studies (Dancy et al., 2020).

The disparities in major concentration between men and women have existed for many years. While gender integration across majors rose in the mid-1950s, the progression slowed after the 1980s with numbers stabilizing in the past several decades (Barrone, 2011; Morgan et al., 2013). In recent years, one study showed that there were still notable differences between genders regarding major selection, even for a cohort of college students in which rates of enrollment in postsecondary education were more than 10% higher for young women than for young men (Gemici & Wiswall, 2014). This statistic suggests that there are resilient underlying

structural and cultural forces that reinforce gender segregation in academic fields (Barrone, 2011).

Importantly, research indicates that the dichotomy in major selection between men and women also echoes a dichotomy in future careers. Women have been historically underrepresented in many of the highest-earning career fields (Patnaik et al., 2022; Wolniak et al., 2008) and are also underrepresented in college majors that lead to high-paying occupations. Women are most heavily concentrated in majors such as education and health, which have lower earnings potential than male-heavy majors such as engineering and business (Carnevale et al., 2015; Speer, 2017). Women and students of color are consistently enrolling in majors that correlate to lower-paying professions (Carnevale, Strohl, et al., 2011; Carnevale et al., 2015) but are more highly represented in humanities and the arts (Speer, 2017; Wiswall & Zafar, 2015). Studies found that women were less likely than men to use earning potential as a decision factor (Gati & Perez, 2014; Kumar & Kumar, 2013; Wiswall & Zafar, 2015). The resulting imbalance of gender parity in higher-earning majors has implications for women's ability to earn as much as men and, therefore, contributes to the wage gap.

Moreover, students may also be influenced by the gender representation they experience in their families. A study exploring familial career history through the lens of undeclared students showed that students were likely to internalize differences in occupational choices based on gender and to recognize a gender-based wage gap within their families (Storlie et al., 2019). Students identified it as the "norm" in their household for mothers, grandmothers, and aunts to be "stay-at-home" wives who opted out of a professional career (Storlie et al., 2019, p. 87). Other participants noted that their mother was the first in the family lineage to attend college, which positively influenced their academic careers (Storlie et al., 2019).

Intersectionality has also been factored into previous research because identities such as race and socioeconomic class can intersect with gender identity to influence major selection. Both women and students of color consistently enroll in majors that correlate to lower-paying professions (Carnevale, Strohl, et al., 2011). Separately, a study by Niu (2017) found that socioeconomic status was the most determining factor if a student chooses a STEM major. The gender and racial gaps narrow for STEM enrollment when referencing students from a higher socioeconomic class (Niu, 2017). However, one study stated that gender differences showed a much larger disparity in major selection than racial and ethnic disparities (Dickson, 2010).

It is important to note that past literature on gender and major selection focused on the male-female dichotomy. However, gender is not a binary, and many other forms of gender identity exist. Little research was found that recognizes the experiences of trans and non-binary students concerning major selection. Additionally, gender does not exist in isolation, and students may have other salient identities (Crenshaw, 1989); the intersection of various identities could play a role in major selection.

Race/Ethnicity

Major selection has a deeper body of research dedicated to gender compared to race. However, some research has been conducted that shows themes around race/ethnicity and major choice. Like women, students of color consistently enroll in majors correlated to lower-paying professions (Carnevale, Strohl, et al., 2011). In a more recent study conducted by Carnevale et al. (2015), the researchers found that Black students had the highest represented proportion in academic areas such as counseling, human services, and community organization, which correlated with lower-paying professions. Further supporting that notion, studies found a low representation of students of color in many areas of STEM (Barr et al., 2008; Carnevale, Strohl,

et al., 2011; Morgan et al., 2013; Nui, 2017; Syed, 2010). This was echoed by Morgan et al. (2013) and Nui (2017), who stated that Black and Hispanic students were underrepresented in the sciences and engineering. Specifically, Barr et al. (2008) found that racial minorities showed a larger decline in interest in the pre-medical field than White students.

Majors related to business followed similar trends; racially minoritized students collectively majored in economics at approximately one-third of the rate that White, non-Hispanic men did (Bayer & Wilcox, 2019).

However, there is disagreement in the literature. A recent study by Jewett and Chen (2022) stated that race and ethnicity was not a significant factor in a student choosing a STEM major, except for Asian-American students, who were more likely to select STEM majors.

Additional literature echoed the sentiment that Asian-American students were the exception to many STEM findings around minority groups, as Asian-American students had a higher representation in STEM majors than non-STEM majors (Niu, 2017). Additionally, students who did not speak English as a first language were more represented in STEM majors than non-STEM majors (Niu, 2017).

It should be noted that there are nuances around these findings. As mentioned, intersecting identities play a factor in major selection. Dancy et al. (2020) reported that women of color overwhelmingly viewed their race and gender as an impact on their major experiences. Another study found that even though Black students were underrepresented in STEM, they were more likely to choose a STEM major than White students if socioeconomic status was comparable (Niu, 2017). This researcher found that the racial gap narrowed for STEM enrollment when using equivalent socioeconomic status.

Ethnic identity was found to be impacted by major selection. For example, Syed (2010) conducted a study investigating the correlation between major selection and developing ethnic identities. The research interviewed 90 ethnically diverse college students at various stages of their college careers. Syed found that the choice of major impacted ethnic development. Specifically, students in sciences/engineering were less likely to be less connected to ethnic identities or strive to compartmentalize their identities from their academics; often, the students less connected to their ethnic identities were White (Syed, 2010). Students more connected with their ethnic identities were more likely to choose majors in humanities, social sciences, and the arts (Syed, 2010). Gasser (2013) found that Black students with positive ethnic identities were more likely to have a higher occupational commitment and perceive more career opportunities compared to students who were less connected to their ethnic identity. However, Gasser also stated that career and academic appraisals and educational aspirations for Black and Asian-American students were significantly lower than those of White students. Furthermore, women and students of color were more commonly perceived as harder workers than White men in the major, yet some students believed that underrepresented students benefited due to increased job and scholarship opportunities (Dancy et al., 2020). Like women, the research indicated a pipeline issue preventing students of color from feeling welcome in specific academic areas.

Socioeconomic Status

Research has shown that socioeconomic status can impact the majors that students choose for college (Carnevale, Rose, et al., 2011; Carnevale, Strohl, et al., 2011; Carnevale et al., 2015; Creusere et al., 2019; Niu, 2017; Quadlin, 2017; Webber, 2016). For example, while studies showed that gender and racial identities impact students choosing STEM majors, household income was found to be the best indicator (Niu, 2017). As previously mentioned, the gender and

racial gap narrowed for STEM enrollment when referencing students from a higher socioeconomic class (Niu, 2017).

However, a recent study by Jewett and Chen (2022) offered a contradictory view that socioeconomic status was not a significant predictor of STEM major selection; the study posited that high school exposure to AP STEM courses was a significant predictor. On the other hand, Niu (2017) stated that low socioeconomic students were disadvantaged in pursuing STEM majors as they may not have always had access to this area during their high school education.

One study from Quadlin (2017) looked at the interaction of student financials with college decision-making, specifically for the decision to enter undeclared. In this study, as family contributions to tuition increased, the likelihood of being undeclared increased, whereas as loan funding increased, students were more likely to major in business, health, and nursing. As students accrued more loans, their predicted probability of being undeclared decreased (Quadlin, 2017).

Social Mobility

To better understand the underlying dynamics of major decision-making, it is important to review research on higher education's connection to social mobility. Studies state that society views higher education as a pathway to social mobility (Webber, 2016; Wolniak et al., 2008), but not everyone has the same access. Education inequality is a pre-existing diversity issue in the United States (Santamaria & Santamaria, 2016). For example, rates of achieving social mobility are lower for Hispanic and Black students than for White students (Chetty et al., 2018; Creusere et al., 2019). Although completing a bachelor's degree increases the likelihood of upward social mobility from generation to generation (Creusere et al., 2019; Webber, 2016), literature has shown that it is not the only factor at play; the academic area a student chooses to study can

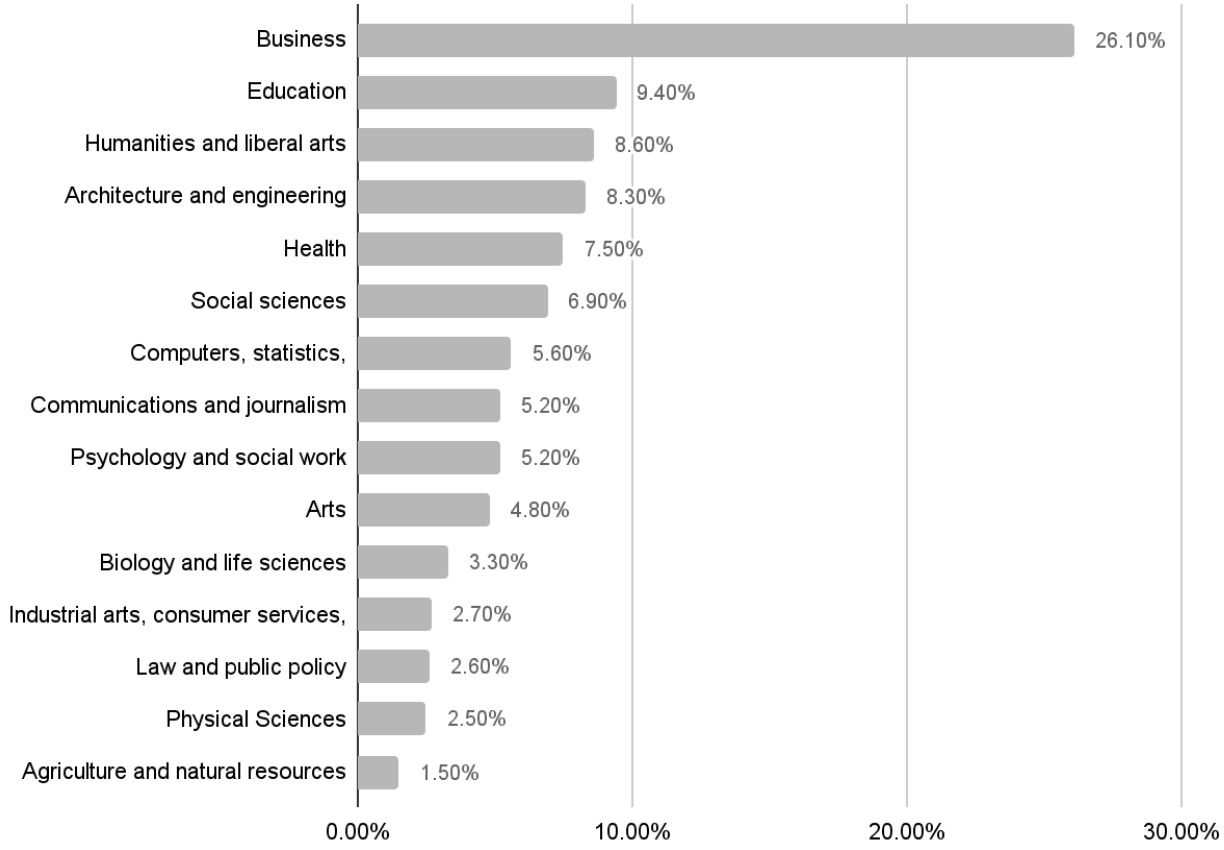
impact the ability to move between socioeconomic strata. For example, one study found that students who choose STEM majors in college are more likely than non-STEM majors to move up one or more quintiles from their parental household income (Creusere et al., 2019). Another factor to consider for social mobility related to higher education is that personal debt arising from student loans has steadily risen in recent years (Webber, 2016).

National Distribution and Earnings by Majors

It is important to understand the national data by major when analyzing the results of this study. A study from Georgetown University Center on Education and the Workforce (Carnevale et al., 2015) assessed national data around chosen major and median earnings from college-educated students. The percentages of college students enrolled in each major group, nationally, are shown in Figure 2.

Figure 2

Share of College Graduates (Ages 25-29) by Major Subgroup



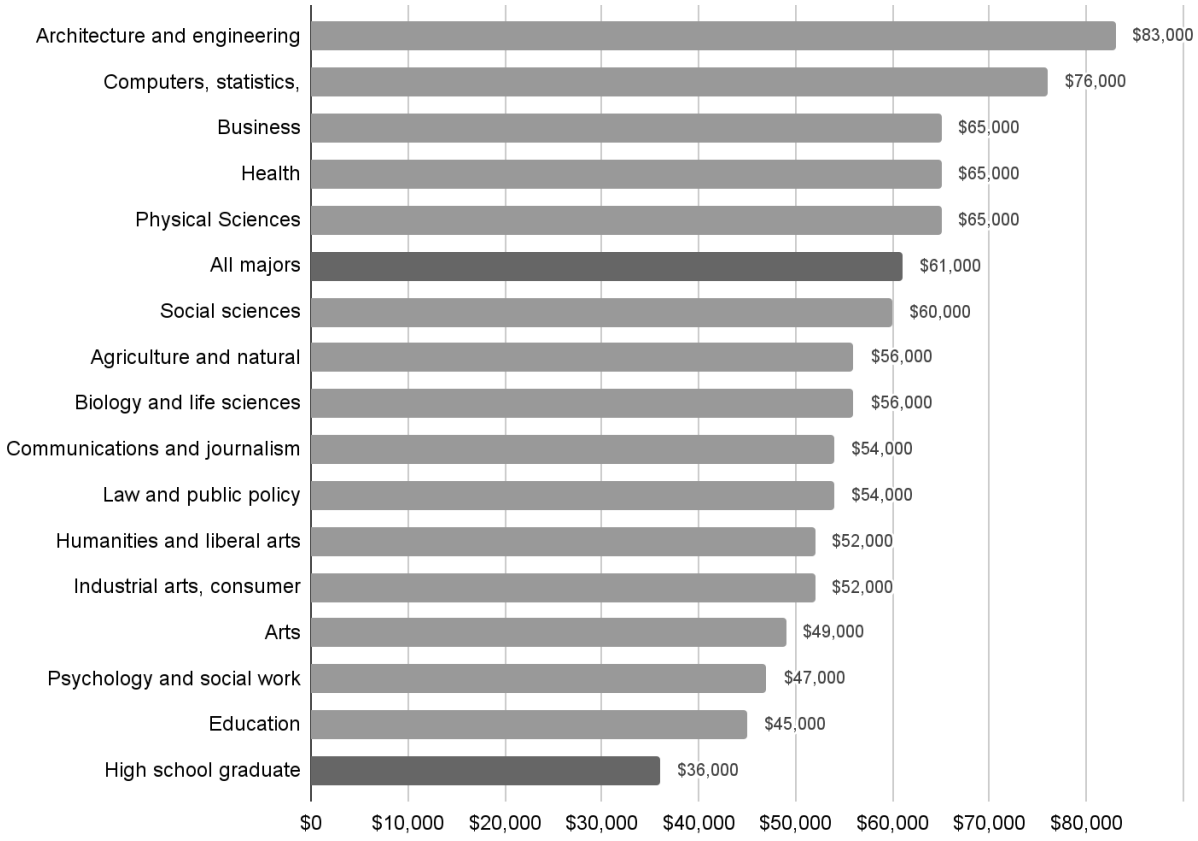
Note. Adapted from *The Economic Value of College Majors*, Georgetown University Center on Education and the Workforce (Carnevale et al., 2015).

Georgetown University Center for Education and the Workforce collected median and lifetime income data based on major, as shown in Figure 3. There is a vast differentiation of earnings, with students in computers, statistics, and mathematics outearning those in education by $38,000 annually. Median earnings for the entire sample are $61,000, with only four major groups earning higher than the median. Business, health, physical sciences, and computers, statistics, and mathematics all outearn the median salary. In contrast, majors such as arts, education, psychology, and social work all earn less than $50,000 annually when viewed from

the median. In spite of these differences, all college degree earners still outearn high school graduates without a college degree, which underscores the financial importance of achieving any bachelor's degree.

Figure 3

Median Annual Wages of College-Educated Workers (ages 25-29) by Major Groups

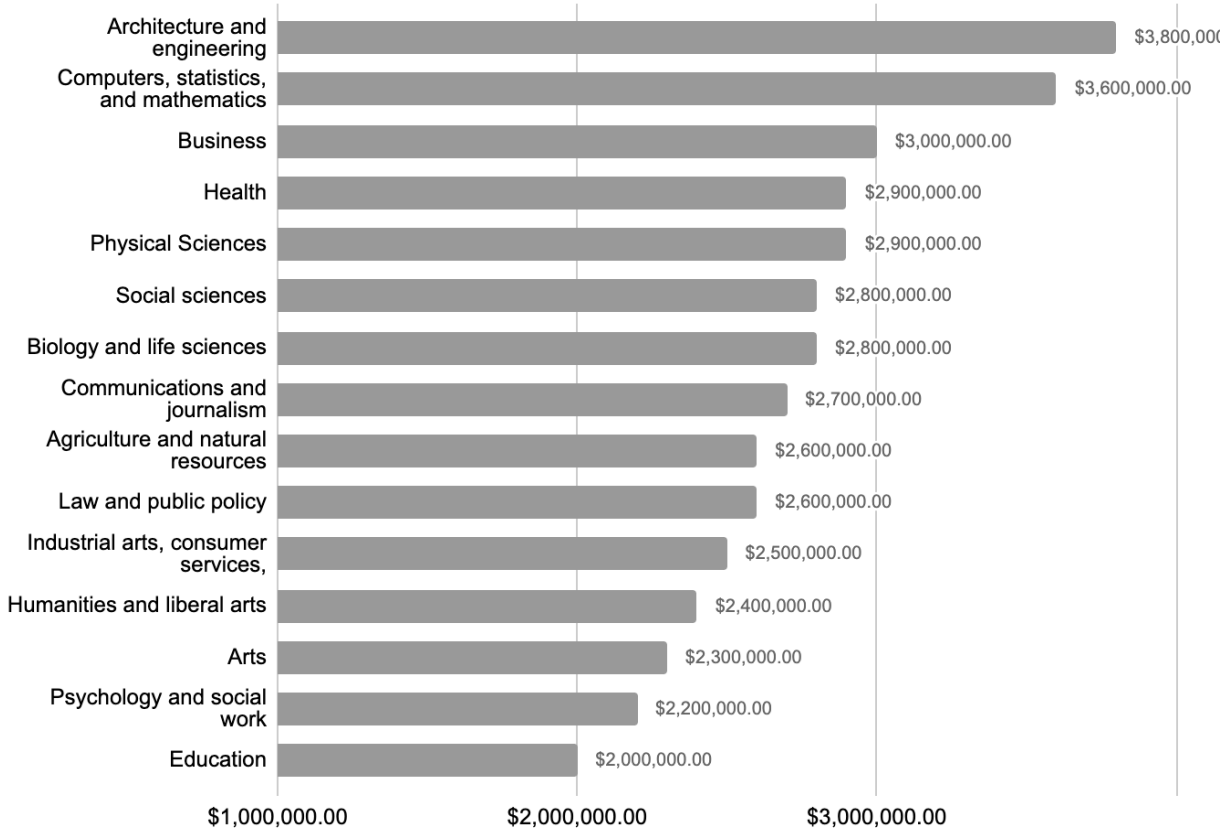


Note. Adapted from *The Economic Value of College Majors*, Georgetown University Center on Education and the Workforce (Carnevale et al., 2015).

A recent Georgetown University Center on Education and the Workforce study synthesized lifetime earnings based on major, as shown in Figure 4.

Figure 4

Median Lifetime Earnings by Major Subgroups



Note. Adapted from *The College Payoff: More Education Doesn't Always Mean More Earnings,* Georgetown University Center on Education and the Workforce (Carnevale et al., 2021).

The national data provided by Georgetown University Center on Education and the Workforce showcases an inequity between majors and earnings, which can impact students' social mobility.

Perceptions of Earnings and Unemployment Rates

The perception of future earnings can play a role in major decision-making because students consider occupations when selecting their major. Georgetown University's Center on Education and the Workforce found that lifelong earnings and unemployment rates were directly

related to academic major and educational attainment; earning a college degree resulted in higher lifelong earnings, and choosing a specific academic major could result in higher lifelong earnings than other majors (Carnevale, Strohl, et al., 2011; Carnevale et al., 2015).

Although previous research has identified correlations between earnings and academic majors, there is disagreement about the significance of earnings potential as a factor in college major selection. Several studies maintained that earnings potential was important when selecting a major (Loveland, 2017; Malik & Slaughter, 2016; Spight, 2020), while others found that potential earnings was a factor that influenced major choice, but not the most significant one (Beffy et al., 2012; Patnaik et al., 2022; Wiswall & Zafar, 2015).

In a recent study, Patnaik et al. (2022) found that earnings may not be the most significant factor on their own but were relevant when related to gender; findings concluded that men were more likely than women to opt into a risky but high-paying major, such as business or economics. One study found that men were more likely than women to use potential earnings as a decision-making factor when choosing a major (Wiswall & Zafar, 2015). Several studies suggest that students and their families increasingly feel that college majors must directly correlate to job success, which has led to a higher demand for students to choose majors with perceived occupational value (Loveland, 2017; Malik & Slaughter, 2016; Spight, 2020).

While there is no consensus on the level of influence earnings perception has on major selection, existing literature suggests that not all majors are worth the same salary-wise. One study found that the highest-earning majors could attain 314% more than the lowest when viewed from the median point (Carnevale, Rose, et al., 2011; Carnevale, et al., 2015), while potential earnings could be impacted by 25-35% based on the choice of major (Pascarella & Terenzini, 2005). The highest-earning majors tended to be found in fields of STEM and, to a

lesser extent, business (Carnevale et al., 2015; Wolniak et al., 2008). The lowest-earning majors fell under academic areas related to humanities, arts, education, social work, and psychology (Carnevale et al., 2015; Wolniak et al., 2008).

Researchers expected that as the cost of higher education increased, students considered economically rational were more likely to choose a major that offered a higher return on investment with higher lifetime earnings (Malik & Slaughter, 2016). Malik and Slaughter (2016) analyzed the relationship between college tuition increases and the likelihood that students would choose a "financially secure" major. Majors in this study were coded as "financially secure" or "financially insecure" based on national unemployment data. The study found that a $1,000 increase in average salary was associated with a .45% proportional increase in students graduating with a financially secure major. This study considered industries such as business, law, and STEM among the most "financially secure" majors. The study also found that the overall increase in college tuition had a higher impact on students in majors with a lower earnings distribution with that degree (Malik & Slaughter, 2016).

Higher unemployment rates in a given area were found to have a significant relationship with the proportion of graduates who received their degree in financially secure majors. This is likely because students who recognize they live in an area with a weak labor market shift their academic focus to an economically secure major. The study also showed that students who received financial aid were more likely to graduate with a financially secure major. The findings from this study indicated that university administrators would be aiding the students by democratizing access to financially secure majors, particularly during high-employment periods or around tuition increases (Malik & Slaughter, 2016).

Rising college costs were identified as a factor making students more prudent with their financial spending (Loveland, 2017; Malik & Slaughter, 2016). Students wanted to know costs, average debt, and graduation rates before committing to a college (Loveland, 2017). A study from Stange (2014) offered several suggestions aimed at alleviating the problem of students feeling pressured to make major decisions because of finances. Stange (2014) pointed out that more equitable enrollment in majors was vital because majors predict which career fields students eventually choose. It follows that more diverse representation across college majors is needed to achieve diverse workforce representation. Stange's research suggests that institutions should consider assigning tuition prices based on the anticipated salary range post-graduation, with students who can anticipate making more money in their field being assessed higher tuition. This research showed that underrepresented student groups were the ones most impacted by tuition increases and, therefore, could most benefit from differential pricing by undergraduate majors.

First-Generation Students

First-generation students represent a large portion of the American college student population. One study found that as many as 59% of students identified as first-generation (RTI International, 2019). The same study found that these students came from more marginalized identities and had significantly lower parental income (RTI International, 2019). Another study found that first-generation students were more likely to choose career paths with higher average wages and low unemployment rates (Trejo, 2016). The same study showed that preferred majors for first-generation students were computer science, math, engineering, health, psychology, and education; these students were less drawn to arts, biology, communication, and humanities (Trejo, 2016).

Limited research has been conducted about the specific population of undeclared first-generation college students. However, one study found that first-generation undeclared students were considered at risk of dropping out of college compared to continuing-generation undeclared students (Glaessegen et al., 2018). This research has also found that first-generation students were less likely to find and utilize resources that could lead to college success, with one study finding that first-generation undeclared students did not always understand the role of an academic advisor (Glaessegen et al., 2018). Instead, they made use of their continuing-generation peers to gather information, which could lead to inaccurate information or misinterpretation of policy (Glaessegen et al., 2018). These students could benefit greatly from campus resources and intervention, as one study found that for every meeting with an advisor, the odds of retaining that student increased by 13% (Swecker et al., 2013).

Generation Z

Research has recently begun on the population that now makes up the majority of college students: Generation Z. Generation Z students were born between 1995 - 2010 and are currently the largest majority of the college-going population (Loveland, 2017). Research has found that Generation Z was less influenced by their parents when making educational decisions than previous generations (Kantarova et al., 2017). One study found that peers were more influential than parents when a Generation Z student made an educational decision (Loveland, 2017).

More than previous generations, Generation Z students are concerned about the cost of college. Therefore, they expect practical skills and financial payoff upon degree completion (Loveland, 2017). Generation Z is savvy about money due to being cognizant of the reality of student loan debt, stress over family income, and concerns about the affordability of college (Henderson, 2013; Loveland, 2017). Because of watching their families struggle in the

workforce, Generation Z has developed a sense of entrepreneurialism and independence (Loveland, 2017). This type of generational mindset can impact the majors that current college students choose, as they are focused on the career payoff that college degree achievement would result in.

Interests and Abilities

Several studies examined how interests and abilities might connect to major selection. These studies found differences based on gender regarding interests and abilities in major selection (Kumar & Kumar, 2013; Wiswall & Zafar, 2015). The research concluded that women were more likely to weigh beliefs about their ability when choosing a major, whereas men were less likely to factor their skills into the decision. They also found that women were less likely to be overconfident in their abilities than men.

A variation could also occur based on the major being discussed. Kumar and Kumar (2013) found that interest was *not* a significant factor for students who chose a business major, but skills and aptitude in the area were found to have a strong influence. Similarly, Geyman et al. (2015) found that business students choose majors that align with their skills and abilities.

John Holland (1997) created one of the most well-known career choice theories, commonly called the Holland Code or RIASEC. Holland's theory stated that strong vocational fit could vary based on personality type. Holland created a tool to aid in understanding an individual's attitudes, skills, and values to determine the personality type. Individuals and work environments are represented by six personality types: realistic, investigative, artistic, social, enterprising, and conventional. Holland found that individuals prefer environments compatible with their skills, values, and areas of interest (1997).

Familial Impact

Parental and familial factors have influenced career decisions for several decades (Gordon & Steele, 2015; Holland, 1997). Garcia et al. (2012) conducted a study to determine how parental support impacts career decision-making self-efficacy. Parental support was provided by a primary caregiver to an individual through verbal encouragement, vocation-oriented modeling, assistance, and emotional support (Turner & Lapan, 2002). The study found that higher parental support increased students' career decision-making self-efficacy (Garcia et al., 2012). A study by Johnson et al. (2014) found that healthy career development derived from a balance of attachment to parents and autonomy. A healthy psychological separation and parental support level were positively linked to career decision-making ability (Johnson et al., 2014). One study on how high school seniors acquire information posited that students identified parents and friends as the most helpful when helping students decide on a field of study (Owen et al., 2020). This study also found that the perceived helpfulness of parents increased with parents' education levels. Research from Geyfman, Force, and Davis (2015) showed that parents have the most influence on students' initial major choice but significantly less influence on ultimate career choice.

Raque-Bogdan et al. (2013) examined career-related parent support and career barriers based on gender and racial identity. The study showed that women reported higher parental career-related emotional support levels than men. However, women also reported higher levels of career barriers. The researchers found no significant ethnic differences in career-related parent support among this college student sample. This study analyzed the four dimensions of career-related parental support (career modeling, verbal encouragement, emotional support, and

instrumental assistance); all were positively related to coping with career barriers. This study did not evaluate socioeconomic status or generation.

Many of these results relating to career-related parental support were conducted on Millennials in college. However, there is little research on parental support for Generation Z students. Kantorova et al. (2017) asserted that Generation Z was less influenced by their parents than previous generations when making educational decisions.

Peer Impact

Some research has been conducted on how peers may influence the choice of a major. Peers can play a smaller or larger role depending on how much information students receive from other sources. Access to information, or lack thereof, can impact decisions students make in and around college (Owen et al., 2020).

One study about how high school seniors acquire information found that students identified parents and friends as the most helpful when helping students decide on a field of study (Owen et al., 2020). However, a contrasting study from Gallup-Strada Education Network (2017) found that employers were more helpful than peers and family. As previously mentioned, studies showed that first-generation students use continuing-generation peers to gather information (Glaessegen et al., 2018). Researchers have also discovered gender differentiation. In a study by Kumar and Kumar (2013), the research found that women were most influenced by family and high school counselors, while men placed more value on friends and professors. Geyfman et al. (2013) concluded that social influences such as friends, parents, and teachers influenced both genders.

Theoretical Framework

This study aimed to identify systemic inequities in higher education with the hopes that they can be corrected by educational leaders, leading the researcher to frame the study using both a social justice theory and a leadership theory. The study used the cumulative (dis)advantage theory and the cultural proficiency framework to guide the research.

Theory of Cumulative (dis)Advantage

The cumulative (dis)advantage theory states that advantages for one group or individual over another accumulate over time, resulting in inequality growing over time (DiPrete & Eirich, 2006). This theory was chosen to frame this study because of the advantages or disadvantages that may result from choosing a major (Carnevale, Rose, et al., 2011; Carnevale, Strohl, et al., 2011; Carnevale et al., 2015). The choice of major may be influenced by gender, race, or other identities (Dancy et al., 2020; Jewett & Chen, 2022; Niu, 2017; Patnaik et al., 2022; Speer, 2017). Therefore, the theory of cumulative disadvantage has shown that students who are already marginalized due to identity may increase their disadvantage based on their choice of major. Additionally, undeclared students are often viewed as a population who face disadvantages when it comes to persistence and graduation rates (Glaessegen et al., 2018; Reynolds et al., 2010; Sklar, 2014; Yue & Fu, 2017). Undeclared students' pathways to graduation do not have the same clarity as their declared peers; this creates a disadvantage that can lead to more time spent in college (Reynolds et al., 2010).

The cumulative disadvantage theory has been used in other research to show how social inequities can grow over time. This theory was used as a framework to point out educational inequality in a study by Bottia et al. (2021), which identified the factors associated with the likelihood of racially minoritized students participating in STEM programs in college. A study

by Easton and Kong (2021) used the cumulative disadvantage theory to frame how childhood adversity can impact an individual's future.

Cultural Proficiency Framework

Culturally proficient leadership is rooted in the belief that leaders must understand their assumptions, beliefs, and values about people and cultures to be effective in a cross-cultural setting (Terrell et al., 2018). The authors of this theory posited that culturally proficient leaders must recognize the educational achievement gap where systemic disparities persist in educational settings (Terrell et al., 2018). Access to high-quality education depends on the neighborhood and is a form of segregation; educational leaders should recognize these inequities to make positive change. This framework encourages leaders to shift their focus from "What is wrong with the student?" to "What is it we need to do to meet the student's needs?" (Terrell et al., 2018, p. 19). The cultural proficiency framework was used to frame this study because it guides educational leaders seeking to create more welcoming cultures and equitable policies in their schools. Culturally proficient leaders can benefit from the research in this study, which focuses on how underprivileged identities can lead to continued inequalities throughout the lifespan due to their choice of major.

Conclusion

Extensive research has been conducted on the development of undeclared students. Additionally, research has covered areas relating to what areas high school students choose to study in college, broken down by various areas that may influence the decision, such as identity, aptitude, family, or peers. However, this literature mainly references students who choose to enroll in college *with* a declared major. Therefore, there is a gap in the literature concerning the influences that impact undeclared students during their major selection process. This study aimed

to close that gap by analyzing how significantly the aforementioned areas may influence the major declaration of undeclared students, including race, gender, socioeconomic status, and first-generation status. This study has added to the literature on undeclared students and the choice of college major by bridging the gap between the two areas. Broadly, this study contributes to research on social inequities that college majors may be perpetuating. Findings from this study can help educational leaders improve this student population's academic success and create more equity within career pipelines.

Chapter 3: Methodology

This study explored the relationships between the major decisions of undeclared students and their identity. Using correlation analysis, the college major selections of students based on gender, race, socioeconomic status (SES), and first-generation status were examined to determine if a relationship existed. Additionally, regression analysis was employed to assess whether identity could predict major selection for this group of students.

Correlational research design was identified as the best choice to investigate relationships between two variables without an attempt to influence these variables (Fraenkel et al., 2011). Fraenkel et al. (2011) has claimed that correlation does not equate to causation, so if a relationship was discovered in this study, it would not prove causation. The study analyzed the relationships between identity and choice of major, focusing on the four identity variables to find relationships between identity and major selection for undeclared students. The researcher did not manipulate variables, but analyzed secondary data previously collected at one four-year university. Quantitative data analysis was used to identify the relationships between identity and major selection and analyze if identity can predict major choice for undeclared students. A predictive study can be used if a relationship of sufficient magnitude exists between two variables (Fraenkel et al., 2011). A multinomial logistic regression analysis was conducted to determine which variables, if any, predicted the choice of major for undeclared students.

Many seminal studies around undeclared students were qualitative (Ellis, 2014; Galotti, 1999; Glaessegan et al., 2018; Reynolds et al., 2010). These studies often sought to understand the experience of undeclared students and their choice of major. However, several recent studies on undeclared students were quantitative, measuring graduation rates for undeclared students (Spight, 2020, 2022). Notable studies about major selection did not specifically consider

undeclared students in their research. Authors of these studies analyzed quantitative trends in major selection based on identity (Bayer & Wilcox, 2019; Creusere et al., 2019; Malik & Slaughter, 2016) but did not specifically address the population of students who entered college without a major and subsequently made a decision once enrolled. This research study aimed to combine concepts from several of these studies by analyzing quantitative trends of major selection based on identity groups using undeclared students.

The following research questions were addressed in the study:

RQ1: Is identity related to choice of college major for undeclared students?

RQ1a: Is there a relationship between gender and major for undeclared students?

RQ1b: Is there a relationship between race and major for undeclared students?

RQ1c: Is there a relationship between socioeconomic status and major for undeclared students?

RQ1d: Is there a relationship between first-generation status and major for undeclared students?

RQ2: Does identity predict major selection for undeclared students, as measured by gender, race, socioeconomic status, and first-generation status?

To address RQ1 and its subquestions, the researcher analyzed the relationship between chosen majors and social identities. This study examined four independent variables: gender, race, socioeconomic status, and first-generation status to identify relationships with the dependent variable: choice of major. The chi-square test of independence was used to calculate this relationship. The chi-square test was identified as the appropriate correlation coefficient because it is commonly used in educational research when describing the relationship between

two categorical variables (Fraenkel et al., 2011). To address RQ2, the researcher used a multinomial logistic regression analysis to understand which variables, if any, predicted the choice of major for undeclared students.

The researcher identified benefits of using correlational and predictive design for this study and secondary data. The study used secondary data previously collected by Study University to conduct this quantitative analysis; the secondary data analysis benefited Study University because it resulted in findings that contribute to insights about the university's population. The chi-square test was identified as an appropriate and reliable model to examine relationships between two categorical variables (Fraenkel et al., 2011). The chi-square test allowed the researcher to investigate the relationship between two variables without manipulating the variables (Fraenkel et al., 2011). Multinomial logistic regression analysis is a technique used to predict the influence of the independent variable on the dependent variable (Fraenkel et al., 2011).

The correlational research design has limitations (Fraenkel et al., 2011). The researcher did not manipulate any variables, nor control the environment, which created threats to internal validity. While relationships can be identified in correlational design, they must be interpreted cautiously because causation may be suggested but cannot be proven (Fraenkel et al., 2011).

About Study University

Study University is a four-year, public university in the northeastern United States with an R2 research designation (Carnegie Classification of Institutions of Higher Education, 2023). Study University's student population is approximately 18,000 undergraduate students and an additional 4,500 students seeking master's and doctoral degrees (Anonymous, 2023). The university is a Hispanic Service Institution, a designation granted to colleges with a population of

more than 25% Hispanic and Latinx students. Study University's undergraduate population is comprised of 60% female students and 40% male students. Racially, the undergraduate student population consists of 36% Hispanic/Latino, less than one percent Native American, seven percent Asian, 13% Black/African American, 37% White, and three percent with two or more races identified. Approximately 48% of incoming students at Study University identify as first-generation college students. Study University's acceptance rate is approximately 91%, with 20% of those students enrolling after their acceptance and the average enrolled student ranking in the 58th percentile of their high school class. The average classroom size is 23, with a 17:1 student-to-faculty ratio (Anonymous, 2023).

The Model for Undeclared Student Advising at Study University

Study University developed an academic college for undeclared students, with its own academic advisors, career advisors, programming, and first-year seminar for undeclared students. This model was created by the university as a response to higher rates of attrition of undeclared students; the services were created to offer intentional services geared specifically for undeclared students to better advise, retain, and assist them. Study University provides this unique population of students with opportunities for intentional academic and career advising, and academic programming geared toward exploring majors. The students in this sample were undeclared and took part in this specific model for advising undeclared students.

Sample

The population examined in this study was college students who enrolled in college without a major (undeclared) and have since declared their major. The sample used for this study included students who met that criterion at Study University, a four-year public university. The university had previously collected these data.

The study sample included data from 1,686 students, which was the amount of data the university provided. The researcher obtained these data from the university by working with the department designated for undeclared students. The department tracked data regarding major selection and demographics. Leaders within the department provided demographic information and information on chosen major to the researcher for analysis.

The data were cleaned once received. Transfer students were excluded from the sample to maintain a sample of a peer group of first-year students who started at the university as undeclared students. The full sample of 1,686 students was used. However, five students were excluded due to outlier characteristics that could skew the results. Two students identified as Native American, and three students were identified to be in the lowest income quintile. These five students were eliminated from the sample for regression testing.

Sample Size

The study's sample included 1,686 undeclared students.

Ethical Considerations

Internal Review Board (IRB) approval was received prior to the researcher's request for data from Study University. There were minimal potential risks for study sample members, as their identities were anonymous. Potential risks included loss of anonymity due to demographic information. However, the researcher took steps to prevent the loss of anonymity, such as removing students' names.

Societal benefits are broad in scope. Findings from this research can help higher education leaders identify policies that may lead to systemic oppression by gatekeeping populations of students from certain majors; findings from this research may provide an opportunity for leaders to reevaluate outdated policies. Additionally, analyzing diversity within

college majors can lead to an analysis of diversity within the professional workforce because college graduates in each major fuel the career pipeline. This research was designed to lead to greater diversity within each college major, which can subsequently lead to more workforce diversity.

Data Collection

This study used secondary data. The data were provided by Study University directly to the researcher. The researcher obtained these data from Study University by working with the department at the university designated for undeclared students. The department has historically tracked data regarding major selection and demographics. The associate dean within the department provided demographic information to the researcher for the following: 1) chosen major, 2) gender, 3) race, 4) hometown zip code, and 5) first-generation status. The data represented students who began their college career undeclared but had since declared an academic major. No research instrument was used since the university already collected these data.

The data did not provide names to protect the participants' anonymity. The researcher used a unique number indicator to identify each participant. Aggregate data were not published in a way that could identify the participants. The researcher did not report individual data that may be identifiable when presenting the results of this study.

Data Analysis

This study aimed to examine if identity had a relationship with the choice of college major and analyzed which identities predicted major selection. Data analysis consisted of descriptive and inferential statistics. Descriptive statistics included calculating each independent variable's frequency, percentage, mean, median, mode, and standard deviation. Inferential

statistics included correlational analysis to identify the relationship between identity and choice of major and regression analysis to examine if identity can predict major selection for undeclared students. This statistical analysis was conducted using Statistical Package for Social Sciences (SPSS) software version 29.0.

Correlational Analysis

Chi-square tests were used to answer Research Question 1:

RQ1: Is identity related to choice of college major for undeclared students?

RQ1 examined relationships between four independent variables (gender, race, socioeconomic status, first-generation status) and the dependent variable (chosen college major).

The chi-square test was identified as an appropriate and reliable model to examine relationships between two categorical values and is commonly used in educational research (Fraenkel et al., 2011). The chi-square test allowed the researcher to investigate the possibility of a relationship between two categorical variables without manipulating the variables (Fraenkel et al., 2011). This analysis was conducted four times for each of the independent variables. An alpha level of $< .05$ was used to identify the strength of relationships between the variables. The strength of relationships was measured by testing the null hypotheses. The following null hypotheses were tested:

RQ1a H_0: There is no relationship between major and gender.

RQ1b H_0: There is no relationship between major and race.

RQ1c H_0: There is no relationship between major and socioeconomic status.

RQ1d H_0: There is no relationship between major and First-Generation status.

The null hypotheses were tested using the chi-square test of independence. The researcher assessed the p-values using standard cut-off alpha levels of < .05 to determine if a significant relationship exists.

Majors

Study University has approximately 75 majors that students are able to choose from. However, for the purpose of this study, majors were coded into 13 subgroups. These subgroups were pre-established in *The Economic Value of College Majors* (Carnevale et al., 2015) through Georgetown University's Center on Education and the Workforce. Each of the 75 major options was coded into a major subgroup, as listed in Table 2. The choice of the subgroup for each major was determined using the coding methods of Carneval et al. (2015) in *The Economic Value of College Majors.* The research coded each student into one of these 13 subgroups based on their chosen major.

Table 2

Coding for Academic Majors into Subgroups

Subgroup	Affiliated majors
Arts	Animation and Visual Effects, Dance, Illustration, Fashion Design & Merchandising, Film and Television, Filmmaking, Music, Music Therapy, Musical Theatre, Theatre, Theatre Studies, Television and Digital Media, Recording Arts and Production, Visual Arts, Visual Communication Design
Biology and life sciences	Biochemistry, Biology, Earth and Environmental Science, Molecular Biology, Sustainability Science
Business	Accounting, Business Administration, Economics
Communication and journalism	Advertising, Communication and Media Arts, Journalism and Digital Media, Social Media Public Relations, Sports Communication, Public and Professional Writing
Computers, statistics, and mathematics	Applied Math and Statistics, Computer Science, Data Science, Information Technology, Mathematics
Education	Educational Foundations for Elementary Teachers, Family Sci & Human Development, Physical Education
Health	Exercise Science, Medical Humanities, Nursing, Nutrition and Food Science, Public Health
Humanities and liberal arts	Arabic, Asian Languages and Cultures, Classics, English, French, German, History, Humanities, Italian, Latin, Linguistics, Liberal Studies, Philosophy, Spanish, Religious Studies
Industrial arts, consumer services, and recreation	Hospitality, Sports, Events and Tourism, Geography, Environment and Urban Studies, Product Design
Law and public policy	Jurisprudence, Law & Society, Justice Studies, Policy Studies
Physical Sciences	Chemistry, Earth & Environmental Science, Marine Biology and Coastal Science, Physics
Psychology and social work	Child Advocacy and Policy, Psychology
Social Sciences	Anthropology, Gender, Sexuality and Women's Studies, Geography, Language, Business and Culture, Political Science, Sociology

Gender

To determine if there was a relationship between major and gender, the researcher tested the following research question using the null hypothesis:

RQ1a: Is there a relationship between gender and major for undeclared students?

RQ1a H_0: There is no relationship between major and gender.

The secondary data included the gender associated with each student in the sample. However, the secondary data provided only recognized students in the female/male gender binary. The researcher acknowledges that gender exists outside of the male-female binary, but because these were secondary data, the researcher used the gender binary the university provided.

Two variables were analyzed: gender and major. Each student had selected a major from approximately 75 options. Using the sample of 1,686 students, the chi-square test was used to identify if there was a relationship between gender and chosen major.

Race

The researcher tested the following null hypothesis to answer the research question to determine if a relationship existed between race and major:

RQ1b: Is there a relationship between race and major for undeclared students?

RQ1b H_0: There is no relationship between major and race.

Race was included in the secondary data that was collected. Students in the sample identified themselves as one of six different racial categories: 1) Asian, 2) Black-African American, 3) Hispanic-Latino, 4) Native American-Alaskan native, 5) White, and 6) two or more races. The final category allowed students to select if they identified as more than one race. Major and race were analyzed using the chi-square test to determine if a relationship existed.

Socioeconomic Status

To examine the relationship between race and socioeconomic status, the researcher tested the following null hypothesis to answer the following research question:

RQ1c: Is there a relationship between socioeconomic status and major for undeclared students?

RQ1c H_0: There is no relationship between major and socioeconomic status.

Socioeconomic status is not a data point that the university collects; therefore, data transformation was used to represent the socioeconomic status of each student. The socioeconomic status was determined by identifying the median household income from the zip code affiliated with each student's home address. Median household income was determined using data from the United States Census Bureau (2021) to represent the socioeconomic status of each student. Two categorical values are needed to perform a chi-square test; therefore, the median household income was coded into a categorical value. Five categorical values were identified to represent ranges of household earnings, as displayed in Table 3. These quintiles were pre-established based on income data collected from the United States Census Bureau (2021).

Table 3

Household Income Coded into Categorical Values Based on Earnings Quintile

Assigned Earnings Quintile	Household Income
Lowest Quintile	< $28,007
Second Quintile	$28,008 to $55,000
Third Quintile	$55,001 to $89,744
Fourth Quintile	$89,745 to $149,131
Highest Quintile	> $149,132

The chi-square test was used to assess if there was a relationship between chosen major and socioeconomic status, as represented by the quintile group of median household income of the students' town.

First-Generation Status

The following null hypothesis was tested to answer the research question to identify the relationship between chosen major and first-generation status:

RQ1d: Is there a relationship between first-generation status and major for undeclared students?

RQ1d H_0: There is no relationship between major and first-generation status.

The data included a designation indicating whether a student was a first-generation student or a continuing-generation student (non-first-generation student). This designation was self-selected by each student.

Two variables were analyzed: first-generation status and major. There are approximately 75 major options, and each student had selected one. The chi-square test was used to identify if there was a relationship between first-generation status and choice of major.

Predictive Analysis

Predictive research analysis was used to determine if any identities were a predictor for college students who enrolled as undeclared. Multinomial logistic regression was used to answer the following research question:

RQ2: Does identity predict major selection for undeclared students, as measured by gender, race, socioeconomic status, and first-generation status?

To answer RQ2, the researcher used regression analysis to examine which variables predicted the choice of major for undeclared students. Multinomial logistic regression was used to analyze the relationship between several independent variables (gender, race, socioeconomic status, and first-generation status) and the dependent variable (major). Multinomial logistic regression was selected as the appropriate test because it requires two or more categorical predictor variables (Fraenkel et al., 2011).

This analysis included one criterion and four predictors. Major served as the criterion, while identities (gender, race, socioeconomic status, and first-generation status) were the predictors. However, five students were eliminated from the multinomial regression analysis due to outlier characteristics that could skew the results. Two students identified as Native American, and three students were identified to be in the lowest income quintile. These five students were eliminated from the sample for regression testing as multinomial logistic regression analysis requires the removal of outliers (Fraenkel et al., 2011).

Each variable was coded to conduct the multinomial logistic regression analysis. Majors were coded into major subgroups to represent the criterion. The four identity groups were coded into numerical values to run a multinomial logistic regression analysis, as represented in Table 4.

Table 4

Coding for Multinomial Logistics Regression

Predictor Variable	Predictor Variable Response	Code
Gender	Female	0
	Male	1
Race	2+ Races	0
	Asian	1
	Black-African American	2
	Hispanic/Latino	3
	White	4
Income Quintile	Lowest Income Quintile	0
	Second Income Quintile	1
	Third Income Quintile	2
	Fourth Income Quintile	3
	Highest Income Quintile	4
First-Generation Status	Continuing-Generation	0
	First-Generation	1

Data were input into the SPSS statistics software. The output was interpreted in several different ways. The chi-square goodness-of-fit test was used to assess the significance of the overall model, with a statistically significant result ($\alpha < 0.05$), indicating the model was not a good fit for the data. The model fitting information was also used to assess the model's fit; in this case, significance ($\alpha < 0.05$) indicated the model with the variables was a better predictor than a model without the variables.

Likelihood ratio tests were used to indicate the significance of each predictor variable, using an alpha level of $< .05$ to identify significance. Finally, parameter estimates were used to measure the contribution of each predictor in the model.

Summary

This study aimed to examine relationships between identity and choice of college major and analyzed which identities predicted major selection. The study sample included 1,686 students who enrolled without a major at Study University, a diverse university in the Northeast. Chi-square tests of independence were conducted to identify the relationship between identity and choice of major. Multinomial logistic regression was used to examine if identity predicted major selection for undeclared students.

Chapter 4: Results

This chapter presents data analysis and interpretation for the results of this study. Data analysis was conducted using SPSS. This study aimed to identify relationships between identity and major and assessed which identities predicted major. The beginning of this chapter describes the sample of undeclared students used in this study. The sample is described based on the chosen major subgroup and the four independent variables: 1) gender, 2) race, 3) socioeconomic status, and 4) first-generation status. Descriptive statistics are provided for each variable.

The latter part of this chapter offers the results of the statistical testing. Chi-square tests were used to test for relationships between identity and chosen major for undeclared college students. Gender, race, and socioeconomic status were related to choice of major, while no relationship was found between first-generation status and major. Additionally, a multinomial regression analysis was used to evaluate if any of the four independent variables could be used to predict majors selected by undeclared students. The study found two variables that predicted major selection, with 12 findings regarding specific identity groups.

Sample

The sample size for this study was 1,686 students who enrolled as undeclared at Study University. The demographic information included major, gender, race, socioeconomic status, and first-generation status for each student. The population consisted of students who had since declared their major. Table 5 displays the distribution of major subgroups selected by each participant. Business was the most selected major, with 31.7% of the sample. Arts and communication and journalism were the second and third most popular, representing 20% and 9.6% of the sample, respectively. Physical sciences was the least selected major subgroup, with

only 0.5% of the sample. The remaining nine major subgroups ranged from 8.4% to 1.8% of the sample, as presented in Table 5.

Table 5

Distribution of Sample by Major Subgroup (N=1,686)

Major Subgroup	Frequency	Percent
Arts	337	20
Biology and life sciences	30	1.8
Business	535	31.7
Communication and Journalism	162	9.6
Computers, statistics, and mathematics	40	2.4
Education	103	6.1
Health	113	6.7
Humanities and liberal arts	61	3.6
Industrial arts, consumer services, and recreation	38	2.3
Law and public policy	75	4.4
Physical Sciences	9	.5
Psychology and social work	142	8.4
Social Sciences	41	2.4
Total	1,686	100

This study examined the sample by independent variables, including gender, race, socioeconomic status, and first-generation status. Regarding gender, female students comprised 52.6%, while male students made up 47.6%. According to The National Center for Education Statistics (2020), national college enrollment statistics indicate up to 58% female and 42% male students. Additionally, the overall undergraduate population at Study University was 60% female and 40% male when the data was collected. Although this study's sample had a slightly higher representation of women than men, it still fell short of both the national average and the

population of Study University. It is essential to note that both the national and study data only reported gender in the binary of male/female. Therefore, students who identified as trans, genderqueer, or non-binary may have been part of this study, but their gender identity was not accounted for if it fell outside of this binary.

Of the 1,686 students in the sample, White students represented 42.8%. Hispanic-Latino and Black-African American students represented the second and third highest portions, with 33.3% and 14.5%, respectively. These three racial identities constituted a majority of the sample at 90.6% of the total sample. Asian students represented 6.4% of the sample, while students who identified with two or more races represented 2.9%. Native-American-Alaskan Native students were an outlier group, totaling only two students out of 1,686, equating to only .1% of the study sample. White students were more highly represented within this sample (42.8%) when compared to the overall undergraduate population of White students at Study University (37%), while Hispanic/Latino students had lower representation within the sample (33%) when compared to this Hispanic/Latino the population at Study University (36%). The other racial groups made up a similar population of the sample when compared to the undergraduate population of Study University.

The study analyzed the socioeconomic status of each student by retrieving the median household income from their hometown as provided by the United States Census Bureau (2021). The income data were then sorted into five quintile groups, as presented in Table 6. Table 6 also provides descriptive statistics for the median household income in each earning group.

Table 6

Descriptive Statistics of Sample by Socioeconomic Status Represented by Median Household Income (N=1,686)

Median Household Income Quintile	Frequency	Percent	*M*	*Mdn*	*SD*	Min.	Max.
Lowest Quintile *< $28,007*	3	.18	$27,399	$27,399	0	$27,399	$27,399
Second Quintile *$28,008 to $55,000*	176	10.44	$47,161	$49,101	5983	$29,657	$54,904
Third Quintile *$55,001 to $89,744*	488	28.88	$73,270	$73,716	9659	$55,501	$89,639
Fourth Quintile *$89,745 to $149,131*	855	50.71	$114,320	$109,331	16333	$89,881	$148,945
Highest Quintile *> $149,132*	164	9.73	$168,521	$163,074	17085	$148,945	$250,000

The study classified first-generation students into a binary system based on whether their parents attended college or not. Those with non-college-attending parents self-identified as first-generation students, while those with parents who attended college self-identified as continuing-generation students. The distribution of first-generation students revealed that 21.1% of the sample identified as first-generation students, while the remaining 78.9% did not.

The percentage of first-generation students in this sample was lower than the national average and the overall population of first-generation students at Study University. Approximately 48% of incoming students at Study University identified as first-generation, while they only made up 21% within this sample of undeclared students. One national study found that as many as 59% of students in the United States identified as first-generation (RTI International, 2019).

Demographic Breakdown by Major

Table 7 presents a compilation of variables that display the distribution of the 13 major subgroups, categorized by four identity areas: gender, race, socioeconomic status, and first-generation status. Analysis of Table 7 reveals areas where identity groups are overrepresented or underrepresented. Notably, the arts subgroup exhibited the most normative representation, with percentage breakdowns that aligned closely with the entire sample.

Table 7

Distribution Percentages of Sample by Major Subgroup and Identity (N=1,686)

	Gender		Race						Income Quintile					First-Gen Status	
Major Subgroup	F	M	Asian	Black	Latinx	Native Amer.	White	2+ Races	1	2	3	4	5	Y	N
Arts	52.5	46.3	5.3	15.0	30.5	0	44.6	3.5	0	10.3	31.4	48.7	8.5	17.6	81.2
Biology and life sciences	63.3	36.7	6.7	16.7	33.3	0	40.0	3.3	0	13.3	36.7	40.0	10.0	16.7	83.3
Business	37.8	61.8	7.3	11.7	34.8	0.2	43.2	2.4	0	9.9	28.7	50.8	10.2	24.0	75.6
Communic. and Journalism	54.3	44.5	4.9	14.0	29.9	0	45.7	4.3	0	4.9	23.8	59.8	10.4	15.2	83.5
Computers, statistics, and mathematics	40.0	60.0	25.0	10.0	35.0	0	25.0	5.0	2.5	12.5	25.0	57.5	2.5	20.0	80.0
Education	77.7	22.3	1.9	9.7	31.1	0	56.3	1.0	0	4.9	25.2	64.1	5.8	26.2	73.8
Health	59.3	40.7	10.6	26.5	26.5	0	35.4	0.9	0	15.9	28.3	46.9	8.8	23.0	77.0
Humanities and liberal arts	50.8	49.2	4.9	9.8	31.1	0	49.2	4.9	0	6.6	31.1	44.3	18.0	14.8	85.2
Industrial arts, consumer services, and recreation	52.6	47.4	7.9	18.4	18.4	2.6	52.6	0	0	13.2	23.7	52.6	10.5	21.1	78.9
Law and public policy	49.3	50.7	4.0	21.3	30.7	0	26.7	4.0	0	9.3	30.7	46.7	13.3	18.7	81.3
Physical Sciences	44.4	55.6	0	22.2	33.3	0	33.3	11.1	0	11.1	33.3	33.3	22.2	11.1	88.9
Psychology and social work	77.1	21.5	4.2	16.7	44.4	0	29.9	3.5	1.4	16.0	32.6	40.3	8.3	25.0	73.6
Social Sciences	75.6	24.4	4.9	9.8	46.3	0	0	0	0	19.5	19.5	51.2	9.8	17.1	82.9
Total: All	52.6	47.4	6.4	14.5	33.3	.1	42.8	2.9	.2	10.4	28.9	50.7	9.7	21.1	78.9

Gender

Female students made up 52.6% of the sample. Notably, the fields of education, social sciences, and psychology and social work exhibited a higher representation of female students, comprising 77.7%, 77.1%, and 75.6%, respectively. In contrast, men accounted for 47.4% of the population but demonstrated a higher representation in business (61.8%) and computers, statistics, and mathematics (60%).

Race

The representation of different races in Table 7 reveals patterns of overrepresentation and underrepresentation within major subgroups, much like with gender. While Asian students made up 6.4% of the total sample, they represented 25% of students in computers, statistics, and mathematics. In contrast, they were underrepresented in education (1.9%). Black and African American students were overrepresented in majors including health (26.5%), physical sciences (22.2%), and law and public policy (21.3%), but slightly underrepresented in computers, statistics, and mathematics, education, humanities, and social sciences. Hispanic and Latinx students accounted for 33.3% of the total sample but were underrepresented in health (26.5%) and industrial arts, consumer services, and recreation (18.4%). They were overrepresented in psychology and social work (44.4%) and social sciences (46.3%). White students, who constituted 42.7% of the total sample, were underrepresented in computers, statistics, and mathematics (25%), law and public policy (26.7%), and psychology and social work (29.9%) but slightly overrepresented in education (56.3%) and industrial arts, consumer services, and recreation (52.6%). While Native American students and those identifying as two or more races represented smaller populations, it is noteworthy that the latter subgroup accounted for only 2.9% of the total sample yet comprised 11.1% of students in physical sciences.

Socioeconomic Status

Table 7 presents the distribution of students' income quintiles and their corresponding percentages. The data showed that students in the highest earning quintile, comprising 9.7% of the sample, were overrepresented in physical sciences (22.2%) and humanities and liberal arts (18%) but underrepresented in computers, statistics, and mathematics (2.5%). Meanwhile, students in the fourth quintile comprised 50.7% of the sample and displayed the most significant difference in education (64.1%) and physical sciences (33.3%). The third quintile, representing 28.9% of the sample, was overrepresented in biology and life sciences (36.7%) and social sciences (19.5%). On the other hand, students in the second quintile comprised 10.4% of the sample and had higher representation in health (15.9%), psychology and social work (16%), and social sciences (19.5%). However, they were less represented in communication and journalism (4.9%), humanities and liberal arts (6.6%), and education (4.9%).

First-Generation Status

Table 7 illustrates the breakdown of students based on whether they identified as first-generation (Yes) or continuing-generation (No). The sample was comprised of 21% first-generation students. In terms of academic fields, there was a higher representation of first-generation students in education (26.2%) and business (24%), while humanities and liberal arts (14.8%) and physical sciences (11.1%) had a lower representation.

Data Analysis

RQ1: Is identity related to choice of college major for undeclared students?

Chi-square tests of independence were used to assess if two categorical values were related (Fraenkel et al., 2011). In this study, four chi-square tests were conducted to identify if there was a relationship between the chosen major and each of the four independent variables: 1)

gender, 2) race, 3) socioeconomic status, and 4) first-generation status. The chi-square tests were used to answer RQ1. Each of the four independent variables presented a null hypothesis that proposed the absence of any relationship.

RQ1a H_0: There is no relationship between major and gender.

RQ1b H_0: There is no relationship between race and gender.

RQ1c H_0: There is no relationship between socioeconomic status and gender.

RQ1d H_0: There is no relationship between first-generation status and gender.

Four separate chi-square tests were performed to evaluate the null hypothesis for each variable. The analysis revealed a correlation between gender, race, and socioeconomic status with majors. Conversely, no relationship was observed between first-generation status and majors. The results of all four chi-square tests are provided below.

Gender

A chi-square test of independence was performed to examine the relationship between gender and major subgroup, as shown in Table 8. With an alpha level of < .05, the relationship between these variables was significant, X^2 $(12, N = 1,686) = 123.99$, $p < .001$. The researcher rejected the null hypothesis.

RQ1a: Is there a relationship between gender and major for undeclared students?

H_0: There is no relationship between major and gender.

Table 8

Chi-Square Test of Independence for Gender and Major Subgroup (N=1,686)

	Value	df	*p*
Pearson Chi-Square	123.993	12	<.001
Likelihood Ratio	130.149	12	<.001
N of Valid Cases	1,686		

a. 2 cells (7.7%) have expected count less than 5. The minimum expected count is 4.27.

Race

A chi-square test of independence was performed to examine the relationship between race and major subgroup, as shown in Table 9. With an alpha level of < .05, the relationship between these variables was significant, X^2 (*60, N = 1,686)* = 118.172, $p < .001$. The researcher rejected the null hypothesis.

RQ1b: Is there a relationship between race and major for undeclared students?

H_0: There is no relationship between major and race.

Table 9

Chi-Square Test of Independence for Race and Major Subgroup (N=1,686)

	Value	df	*p*
Pearson Chi-Square	118.172	60	<.001
Likelihood Ratio	96.482	60	.002
N of Valid Cases	1,686		

22 cells (33.8%) have expected count less than 5. The minimum expected count is .26.

Socioeconomic Status

A chi-square test of independence was performed to examine the relationship between gender and major subgroup, as shown in Table 10. With an alpha level of < .05, the relationship between these variables was significant, X^2 (*48, N = 1,686)* = 77.572, *p* = .004). The researcher rejected the null hypothesis.

RQ1c: Is there a relationship between socioeconomic status and major for undeclared students?

H_0: There is no relationship between major and socioeconomic status.

Table 10

Chi-Square Test of Independence for Socioeconomic Status (as Measured by Income Quintile) and Major Subgroup (N=1,686)

	Value	df	*p*
Pearson Chi-Square	77.572	48	.004
Likelihood Ratio	64.394	48	.057
N of Valid Cases	1,686		

a. 25 cells (38.5%) have expected count less than 5. The minimum expected count is .26.

First-Generation Status

A chi-square test of independence was performed to examine the relationship between gender and major subgroup, as shown in Table 11. With an alpha level of < .05, the relationship between these variables was not significant, X^2 (*412, N = 1,686)* = 14.733, *p* = .256. The researcher failed to reject the null hypothesis.

RQ1d: Is there a relationship between first-generation status and major for undeclared students?

H_0: There is no relationship between major and gender.

Table 11

Chi-Square Test of Independence for First-Generation Status and Major Subgroup (N=1,686)

	Value	df	*p*
Pearson Chi-Square	14.733	12	.256
Likelihood Ratio	15.056	12	.238
N of Valid Cases	1,686		

a. 1 cell (3.8%) has expected count less than 5. The minimum expected count is 1.90.

RQ2: Does identity predict major selection for undeclared students, as measured by gender, race, socioeconomic status, and first-generation status?

Predictive research analysis was used to determine if any of the four identities evaluated acted as a predictor for selected majors. Multinomial logistic regression was used to answer RQ2. A multinomial logistic regression was performed between the predictors for unordered groups, including gender, race, socioeconomic quintile group, first-generation status, and the 13 major subgroups. The reference category used for the outcome variable was arts majors, as this was determined to be the most normative group compared to percentages of the sample at large. White students were chosen as a reference group when comparing race, and the highest income quintile was chosen as the reference group when evaluating socioeconomic income.

An alpha level of < .05 was used to identify statistically significant test results. The addition of the predictor variables to a model that only contained the intercept significantly improved the fit between data and model, X^2 (*108, N = 1,681)* = 279.53, $p < .001$, with Nagelkerke R-square value of .156 explaining 15.6% of the variance in major choice. The goodness-of-fit was explored using the Pearson goodness-of-fit test, as shown in Table 12; the test was not significant ($p = .15$), indicating the model was a good fit. Significant unique contributions were made by gender and race, as shown in Table 13.

Table 12

Multinomial Logistics Regression Goodness-of-Fit (N=1,681)

	Chi-Square	df	Sig.
Pearson	808.11	768	.153
Deviance	1480.21	768	1.000

Table 13

Multinomial Logistics Regression Likelihood Ratio Test (N=1,681)

	Model Fitting Criteria	Likelihood Ratio Tests		
Effect	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept	1480.21	.000	0	
Gender	1614.38	134.17	12	<.001***
First-Generation	1495.30	15.10	12	.24
Income Quintile	1523.84	43.63	36	.18
Race	1563.27	83.06	48	.001**

*p<.05;** p<.01; ***p<.001. The chi-square statistic is the difference in -2 log-likelihoods between the final model and a reduced model. The reduced model is formed by omitting an effect from the final model. The null hypothesis is that all parameters of that effect are 0.

Eight major subgroups produced significant results: 1) business, 2) communication and journalism, 3) computers, statistics, and mathematics, 4) education, 5) health, 6) humanities and liberal arts, 7) psychology and social work, and 8) social sciences. No significant results were found in the five remaining major subgroups. Coding was used for gender [0=female, 1=male] and first-generation status [0=Continuing-Generation, 1=First-Generation], as shown in Table 4. A summary of significant findings is reported in Table 14.

Table 14

Main Findings from Multinomial Regression Analysis (N=1,681)

Major Subgroup	Predictor	Result
Business	Gender	Male more likely than female
Business	First-Gen Status	First-Gen more likely than Continuing-Gen
Communication and Journalism	Socioeconomic Status	2nd lowest income less likely than highest income
Computers, Statistics, and Mathematics	Race	Asian-American more likely than White
Education	Gender	Female more likely than male
Health	Race	Asian-American more likely than White
Health	Race	Black-African American more likely than White
Humanities and Liberal Arts	Gender	Female more likely than male
Humanities and Liberal Arts	Socioeconomic Status	4th income more likely than highest income
Psychology and Social Work	Gender	Female more likely than male
Psychology and Social Work	Race	Hispanic-Latino more likely than White
Social Sciences	Gender	Female more likely than male

Business Majors

Gender and first-generation status predicted selecting business as a major subgroup, as shown in Table 15. The odds that an undeclared student would select a business major were 1.92 higher for males than females in this sample. The odds that an undeclared student would select a business major were 1.56 times higher for first-generation students than continuing-generation students in this sample.

Table 15

Business Major Subgroup Results Using Multinomial Logistics Regression (N=1,681)

Variable	B	OR (95% CI)	SE	*p*
Gender	.68	1.92 (1.45/2.54)	.14	<.001***
First-Generation Status	.45	1.56 (1.100/2.22)	.18	.013**
Income Quintile				
Income Quintile = 2	-.4	.67 (.35/1.68)	.34	.23
Income Quintile = 3	-.4	.67 (39/1.1)	.27	.14
Income Quintile = 4	-.25	.78 (.47/1.3)	.25	.32
Income Quintile = 5	0	1		
Race				
Race = 2 or more races	-.3	.74 (.33/1.68)	.42	.47
Race = Asian	.46	1.59 (.86/2.92)	.31	.14
Race = Black African American	-.13	.88 (.57/1.37)	.23	.57
Race = Hispanic Latino	.26	1.3 (.92/1.83)	.18	.15
Race = White	0	1		

Note. OR = Odds Ratio. SE = Standard Error. 95% CI = Confidence Interval. *p<.05;** p<.01; ***p<.001. Coding: Female = 0, Male = 1. Continuing-Generation = 0, First-Generation = 1, Income Quintile 2 = 0, Income Quintile 3 = 1, Income Quintile 4 = 2, Income Quintile 5 = 3. 2+ Races = 0, Asian = 1, Black African American = 2, Hispanic Latino = 3, White = 4. Reference groups: Male, Continuing-Generation, Income Quintile 5, White.

Communication and Journalism Majors

Socioeconomic status, as represented by income quintile, acted as a predictor for students selecting a communication and journalism major. The odds ratio indicated for every unit increase in Income Quintile 2, the odds of selecting a communication and journalism major decreased by a factor of .35, as shown in Table 16.

Table 16

Communication and Journalism Major Subgroup Results Using Multinomial Logistics Regression (N=1,681)

Variable	B	OR (95% CI)	SE	*p*
Gender	-.13	.88 (.6/1.3)	.2	.52
First-Generation Status	-.12	.89 (.53/1.5)	.26	.66
Income Quintile				
Income Quintile = 2	-1.05	.35 (.13/.96)	.515	.04*
Income Quintile = 3	-.53	.59 (.29/1.2)	.37	.15
Income Quintile = 4	.01	1.01 (.53/1.93)	.33	.98
Income Quintile = 5	0	1		
Race				
Race = 2 or more races	.24	1.27 (.48/3.37)	.5	.63
Race = Asian	.07	1.08 (.44/2.63)	.5	.87
Race = Black African American	.16	1.18 (.65/2.11)	.3	.59
Race = Hispanic Latino	.22	1.24 (.78/1.98)	.24	.37
Race = White	0	1		

Note. OR = Odds Ratio. SE = Standard Error. 95% CI = Confidence Interval. *p<.05;** p<.01; ***p<.001. Coding: Female = 0, Male = 1. Continuing-Generation = 0, First-Generation = 1, Income Quintile 2 = 0, Income Quintile 3 = 1, Income Quintile 4 = 2, Income Quintile 5 = 3. 2+ Races = 0, Asian = 1, Black African American = 2, Hispanic Latino = 3, White = 4. Reference groups: Male, Continuing-Generation, Income Quintile 5, White.

Computers, Statistics, and Mathematics Majors

Race was a predictor for computers, statistics, and mathematics majors, as displayed in Table 17. The odds ratio indicated that for each unit increase for Asian-American students, the odds of selecting a computers, statistics, and mathematics major increased by a factor of 10.73.

Table 17

Computers, Statistics, and Mathematics Major Subgroup Results Using Multinomial Logistics Regression (N=1,681)

Variable	B	OR (95% CI)	SE	*p*
Gender	.58	.1.8 (.9/3.6)	.35	.09
First-Generation Status	-.09	.9 (3.8/2.21)	.45	.84
Income Quintile				
Income Quintile = 2	1.19	3.3 (.35/31.27)	1.15	.3
Income Quintile = 3	.74	2.1 (.25/17.4)	1.08	.5
Income Quintile = 4	1.35	3.84 (.5/30)	1.04	.2
Income Quintile = 5	0	1		
Race				
Race = 2 or more races	.97	2.63 (.51/13.5)	.83	.25
Race = Asian	2.37	10.73 (3.8/30.4)	.53	<.001***
Race = Black African American	.3	1.35 (.39/4.64)	.63	.64
Race = Hispanic Latino	.77	2.16 (.87/5.38)	.47	.1
Race = White	0	1		

Note. OR = Odds Ratio. SE = Standard Error. 95% CI = Confidence Interval. *p<.05;** p<.01; ***p<.001. Coding: Female = 0, Male = 1. Continuing-Generation = 0, First-Generation = 1, Income Quintile 2 = 0, Income Quintile 3 = 1, Income Quintile 4 = 2, Income Quintile 5 = 3. 2+ Races = 0, Asian = 1, Black African American = 2, Hispanic Latino = 3, White = 4. Reference groups: Male, Continuing-Generation, Income Quintile 5, White.

Education Majors

Gender predicted when choosing an education major, as shown in Table 18. The odds that an undeclared student would select an education major were .3 times higher for females than males in this sample.

Table 18

Education Major Subgroup Results Using Multinomial Logistics Regression (N=1,681)

Variable	B	OR (95% CI)	SE	*p*
Gender	-1.19	.3 (.18/.51)	.26	<.001***
First-Generation Status	.49	1.64 (.96/2.8)	.27	.72
Income Quintile				
Income Quintile = 2	-.34	.72 (.19/2.71)	.69	.62
Income Quintile = 3	.21	1.23 (.45/3.36)	.51	.68
Income Quintile = 4	.75	1.23 (.45/3.36)	.48	.12
Income Quintile = 5	0	1		
Race				
Race = 2 or more races	-1.5	.22 (.03/1.78)	1.06	.16
Race = Asian	-1.3	.27 (.06/1.23)	.78	.09
Race = Black African American	-.52	.6 (.28/1.29)	.39	.19
Race = Hispanic Latino	-.15	.86 (.5/1.49)	.28	.6
Race = White	0	1		

Note. OR = Odds Ratio. SE = Standard Error. 95% CI = Confidence Interval. *p<.05;** p<.01; ***p<.001. Coding: Female = 0, Male = 1. Continuing-Generation = 0, First-Generation = 1, Income Quintile 2 = 0, Income Quintile 3 = 1, Income Quintile 4 = 2, Income Quintile 5 = 3. 2+ Races = 0, Asian = 1, Black African American = 2, Hispanic Latino = 3, White = 4. Reference groups: Male, Continuing-Generation, Income Quintile 5, White.

Health Majors

Race was a predictor for the health subgroup, as displayed in Table 19. The odds ratio indicated that for each unit increase for Asian-American students, the odds of selecting a health major increased by a factor of 2.41. The odds ratio indicated for each unit increase for Hispanic and Latino students, the odds of selecting a health major increased by a factor of 1.04.

Table 19

Health Major Subgroup Results Using Multinomial Logistics Regression (N=1,681)

Variable	B	OR (95% CI)	SE	*p*
Gender	-.2	.82 (.53/1.27)	.23	.37
First-Generation Status	.26	1.29 (.76/2.12)	.27	.34
Income Quintile				
Income Quintile = 2	.19	1.21 (.46/3.18)	.49	.7
Income Quintile = 3	-.29	.75 (.32/1.75)	.43	.51
Income Quintile = 4	-.04	.96 (.44/2.12)	.40	.93
Income Quintile = 5	0	1		
Race				
Race = 2 or more races	-1.17	.31 (.04/2.46)	1.06	.27
Race = Asian	.88	2.41 (1.05/5.53)	.424	.04*
Race = Black African American	.79	2.2 (1.20/4.03)	.309	.01*
Race = Hispanic Latino	.04	1.04 (.58/1.86)	.295	.89
Race = White	0	1		

Note. OR = Odds Ratio. SE = Standard Error. 95% CI = Confidence Interval. *p<.05;** p<.01; ***p<.001. Coding: Female = 0, Male = 1. Continuing-Generation = 0, First-Generation = 1, Income Quintile 2 = 0, Income Quintile 3 = 1, Income Quintile 4 = 2, Income Quintile 5 = 3. 2+ Races = 0, Asian = 1, Black African American = 2, Hispanic Latino = 3, White = 4. Reference groups: Male, Continuing-Generation, Incoming Quintile 5, White.

Humanities and Liberal Arts Majors

Gender and socioeconomic status predicted humanities and liberal arts majors, as shown in Table 20. The odds that an undeclared student would select a humanities major were 1.12 times higher for females than males in this sample. As the odds ratio indicated for each unit

increase for Income Quintile 4, the odds of selecting a humanities major decreased by a factor of .42.

Table 20

Humanities and Liberal Arts Major Subgroup Results for Using Multinomial Logistics Regression (N=1,681)

Variable	B	OR (95% CI)	SE	*p*
Gender	-.11	1.12 (.64/1.95)	.28	.01*
First-Generation Status	-.17	.85 (.39/1.84)	.39	.69
Income Quintile				
Income Quintile = 2	-1.14	.32 (.09/ 1.19)	.67	.09
Income Quintile = 3	-.73	.48 (.20/ 1.17)	.45	.11
Income Quintile = 4	-.86	.42 (.19/ .95)	.41	.04*
Income Quintile = 5	0	1		
Race				
Race = 2 or more races	-18.64	1.345 (.36/5.1)	.68	.66
Race = Asian	.18	.90 (.25/3.32)	.67	.88
Race = Black African American	-.01	.66 (.25/ 1.74)	.49	.41
Race = Hispanic Latino	-.76	1.07 (.54/2.11)	.35	.84
Race = White	0	1		

Note. OR = Odds Ratio. SE = Standard Error. 95% CI = Confidence Interval. *p<.05;** p<.01; ***p<.001. Coding: Female = 0, Male = 1. Continuing-Generation = 0, First-Generation = 1, Income Quintile 2 = 0, Income Quintile 3 = 1, Income Quintile 4 = 2, Income Quintile 5 = 3. 2+ Races = 0, Asian = 1, Black African American = 2, Hispanic Latino = 3, White = 4. Reference groups: Male, Continuing-Generation, Income Quintile 5, White.

Psychology and Social Work Majors

Gender and race were found to be a predictor when choosing psychology and social work majors. The odds that an undeclared student would select a psychology or social work major were .34 times higher for females than males in this sample, as displayed in Table 21. The odds that an undeclared student would select a psychology or social work major were 1.85 times higher for Hispanic and Latino students compared to White students in this sample.

Table 21

Psychology and Social Work Major Subgroup Results for Using Multinomial Logistics Regression (N=1,681)

Variable	B	OR (95% CI)	SE	B
Gender	-1.07	.34 (.22/.54)	.23	-1.07
First-Generation Status	.25	1.28 (.79/2.08)	.25	.25
Income Quintile				
Income Quintile = 2	.09	1.1 (.45/2.70)	.46	.09
Income Quintile = 3	-.13	.88 (.40/1.91)	.4	-.13
Income Quintile = 4	-.1	.90 (.43/1.90)	.38	-.1
Income Quintile = 5	0	1		0
Race				
Race = 2 or more races	.32	1.38 (.45/4.18)	.57	.32
Race = Asian	-.05	.95 (.35/2.58)	.51	-.05
Race = Black African American	.39	1.47 (.79/2.76)	.32	.39
Race = Hispanic Latino	B	1.85 (1.12/3.07)	.26	.61
Race = White	-1.07	1		0

Note. OR = Odds Ratio. SE = Standard Error. 95% CI = Confidence Interval. *p<.05;** p<.01; ***p<.001. Coding: Female = 0, Male = 1. Continuing-Generation = 0, First-Generation = 1, Income Quintile 2 = 0, Income Quintile 3 = 1, Income Quintile 4 = 2, Income Quintile 5 = 3. 2+ Races = 0, Asian = 1, Black African American = 2, Hispanic Latino = 3, White = 4. Reference groups: Male, Continuing-Generation, Income Quintile 5, White.

Social Sciences Majors

Gender was a predictor of selecting social sciences as a major subgroup, as shown in Table 22. The odds that an undeclared student would select a social science major were .37 times higher for females than males in this sample.

Table 22

Social Sciences Major Subgroup Results Using Multinomial Logistics Regression (N=1,681)

Variable	B	OR (95% CI)	SE	*p*
Gender	-1.01	.37 (.17/.78)	.38	.009**
First-Generation Status	-.206	.81 (.34/1.96)	.45	.65
Income Quintile				
Income Quintile = 2	.28	1.32 (.33/5.24)	.7	.69
Income Quintile = 3	-.71	.49 (.13/1.81)	.67	.29
Income Quintile = 4	.002	1.00 (.32/3.16)	.59	.99
Income Quintile = 5	0	1		
Race				
Race = 2 or more races	-18.16	1.29 (.0/.0)	7686.81	.99
Race = Asian	.02	1.02 (.21/4.91)	.8	.98
Race = Black African American	-.27	.76 (.23/2.5)	.61	.66
Race = Hispanic Latino	.54	1.71 (.78/3.78)	.4	.18
Race = White	0	1		

Note. OR = Odds Ratio. SE = Standard Error. 95% CI = Confidence Interval. *p<.05;** p<.01; ***p<.001. Coding: Female = 0, Male = 1. Continuing-Generation = 0, First-Generation = 1, Income Quintile 2 = 0, Income Quintile 3 = 1, Income Quintile 4 = 2, Income Quintile 5 = 3. 2+ Races = 0, Asian = 1, Black African American = 2, Hispanic Latino = 3, White = 4. Reference groups: Male, Continuing-Generation, Income Quintile 5, White.

Summary

The findings of this study suggest that major selection is related to gender, race, and socioeconomic status for undeclared students. However, there was no relationship between major selection and first-generation status. Table 14 summarized the significant predictors of major selection, which included various variables. Women chose education, humanities and liberal arts, social sciences, and psychology and social work more frequently than men, whereas men were almost twice as likely to select business majors. Additionally, Asian and Black-African American students were more likely to choose health majors than White students, whereas Hispanic-Latinx students were more likely to choose psychology and social work. Asian students were 10 times more likely to pursue majors in the computers, statistics, and mathematics subgroups than White students. Regarding socioeconomic status, students in the second lowest income quintile were less likely to choose communication and journalism majors, while those from the fourth highest income quintile were more prone to select humanities and liberal arts. Finally, the sole significant finding regarding first-generation students was that they were more likely to choose business majors than continuing-generation students. Chapter 5 presents an analysis and interpretation of these findings in the context of prior research and higher education norms.

Chapter 5: Discussion

This research examined the relationship between social identity and major selection for undeclared students. Previous researchers have suggested that relationships exist between major and gender (Jewett & Chen, 2022; Speer, 2017; Wiswall & Zafar, 2015), major and race (Niu, 2017; Syed, 2010), major and socioeconomic status (Carnevale et al., 2015; Loveland, 2017; Malik & Slaughter, 2016; Niu, 2017), and major and first-generation status (Trejo, 2016). However, none of these studies specifically examined major patterns with undeclared students.

This study contributes to the larger body of research around major declaration trends by investigating undeclared students, the relationship between identity and major, and the identities that may be the most salient predictor for majors. This chapter provides a summary of the results, followed by a discussion of the findings based on identity and implications for leaders in higher education. It also accounts for the study's limitations and offers suggestions for future research.

Considerations of Study University's Advising Structure

The advising services that Study University had for its undeclared students, which comprised this study's participants, were specialized and worth highlighting within the context of these results. The study's participants were provided with tailored advising services to aid the undeclared demographic. These services featured dedicated advisors working exclusively with undeclared students, academic programming for major exploration, and a unique freshman seminar encompassing major exploration. The university observed improved retention rates and quicker declaration times for undeclared students with the implementation of this approach, which supports prior literature that indicates advising services can enhance motivation for choosing a major (Leach & Patall, 2016) and improve graduation rates and persistence (Wang & Orr, 2019).

Recapitulation of Results

Relationships were found between choice of major and gender, race, and socioeconomic status. Gender and race predicted choice of major for undeclared students. Students from historically privileged identity groups were more likely to be undeclared compared to peers from historically marginalized identity groups.

Secondary data were collected from Study University to address two research questions. The first question investigated whether there was a relationship between identity and choice of college major for undeclared students. Four chi-square tests were conducted to address each of the four identities: gender, race, socioeconomic status, and first-generation status. The results showed that major selection was related with gender, race, and socioeconomic status, while first-generation status and major selection were unrelated.

The second research question explored whether identity predicted major selection for undeclared students. A multinomial logistics regression was used to test for predictors in major selection of undeclared students. Gender and race predicted major selection. Neither socioeconomic nor first-generation status predicted major selection.

A more intersectional look at the multinomial regression results identified patterns around major declarations for specific identities, as summarized in Chapter 4, Table 14. Women in this study's sample were more likely to choose education, humanities and liberal arts, social sciences, and psychology and social work when compared to men. In contrast, men were almost twice as likely to choose business. Regarding race, Asian students and Black-African American students were more likely to choose health majors when compared to White students, while Hispanic-Latinx students were more likely to choose psychology and social work when compared to White students. Asian students were 10 times more likely than White students to

choose computers, statistics, and mathematics majors. White students were more likely than every other race to select education. Regarding socioeconomic status, students in the second lowest income quintile were significantly less likely to choose communication and journalism majors, while students from the fourth highest income quintile were more likely to choose humanities and liberal arts majors. There was one finding pertaining to first-generation college students: a higher likelihood to choose business majors when compared to continuing-generation students.

Discussion

A thorough analysis of the results was carried out through a social justice framework that considered the influence of privilege and marginalization for each identity area. This approach explored how even minor disparities can compound over time, leading to lasting disadvantages. These findings have been examined through the notion of cumulative (dis)advantage, which asserts that certain groups or individuals accrue advantages that only serve to exacerbate existing inequalities (DiPrete & Eirich, 2006).

Undeclared Students within this Sample

Students from historically privileged identity groups were more likely to be undeclared compared to peers from historically marginalized identity groups. White students comprised 42.7% of undeclared students, yet only 37% of the entire student population at Study University. Men represented 47% of the undeclared student population but only 40% of the population as a whole at Study University. Continuing-generation students were 79% of the sample but were only estimated to be 52% of the total population of Study University. The income quintile showed similar results, with 60.4% of the population falling in the two highest income quintiles and only 10.6% within the two lowest.

These data showed a higher likelihood for White, male, continuing-generation, and higher-income students to be undeclared. This echoes previous literature that indicates a higher need for marginalized students to be more prudent and fiscally minded when selecting their college major, while advantaged students may have the privilege of having time and resources to explore major options (Wolniak et al., 2008).

Gender

The study's regression analysis revealed that gender acted as a predictor for major selection, as summarized in Table 14. Women were more likely to choose majors that correlated to lower-paying professions. Women in this study were more likely to choose majors that are associated with lower earnings, such as education, psychology and social work, social sciences, and humanities and liberal arts, which all have an annual income below the median earnings of all majors. On the other hand, male students were twice as likely to select business as a major, which is associated with higher lifetime earnings. Previous research suggests that a $20,000 difference in annual earnings between education and business can accumulate to a $1,000,000 earnings difference over a lifetime (Carnevale et al., 2015, 2021), which supports the cumulative (dis)advantage theory, stating that small disadvantages can add up to larger disadvantages throughout a lifetime. Men were also inclined to choose majors in computers, statistics, and mathematics, which are associated with some of the highest lifetime earnings (Carnevale et al., 2021).

The findings of this study highlight a disparity between the majors chosen by women and men, with women more often selecting lower-paying fields. This echoes earnings trends seen at the national level, where White women earn only 80 cents, Black women only 67 cents, and Hispanic women only 57 cents for every dollar a White man earns (US Department of Labor,

2023). However, the reasons behind these decisions remain unclear, and factors such as gender role socialization should be further analyzed. Gender role socialization refers to how children are taught the social expectations, attitudes, behavior, and appearance associated with their gender (Bussey & Bandura, 1999). Influences from parents, peers, media, and teachers can all shape a student's understanding of how to conform to gender norms. As an example, from a young age, girls are often taught to prioritize qualities such as helpfulness, generosity, and empathy; this may lead them to pursue majors and careers that align with these values.

There are opportunities to challenge societal norms and break down gender stereotypes. Parents and teachers can provide interventions to encourage the exploration of diverse interests and majors. Academic advisors and professors can thoughtfully introduce their students to alternative areas of study. Educational policymakers can review how campus culture promotes gender equality.

Race

This study found that race impacted a student’s choice of major, which is consistent with previous literature, and revealed several unique major selection trends across Black-African American students and Business majors that diverged from prior research. This study also showed trends consistent with prior research, particularly across Asian-American, Hispanic-Latinx, and White students. However, the distinct features and resources available at Study University, as referenced in Chapter 3, should be considered when analyzing these results, including the dedicated advising resources it allocates towards undeclared students and the subgroups that make up its majors.

One of the most notable trends was that Black-African American students were more likely to choose health majors compared to White students, contrasting prior research that found

Black-African American students are typically underrepresented in STEM majors (Barr et al., 2008; Carnevale, Strohl, et al., 2011; Morgan et al., 2013; Nui, 2017; Syed, 2010). Several factors could explain this phenomenon. Firstly, the Black-African American students in this sample were also undeclared, which distinguishes them from previous research in which the samples included a more diverse group of college students. Secondly, Study University's unique undeclared advising opportunities may have provided students with additional guidance and support to pursue majors where their identity groups have traditionally been underrepresented. Lastly, majors within the health subgroup do not encompass all areas of STEM. This subgroup includes medical humanities, exercise science, public health, and nutrition and food sciences, which are linked to helping professions, as opposed to majors within the biology and life sciences subgroup, which lead to medical school. No findings were observed within the biology and life sciences subgroup. This distinction supports the research that Black students are most prominently represented in academic areas such as human services (Carnevale et al., 2015).

This study also showed no notable racial discrepancies among students in the business major subgroup, which is inconsistent with previous research by Bayer and Wilcox (2019) that found that racially minoritized students tend to major in economics at a rate approximately one-third lower than White men.

This research supports previous findings regarding the academic interests of Asian-American students, particularly that they are well-represented in STEM (Barr et al., 2008; Carnevale, Strohl, et al., 2011; Morgan et al., 2013; Nui, 2017; Syed, 2010). Asian-American students were more likely to choose health majors compared to White students and 10 times more likely than White students to choose majors in computers, statistics, and mathematics. It is worth noting that mathematics in particular has a reputation for high academic standards and is

associated with some of the highest-earning industries (Carnevale et al., 2021). This suggests that students from other backgrounds interested in these majors may have faced barriers to entry due to the competitive admissions standards.

Hispanic-Latinx students were more likely to select psychology and social work majors over White students. Considering the psychology and social work subgroup has one of the lowest life-long earnings (Carnevale et al., 2021), these results echoed previous findings that suggested students of color consistently enroll in majors that correlate to lower-paying professions (Carnevale et al., 2011). Additionally, women were more likely to choose a major within the psychology and social work subgroup, which showed a higher likelihood for Latina women to opt into major areas with less earnings potential. This inequity is an example of cumulative (dis)advantage, where historically marginalized groups are further disadvantaged by choosing majors that perpetuate the wage gap (DiPrete & Eirich, 2006).

This study found that White students were more likely than any other race to choose education. Although White students were more prevalent in the education subgroup than any other racial group, this difference did not reach a statistically significant level. However, one notable finding was that women were more likely to choose education than men, consistent with national statistics indicating that 77% of K-12 teachers in public schools are women and 80% are White (NCES, 2023).

In reviewing these trends, broader influencing factors should be considered. Racial identities do not exist in a vacuum, and students may be weighing many factors when selecting their majors. The choice of major can be influenced by cultural and societal norms associated with race. Asian-American students may feel more encouraged to choose majors like computer science or math if they see professors and students who share their identities in those fields,

while Black and Hispanic students may not see themselves well-represented in those areas and may not feel fully supported in choosing them.

Socioeconomic Status

This study showed that socioeconomic status was related with major selection but did not predict the major that undeclared students would choose. This finding stands in contrast to previous studies that suggested household income was the leading indicator for STEM major selection (Niu, 2017).

Upon analyzing the major subgroups, two noteworthy discoveries surfaced. Firstly, students from the second-lowest income quintile selected communication and journalism majors less than students in the highest-income quintile. Secondly, students belonging to the fourth highest income quintile selected majors in the humanities and liberal arts subgroup less often than students in the highest income bracket. It is pertinent to note that both subgroups were associated with below-average median lifetime earnings. This could imply that students from the highest income bracket may not prioritize earnings potential while making their major choices.

The sample of undeclared students used in this study skewed towards higher income quintiles, with 60.4% of students falling into the top two quintiles and only 10.6% in the bottom two, which supports prior literature that suggests students from higher socioeconomic backgrounds are more inclined to enroll into college without a major (Quadlin, 2017). A study by Quadlin (2017) found that an increase in family contributions to tuition was associated with a higher likelihood of being undeclared, while an increase in loan funding was linked to a greater probability of majoring in business, health, or nursing. The study also found that as students accumulated more loans, their predicted likelihood of being undeclared decreased. However, this study differed from Quadlin's in the finding that gender and race were better predictors than socioeconomic status when it came to undeclared students’ choice of major.

First-Generation Status

The study determined that major and first-generation status were unrelated and first-generation status was not a predictor of major. However, the study showed first-generation students were more likely to declare a business major, one of the highest lifetime earnings majors, according to Figure 5. This finding supports previous research indicating that first-generation students chose majors that offered financial security (Trejo, 2016). It is possible that first-generation students who chose higher-earning majors, such as business, were more focused on improving their social mobility.

The study's sample included 21.1% of first-generation students, while the remaining 78.9% were continuing-generation students. This percentage is lower than the national average and university-wide average (RTI International, 2019). The underrepresentation of first-generation students within the sample may indicate that first-generation students are less likely to enroll in college without a declared major. Studies have shown that first-generation undeclared students are more likely to drop out than continuing-generation students (Glaessegen et al., 2018), and first-generation students prioritize higher salaries and lower unemployment rates upon graduation (Trejo, 2016). Therefore, first-generation students may be less inclined to enroll in college without a clear direction.

Implications for Educational Leaders

This study can offer insights and considerations for higher educational leaders as they develop programs and policies related to major selection. These results can be particularly helpful for leaders who aim to address career pipeline diversity and social mobility post-graduation.

University Policies

Major admission requirements may prevent historically marginalized students from accessing their desired majors. Educational leaders can thoroughly examine their university policies to identify why specific student groups are not well-represented in particular majors. Some universities have admission policies that include prerequisites, auditions, portfolios, interviews, or GPA requirements for certain majors. This type of gatekeeping can hinder students from disadvantaged backgrounds, leading to a cycle of cumulative disadvantage (Easton & Kong, 2021). For instance, competitive majors like STEM or business may require students who have not yet declared their major to accomplish a high GPA and take prerequisite courses before they are allowed to declare. Students from low-income backgrounds or students of color may be at a disadvantage if their high school does not equip them with adequate preparation for math and science courses. Students are also classified into honors or non-honors courses during their high school years based on their academic performance, which could prematurely assess their academic abilities. Students who are in non-honors tracks, students of color, and low-income students may already have experienced an educational disadvantage before they enter college. Limiting their choice of major could compound this cumulative disadvantage, affecting their lifetime earnings (Carnevale et al., 2021). Previous studies (Barr et al., 2008; Carnevale, Strohl, et al., 2011; Morgan et al., 2013; Nui, 2017) have revealed that Black students are less likely to declare into business and computers, statistics, and mathematics, which exemplifies how marginalized populations may be denied access to higher-paying majors.

To help close this gap, universities can provide bridge programs that eliminate the learning gap. These programs offer additional tutoring and support to underprepared students, thus reducing cumulative disadvantages. If colleges lower or eliminate major restrictions, this

could create more opportunities for historically disadvantaged students to gain access to all majors, including those that lead to greater social mobility. Educational leaders should consider reevaluating their policies regarding admission into majors to understand which student groups they are excluding and denying a pathway to social mobility.

Campus Culture and Societal Norms

Cultural norms may impact an undeclared student's choice of major, and representation within an academic discipline may dissuade or persuade a student to join a major (Corbett & Hill, 2015; Dancy et al., 2020; Storlie et al., 2019). During the process of socialization, adolescents learn societal norms and behaviors that shape their future actions (Bussey & Bandura, 1999). Educational leaders should be mindful of campus culture in this regard, as college students take cues from their surroundings to determine what is normalized. When students see individuals like themselves represented in a particular major or career field, they may feel more comfortable pursuing that area. For instance, women are more likely to choose education, which can lead to future generations of women seeing themselves in the teaching profession. This is because they have grown up seeing female classroom teachers and have learned that studying education is normal and acceptable for women. On the other hand, men are often represented more in business, which may explain why they choose business majors at higher rates. Colleges should carefully consider the norms they establish on campus to create greater balance among majors.

To foster a welcoming environment for underrepresented identities in each major, colleges should audit the identity makeup of their faculty and staff. Gender or racial imbalances across departments may inadvertently reinforce stereotypes and social norms about who belongs

in a particular field of study. Studies have shown that a pipeline issue may discourage students of color and women from feeling comfortable in certain academic areas (Dancy et al., 2020).

Undeclared vs. Declared Students

Specifically tailored advising practices for undeclared students are not completely shifting declaration patterns to greater equality. Findings from this study support previous literature about major declaration patterns, such as Asian-American students' tendencies to choose STEM majors (Nui, 2017) and the tendencies of women and students of color to choose majors that correlate with lower-paying professions (Carnevale, Strohl, et al., 2011; Carnevale et al., 2015). Despite receiving specialized advising services tailored to guide undeclared students through the major exploration process, the patterns observed in this sample indicate a certain degree of similarity. This suggests that advising services for undeclared students may not effectively address the barriers preventing them from entering majors where they are underrepresented. Undeclared student advisors have a unique opportunity to work with students before they declare a major and should be cognizant of the need to encourage students to challenge stereotypes, explore all available options, and introduce them to educational areas they may be unaware of.

Advising Practices

This study's results could be used to inform advising practices at higher educational institutions by bringing awareness to existing major selection trends. Through a deeper understanding of major selection influences and trends, culturally proficient advisors can introduce students to a wide range of majors and engage in conversations that challenge and dismantle internalized stereotypes.

The advising services offered to undeclared students at Study University have been primarily focused on improving retention rates and reducing declaration times. However, there may be a lack of cultural competency and not enough dissemination of knowledge. Advisors should consider the cultural proficiency framework (Terrell et al., 2018) as a lens for examining their values, policies, practices, and behaviors. This will help them better understand how to advocate for and support different populations, including students with unique challenges. Advisors who exhibit cultural proficiency will be able to tailor their advising style to meet the individual needs of each student and be mindful of any barriers they may face, and more likely to introduce students to all major areas.

Academic advisors have a crucial role in helping undeclared students explore unfamiliar majors and career paths. While first-year seminar courses can introduce basic concepts of major exploration, a dedicated semester-long course would be even more beneficial. Previous research has shown that such courses can increase student persistence and lead to early declaration of majors (Reynolds et al., 2010). By creating formal spaces and curricula that introduce all majors, including less familiar ones like public health, product design, or medical humanities, advisors can help students make informed decisions about their academic and professional futures.

Limitations

This study encountered some limitations in its methodology. The data relied on previously compiled secondary data from a university, which imposed certain data stipulations that the researcher could not alter. The gender information provided only allowed for the selection of binary options, leaving out other gender identities such as trans male, trans female, non-binary, or genderqueer. It is possible that some students in the study might have identified outside the gender binary but were not able to express themselves fully due to the limitations of

the data collection method. The same issue was encountered when it came to racial subgroups, as the categories presented were limited. Black-African American was grouped together even though not all students may identify with that specific label. Lastly, data regarding the students' socioeconomic status was imperfect because it reflected the median household income from the zip code of the student's home address rather than individual household income.

Another limitation of this study was that the sample was collected from one university. Despite the diversity of identities represented in the sample, it was not geographically diverse, as a majority of the students were from the same region. This may have resulted in certain consistencies based on local culture and norms. Additionally, the study did not take into account how students' perceptions of careers may be changing based on generational norms.

Suggestions for Future Research

While this study uncovered several noteworthy findings, it primarily focused on identifying declaration patterns rather than delving into the underlying reasons for these trends. A qualitative follow-up study would be valuable in shedding light on the factors that influence undeclared students' choice of major and provide greater insight into this phenomenon.

The findings of this research shed light on the majors that students ultimately choose but did not account for their initial major preferences. A more thorough examination of academic gatekeeping would yield a more complete picture of the students who were prevented from pursuing certain majors due to various restrictions. Monitoring the relationship between a student's desired major and eventual selection could prove valuable, as these choices may not always align. These findings could aid educational policymakers in identifying students who may face challenges when pursuing their academic goals.

It would be valuable to assess the efficacy of undeclared student advising methods. This study revealed similarities between declared and undeclared students' declaration patterns, despite receiving more individualized advising at this institution. Assessing advising techniques is essential to ascertain if they aid undeclared students in making informed decisions about their majors and staying on course toward graduation. There would also be value in exploring if students remain in the majors and career fields that they have selected.

Conclusion

This study highlighted gender and race as strong predictors of college students' choice of major. However, the study went further by extending this same finding to undeclared college students. Undeclared women consistently declared majors correlated with lower life-long earnings, such as education, social sciences, psychology and social work, and humanities and liberal arts. In contrast, men were found to have declaration patterns around business and computers, statistics, and mathematics, which are subgroups correlated with higher lifelong earnings. These findings echo career pipeline and earnings imbalances that are evidenced by the wage gap between men and women in the United States.

In addition to gender, race can serve as a predictor for major declaration patterns for undeclared students. For instance, Asian-American students had a higher likelihood of declaring into computers, statistics, and mathematics or health, while Hispanic-Latinx students showed significantly higher rates of choosing the psychology and social work subgroup. Black students were found to have higher representation in health and law and public policy subgroups.

Students from privileged identity groups were less likely to choose to be undeclared. This suggests that students from historically marginalized identity groups may prioritize financial

stability when selecting a major and prefer to avoid the uncertainty of being undeclared during their college years.

Educational leaders can utilize this research to gain a better understanding of how to support undeclared students. Advisors must be mindful of their unconscious biases and acknowledge the accumulated disadvantages that historically marginalized students have faced. Advising models for undeclared students should have exploratory elements that introduce them to all the options available within the university instead of limiting them to their pre-enrollment knowledge. Lastly, this study should inspire higher education leaders to reassess their campus culture and academic policies. Academic gatekeeping, such as admission standards for majors, may hinder opportunities for social mobility. Universities should also consider the demographics and culture of each department. Students who do not see themselves represented may feel less welcome in that space. Intentional policymaking from educational leaders can lead to more pathways to social mobility for all students.

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Appendix A: Distribution of Sample by Majors

Distribution of Sample by Majors (N=1,686)

Major	Major Subgroup	Frequency	Percent
Accounting	Business	48	2.8
Advertising	Communication and Journalism	10	.6
Animation and Illustration	Arts	38	2.3
Anthropology	Social Sciences	4	.2
Biochemistry	Biology and life sciences	1	.1
Biology	Biology and life sciences	21	1.2
Business Administration	Business	452	26.8
Chemistry	Physical Sciences	1	.1
Child Advocacy and Policy	Psychology and social work	21	1.2
Communication Media Studies	Communication and Journalism	69	4.1
Computer Science	Computers, statistics, and mathematics	18	1.1
Dance	Arts	19	1.1
Data Science	Computers, statistics, and mathematics	2	.1
Earth & Environmental Science	Physical Sciences	6	.4
Economics	Business	35	2.1
Ed Foundations Elem Teachers	Education	26	1.5
English	Humanities and liberal arts	28	1.7
Exercise Science	Health	56	3.3
Family Sci & Human Development	Education	60	3.6
Fashion Design & Merchandising	Arts	9	.5
Film and Television	Arts	67	4.0

Filmmaking	Arts	11	.7
Geog, Environ, & Urban Stu	Industrial arts, consumer services, and recreation	3	.2
German	Humanities and liberal arts	1	.1
History	Humanities and liberal arts	13	.8
Hosp, Sprts, Evnts, Tour	Industrial arts, consumer services, and recreation	27	1.6
Humanities	Humanities and liberal arts	10	.6
Information Technology	Computers, statistics, and mathematics	13	.8
Italian	Humanities and liberal arts	1	.1
Journalism and Digital Media	Communication and Journalism	6	.4
Jurisprudence, Law & Society	Law and public policy	5	.3
Justice Studies	Law and public policy	70	4.2
Language, Business & Culture	Social Sciences	8	.5
Linguistics	Humanities and liberal arts	11	.7
Marine Biology & Coastal Sci	Physical Sciences	1	.1
Mathematics	Computers, statistics, and mathematics	7	.4
Medical Humanities	Health	22	1.3
Molecular Biology	Biology and life sciences	1	.1
Music	Arts	40	2.4
Music Therapy	Arts	11	.7
Musical Theatre	Arts	32	1.3
Nutrition and Food Science	Health	7	.4
Philosophy	Humanities and liberal arts	7	.4
Physical Education	Education	17	1.0
Physics	Physical Sciences	1	.1
Political Science	Social Sciences	7	.4
Product Design	Industrial arts, consumer services, and recreation	8	.5
Psychology	Psychology and social work	123	7.2

Public Health	Health	28	1.7
Recording Arts and Production	Arts	9	.5
Social Media Public Relations	Communication and Journalism	42	2.5
Sociology	Social Sciences	8	.1
Spanish	Humanities and liberal arts	1	.1
Sports Communication	Communication and Journalism	30	1.8
Sustainability Science	Biology and life sciences	7	.4
Theatre	Arts	23	1.4
Theatre Studies	Arts	29	1.7
Visual Arts	Arts	44	2.6
Visual Communication Design	Arts	16	.9
Total		1,686	100

Vita

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